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**STUDY MATERIAL**

**EXECUTIVE PROGRAMME**

**COST AND MANAGEMENT  
ACCOUNTING**

**MODULE 1**

**PAPER 2**



**THE INSTITUTE OF  
Company Secretaries of India**  
**IN PURSUIT OF PROFESSIONAL EXCELLENCE**  
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## EXECUTIVE PROGRAMME

### **COST AND MANAGEMENT ACCOUNTING**

Finance and accounting have assumed much importance in today's competitive world of business wherein corporate organisations have to show the true and fair view of their financial position. Thus, the application of accounting in the business sector has become an indispensable factor. Company Secretary has to provide the complete and accurate information about the financial operations of the company to management for decision making. This emphasises that the books of account are to be maintained accurately, up-to-date and as per the norms.

The subject '**Cost and Management Accounting**' is very important and useful for optimum utilisation of existing resources. These are branches of accounting and had been developed due to limitations of financial accounting. It is an indispensable discipline for corporate management, as the information collected and presented to management based on cost and management accounting techniques helps management to solve not only specific problems but also guides them in decision making. Keeping in view the importance of this subject, various topics on Cost and Management Accounting have been prescribed in the syllabus of CS Executive Programme with the objective of acquainting the students with the basic concepts used in cost accounting and management accounting having a bearing on managerial decision-making.

The entire paper has been discussed in twelve study lessons. In starting four study lessons we have discussed about the basic of cost accounting, material, labour and overheads costing. Further we have highlighted the concept of activity based costing, cost records, different costing systems. Thereafter study focuses on the marginal costing, standard costing, budgeting & its applications for decision making in business. At last we have discussed about cost accounting records, cost audit and analysis & interpretation of financial statements.

In this study every efforts has been made to give a comprehensive coverage of all the topics relevant to the subject. In all study lessons the requisite theoretical framework for understanding the practical problems in the subject has been explained and wherever necessary practical illustrations have been given to facilitate better understanding. At the end of each study lesson a brief about the lesson have been given under the caption '**Lesson Round Up**' as well a good blend of theoretical and practical questions have been given under the caption '**Self Test Questions**' for the practice of students to test their knowledge. In fact, this being a practical paper, students need to have good theoretical knowledge and practice to attain the requisite proficiency and confidence.

This study material has been published to aid the students in preparing for the Cost and Management Accounting paper of the CS Executive Programme. It is part of the education kit and takes the students step by step through each phase of preparation stressing key concepts, pointers and procedures. Company Secretaryship being a professional course, the examination standards are set very high, with emphasis on knowledge of concepts, applications, procedures and case laws, for which sole reliance on the contents of this study material may not be enough.

Therefore, in order to supplement the information/contents given in the study material, students are advised to refer to the Suggested Readings mentioned in the study material, Student Company Secretary, Business Dailies and Journals.

In the event of any doubt, students may write to the Directorate of Academics and Professional Development in the Institute for clarification at [cma@icsi.edu](mailto:cma@icsi.edu).

Although due care has been taken in publishing this study material yet the possibility of errors, omissions and/or discrepancies cannot be ruled out. This publication is released with an understanding that the Institute shall not be responsible for any errors, omissions and/or discrepancies or any action taken in that behalf.

Should there be any discrepancy, error or omission noted in the study material, the Institute shall be obliged if the same are brought to its notice for issue of corrigendum in the 'Student Company Secretary'.

## EXECUTIVE PROGRAMME

### SYLLABUS FOR

#### MODULE 1 - PAPER 2: COST AND MANAGEMENT ACCOUNTING (100 Marks)

**Level of Knowledge:** Working Knowledge

**Objective:** To acquire knowledge and understanding of the concepts, techniques and practices of cost and management accounting and to develop skills for decision making.

**Detail Contents:**

#### 1. Introduction to Cost and Management Accounting

- Cost Accounting: Evolution, Meaning, Objectives and Scope
- Concepts of Costs , Classifications and Elements of Cost
- Cost Centre and Cost Unit
- Methods and Techniques of Costing
- Cost Accounting Standards
- Installation of a Costing System
- Practical Difficulties in Installing a Costing System
- Role of Cost Accountant in Decision Making
- Management Accounting: Evolution, Meaning, Objectives and Scope
- Tools and Techniques of Management Accounting
- Relationship of Cost Accounting, Financial Accounting, Management Accounting and Financial Management
- Conflicts in Profit versus Value Maximisation Principle
- Role of Management Accountant in Decision Making

#### 2. Material Cost

- Materials Control – Concept and Techniques
- Procurement Procedures and Documentation: Methods of Purchasing; Procedure of Purchases, Stores and Issue of Material; Stock Verification
- Methods of Pricing of Material: FIFO, LIFO, Simple Average, Weighted Average
- Accounting and Control of Material Losses, Wastage, Scrap, Spoilage and Defectives
- Inventory Management: Techniques of fixing of minimum, maximum and reorder levels, Economic Order Quantity, ABC Analysis ; Stock Verification and Perpetual Inventory

#### 3. Labour Cost

- Meaning and Classification of Labour Costs
- Accounting and Control of Labour Costs
- Time Keeping and Time Booking
- Attendance and Payroll Procedures, Time Recording, Overtime and Idle Time
- Labour turnover and Remedial Measures
- Efficiency Rating Procedures; Remuneration Systems and Incentive Schemes

#### 4. Direct Expenses and Overheads

- Direct Expenses: Meaning, Nature, Collection, Classification and Treatment of Direct and Indirect Expenses
- Overheads: Meaning, Nature, Collection and Classification Functional Analysis: Factory, Administration, Selling, Distribution, Research and Development
- Behavioural Analysis: Fixed, Variable, Semi variable and Step Cost Allocation, Apportionment, Absorption and Control of Overheads
- Preparation of Cost Sheet

#### 5. Activity Based Costing (ABC)

- Meaning, Importance, Characteristics
- Elements and Steps involved
- ABC vs. Traditional Costing
- Uses and Limitations

#### 6. Cost Records

- Cost Ledgers – Integrated Accounts and Non-Integrated Accounts
- Reconciliation of Cost and Financial Accounts

#### 7. Costing Systems

- Unit and Output Costing
- Job Costing: Job Cost Cards, Collecting Direct Costs, Allocation of Overheads and its Applications
- Batch Costing: Features and Applications
- Contract Costing: Features, Distinction between Job and Contract Costing, Progress Payments, Retention Money, Escalation Clause, Contract Accounts, Accounting for Material, Accounting for Plant Used in a Contract, Contract Profit and Accounting Entries
- Process Costing: Features, Applications and Types of Process Costing, Process Loss, Abnormal Gains and Losses, Equivalent Units, Inter-Process Profit, Joint Products, By-Products and Accounting
- Service Costing: Features and Applications, Unit Costing and Multiple Costing, Application, Identification of Cost Unit and Cost Determination and Control

#### 8. Marginal Costing

- Meaning, Advantages, Limitations and Applications
- Breakeven Analysis
- Cost-Volume Profit Analysis
- P/V Ratio and its Significance
- Margin of Safety
- Absorption Costing: System of Profit Reporting and Stock Valuation
- Difference between Marginal Costing and Absorption Costing
- Income Measurement under Marginal Costing and Absorption Costing

#### 9. Standard Costing

- Definition, Significance and Applications
- Various Types of Standards
- Installation of Standard Costing System-for Material, Labour, and Overhead

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- Variance Analysis for Materials, Labour and Overheads and Accounting Treatment of Variances
- Benchmarking for Setting of Standards
- Variance Reporting to Management

#### **10. Budget, Budgeting and Budgetary Control**

- Budget Concept, Manual
- Fixed and Flexible Budgets
- Preparation and Monitoring of Various Types of Budgets
- Budgetary Control System: Advantages, Limitations and Installation
- Zero Base Budgeting
- Programme and Performance Budgeting

#### **11. Cost Accounting Records and Cost Audit**

- Nature and Scope of Cost Audit
- Cost Accounting Records and Cost Audit under Companies Act, 1956
- Purpose, Scope and Advantages of Cost Audit
- Implementing Authorities of Cost Audit
- Cost Audit Techniques and Programmes
- Cost Audit Report
- Cost Auditor – Appointment, Rights and Responsibilities

#### **12. Analysis and Interpretation of Financial Statements**

- Financial Statements: Nature, Attributes, Objectives, Importance, Limitations
- Recent Trends in Presenting Financial Statements
- Financial Statements Analysis: Types, Methods, Objectives, Limitations
- Ratio Analysis: Accounting, Uses, Classification, Advantages, Limitations
- Cash Flow Statement
- Fund Flow Statement
- Difference between Cash Flow and Fund Flow Statement
- Management Reporting

## LIST OF RECOMMENDED BOOKS

### MODULE I

### PAPER 2: COST AND MANAGEMENT ACCOUNTING

#### Recommended Readings and References:

1. S.P. Jain & K.L. Narang : Cost and Management Accounting; Kalyani Publishers, 23, Daryaganj, New Delhi-110 002.
2. V.K. Saxena & C.D. Vashist : Cost and Management Accounting; Sultan Chand & Sons, 23, Daryaganj New Delhi -110 002.
3. M.N. Arora : Cost and Management Accounting (Theory and Problems); Himalaya Publishing House, Ramdoot, Dr. Bhalerao Marg, Kelewadi, Girgaon, Mumbai-400 004.
4. S.N. Maheshwari : Cost and Management Accounting; Sultan Chand & Sons, 23, Daryaganj New Delhi -110 002.
5. I.M. Pandey : Management Accounting; Vikas Publishing House (P) Ltd. A-22, Sector 4, Noida – 201 301
6. Ravi M. Kishore : Advanced Management Accounting; Taxmann's, Taxmann Publication (P) Ltd. 59/32, New Rohtak Road, New Delhi – 110 005.
7. M.Y. Khan & P.K. Jain : Theory and Problems of Management and Cost Accounting; McGraw-Hill Education (India) Ltd. B-4, Sector 63, Gautam Budh Nagar, Noida – 201 301.
8. Jawahar Lal : Cost Accounting; McGraw-Hill Education (India) Ltd. B-4, Sector 63, Gautam Budh Nagar, Noida – 201 301.
9. C.T. Horngren : Cost and Management Accounting - A Managerial Emphasis; Pearson Education Asia, 482, F.I.E. Patparganj, Delhi-110 092.
10. B.M. Lall Nigam & I.C. Jain : Cost Accounting Principles and Practice; Prentice Hall of India, M-97, Connaught Circus, New Delhi-110 001.

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11. Drury Colin : Management and Cost Accounting; International Thomson Business Press, London.
12. K.S. Thakur : Cost Accounting – Theory & Practice; Excel Books, A-45, Naraina, Phase-I, New Delhi-110028.
- 13 B.M. Lall Nigam and I.C. Jain Cost Accounting Principles and Practice - PHI Learning Private Limited
- 14 Ashish K. Bhattacharyya Principles and Practice of Cost Accounting- PHI Learning Private Limited





**ARRANGEMENT OF STUDY LESSONS**

**PAPER 2: COST AND MANAGEMENT ACCOUNTING (100 Marks)**

<i>Lesson No.</i>	<i>Subject</i>
1.	Introduction to Cost and Management Accounting
2.	Material Cost
3.	Labour Cost
4.	Direct Expenses and Overheads
5.	Activity Based Costing (ABC)
6.	Cost Records
7.	Costing Systems
8.	Marginal Costing
9.	Standard Costing
10.	Budget, Budgeting and Budgetary Control
11.	Cost Accounting Records and Cost Audit
12.	Analysis and Interpretation of Financial Statements
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# Lesson 1

## INTRODUCTION TO COST AND MANAGEMENT ACCOUNTING

### LESSON OUTLINE

- Concept of Cost
- Evolution of Cost Accounting
- Costing, Cost Accounting and Cost Accountancy
- Objectives, Importance and Scope of cost accounting
- Classifications and Elements of Cost
- Cost Centre and Cost Unit
- Methods and Techniques of Costing
- Cost Accounting Standards
- Installation of a Costing System
- Practical Difficulties in Installing a Costing System
- Role of Cost Accountant in Decision Making
- Management Accounting and its Evolution, Meaning, Objectives, Nature and Scope
- Tools and Techniques of Management Accounting
- Relationship of Cost Accounting, Financial Accounting, Management Accounting and Financial Management
- Limitations of Management Accounting
- Conflicts in Profit versus Value Maximisation Principle
- Role of Management Accountant in Decision Making
- Lesson Round Up
- Self-Test Questions

### LEARNING OBJECTIVES

Accounting information is important for every business which will serve the needs of variety of interested parties. To satisfy the needs of all interested parties a sound accounting system is very necessary. Accounting may be divided into three parts **i. financial accounting ii. cost accounting iii. management accounting.**

Financial accounting is mostly concerned to record the business transactions in books of accounts so that final accounts can be prepared.

Cost accounting developed to help the internal management in decision making. The information provided by cost accounting acts as a managerial tool so that business can utilise the available resources at optimum level.

Management accounting is an extension of management aspects of cost accounting. It provides the information to management so that planning, organizing, directing and controlling of business operations can be done in an orderly manner.

Therefore the objective of the lesson is to enable the student to understand the meaning and purpose of cost and management accounting. What are the various methods and technique of cost accounting so that various information can be provided to management for decision making.

After going through this lesson the students will be able to

1. Understand the nature, scope and utility of cost accounting, management accounting and cost accounting standards.
2. Understand how cost accounting arises out of the need to make business decisions.
3. Difference between cost accounting, management accounting and financial accounting.
4. To familiarize with costing terminology.

Management Accounting is concerned with the information which is useful to Management.

## CONCEPTS OF COST

Cost is the amount of resource given up in exchange for some goods or services. The resources given up are money or money's equivalent expressed in monetary units.

**The Chartered Institute of Management Accountants, London defines cost as “the amount of expenditure (actual or notional) incurred on, or attributable to a specified thing or activity”.**

This activity of a firm may be the manufacture of a product or the rendering of a service which involves expenditure under various heads, e.g., materials, labour, other expenses, etc. A manufacturing organisation is interested in ascertaining the cost per unit of the product manufactured while an organisation rendering service, e.g., transport undertaking, canteen, electricity company, municipality, etc., is interested in ascertaining the costs of the service it renders. In its simplest form, the cost per unit is arrived at by dividing the total expenditure incurred by the total units produced or the quantum of service rendered. But this method is applicable if the manufacturer produces only one product. If the manufacturer produces more than one product, it becomes imperative to split up the total expenditure between the various products so that the cost of each product can be ascertained separately. Even if only one product is manufactured, it may be necessary to analyse the cost per unit of each item of expenditure that goes to make up the total cost. The problem becomes more complicated where a multiplicity of products is produced and it is necessary to analyse the cost per unit of each product into various items of expenditures that make up the total cost.

For a consumer cost means price. For management cost means 'expenditure incurred' for producing a particular product or rendering a particular service. **The process of ascertaining the cost is known as costing.** It consists of principles and rules governing the procedure of finding out the costs of goods/services. It aims at ascertaining the total cost and also per unit cost. For instance, in transport companies the total cost for the period is ascertained and used to find out the cost per passenger/mile. i.e. the cost of carrying one passenger for one mile. It provides for analysis of expenditure in such a way that the management gets complete idea about even the smallest item of cost.

It is necessary to specify the exact meaning of “cost”. When the term is used specifically, it is modified with such terms as prime cost, fixed cost, sunk cost, etc. Each description implies a certain characteristic which is helpful in analysing the cost. It helps cost accounting in achieving its three basic objectives namely-cost ascertainment, cost control and cost presentation.

A cost must always be studied in relation to its purpose and conditions. Different costs may be ascertained for different purposes and under different conditions. Work-in-progress is valued at factory cost, while stock of finished goods may be valued at cost of production. Even if the purpose of the study of cost is the same, different conditions may lead to variation in cost. The cost per unit of a product is sure to vary with an increase in the volume of output since the amount of fixed expenses to be borne by each unit of output decreases.

It is also important to note here that there is no such thing as an exact cost or true cost because no figure of cost is true in all circumstances and for all purposes. Most of the costing information is based on estimates; for example, the amount of overheads is generally estimated in advance; it is distributed over cost units, again on an estimated basis using different methods. Many items of cost of production are handled in an optional manner which may give different costs for the same product without going against the accepted principles in any way. Depreciation is one such item, the amount of which will vary in accordance with the method of depreciation being used. Thus, to arrive at an absolutely correct cost may be quite difficult unless one waits for a long time by which time the costing information may lose all its value.

## EVOLUTION OF COST ACCOUNTING

The history of accounting is as old as civilization. It is the process of identifying, measuring, recording and communicating economic information, capable of being expressed in terms of money. The utility of accounting information lies in its ability to reduce uncertainty. The information has to be relevant, verifiable, quantifiable and free from bias.

Prior to the industrial revolution, businesses were small and characterized by simple market exchanges between individuals and organizations. In those times there was a need of accurate book keeping though not that much of cost accounting.

However, the industrial revolution in the 18<sup>th</sup> century brought large sized process industries performing single activities (e.g. textiles, railways etc.). During this period, there was a lack of market for intermediary products because of which cost information gained importance as a tool for measuring efficiency of different processes. But the concept of prime cost was used around 1875 by some Industrialists. The period, 1880 AD -1925 AD saw the development of complex product designs and the emergence of multi activity diversified corporations like Du Pont, General Motors etc. It was during this period that scientific management was developed which led accountants to convert physical standards into cost standard, the latter being used for variance analysis and control. In 1913 J.L. Nicholson published a book "Cost Accounting Theory and Practice" from New York.

During World War I and II the social importance of cost accounting grew with the growth of each country's defence expenditure. In the absence of competitive markets for most of the required to fight war, the Governments in several countries placed cost-plus contracts under which the price to be paid was the cost of production plus an agreed rate of profit. The reliance on cost information by the parties to defence contracts continued after World War II as well. Even today, most of the government contracts are decided on a cost plus basis.

## COSTING, COST ACCOUNTING AND COST ACCOUNTANCY

### Costing

Costing is the techniques and processes of ascertaining costs. These techniques consist of principles and rules which govern the procedure of ascertaining cost of products or services. The techniques to be followed for the analysis of expenses and the processes of different products or services differ from industry to industry.

The main object of costing is the analysis of financial records, so as to subdivide expenditure and to allocate it carefully to selected cost centers, and hence to build up a total cost for the departments, processes or jobs or contracts of the undertaking.

### Cost Accounting

Cost accounting may be regarded as "a specialised branch of accounting which involves classification, accumulation, assignment and control of costs.

The Costing terminology of **C.I.M.A.** London defines cost accounting as

"The establishment of budgets, standard costs and actual costs of operations, processes, activities or products, and the analysis of variances, profitability or the social use of funds".

**Wheldon** defines cost accounting as "classifying, recording and appropriate allocation of expenditure for

determination of costs of products or services and for the presentation of suitably arranged data for purposes of control and guidance of management". It is thus, a formal mechanism by means of which costs of products or services are ascertained and controlled.

Cost accounting is different from costing in the sense that the former provides only the basis and information for ascertainment of costs. Once the information is made available, costing can be carried out arithmetically by means of memorandum statements or by method of integral accounting.

### Cost Accountancy

Cost Accountancy has been defined as "the application of costing and cost accounting principles, methods and techniques to the science, art and practice of cost control and the ascertainment of profitability. It includes the presentation of information derived there from for the purpose of managerial decision making".

### REVIEW QUESTIONS



**State whether the following statement is "True" or "False"**

*Costing and Cost Accounting are the same thing:*

- *True*
- *False*

**Correct answer: False**

### OBJECTIVES OF COST ACCOUNTING

Cost accounting aims at systematic recording of expenses and analysis of the same so as to ascertain the cost of each product manufactured or service rendered by an organisation. Information regarding cost of each product or service would enable the management to know where to economise on costs, how to fix prices, how to maximise profits and so on. Thus, the main objects of cost accounting are the following:

- (1) To analyse and classify all expenditures with reference to the cost of products and operations.
- (2) To arrive at the cost of production of every unit, job, operation, process, department or service and to develop cost standard.
- (3) To indicate to the management any inefficiencies and the extent of various forms of waste, whether of materials, time, expenses or in the use of machinery, equipment and tools. Analysis of the causes of unsatisfactory results may indicate remedial measures.
- (4) To provide data for periodical profit and loss accounts and balance sheets at such intervals, e.g., weekly, monthly or quarterly, as may be desired by the management during the financial year, not only for the whole business but also by departments or individual products. Also, to explain in detail the exact reasons for profit or loss revealed in total, in the profit and loss account.
- (5) To reveal sources of economies in production having regard to methods, types of equipment, design, output and layout. Daily, weekly, monthly or quarterly information may be necessary to ensure prompt and constructive action.
- (6) To provide actual figures of cost for comparison with estimates and to serve as a guide for future estimates or quotations and to assist the management in their price-fixing policy.

- (7) To show, where standard costs are prepared, what the cost of production ought to be and with which the actual costs which are eventually recorded may be compared.
- (8) To present comparative cost data for different periods and various volumes of output.
- (9) To provide a perpetual inventory of stores and other materials so that interim profit and loss account and balance sheet can be prepared without stock taking and checks on stores and adjustments are made at frequent intervals. Also to provide the basis for production planning and for avoiding unnecessary wastages or losses of materials and stores.
- (10) To provide information to enable management to make short-term decisions of various types, such as quotation of price to special customers or during a slump, make or buy decision, assigning priorities to various products, etc.

## IMPORTANCE OF COST ACCOUNTING

The limitations of financial accounting have made the management to realise the importance of cost accounting. Whatever may be the type of business, it involves expenditure on labour, materials and other items required for manufacturing and disposing of the product. The management has to avoid the possibility of waste at each stage. It has to ensure that no machine remains idle, efficient labour gets due incentive, by-products are properly utilised and costs are properly ascertained. Besides the management, the creditors and employees are also benefited in numerous ways by installation of a good costing system. Cost accounting increases the overall productivity of an organisation and serves as an important tool, in bringing prosperity to the nation. Thus, the importance of cost accounting can be discussed under the following headings:

### (a) Costing as an Aid to Management

Cost accounting provides invaluable aid to management. It provides detailed costing information to the management to enable them to maintain effective control over stores and inventory, to increase efficiency of the organisation and to check wastage and losses. It facilitates delegation of responsibility for important tasks and rating of employees. For all these, the management should be capable of using the information provided by cost accounts in a proper way. The various advantages derived by the management from a good system of costing are as follows:

1. **Cost accounting helps in periods of trade depression and trade competition** - In periods of trade depression, the organisation cannot afford to have losses which pass unchecked. The management must know the areas where economies may be sought, waste eliminated and efficiency increased. The organisation has to wage a war not only for its survival but also continued growth. The management should know the actual cost of their products before embarking on any scheme of price reduction. Adequate system of costing facilitates this.
2. **Cost accounting aids price fixation** - Although the law of supply and demand to a great extent determines the price of the article, cost to the producer does play an important role. The producer can take necessary guidance from his costing records in case he is in a position to fix or change the price charged.
3. **Cost accounting helps in making estimates** - Adequate costing records provide a reliable basis for making estimates and quoting tenders.

4. **Cost accounting helps in channelising production on right lines** - Proper costing information makes it possible for the management to distinguish between profitable and non-profitable activities. Profits can be maximised by concentrating on profitable operations and eliminating non-profitable ones.
5. **Cost accounting eliminates wastages** - As cost accounting is concerned with detailed break-up of costs, it is possible to check various forms of wastages or losses.
6. **Cost accounting makes comparisons possible** - Proper maintenance of costing records provides various costing data for comparisons which in turn helps the management in formulation of future lines of action.
7. **Cost accounting provides data for periodical profit and loss account** - Adequate costing records provide the management with such data as may be necessary for preparation of profit and loss account and balance sheet at such intervals as may be desired by the management.
8. **Cost accounting helps in determining and enhancing efficiency** - Losses due to wastage of materials, idle time of workers, poor supervision, etc., will be disclosed if the various operations involved in the production are studied carefully. Efficiency can be measured, costs controlled and various steps can be taken to increase the efficiency.
9. **Cost accounting helps in inventory control** - Cost accounting furnishes control which management requires in respect of stock of materials, work-in-progress and finished goods.

#### **(b) Costing as an Aid to Creditors**

Investors, banks and other money lending institutions have a stake in the success of the business concern and are, therefore, benefited immensely by the installation of an efficient system of costing. They can base their judgment about the profitability and future prospects of the enterprise on the costing records.

#### **(c) Costing as an Aid to Employees**

Employees have a vital interest in their employer's enterprise in which they are employed. They are benefited by a number of ways by the installation of an efficient system of costing. They are benefited, through continuous employment and higher remuneration by way of incentives, bonus plans, etc.

#### **(d) Costing as an Aid to National Economy**

An efficient system of costing brings prosperity to the business enterprise which in turn results in stepping up of the government revenue. The overall economic development of a country takes place as a consequence increase in efficiency of production. Control of costs, elimination of wastages and inefficiencies led to the progress of the industry and, in consequence of the nation as a whole.

### **SCOPE OF COST ACCOUNTING**

The Scope of Cost Accounting Is Very Wide and Includes:

- (a) **Cost Ascertainment:** The main function of cost accounting is the ascertainment of cost of product or services rendered. It includes collection, analysis of expenses and measurement of production at different stages of manufacture. The collection, analysis and measurement requires different methods of costing for different types of production such as Historical costs, Standard costs, Process cost, Operation cost etc.



It can be done in two ways, namely

- (i) Post Costing, where the ascertainment of cost is done based on actual information as recorded in financial books.
  - (ii) Continuous Costing, where the process of ascertainment is of a continuous nature i.e. where cost information is available as and when a particular activity is completed, so that the entire cost of a particular job is available the moment it is completed.
- (b) *Control of Costs*: In the era of competition, the goal of every business is to sustain; in costs at the lowest point with efficient operating conditions. To sustain, It is essential to examine each individual item of cost in the light of the services or benefits obtained so that maximum utilisation of the money expended or- it may be recovered. This requires planning and use of standard for each item of cost for locating deviations, if any, and taking remedial measures.
  - (c) *Proper matching of cost with revenue*: In cost accounting manager prepares monthly or quarterly statements to reflect the cost and income data identified with the sale of that period.
  - (d) *Aids to Management Decision-making*: Decision-making is a process of choosing between two or more alternatives, based on the resultant outcome of the various alternatives. A Cost Benefit Analysis also needs to be done. All this can be achieved through a good cost accounting system

## CLASSIFICATION OF COSTS

The different bases of cost classification are:

- (1) By time (Historical, Pre-determined).
- (2) By nature or elements (Material, Labour and Overhead).
- (3) By degree of traceability to the product (Direct, Indirect).
- (4) Association with the product (Product, Period).
- (5) By Changes in activity or volume (Fixed, Variable, Semi-variable).
- (6) By function (Manufacturing, Administrative, Selling, Research and development, Pre-production).
- (7) Relationship with accounting period (Capital, Revenue).
- (8) Controllability (Controllable, Non-controllable).
- (9) Cost for analytical and decision-making purposes (Opportunity, Sunk, Differential, Joint, Common, Imputed, Out-of-pocket, Marginal, Uniform, Replacement).
- (10) Others (Conversion, Traceable, Normal, Avoidable, Unavoidable, Total).

### 1. Classification on the Basis of Time

- (a) **Historical Costs**: These costs are ascertained after they are incurred. Such costs are available only when the production of a particular thing has already been done. They are objective in nature and can be verified with reference to actual operations.
- (b) **Pre-determined Costs**: These costs are calculated before they are incurred on the basis of a specification of all factors affecting cost. Such costs may be:
  - (i) **Estimated costs**: Costs are estimated before goods are produced; these are naturally less accurate than standards.

- (ii) **Standard costs:** This is a particular concept and technique. This method involves:
  - (a) setting up predetermined standards for each element of cost and each product;
  - (b) comparison of actual with standard to find variation;
  - (c) pin-pointing the causes of such variances and taking remedial action.

Obviously, standard costs, though pre-determined, are arrived with much greater care than estimated costs.

## 2. By Nature or Elements

There are three broad elements of costs:

- (1) **Material:** The substance from which the product is made is known as material. It can be direct as well as indirect.

**Direct material:** It refers to those materials which become a major part of the finished product and can be easily traceable to the units. Direct materials include:

- (i) All materials specifically purchased for a particular job/process.
- (ii) All material acquired and later requisitioned from stores.
- (iii) Components purchased or produced.
- (iv) Primary packing materials.
- (v) Material passing from one process to another.

**Indirect material:** All material which is used for purposes ancillary to production and which can be conveniently assigned to specific physical units is termed as indirect materials. Examples, oil, grease, consumable stores, printing and stationary material etc.

- (2) **Labour:** Labour cost can be classified into direct labour and indirect labour.

**Direct labour:** It is defined as the wages paid to workers who are engaged in the production process whose time can be conveniently and economically traceable to units of products. For example, wages paid to compositors in a printing press, to workers in the foundry in cast iron works etc.

**Indirect labour:** Labour employed for the purpose of carrying tasks incidental to goods or services provided, is indirect labour. It cannot be practically traced to specific units of output. Examples, wages of store-keepers, foreman, time-keepers, supervisors, inspectors etc.

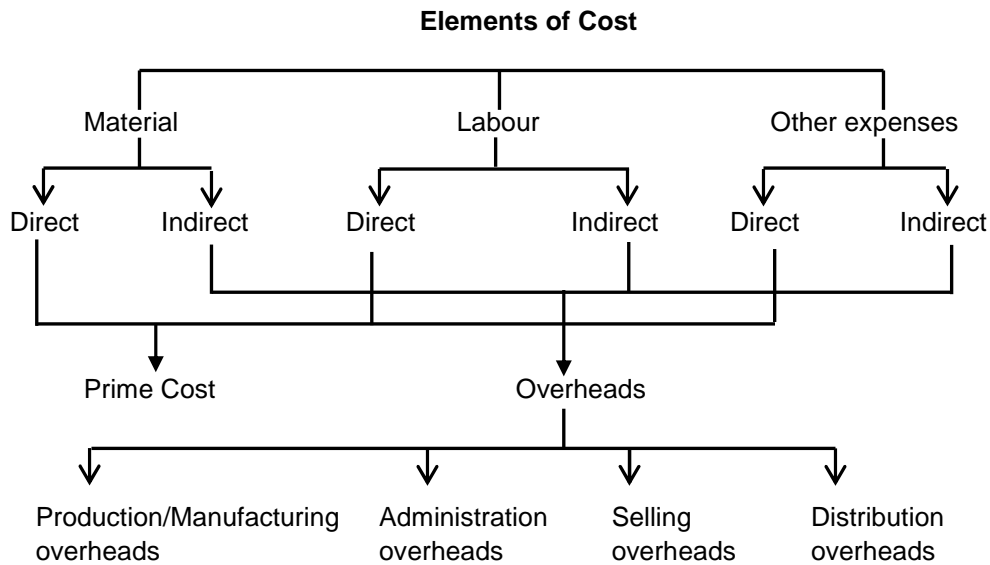
- (3) **Expenses:** Expenses may be direct or indirect.

**Direct expenses:** These expenses are incurred on a specific cost unit and identifiable with the cost unit. Examples are cost of special layout, design or drawings, hiring of a particular tool or equipment for a job; fees paid to consultants in connection with a job etc.

**Indirect expenses:** These are expenses which cannot be directly, conveniently and wholly allocated to cost centre or cost units. Examples are rent, rates and taxes, insurance, power, lighting and heating, depreciation etc.

It is to be noted that the term overheads has a wider meaning than the term indirect expenses. Overheads include the cost of indirect material, indirect labour and indirect expenses. overheads may be classified as (a) production or manufacturing overheads, (b) administration overheads, (c) selling overheads, and (d) distribution overheads.

The various elements of cost can be illustrated by the following chart:



### 3. By Degree of Traceability to the Products

Cost can be distinguished as direct and indirect.

**Direct Costs:** The direct costs are those which can be easily traceable to a product or costing unit or cost center or some specific activity, e.g. cost of wood for making furniture. It is also called traceable cost.

**Indirect Costs :** The indirect costs are difficult to trace to a single product or it is uneconomic to do so. They are common to several products, e.g. salary of a factory manager. It is also called common costs.

Costs may be direct or indirect with respect to a particular division or department. For example, all the costs incurred in the Power House are indirect as far as the main product is concerned but as regards the Power House itself, the fuel cost or supervisory salaries are direct. It is necessary to know the purpose for which cost is being ascertained and whether it is being associated with a product, department or some activity.

Direct cost can be allocated directly to costing unit or cost center. Whereas Indirect costs have to be apportioned to different products, if appropriate measurement techniques are not available. These may involve some formula or base which may not be totally correct or exact.

### 4. Association with the Product

Cost can be classified as product costs and period costs.

**Product Costs:** Product costs are those which are traceable to the product and included in inventory values. In a manufacturing concern it comprises the cost of direct materials, direct labour and manufacturing overheads. Product cost is a full factory cost. Product costs are used for valuing inventories which are shown in the balance sheet as asset till they are sold. The product cost of goods sold is transferred to the cost of goods sold account.

**Period Costs:** Period costs are incurred on the basis of time such as rent, salaries, etc., include many selling and administrative costs essential to keep the business running. Though they are necessary to generate revenue, they are not associated with production, therefore, they cannot be assigned to a product. They are charged to the period in which they are incurred and are treated as expenses.

Selling and administrative costs are treated as period costs for the following reasons:

- (i) Most of these expenses are fixed in nature.
- (ii) It is difficult to apportion these costs to products equitably.

- (iii) It is difficult to determine the relationship between such cost and the product.
- (iv) The benefits accruing from these expenses cannot be easily established.

The net income of a concern is influenced by both product and period costs. Product costs are included in the cost of the product and do not affect income till the product is sold. Period costs are charged to the period in which they are incurred.

### 5. By Changes in Activity or Volume

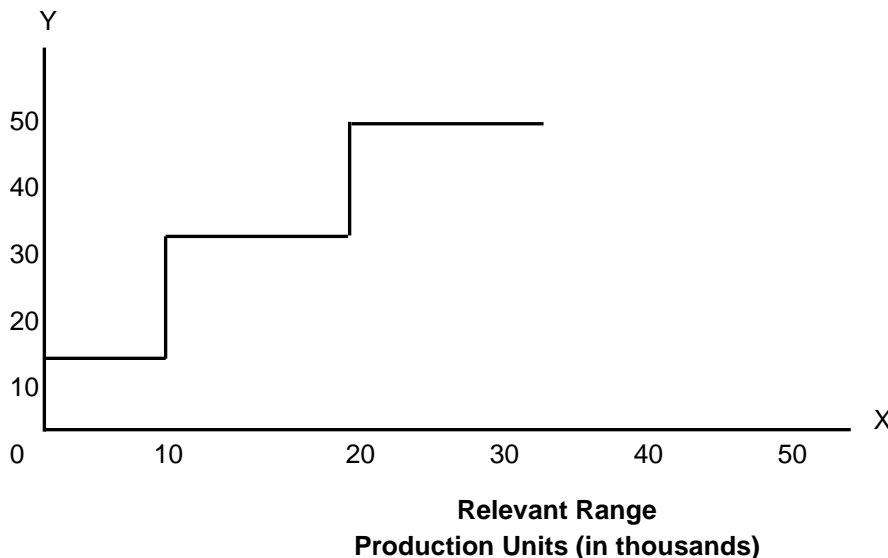
Costs can be classified as fixed, variable and semi-variable cost.

**Fixed Costs:** The Chartered Institute of Management Accountants, London, defines fixed cost as “ the cost which is incurred for a period, and which, within certain output and turnover limits, tends to be unaffected by fluctuations in the levels of activity (output or turnover)”.

These costs are incurred so that physical and human facilities necessary for business operations, can be provided. These costs arise due to contractual obligations and management decisions. They arise with the passage of time and not with production and are expressed in terms of time. Examples are rent, property-taxes, insurance, supervisors’ salaries etc.

It is wrong to say that fixed costs never change. These costs may vary depending on the circumstances. The term fixed refer to non-variability related to the relevant range. Fixed cost can be classified into the following categories for the purpose of analysis:

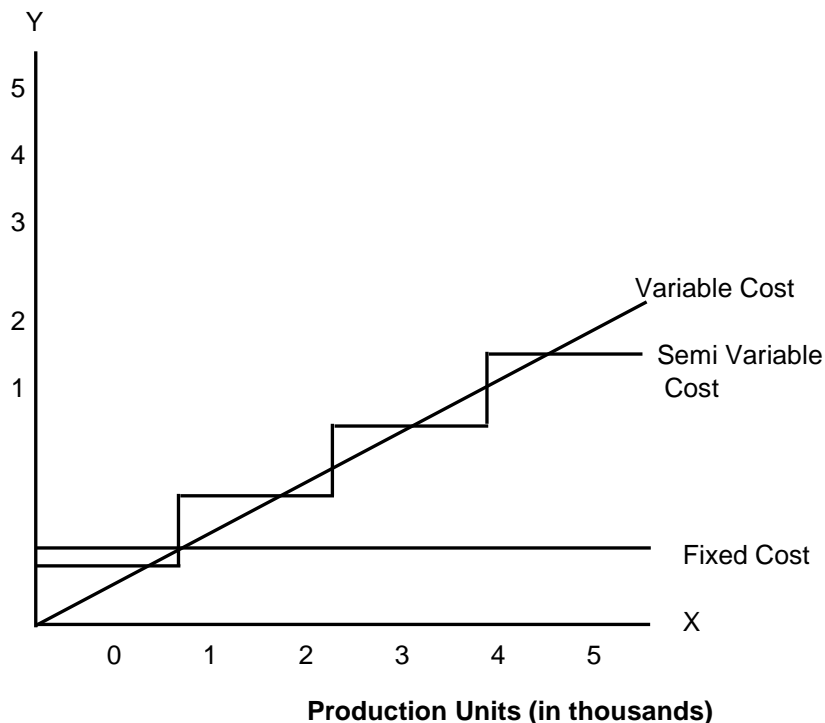
- (a) **Committed Costs:** These costs are incurred to maintain certain facilities and cannot be quickly eliminated. The management has little or no discretion in this cost, e.g., rent, insurance etc.
- (b) **Policy and Managed Costs:** Policy costs are incurred for implementing particular management policies such as executive development, housing, etc. Such costs are often discretionary. Managed costs are incurred to ensure the operating existence of the company e.g., staff services.
- (c) **Discretionary Costs:** These are not related to the operations and can be controlled by the management. These costs result from special policy decisions, new researches etc., and can be eliminated or reduced to a desirable level at the discretion of the management.
- (d) **Step Costs:** Such costs are constant for a given level of output and then increase by a fixed amount at a higher level of output.



**Variable Cost:** Variable costs are those costs that vary directly and proportionately with the output e.g. direct materials, direct labour. It should be kept in mind that the variable cost per unit is constant but the total cost changes corresponding to the levels of output. It is always expressed in terms of units, not in terms of time.

Management decisions can influence the cost behaviour patterns. The concept of variability is relative. If the conditions upon which variability was determined changes, the variability will have to be determined again.

**Semi-fixed (Semi-Variable) costs:** Such costs contain fixed and variable elements. Because of the variable element, they fluctuate with volume and because of the fixed element; they do not change in direct proportion to output. Semi-variable costs change in the same direction as that of the output but not in the same proportion. Depreciation is an example; for two shifts working the total depreciation may be only 50% more than that for single shift working. They may change with comparatively small changes in output but not in the same proportion.



## 6. Functional Classification of Costs

A company performs a number of functions. Functional costs may be classified as follows:

- Manufacturing/production Costs:** It is the cost of operating the manufacturing division of an undertaking. It includes the cost of direct materials, direct labour, direct expenses, packing (primary) cost and all overhead expenses relating to production.
- Administration Costs:** They are indirect and covers all expenditure incurred in formulating the policy, directing the organisation and controlling the operation of a concern, which is not related to research, development, production, distribution or selling functions.
- Selling and Distribution Cost:** Selling cost is the cost of seeking to create and stimulate demand e.g. advertisements, market research etc. Distribution cost is the expenditure incurred which begins with making the package produced available for dispatch and ends with making the reconditioned packages available for re-use e.g. warehousing, cartage etc. It includes expenditure incurred in

transporting articles to central or local storage. Expenditure incurred in moving articles to and from prospective customers as in the case of goods on sale or return basis is also distribution cost.

- (d) **Research and Development Costs:** They include the cost of discovering new ideas, process, products by experiment and implementing such results on a commercial basis.
- (e) **Pre-production Cost:** When a new factory is started or when a new product is introduced, certain expenses are incurred. There are trial runs. Such costs are termed as pre-production costs and treated as deferred revenue expenditure. They are charged to the cost of future production.

## 7. Relationships with Accounting Period

Costs can be capital and revenue.

Capital expenditure provides benefit to future period and is classified as an asset. On the other hand, revenue expenditure benefits only the current period and is treated as an expense. As and when an asset is written off, capital expenses to that extent becomes cost. Only when capital and revenue is properly differentiated, the income of a particular period can be correctly determined. It is not possible to distinguish between the two under all circumstances.

## 8. Controllability

Cost can be Controllable and Non-Controllable.

**Controllable Cost:** The Chartered Institute of Management Accountants defines controllable cost as “cost which can be influenced by its budget holder”.

**Non-Controllable Cost:** It is the cost which is not subject to control at any level of managerial supervision.

The difference between the terms is very important for the purpose of cost accounting, cost control and responsibility accounting.

A controllable cost can be controlled by a person at a given organisational level. Controllable cost are not totally controllable. Some costs are partly controllable by one person and partly by another e.g., maintenance cost can be controlled by both the production and maintenance manager. The term “controllable costs” is often used to mean variable costs and non-controllable costs as fixed.

Belkaoni has mentioned the following fallacies about controllable costs:

- (i) All variable costs are controllable and fixed are not.
- (ii) All direct costs are controllable and indirect costs are not.
- (iii) All long-term costs are controllable.

Sometimes the time factor and the decision making authority can make a cost controllable. If the time period is long enough, all costs can be controlled. Proper delegation helps in establishing clear responsibility and controllability. But all costs can be controlled by one or another person. The authority and responsibility of cost control is delegated to different levels, though the managing director is responsible for all the costs.

## 9. Costs for Analytical and Decision Making Purposes

- (a) **Opportunity Costs:** Opportunity cost is the cost of selecting one course of action and the losing of other opportunities to carry out that course of action. It is the amount that can be received if the asset is utilised in its next best alternative.

Edwards, Hermanson and Salmonson define it as “the benefits lost by rejecting the best competing alternative to the one chosen. The benefit lost is usually the net earnings or profit that might have been earned from the rejected alternative”

**Example:** Capital is invested in plant and machinery. It cannot be now invested in shares or debentures. The loss of interest and dividend that would be earned is the opportunity cost. Another example is when the owner of a business foregoes the opportunity to employ himself elsewhere.

Opportunity costs are not recorded in the books. It is important in decision making and comparing alternatives.

- (b) **Sunk Costs:** A sunk cost is one that has already been incurred and cannot be avoided by decisions taken in the future. As it refers to past costs, it is called unavoidable cost. The National Association of Accountants (USA) defines a sunk cost as “an expenditure for equipment or productive resources which has no economic relevance to the present decision making process”. This cost is not useful for decision making as all past costs are irrelevant. CIMA defines it as the past cost not taken into account in decision making.

It has also been defined as the difference between the purchase price of an asset and its salvage value.

- (c) **Differential Cost:** Differential cost has been defined as “the difference in total cost between alternatives, calculated to assist decision making”. Differential cost is the increase or decrease in total costs resulting out of:

- (a) Producing and distributing a few more or few less of products;
- (b) A change in the method of production/distribution;
- (c) An addition or deletion of a product or a territory; and
- (d) The selection of an additional sales channel.

The differential cost between any two levels of production is the difference between the marginal costs at these two levels and the increase or decrease in fixed costs, if any. These costs are usually ‘specific purpose costs’ as they are determined for a particular purpose and under specific circumstances.

Incremental cost measures the addition in unit cost for an addition in output. This cost need not be the same at all levels of production. It is usually expressed as a cost per unit whereas the differential cost is measured in total. The former applies to increase in production and is restricted to the cost only, whereas the differential cost has a comprehensive meaning and application in the sense that it denotes both increase or decrease.

Differential costs is useful in planning and decision making and helps to choose the best alternative. It helps management to know the additional profit that would be earned if idle capacity is used or when additional investments are made.

- (d) **Joint Costs:** The processing of a single raw material results in two or more different products simultaneously. The joint products are not identifiable as different types of product until a certain stage of production known as the split-off point is reached. Joint costs are the costs incurred upto the point of separation. One product may be of major importance and others of minor importance which are called by-products.

Bierman and Djckman define it as: “Joint costs relate to a situation in which the factors of production

by their basic nature result in two or more products. The jointness results from there being more than one product, and these multi-products are the result of the methods of production or the nature of raw material and not of a decision by management to produce both”.

The National Association of Accountants defines it as follows:

“Joint costs relate to two or more products produced from a common production process or element-material, labour or overhead or any combination thereof or so locked together that one cannot be produced without producing the other”.

Joint costs can be apportioned to different products only by adopting a suitable basis of apportionment.

- (e) **Common Costs:** Common costs are those costs which are incurred for more than one product, job, territory or any other specific costing object. They are not easily related with individual products and hence are generally apportioned.

The National Association of Accountants defines the term as “the cost of services employed in the creation of two or more outputs which is not allocable to those outputs on a clearly justified basis”.

It should be kept in mind that management decisions influence the incurrence of common costs e.g. rent of the factory is a common cost to all departments located in factory.

- (f) **Imputed Costs:** Some costs are not incurred and are useful while taking decision pertaining to a particular situation. These costs are known as imputed or notional costs and they do not enter into traditional accounting systems.

**Examples:** Interest on internally generated funds, salaries of owners of proprietorship or partnership, notional rent etc.

- (g) **Uniform Costs:** They are not distinct costs as such. Uniform costing signifies common costing principles and procedures adopted by a number of firms. They are useful in inter-firm comparison.
- (h) **Marginal Costs:** It is the aggregate of variable costs, i.e., prime cost plus variable overheads. Thus, costs are classified as fixed and variable.
- (i) **Replacement Costs:** This is the cost of replacing an asset at current market values e.g. when the cost of replacing an asset is considered, it means the cost of purchasing the asset at the current market price is important and not the cost at which it was purchased.
- (j) **Out of Pocket Cost:** It involves payment to outsiders i.e. gives rise to Cash Expenditure as opposed to such costs as depreciation which don't involve any cash expenditure. Such costs are relevant for price fixation during recession or when make or buy decision is to be made.

## 10. Other Costs

- (i) **Conversion Cost:** It is the cost of a finished product or work-in-progress comprising direct labour and manufacturing overhead. It is production cost less the cost of raw material but including the gains and losses in weight or volume of direct material arising due to production.
- (ii) **Normal Cost:** This is the cost which is normally incurred at a given level of output in the conditions in which that level of output is achieved.
- (iii) **Traceable Cost:** It is the cost which can be easily associated with a product, process or department.



- (iv) **Avoidable Costs:** Avoidable costs are those costs which under the present conditions need not have been incurred.  
**Example:** (a) Spoilage in excess of normal limit; (b) Unfavourable cost variances which could have been controlled.
- (v) **Unavoidable Costs:** Unavoidable costs are those costs which under the present conditions must be incurred.
- (vi) **Total Cost:** This is the sum of all costs associated to a particular unit, or process, or department or batch or the entire concern. It may also mean the sum total of material, labour and overhead. The term total cost however, is not precise, it needs to be made precise by using terms that indicate the elements of cost included.
- (vii) **Value Added:** Strictly, it is not cost. It means the selling price of the product/service less the cost of materials used in the product or the service. Often depreciation is also deducted for ascertaining “value added”.

## REVIEW QUESTIONS



A cost which does not involve any cash outflow is called \_\_\_\_\_ or \_\_\_\_\_

**Correct answer: Notional cost, Imputed cost**

## COST CENTRE AND COST UNIT

A cost accountant has to ascertain cost by cost centre or cost unit or by both.

### Cost Centre

According to the Chartered Institute of Management Accountants, London, cost centre means, “a production or service location, function, activity or item of equipment whose costs may be attributed to cost units”. Cost centre is the smallest organisational sub-unit for which separate cost collection is attempted. Thus cost centre refers to one of the convenient unit into which the whole factory organisation has been appropriately divided for costing purposes. Each such unit consists of a department or a sub-department or item of equipment or, machinery or a person or a group of persons. For example, although an assembly department may be supervised by one foreman, it may contain several assembly lines. Sometimes each assembly line is regarded as a separate cost centre with its own assistant foreman. Take another example, in a laundry, activities such as collecting, sorting, marketing and washing of clothes are performed. Each activity may be considered as a separate cost centre and all costs relating to a particular cost centre may be found out separately.

Cost centres may be classified as follows :

- (i) **Productive, Unproductive and Mixed Cost Centres:** Productive cost centres are those which are actually engaged in making the products - the raw materials are handled here and converted into saleable products. In such centres both direct and indirect costs are incurred, machine shops, welding shops, and assembly shops are examples of production cost centres in an engineering factory. Service or unproductive cost centres do not make the products but are essential aids to the productive centres. Examples of such service centres are those of administration, repairs and maintenance, stores and drawing office departments. Mixed cost centres are those which are

engaged some on productive and other lines on service works. For instance, a tool shop serves as a productive cost centre when it manufactures dies and jigs for specific order, but serves as servicing cost centre when it does repairs for the factory.

- (ii) **Personal and Impersonal Cost Centre:** A personal cost centre consists of a person or a group of persons. An impersonal cost centre is one which consists of a department, plant or item of equipment (or group of these).
- (iii) **Operation and Process Cost Centre:** In case a cost centre consists of those machines and/or persons which carry out the same operation is termed as operation cost centre. If a cost centre consists of a continuous sequence of operations it is called process cost centre.

The determination of a suitable cost centre is very important for ascertainment and control of cost. The manager in charge of a cost centre is held responsible for control of cost of his cost centre.

### Cost Unit

The Chartered Institute of Management Accountants, London, defines a unit of cost as “a unit of product or service in relation to which costs are ascertained”. A cost unit is a devise for the purpose of breaking up or separating costs into smaller sub-divisions. These smaller sub-divisions are attributed to products or services to determine product cost or service cost or cost of time spent for a particular job etc. We may for instance determine the cost per ton of steel, per tonne kilometre of a transport service or cost per machine hour. The forms of measurement used as cost units are usually the units of physical measurements like number, weight, area, length, value, time etc. Unit selected should be unambiguous, simple and commonly used. Following are some examples of cost unit:

<b>Industry/Product</b>	<b>Cost unit</b>
Automobile	Number
Brick works	1000 bricks
Cement	Tonne
Transport	Tonne - Kilometre Passenger - Kilometre
Chemicals	Litre, gallon, kilogramme, tonne
Steel	Tonne
Sugar	Tonne

The selection of suitable cost centres or cost units for which costs are to be ascertained in an undertaking depends upon a number of factors which are listed as follows:

- (i) Organisation of the factory.
- (ii) Conditions of incidence of cost.
- (iii) Requirements of the costing system i.e. suitability of the units of centres for cost purposes.
- (iv) Availability of information.
- (v) Management policy regarding making a particular choice from several alternatives.

### METHODS OF COSTING

The general fundamental principles of ascertaining costs are the same in every system of cost accounting, but the methods of analysis and presenting the costs vary from industry to industry. Different methods are used because business enterprises vary in their nature and in the type of products or services they produce or render.

### **Job Costing**

It refers to a system of costing in which costs are ascertained in terms of specific jobs or orders which are not comparable with each other. Industries where this method of costing is generally applied are printing press, automobile garage, repair shop, ship-building, house building, engine and machine construction, etc.

### **Contract Costing**

Although contract costing does not differ in principle from job costing, it is convenient to treat contract cost accounts separately. The term is usually applied to the costing method adopted where large scale contracts at different sites are carried out, as in the case of building construction.

### **Batch Costing**

This method is also a type of job costing. A batch of similar products is regarded as one job and the cost of this complete batch is ascertained. It is then used to determine the unit cost of the articles produced. It should, however, be noted that the articles produced should not lose their identity in manufacturing operations.

### **Terminal Costing**

This method is also a type of job costing. This method emphasises the essential nature of job costing, i.e. the cost can be properly terminated at some point and related to a particular job.

### **Operation Costing**

This method is adopted when it is desired to ascertain the cost of carrying out an operation in a department, for example, welding. For large undertakings, it is frequently necessary to ascertain the cost of various operations.

### **Process Costing**

Where a product passes through distinct stages or processes, the output of one process being the input of the subsequent process, it is frequently desired to ascertain the cost of each stage or process of production. This is known as process costing. This method is used where it is difficult to trace the item of prime cost to a particular order because its identity is lost in volume of continuous production. Process costing is generally adopted in textile industries, chemical industries, oil refineries, soap manufacturing, paper manufacturing, tanneries, etc.

### **Unit or Single or Output or Single-output Costing**

This method is used where a single article is produced or service is rendered by continuous manufacturing activity. The cost of whole production-cycle is ascertained as a process or series of processes and the cost per unit is arrived at by dividing the total cost by the number of units produced. The unit of costing is chosen according to the nature of the product. Cost statements or cost sheets are prepared under which various items of expenses are classified and the total expenditure is divided by total quantity produced in order to arrive at unit cost of production. This method is suitable in industries like brick-making, collieries, flour mills, cement manufacturing, etc. This method is useful for the assembly department in a factory producing a mechanical article e.g., bicycle.

### **Operating Costing**

This method is applicable where services are rendered rather than goods produced. The procedure is same as in the case of single output costing. The total expenses of the operation are divided by the units and cost

per unit of service is arrived at. This method is employed in railways, road transport, water supply undertakings, telephone services, electricity companies, hospital services, municipal services, etc.

### **Multiple or Composite Costing**

Some products are so complex that no single system of costing is applicable. It is used where there are a variety of components separately produced and subsequently assembled in a complex production. Total cost is ascertained by computing component costs which are collected by job or process costing and then aggregating the costs through use of the single or output costing system. This method is applicable to manufacturing concerns producing motor cars, aeroplanes, machine tools, type-writers, radios, cycles, sewing machines, etc.

### **Departmental Costing**

When costs are ascertained department by department, the method is called "Departmental Costing". Usually, for ascertaining the cost of various goods or services produced by the department, the total costs will have to be analysed, say, by the use of job costing or unit costing.

## **TECHNIQUES OF COSTING**

The following techniques of costing are used by the management for controlling costs and making managerial decisions:

### **Historical (or Conventional) Costing**

It refers to the determination of costs after they have been actually incurred. It means that cost of a product can be calculated only after its production. This system is useful only for determining costs, but not useful for exercising any control over costs. It can serve as a guidance for future production only when conditions continue to be the same in future.

### **Standard Costing**

It refers to the preparation of standard costs and applying them to measure the variations from standard costs and analysing the variations with a view to maintain maximum efficiency in production. What is done in this case is that costs of each article are determined before-hand under current and anticipated conditions, but sometimes they are determined before-hand under normal or ideal conditions. Then actual costs are compared with the pre-determined costs and deviations known as variances are noted down. Thereafter, the reasons for the variances are ascertained and necessary steps are taken to prevent their recurrence.

### **Marginal Costing**

It refers to the ascertainment of marginal costs by differentiating between fixed costs and variable costs and the effect on profit of the changes in volume or type of output. In this case, only the variable costs are charged to products or operations while fixed costs are charged to profit and loss account of the period in which they arise.

### **Uniform Costing**

A technique where standardized principles and methods of cost accounting are employed by a number of different companies and firms, is termed as uniform costing. This helps in comparing performance of one firm with that of another.

## Direct Costing

The practice of charging all direct costs to operations, process or products leaving all indirect costs to be written off against profits in the period in which they arise, is termed as direct costing.

## Absorption Costing

The practice of charging all costs both variable and fixed to operation, process or products or process is termed as absorption costing.

## Activity Based Costing

In a business organization, Activity-Based Costing (ABC) is a method of assigning the organization's resource costs through activities to the products and services provided to its customers. It is defined as a technique of cost attribution to cost units on the basis of benefits received from indirect activities, e.g. ordering, setting up, assuring quality. ABC involves identification of costs with each cost driving activity and making it as the basis of apportionment of costs over different products or jobs on the basis of the number of activities required for their completion. It is basically used for apportionment of overheads costs in an organisation having products that differ in volume and complexity of production. Under this technique, the overhead costs of the organisation are identified with each activity which is acting as a cost driver i.e. the the cause for incurrence of overhead cost. Such cost drivers may be purchase orders issued, quality inspections, maintenance requests, material receipts, inventory movements, power consumed, machine time, etc. Having identified the overhead costs with each cost centre, cost per unit of cost driver can be ascertained. The overhead costs can be assigned to jobs on the basis of number of activities required for their completion. This is generally used as a tool for understanding product and customer cost and profitability. As such, ABC has predominately been used to support strategic decisions such as pricing, outsourcing and identification and measurement of process improvement initiatives.

ABC principles are used: (i) to focus management attention on the total cost to produce a product or service, and (ii) as the basis for full cost recovery. Support services are particularly suitable for activity-based resourcing because they produce identifiable and measurable units of output.

Activity-Based Costing encourages managers to identify which activities are value added—those that will best accomplish a mission, deliver a service, or meet a customer demand. It improves operational efficiency and enhances decision-making through better, more meaningful cost information.

## COST ACCOUNTING STANDARDS

Cost Accounting Standards (CAS) had been issued by the Institute of Cost Accountants of India (ICAI). The Preface to Cost Accounting Standards issued by the ICAI has set out the following objectives to be achieved through CAS:

- (a) To provide better guidelines on standard cost accounting practices;
- (b) To assist cost accountants in preparation of uniform cost statements;
- (c) To provide guidelines to bring standard approach towards maintenance of cost accounting records under various statutes;
- (d) To assist the management to follow the standard cost accounting practices in the matter of compliance with statutory obligations; and
- (e) To help Indian industry and the government towards better cost management.

Financial accounting standards control accounting policies of companies to protect investors' interest. They protect investors from window dressing of financial statements and bring transparency, consistency and uniformity in financial reporting and thus improve the capital market efficiency. The needs for financial accounting standards are well understood by all user groups. But it is not so in case of cost accounting standards. There are reasons for the same.

Cost accounting principles and practise evolved over years to fulfil needs of managers. They are the primary users of cost (and revenue) information. They need cost information for planning and control and ask for specific cost information that they require. A cost accounting system generates information primarily for internal use.

Government and regulators are also users of cost information. Regulators use cost information to protect the interest of customers. For example cost information is important to assess whether a service/goods provider is cross subsidising different services /goods or different customer segments.

Thus, in the process of formulating standards, the standard-setting bodies benchmark the Indian practices with global practices and select the best practices from diverse practices available globally. Therefore, the CAS improves cost accounting practices and the body of knowledge available in India.

The Institute of Cost Accountants of India, recognizing the need for structured approach to the measurement of cost in manufacture or service sector and to provide guidance to the user organizations, government bodies, regulators, research agencies and academic institutions to achieve uniformity and consistency in classification, measurement and assignment of cost to product and services, has constituted Cost Accounting Standards Board (CASB) with the objective of formulating the Cost Accounting Standards. The Board has so far released 15 Cost Accounting Standards and document on Generally Accepted Cost Accounting Principles (GAAP), which are as under:

#### **COST ACCOUNTING STANDARDS**

<b>CAS No</b>	<b>Title</b>	<b>Objective</b>
CAS1	Classification of Cost	For preparation of Cost Statements.
CAS2	Capacity Determination	For determination of capacity.
CAS2 (Revised 2012)	Capacity Determination	To bring uniformity and consistency in the principles and methods of determination of capacity with reasonable accuracy.
CAS3	Overheads	For Collection, Allocation, Apportionment and Absorption of overheads.
CAS3 (Revised 2011)	Overheads	To bring uniformity and consistency in the principles and methods of determining the overheads with reasonable accuracy.
CAS4	Cost of Production for Captive Consumption	To determine the assessable value of excisable goods used for captive consumption.
CAS5	Average (equalized) Cost of Transportation	To determine averaged/equalized transportation cost.
CAS6	Material Cost	To bring uniformity and consistency in the principles and methods of determining the material cost with reasonable accuracy in an economically feasible manner.

CAS7	Employee Cost	To bring uniformity and consistency in the principles and methods of determining the Employee cost with reasonable accuracy.
CAS8	Cost of Utilities	To bring uniformity and consistency in the principles and methods of determining the Cost of Utilities with reasonable accuracy.
CAS9	Packing Material Cost	To bring uniformity and consistency in the principles and methods of determining the Packing Material Cost with reasonable accuracy.
CAS10	Direct Expenses	To bring uniformity and consistency in the principles and methods of determining the Direct Expenses with reasonable accuracy.
CAS11	Administrative Overheads	To bring uniformity and consistency in the principles and methods of determining the Administrative Overheads with reasonable accuracy.
CAS12	Repairs And Maintenance Cost	To bring uniformity and consistency in the principles and methods of determining the Repairs and Maintenance Cost with reasonable accuracy.
CAS13	Cost of Service Cost Centre	To bring uniformity and consistency in the principles and methods of determining the Cost of Service Cost Centre with reasonable accuracy.
CAS14	Pollution Control Cost	To bring uniformity and consistency in the principles and methods of determining the Pollution Control Costs with reasonable accuracy.
CAS15	Selling & Distribution Overheads	To bring uniformity and consistency in the principles and methods of determining the selling and distribution overheads with reasonable accuracy.

### INSTALLATION OF A COSTING SYSTEM

A cost accounting system is a system that accumulates costs, assigns them to cost objectives and reports cost information. It ascertains product profitability and helps management in planning and control of business operations.

A system has to be designed to suit the needs of an organisation. Costing can be employed in any industry whether it is manufacturing industry or other industries like public utility, public services, construction companies, agriculture, mining etc.

As a system designer, the cost accountant should be able to perceive the needs of the management at various levels and design such a system as will meet those needs promptly, effectively and efficiently. The “needs” are concerned with the following:

- (i) **The objective:** The system will naturally differ according to what is expected from the costing system. The system will be simple if the objective is merely to fix prices; it will have to provide detailed information if the aim is to measure efficiency, control, etc. If the law requires installation of the costing system, the legal requirements must obviously be kept in mind.
- (ii) **Decision-Making Points:** The levels of management which require information will determine the

quantum and format of information that the costing system will have to provide. The periodicity of the various reports will be similarly determined.

- (iii) **Significant Operations:** Costing must obviously pay greater attention to those areas which account for the bulk of expenditure. Mostly, it is production but, in quite a few cases, selling and distribution, accounts for greater expenditure than production; in such a case the system must devote greater care to selling and distribution.
- (iv) **Uncontrollable Items:** Sometimes the law provides for a certain course of action; for example sugar must be packed in new gunny bags. Costing must not try to change this. Sometimes managements may decide to adopt a particular course for various reasons, for example, purchasing an item only from a particular firm. Obviously, it will be no use trying to alter this.

To install a sound costing system in an organisation is not an easy task. The costing for each firm must be so designed as to meet its earlier needs. It should be ensured first that the following pre-requisites for installing a sound costing system are present in the organisation:

- (a) The organisational set up should be clear cut regarding authority and responsibility of different individuals.
- (b) The management of the organisation should extend full support to the system.
- (c) The co-operation of the members of the staff and of the workers in general should be ensured. They should have the real spirit and enthusiasm to operate the system.
- (d) If financial records can yield all the necessary costing information, it is not necessary to have a separate costing department. Usually, however, a separate costing department is essential or desirable but its strength will depend upon the needs of the management and the volume and complexity of transactions or events to be recorded and handled.

The following are the essential considerations which would govern the installation of a sound costing in an organisation in general:

**Executive Side:** The memorandum and articles, organisation chart, delegation of powers etc.

**Accounting Side:** Financial accounting records, last audited accounts etc.

**Internal Control Side:** The existing forms, registers, number of copies etc.

**Technical side and Others:**

- (i) The size, layout and organisation of the factory should be studied.
- (ii) The methods of purchase, receipt, storage and issue of materials should be examined and modified if necessary.
- (iii) The method of paying wages should be studied.
- (iv) The management requirements and their attitude towards cost accounting should be kept in view.
- (v) The cost of installing and operating the system should be economical.
- (vi) The nature, method, process and stages of production, the quantities and qualities of each product should be examined.
- (vii) The system should suit the organisation.
- (viii) Forms and records should involve minimum clerical work and cost.



- (ix) The system should enable prompt reporting to the various levels of management.
- (x) The system should so designed that cost can be effectively controlled.
- (xi) The staff in the cost accounting department should have the ability to produce required cost data. The persons using the reports should be able to understand and use the information.
- (xii) The adoption of cost accounting systems and practices followed by other firms in the industry facilitates inter unit and inter-firm comparisons.
- (xiii) A suitable unit of cost should be selected so that the cost is meaningful. For example, in a steel mill, the unit is “tonne” and in a company producing refrigerators, the unit is each refrigerator. In a transport company, the unit is “tonne-km” i.e., the effort in hauling one tonne of goods for one kilometre.
- (xiv) External factors e.g. government regulations affect the frequency, volume and structure of the cost accounting system.

Any proposed changes should suit other departments and should dislocate production schedule. Other points to be noted are :

- (a) **Accuracy:** Cost accounts must be accurate and correct otherwise they will prove to be misleading.
- (b) **Equity:** Allocation of indirect expenses to a particular class of output, department or job should be fair and equitable.
- (c) **Simplicity:** As cost accountants are highly analytical, there is a tendency towards complexity. Needless, elaboration should be scrupulously avoided and care must be taken to keep them as simple as possible. Careful choice should be made of the cost unit i.e. the quantity for which cost will be computed e.g. a tonne of steel, a kg. of yarn etc.
- (d) **Elasticity:** The cost accounting system should be elastic and capable of adapting itself to altered circumstances.
- (e) **Comparability:** The records must be maintained in such a manner that the result of one period can be compared with the results of any other period. The records of the past must act as a guide for the future.
- (f) **Promptness:** Prompt recording of the relevant figures in analytical form is the sine qua non of costing. Arrangements should be made for the prompt supply of records by the various departments relating to raw material, stores, labour etc., and the data thus obtained, are promptly analysed and recorded.
- (g) **Observance of instructions:** The costing staff must carefully obey the instructions given to them and even slight deviations must be permitted.
- (h) **Periodical results:** In order to derive maximum benefit, it is advisable to have the results prepared periodically so that actual cost can be compared with estimated costs.
- (i) **Reconciliation with financial accounts:** The whole system should be so maintained as to make reconciliation with financial accounts easy and simple.

## PRACTICAL DIFFICULTIES IN INSTALLING A COSTING SYSTEM

1. **Lack of support from top management:** Many a times, the cost accounting system is introduced without the support of the top management in all the functional areas. Even managing director or chairman often introduces such system without consulting the departmental heads. This results in opposition from the various managers as they consider it is an interference on their activities.

2. **Resistance from the existing staff:** The existing financial accounting staff may offer resistance to the cost accounting system because of a feeling of their being declared redundant under the new system.

3. **Non-cooperation at other levels of organisation:** The foreman, supervisors and other staff may also resent the additional paper work and may not co-operate in providing the basic data which is absolutely essential for the success of the system.

4. **Shortage of trained staff:** There may be shortage of cost accountants to handle the work of cost analysis, cost control and cost reduction. The work of the costing department can not be handled with the availability of trained staff.

5. **Heavy costs:** The costing system will involve heavy costs unless it has been suitably designed to suit specific requirements.

To overcome this difficulties the following points are suggested:

1. Before the installation of a costing system, there must be firm commitment to the system on the part of the top management.
2. The existing accounting staff should be impressed about the need to supplement the existing financial accounting system.
3. The employees should be properly educated regarding the benefits which can be obtained from such a system.
4. The existing staff working in the accounts department must be properly trained in costing methods and techniques.
5. The costing system should be installed and operated according to the requirements of a specific case, so that it may not entail heavy cost to the organisation.
6. There should be proper supervision after installation and continuous efforts on the part of the cost accountant to make the system successful and to achieve the desired objectives.

## **ROLE OF COST ACCOUNTANT IN DECISION MAKING**

The outlook of modern business is such that all enterprises-whether large or small, manufacturing or non-manufacturing, public or private, profit or nonprofit-require a wide variety of cost data in making day-to-day operating decisions. Thus, for the modern cost accountant, the positive emphasis on analysis and interpretation) requires involvement in the dynamic phase of business-the current period and the future. The dynamic phase is concerned primarily with planning (i.e., selecting objectives and the means for their attainment) and controlling (i.e., achieving conformity to established plans). Cost Accountants collect, assimilate, collate and analyse all financial information related to an organization. Their main role is to ensure that managerial decisions are within cost prescriptions. They need to give a prediction about financial performance of any project. For this cost accountant considers many factors such as the cost of raw material, labour, transport and overheads, among others. He will be responsible for planning and executing effective management information and control systems, inventory control incorporating mathematical models, investment analysis, project management, internal audit, cost audit etc.

### **Cost Accountant plays one of the most important roles in the organization**

Cost accountant analyst performs one of the most important roles in the entire organization. It is really imperative that the companies pay a great emphasis on the job of an accountant analyst. Cost accountancy deals with the preparation of the various reports for the knowledge of the internal stakeholder.

All the decisions that are taken by the company management regarding the future of the company are based on the financial reports that are prepared by the cost accountants.

Cost Accountant performs action as under:

1. To analyze material, labor and the overhead expenses
2. To reconcile daily productions with accounting transactions
3. To coordinate with R&D for production of new items
4. To Assist the controller in developing cost improvement opportunities
5. To prepare the new product costing as well as do the gross profit analysis for the marketing in order to determine the feasibility and profitability before presenting the samples and pricing to the customers.

## MANAGEMENT ACCOUNTING

### INTRODUCTION

In every business enterprise, various transactions and events take place every day; sales are effected, purchases are made, expenses are met or incurred, payments are received and made, assets are sold and acquired. These events, arising out of the decisions and actions of management, exercise their effects and impact on the operational efficiency and position of the enterprise. Most of these transactions and events have money values or can be measured and expressed in money values. Since they affect the operation and position of the enterprise, they need to be measured, recorded, analysed and reported to the management, so that the management can evaluate their effect upon the enterprise.

As compared with financial accounting and cost accounting, management accounting is a later development. Management accounting links management with accounting. All such information that is useful to the management is the subject matter of management accounting. Any information required for decision making is the concern of management accounting. Management accounting, unlike financial accounting, provides information for internal users, though the basic data come from the same accounting system i.e., financial accounting and cost accounting systems.

Management accounting collects and provides accounting, cost accounting, economic and statistical information to the men at various managerial levels to assist them in the performance of managerial functions and their evaluations. It is the development and application of various techniques of recording, analysis, interpretation and presentation, making the financial, costing, and other data active and effective in the performance of managerial functions, viz., planning, decision-making and control. It should be noted that management accounting makes use of not only accounting techniques but also of statistical and mathematical techniques. Management accounting is forward looking and should, therefore, be able to treat economic information and data to make it suitable for use by the management.

### Evolution of Management Accounting



Managerial accounting has its roots in the industrial revolution of the 19th century. During this early period, most firms were tightly controlled by a few owner-managers who borrowed based on personal relationships and their personal assets. Since there were no external shareholders and little unsecured debt, there was little need for elaborate financial reports. In contrast, managerial accounting was relatively sophisticated and

provided the essential information needed to manage the early large scale production of textile, steel, and other products. After the turn of the century, financial accounting requirements grow rapidly because of new pressures placed on companies by capital markets, creditors, regulatory bodies, and federal taxation of income. Many firms needed to raise funds from increasingly widespread and detached suppliers of capital. To tap these vast reservoirs of outside capital, firms' managers had to supply audited financial reports. Because outside suppliers of capital relied on audited financial statements, independent accountants had a keen interest in establishing well defined procedures for corporate financial reporting. As a consequence, for many decades, management accountants increasingly focused their efforts on ensuring that financial accounting requirements were met and financial reports were released on time. The practice of management accounting stagnated. In the early part of the century, as product line expanded operations became more complex, forward looking companies saw a renewed need for management-oriented reports that was separate from financial reports. But in most companies, management accounting practices up through themid-1980s were largely indistinguishable from practices that were common prior to World War I. In recent years, however, new economic forces have led to many important innovations in management accounting

### **Definition of Management Accounting**

The management accounting team of Anglo-American Council on Productivity defined management accounting as:

“The presentation of accounting information in such a way as to assist management in the creation of policy and in day to day operation of an understanding”.

**American Accounting Association defines** management accounting as under:

“The application of appropriate techniques and concepts in processing historical and projected economic data of an entity to assist management in establishing plans for reasonable economic objectives and in the making of rational decisions with a view towards these objectives”.

**J Batty defines:**

“Management accounting is the term used to describe accounting methods, systems and techniques which coupled with special knowledge and ability, assists management in its task of maximising profits or minimising losses.”

**Brown and Howard define:**

“Management accounting is that aspect of accounting which is concerned with the efficient management of a business through the presentation of management of such information as will facilitate efficient and opportune planning and control.”

**Robert Anthony has defined** management accounting thus:

“Management accounting is concerned with accounting information which is useful to management”

**According to CIMA, London:** “Management accounting is an integral part of management concerned with identifying, presenting and interpreting information used for: (a) formulating strategy; (b) planning and controlling activities; (c) decision taking; (d) optimising the use of resources; (e) disclosure to shareholders and others external to the entity; (f) disclosure to employees; (g) safeguarding assets.

The above involves participation in management to ensure that there is effective: (i) formulation of plans to meet objectives (strategic planning); (ii) formulation of short-term operation plans (budgeting/profit; planning); (iii) acquisition and use of finance (financial management) and recording of transaction (financial accounting

and cost accounting); (iv) communication of financial and operating information; (v) corrective action to bring plans and results into line (financial control); (vi) reviewing and reporting on systems and operations (internal audit, management audit)."

If the meaning of 'managing' and 'accounting' are understood, the definition of management accounting becomes quite clear. The main objective of the management is to manage the company following a managing pattern comprised of formulation of plan, allocation of responsibilities for implementing the plan, organising procedures to assist in the execution of the plan, and control of the performance. To assist in this process, the accounting system provides to the management the following information viz. (1) data designed to assist in the formulation of a plan covering all business functions, (2) transform the project in quantitative terms with sources available to finance the project costs; (3) devise workable standards of performance matching to the responsibilities and measure the performance and assist in the revision/modification of the plan.

An analysis of the above definitions enables us to define management accounting as the processing and presenting of accounting, cost accounting and other economic data, both historical and projected, in such a way as would assist in the performance evaluation of managerial functions, viz. planning, decision-making and control. Processing and presenting of the data involves the use of techniques of cost accounting, budgetary control, standard costing, break-even analysis, ratio-analysis, funds and cash flow analysis, etc.

## **OBJECTIVE OF MANAGEMENT ACCOUNTING**

The fundamental objective of management accounting is to assist the management in carrying out its duties efficiently so that maximize profits or minimize losses of management. It includes computation of plans and budgets covering all aspects of the business. Example: production, selling, distribution, research and finance. Management accounting systematic allocate responsibilities for implementation of plans and budgets. It analysis of all transactions, financial and physical, to enable effective comparison to be made between the forecasts and actual performance.

The main objectives of management accounting are as follows:

### **1. To formulate Planning and policy**

Planning involves forecasting on the basis of available information, setting goals; framing polices determining the alternative courses of action and deciding on the program of activities. It facilitate the preparation of statements in the light of past results and gives estimation for the future.

### **2. To interpretation of financial documents**

Management accounting is to present financial information to the management. Financial information must be presented in such away that it is easily understood. It presents accounting information with the help of statistical devices like charts, diagrams, graphs, etc.

### **3. To assist in Decision-making process**

Management accounting makes decision-making process more scientific with the help of various modern techniques. Information/figure relating to cost, price, profit and savings for each of the available alternatives are collected and analyzed accordingly which will provide a base for taking sound decisions.

### **4. To help in control**

Management accounting is a helpful for managerial control. Management accounting tools e.g. standard

costing and budgetary control are helpful in controlling performance. Cost control is affected through the use of standard costing and departmental control is made possible through the use of budgets. Performance of each and every individual is controlled with the help of management accounting.

### **5. To provide report**

Management accounting keeps the management fully informed about the latest position of the concern through reporting. It helps management to take proper and quick decisions. It informs the performance of various departments regularly to the top management.

### **6. To Facilitate Coordination of Operations**

Management accounting provides tools for overall control and coordination of business operations. Budgets are important means of coordination.

## **NATURE OF MANAGEMENT ACCOUNTING**

The following aspects are considered as the nature of management accounting:

- (i) Management accounting is a decision making system: Management accounting provides accounting information in such a way as to assist management in the creation of policy and in the day-to-day operations. Though management accountant is not taking any decision but provides data which is helpful to management in decision making. It communicates a great variety of facts in a systematic and meaningful manner.
- (ii) Management accounting is futuristic: Management accounting unlike the financial accounting, deals with the future. It helps in planning the future-because decisions are always taken for the future course of action. In the decision making process management accounting provides selective and fruitful information out of the data collected.
- (iii) Management accounting is a technique of selective nature: Management accountant takes into account only those data from the financial statement and communicates to the management which is useful for taking decisions.
- (iv) Management accounting analyses different variables: Management accounting helps in analysing the reasons for variations in profit as compared to the past period. It analyses the effects of different variables on the profits and profitability of the concern.
- (v) Management accounting does not set particular formats for information: It provides necessary information to the management in the form which may be more useful to the management in taking various decisions on different aspects of the business.

## **SCOPE OF MANAGEMENT ACCOUNTING**

Management accounting includes financial accounting and extends to the operation of a system of cost accountancy, budgetary control and statistical data. While meeting the legal and conventional requirements regarding the presentation of financial statements, (profit and loss account, balance sheet and cash flow statements) it stresses emphasis upon the establishment and operation of internal controls. The scope of management accounting, inter alia includes:

1. Formation, installation and operation of accounting, cost accounting, tax accounting and information systems. Management accountant has to construct and reconstruct these systems to meet the changing needs of management functions.
2. The compilation and preservation of vital data for management planning. The accounts and the

document files are repository of vast quantities of details about the past progress of the enterprise, without which forecasts of the future is very hazardous for the enterprise. The management accountant presents the past data in such a way as to reflect the trends of events to the management. He is supposed to give his assessment of anticipated changes in relevant areas. Such information provides effective assistance in the planning process. At times the management accountant may be called upon to associate with and even supervise the actual planning process alongwith other members of the management team.

3. Providing means of communicating management plans to the various levels of organisation. This, on the one hand ensures the coordination of various segments of the enterprise plans and on the other defines the role of individual segments in the whole plan and assists the management in directing their activities.
4. Providing and installing an effective system of feed-back reports. This would enable the management in its controlling function. By pin-pointing the significant deviations between actual and expected activities, and by adhering to the principles of selectivity and relevance, such reports help in the installation and operation of the system of 'management by exceptions'. The management accountant is expected to analyse the deviation by reasons and responsibility and to suggest appropriate corrective measures in deserving cases.
5. Analysing and interpreting accounting and other data to make it understandable and usable to the management. It is only through such analysis and clarification that the management is enabled to place the various data and figures in proper perspective in the performance of its functions. Such analysis assists management in the location of responsibilities and to effect necessary changes in the organisational set up to achieve the objectives of the enterprise in a more efficient manner.
6. Assisting management in decision-making by (a) providing relevant accounting, other data and (b) analysing the effect of alternative proposals on the profits and position of the enterprise. Management accountant helps the management in a proper understanding and analysis of the problem in hand and presentation of factual information obviously in financial terms.
7. Providing methods and techniques for evaluating the performance of the management in the light of the objectives of the enterprises, thus assisting in the implementation of the principle of management by objectives.
8. Improving, modifying and sharpening the effectiveness of co-existing techniques of analysis. The management accountant should always think of increasing the practicability of existing techniques. He should be on the lookout for the development of new techniques as well.

Thus, management accounting serves not only as a tool in the hands of management, but also provides for a technique of evaluating the performance of the management itself. It operates as a double-edged sword assisting the management in proper performance of its functions of planning, decision-making and control, and at the same time, enabling the owners and other interested parties to evaluate and appraise the management of the enterprise.

## TOOLS AND TECHNIQUES OF MANAGEMENT ACCOUNTING

A number of tool and techniques have been used under management accounting to help management in achieving the desired goals. For this the management accountant normally uses the following tool and techniques:

- (i) **Financial Planning:** Financial planning is the process of deciding in advance about the financial activities necessary for the organisation to achieve the desired objectives. It includes determining

both long term and short term financial objectives, formulating financial policies and developing the financial procedures etc. Financial policies may relate to the determination of the capital requirement, sources of funds, determination and distribution of income, use of debt and equity capital and the determination of the optimum level of investment in various areas.

- (ii) **Financial Statement Analysis:** Financial statements are analysed to make data more meaningful. Comparative statement analysis, common size statement analysis, trend analysis, ratio analysis, cash flow analysis etc. are the major techniques of financial statement analysis used in management accounting.
- (iii) **Decision Making:** Management accounting helps the management through the techniques of marginal costing, differential costing, capital budgeting, cash flow analysis, discounted cash flow etc. to select the best alternative which will maximise the profits of the business.
- (iv) **Control Techniques:** Management should ensure that the plan formulated by it has been translated into action. Standard costing and budgetary control techniques are useful control techniques used by management.
- (v) **Statistical and Graphical Techniques:** Management accountant uses various statistical and graphical techniques in order to make the information more meaningful and presentation of the same in such a form so that it may help the management in decision making. The techniques of linear programming, statistical quality control, investment chart, sales and earning chart etc. are of vital use.
- (vi) **Reporting:** Management accountant prepares the necessary reports for providing information to the different levels of management by proper selection of data to be presented, organisation of data or selecting the appropriate method of reporting.

### RELATIONSHIP OF COST ACCOUNTING, FINANCIAL ACCOUNTING, MANAGEMENT ACCOUNTING AND FINANCIAL MANAGEMENT

Cost Accounting has been developed because of the limitations of Financial Accounting from the outlook of management control and internal reporting. Financial accounting executes the function of exposing a true and fair overall picture of the results or activities carried on by an enterprise during a period (via statement of profit and loss) and its financial position at the end of the year (via balance sheet). Also, on the basis of financial accounting, effective control can be exercised on the property and assets of the enterprise to ensure that they are not misused or misappropriated. To that extent financial accounting helps to assess the overall progress of a concern, its strength and weaknesses by providing the figures relating to several previous years.

Data provided by Cost and Financial Accounting is further used for the management of all processes associated with the efficient acquisition and deployment of short, medium and long term financial resources. Such a process of management is known as Financial Management. The objective of Financial Management is to maximize the wealth of shareholders by taking effective Investment, Financing and Dividend decisions. Investment decisions relate to the effective deployment of scarce resources in terms of funds while the Financing decisions are concerned with acquiring optimum finance for attaining financial objectives.

The last and very important 'Dividend decision' relates to the determination of the amount and frequency of cash which can be paid out of profits to shareholders. On the other hand, Management Accounting refers to managerial processes and technologies that are focused on adding value to organizations by attaining the effective use of resources, in dynamic and competitive contexts. Hence, Management Accounting is a



distinctive form of resource management which facilitates management's 'decision making' by producing information for managers within an organization.

## DIFFERENCE BETWEEN FINANCIAL ACCOUNTING AND COST ACCOUNTING

Both financial accounting and cost accounting are concerned with systematic recording and presentation of financial data. Financial accounting reveals profits and losses of the business as a whole during a particular period, while cost accounting shows, by analysis and localisation, the unit costs and profits and losses of different product lines. The main difference between financial accounting and cost accounting are summarised below:

- (1) Financial accounting aims at safeguarding the interests of the business and its proprietors and others connected with it. This is done by providing suitable information to various parties, such as shareholders or partners, present or prospective creditors etc. Cost accounting on the other hand, renders information for the guidance of the management for proper planning, operation, control and decision making.
- (2) Financial accounts are kept in such a way as to meet the requirements of the Companies Act, Income-tax Act and other statutes. On the other hand cost accounts are generally kept voluntarily to meet the requirements of management. But now the Companies Act has made it obligatory to keep cost records in some manufacturing industries.
- (3) Financial accounting emphasizes the measurement of profitability, while cost accounting aims at ascertainment of costs and accumulates data for this very purpose.
- (4) Financial accounts disclose the net profit and loss of the business as a whole, whereas cost accounts disclose profit or loss of each product, job or service. This enables the management to eliminate less profitable product lines and maximise the profits by concentrating on more profitable ones.
- (5) Financial accounting provides operating results and financial position usually gives information through cost reports to the management as and when desired.
- (6) Financial accounts deal mainly with actual facts and figures, but cost accounts deal partly with facts and figures and partly with estimates.
- (7) In case of financial accounts stress is on the ascertainment and exhibition of profits earned or losses incurred in the business. In cost accounts the emphasis is more on aspects of planning and control.
- (8) Financial accounting is concerned with historical records, while cost accounting is concerned with historical cost but also with pre-determined cost
- (9) Financial accounts are concerned with external transactions i.e. transactions between the business concern on one side and third parties on the other. These transactions form the basis for payment or receipt of cash. While cost accounts are concerned with internal transactions which do not form the basis of payment or receipt of cash.
- (10) The costs are reported in aggregate in financial accounts but costs are broken into unit basis in cost accounts.
- (11) Financial accounts do not provide information on the relative efficiencies of various workers, plants and machinery while cost accounts provide valuable information on the relative efficiencies of various plants and machinery.
- (12) Financial reports (profit and loss account and balance sheet) are prepared periodically – quarterly,

half yearly or annual basis. But cost reporting is a continuous process and may be daily, weekly, monthly etc.

### **DIFFERENCE BETWEEN FINANCIAL ACCOUNTING AND MANAGEMENT ACCOUNTING**

Financial accounting and management accounting both appear to be similar in as much as both study the impact of business transactions and events of the enterprise and report and interpret the results thereof. Both provide information for internal as well as external use. But management accounting, although having its roots in financial accounting differs from the latter in the following respects.

1. Financial accounting deals with the business transactions and events for the enterprise as a whole. Management accounting, in addition to the study of events in relation to the enterprise as a whole takes organisation in its various units and segments and attempts to trace the impact and effect of the business transactions and events through its various divisions and sub-divisions. Thus, while the financial statement - profit and loss account, balance sheet and cash flow statements reveal the overall performance and position of the enterprise. Management accounting reports emphasise on the details of operational costs, inventories, products, process and jobs. It traces the effect and impact of the business transactions and events on costs, inventories, processes, jobs and products.
2. Financial accounting is attached more with reporting the results and position of the business to persons and authorities other than management - Government, creditors, investors, owners, etc. At times, financial accounting follows window-dressing tactics in order to project a better than actual image of the enterprise. Management accounting is concerned more with generating information for the use of internal management and hence the information reflects the real or really expected position.
3. Financial accounting is necessarily historical. It records and analyses business events long after they have taken place. Management accounting analyses the events as they take place and also anticipates such events for the future. Thus, it uses data which generally has relevance to the future.
4. Since financial accounting data is historical in nature, it is more precise than the management accounting data, which generally reflects the expected future, and hence could only be an estimation. This provides the necessary rapidity to management accounting information.
5. The periodicity in reporting financial accounts is much wider than in case of management accounting. In financial accounting, generally, results are reported on year to year basis. In management accounting, weekly, fortnightly and even monthly reporting is used.
6. Financial accounting has to be governed by the "generally accepted principles". This is so because, it has to cater for the informational needs of the outsiders. It has to stick to the generally accepted methods of presentation of such information. Regarding the contents and form of information, financial accounting has to abide by the legal provisions also. Management accounting has not to worry about such legal and/or conventional constraints and the "generally accepted principles". It is free to formulate its own rules, procedures and forms, because the information it generates is solely for internal consumption. In management accounting fixed assets may be stated at appraisal values, overhead costs may be omitted from inventories or revenues may be recorded before realisation. Generally accepted principles of financial accounting do not permit such accounts. What is important in management accounting is the usefulness of the information for managerial functions rather than its general acceptability. The form and content of management accounting information differs according to the needs and purpose.

7. Financial accounting is a must in case of joint stock companies to meet the statutory provisions of company law and tax laws. Even in case of sole proprietorship and partnership firms financial accounting becomes a necessity for tax purposes. Management accounting, on the other hand, is entirely optional and its forms and contents depend upon the outlook of the management.
8. Financial statements prepared under financial accounting consists of monetary information only. Management accounting statements in addition to monetary information also consist non-monetary information, viz., quantities of materials consumed, number of workers, quantities produced and sold and so on.
9. Financial statements are required to be published and audited by statutory auditors. Management accounting statements are for internal use and thus neither published nor audited.

### **DIFFERENCE BETWEEN COST ACCOUNTING AND MANAGEMENT ACCOUNTING**

Cost accounting and management accounting both are internal to the organisation. Both have the same objectives of assisting management in its functions of planning, decision-making, controlling and techniques like budgetary control, standard costing and marginal costing owe their existence to cost accounting and have slipped into the kitbag of the management accountant. There is a good deal of overlapping in their functions. However, the two systems can be differentiated on the following grounds:

1. Cost accounting is concerned more with the ascertainment, allocation, distribution and accounting aspects of costs. Management accounting is concerned more with impact and effect aspect of costs.
2. Cost accounting data generally serves as a base to which the tools and techniques of management accounting can be applied to make it more purposeful and management oriented. Whereas, the management accounting data is derived both, from the cost accounts and financial accounts.
3. The management accountant places the data in a wider perspective than the cost accountant. This accounts for a greater degree of relevance and objectivity in management accounting than in cost accounting. It is the management accountant who is supposed to have a clear idea regarding the items and types of costs required to analyse and decide specific business problems and the effect of such costs on alternate solutions. A cost accountant is definitely helpful in collecting such costing data for the management accountant.
4. In the organisational set-up, management accountant generally is placed at a higher level of hierarchy than the cost accountant.
5. The approach of the cost accountant is much narrower than that of a management accountant, who may have to use certain economic and statistical data along with the costing data to enable the management to be more accurate the precise in its functions of planning, decision-making and control.
6. Management accounting, in addition to the tools and techniques, like variable costing, break-even analysis, standard costing, etc., available to cost accounting, also makes use of other techniques like cash flow, ratio analysis, etc., which are not within the scope of cost accounting.
7. Management accounting includes both financial accounting as well as cost accounting. It also embraces tax planning and tax accounting. Cost accounting does not include financial accounting and has nothing to do with tax accounting.
8. Management accounting is concerned equally with short-range and long-range planning and uses

highly sophisticated techniques like sensitivity analysis, probability structures, etc., in the planning and forecasting prices. Cost accounting is more concerned with short-term planning. Evaluation of capital investment projects is the speciality of management accountant.

9. Management accounting is concerned, both, with assisting management in its functions, as well as evaluating the performance of the management as an institution. Cost accounting is concerned merely with assisting in management functions and does not provide for the evaluation of the performance of management.
10. Cost accounting is mostly historical in its approach and it projects the past. Management accounting is futuristic in its approach. Management accounting is more predictive in nature than cost accounting.
11. Cost accounting system can be installed without management accounting. While management accounting cannot be installed without a proper cost accounting system.

### LIMITATIONS OF MANAGEMENT ACCOUNTING

The management accountant has the responsibility of producing and providing dependable accounting and other relevant data for the use of management. The data provided, if it has to be really effective in the management process, must be: (1) relevant and precise, (2) consistent and comparable, (3) presented in an appropriate and understandable form, (4) provided at appropriate time intervals, and (5) provided to meet the needs of various levels of management. The management accountant is expected to keep in mind the above points while producing his product. However, the information and reports presented by management accountant still suffers from the following limitations:

- (1) Different meaning of the same term: In accounting different terms carry different meanings under different set of circumstances and conditions. Such meanings and figures may superficially resemble one another and a person who is not, familiar with them may easily become confused or frustrated. The most common source of confusion is the word 'cost'. There are historical costs, full costs, direct costs, variable costs, standard costs, original costs, residual costs, net costs, differential costs, opportunity costs, estimated cost and incremental costs. Some of these terms are synonymous, others are not exactly synonymous through resembling each other, still others, although not synonymous at all, may be used as if they were synonymous. In order to avoid such confusion and misunderstanding, the management accountant should in approaching a specific problem, define, as carefully and clearly as possible, the meaning in which such words are being used. He should as far as possible be consistent in prescribing the meanings to such terms.
- (2) Approximations: Management accounting data cannot be completely accurate in all respects. A good deal of approximation is involved in the compilation and preparation of such data. The smaller the time gap between the happening and reporting of an event, the greater will be the approximation. In addition, in the working out of the estimates and future costs, approximation has to be resorted to. Even in case of historical data, the cost and time required for accuracy may be prohibitive and compel the management accountant to do some approximations. Therefore, while using the information provided by the management accountant, the management must be aware of the degree of approximation. The management accountant should follow a consistent practice in matters of approximations.
- (3) Incompleteness of the data: Management accountant can provide only the quantitative data as far as available, to the management. Business problems and their decisions often require additional quantitative as well as qualitative data which may be outside the purview of the management

accountant. For example, the management accounting data will not disclose the extent to which the quality and utility of a product is affected by the changes in materials or methods of production. The management should guard itself against the belief that problems could be completely solved by numerical analysis. The management accountant should point out as far as possible, the qualitative factors relevant for decision-making in each case.

- (4) Importance of proper management action: A management accountant may provide information and figures in most appropriate form to the management. But figures themselves are nothing more than marks on pieces of paper, and by themselves they accomplish nothing. Anything that the business accomplishes is the result of action of the people. Figures can only assist people in the organisation in various ways. It is the management and the people in the organisation who are to use the figure by understanding their language and act accordingly. The same set of figures, if not acted upon by the management, becomes useless or if misunderstood by the management, may lead to unwise actions.

### CONFLICTS IN PROFIT VERSUS VALUE MAXIMISATION PRINCIPLE



A process that businesses undergo to determine the best output and price levels in order to maximize its income. The business will usually adjust influential factors such as production costs, sale prices, and output levels as a way of reaching its profit goal. There are two main profit maximization methods used, and they are Marginal Cost-Marginal Revenue Method and Total Cost-Total Revenue Method. In economics, profit maximization is the short run or long run process by which a firm determines the price and output level that returns the greatest profit.

The wealth maximization is now redefined as value maximization, since the goal of management is to maximize the present wealth of the owners, i.e., equity shareholders of a company. A company's equity shares are actively traded in the stock exchanges, the wealth of the equity shareholders is represented in market value of the equity shares. The prime goal of the organisation is to maximize the market value of equity shares of the company. The shareholders wealth is maximized only when the market value of the shares is maximized.

The modern approach of management accounting focuses on wealth maximization rather than profit maximization. This gives a longer term horizon for assessment, making way for sustainable performance by businesses. A narrow-minded person or business is mostly concerned about short term benefits. A short term horizon can fulfil objective of earning profit but may not help in creating wealth. It is because wealth creation needs a longer term horizon. Therefore, management emphasizes on wealth maximization rather than profit maximization. For a business, it is not necessary that profit should be the only objective; it may concentrate on various other aspects like increasing sales, capturing more market share etc, which will take care of profitability. So, we can say that profit maximization is a subset of wealth and being a subset, it will facilitate wealth creation.

Giving priority to value creation, managers have now shifted from traditional approach to modern approach that focuses on wealth maximization. This leads to better and true evaluation of business. For e.g., under wealth maximization, more importance is given to cash flows rather than profitability. As it is said that profit is a relative term, it can be a figure in some currency, it can be in percentage etc. For e.g. a profit of ₹ 2 crore cannot be judged as good or bad for a business, till it is compared with investment, sales etc. Similarly, duration of earning the profit is also important i.e. whether it is earned in short term or long term.

In wealth maximization, major emphasizes is on cash flows rather than profit. So, to evaluate various alternatives for decision making, cash flows are taken under consideration. For e.g. to measure the worth of

a project, criteria like: “present value of its cash inflow – present value of cash outflows” (net present value) is taken. This approach considers cash flows rather than profits into consideration and also use discounting technique to find out worth of a project. Thus, maximization of wealth approach believes that money has time value.

At times, wealth maximization may create conflict, known as agency problem. This describes conflict between the owners and managers of firm. As, managers are the agents appointed by owners, a strategic investor or the owner of the firm would be majorly concerned about the longer term performance of the business that can lead to maximization of shareholder’s wealth. Whereas, a manager might focus on taking such decisions that can bring quick result, so that he/she can get credit for good performance. However, in course of fulfilling the same, a manager might opt for risky decisions which can put the owner’s objectives on stake.

Hence, a manager should align his/her objective to broad objective of organization and achieve a trade-off between risk and return while making decision; keeping in mind the ultimate goal of management i.e. to maximize the wealth of its current shareholders

### **ROLE OF MANAGEMENT ACCOUNTANT IN DECISION MAKING**

Depending upon the company situation - size, nature and organisational set up and his own capabilities and position in the company, the management accountant may be required to perform various and varied functions. The importance and effectiveness of his function would also depend upon the confidence reposed in him by the top management and the functional managers. His functions generally embrace each and every activity of the management which can be summarized as follows:

1. Management Accountant establishes, coordinates and administers plans to facilitate the forecasting of sales, expense budgets and cost standards that will permit profit planning, capital budgeting and financing.
2. He will formulate accounting policy and procedures. Operating data and special reports must be prepared so that the performance can be compared with plans and standards, and any variance between actual operations and pre-determined standards can be analysed for corrective actions by management. Such comparisons between actual and expected activities should help the management in proper fixation of responsibility and also in the evaluation of the various functional and divisional heads.
3. Management Accountant is responsible for the protection of the business assets to the extent possible by external controls, internal auditing and insurance coverage.
4. He will be responsible for tax policies and procedures and will supervise and coordinate the reports required by various authorities.
5. Management Accountant must continually be aware of economic and social forces as well as the effect of governmental policies and actions on business activities.

An analysis of the above list (obviously not exhaustive) of functions, reflects the status of a management accountant. He is the principal officer incharge of the accounts of the company. He shall be responsible to the Board of directors for the maintenance of adequate accounting procedures and records on the operation of the business. He shall be responsible to the president or the chairman of the board with respect to the administration of his office. He shall perform such other duties and functions as may from time to time be assigned to him by the president or chairman of the board or the Board of directors. Thus, in his broad functional activities, the management accountant is responsible to the policy making group of top management, whereas, in his administrative activities he is responsible to the top executive officer.

## LESSON ROUND UP

- Cost is the amount of expenditure (actual or notional) incurred on, or attributable to a specified thing or activity.
- Costing is the techniques and processes of ascertaining costs.
- Cost accounting is the establishment of budgets, standard costs and actual costs of operations, processes, activities or products, and the analysis of variances, profitability or the social use of funds.
- Principles of cost accounting are - cost should be related to its cause; cost should be charged only after it has been incurred; the convention of prudence should be ignored; abnormal costs should be excluded from cost accounts; past costs not to be charged to future period; principles of double entry should be applied wherever necessary.
- Costing is an aid to management, creditors, employers and national economy.
- Costs have been classified by - time, nature or elements, degree of traceability to the product, association with the product, changes in activity or volume, function, relationship with accounting period, controllability, cost for analytical and decision-making purposes, etc.
- Cost centre means, a production or service location, function, activity or item of equipment whose costs may be attributed to cost units.
- Cost unit is a unit of product or service in relation to which costs are ascertained.
- Techniques of costing includes - historical or conventional costing, standard costing, marginal costing, uniform costing, direct costing, absorption costing, and activity based costing.
- Methods of costing covers - job costing, contract costing, batch costing, terminal costing, operation costing, process costing, unit costing, operating costing, multiple or composite costing, departmental costing, etc.
- Cost Accounting Standards (CAS) had been issued by the Institute of Cost Accountants of India. Till date 15 CAS had been released.
- Management accounting is an integral part of management concerned with identifying, presenting and interpreting information used for: (a) formulating strategy; (b) planning and controlling activities; (c) decision taking; (d) optimising the use of resources; (e) disclosure to shareholders and others external to the entity; (f) disclosure to employees; (g) safeguarding assets.
- The tools and techniques of management accounting includes - financial planning, financial statement analysis, marginal costing, differential costing, capital budgeting, cash flow analysis, standard costing and budgetary control, techniques of linear programming, statistical quality control, investment chart, sales and earning chart, etc.
- Financial accounting, cost accounting and management accounting are distinct from each other.

## SELF TEST QUESTIONS

1. "The term 'cost' must be qualified according to its context". Discuss this statement referring to important concepts of cost.
2. Distinguish between costing and cost accounting or Costing' and 'cost accounting' are the same.
3. "Financial accounting treats costs very broadly while the cost accounting does this in much greater detail" Explain this statement and state the limitations of financial accounting.
4. Define costing and discuss the objectives of cost accounting. What are the methods of costing that are used in cost accounting ?
5. Cost accounting assists: (a) in controlling efficiency; (b) in pricing products; and (c) in providing a basis for operating policy. Amplify these points, giving reasons for your views.

6. State the advantages that may be derived from a sound system of cost accounting.
7. What do you mean by elements of cost ? Discuss the various elements of cost.
8. Define and explain the terms (a) cost centre and (b) cost unit.
9. You have been asked to design a system of cost accounting for installation in a factory. Describe the essentials that should be considered before you design such a system.
10. Write note on the following, indicating in which kinds of industries or undertakings, the different methods could be suitably applied:
  - (i) Single or output costing
  - (ii) Process costing
  - (iii) Operating Costing
11. What methods of costing would you apply in the following industries ? State how cost should be ascertained in each case ?
  - (i) Building,
  - (ii) Colliery,
  - (iii) Soap works,
  - (iv) Motor cars,
  - (v) Radio sets,
  - (vi) Ship building.
12. State, with reason in brief whether the following statements are true or false :
  - (i) Cost Accounting is not needed by a non-profit organisation such as a hospital.
  - (ii) Notional costs and imputed costs mean the same thing.
  - (iii) Rent on owned building is included in cost accounts (June, 2009).
  - (iv) Notional costs are not included while ascertaining costs.
  - (v) Conversion costs and overheads are interchangeable terms.
  - (vi) The method of costing used in a refinery is "operating costing". (December,2010)
  - (vii) Cost reduction is cost control. (December, 2008)
  - (viii) Cost accounting is a branch of financial accounting. (December, 2008)
  - (ix) In cost accounting, like financial accounting, absolute accuracy is aimed at.
  - (x) All materials and stores such as lubricating oil, will be direct.
  - (xi) Opportunity cost is recorded in the books of account. (December,2010)

**[True : (ii), (iii) only].**
13. Explain briefly the meaning, nature and scope of management accounting.
14. Discuss the importance and limitations of management accounting for managerial decision-making.
15. Explain the tools and techniques of management accounting.
16. Distinguish between
  - (a) Cost accounting and management accounting (June,2011)
  - (b) Management accounting and financial accounting
  - (c) Bin Card and Store Ledger (June, 2011)







# Lesson 2

## MATERIAL COST

### LESSON OUTLINE

- **Inventory Control:**
  - Objectives
  - Technique
- Procurement Procedures and Documentation
- Methods of Purchasing
- Procedure of Purchases,
- Pricing of Store Receipt
- Store keeping and its functions
- Classification and Codification of Materials
- Stock Verification
- Methods of Pricing of Material:
  - Cost Price Method
  - Average Price Method
  - Notional Price Method
- Pricing of Material Return
- Accounting of Material Losses:
  - Wastage, Scrap, Spoilage and Defectives
- Control of Material Losses
- Inventory Management:
- Lesson Round Up
- Self Test Questions

### LEARNING OBJECTIVES

Material is very important part of the cost of a product. In some cases, it constitutes 80% of the total cost of the product. It is very important to have an effective inventory management system. Good inventory management is essential since it is responsible for planning and controlling inventory from the raw material stage at a company to the inventory of delivered finished goods.

The objectives of the lesson are to help the user:

1. Learn about inventory management policies and objectives.
2. Use inventory management tools and techniques.
3. Review financial analysis of inventory management.

After going through this lesson, one should be able to—

1. Understand what is meant by an inventory.
2. Identify some of the advantages and disadvantages of keeping inventory in an operation.
3. Understand the basic principles behind the quantitative approaches to deciding how much inventory to keep.
4. Describe the limitations of traditional quantitative models of inventory decision making.
5. Identify the two main approaches to managing inventory on an on-going basis.

“Inventory is a very expensive asset that can be replaced with a less expensive asset called ‘information’. In order to do this, the information must be timely, accurate, reliable, and consistent. When this happens, you carry less inventory, reduce cost and get products to customers faster.”

– J.David Viale

## INVENTORY CONTROL (MATERIAL CONTROL)

Inventory control is the systematic control and regulation of purchase, storage and usage of materials in such a way as to maintain an even flow of production and at the same time avoiding excessive investment in materials. Efficient material control reduces losses and wastages of materials that otherwise pass unnoticed.

Inventory control is the core of materials management. The need and importance of material varies in direct proportion to the idle time cost of men and machinery and the urgency of requirements. If men and machinery in the factory could wait and so could customers, materials would not lie in want for then and no inventories, need be carried. But it is highly uneconomical to keep men and machines waiting and the requirements of modern life are so urgent that they cannot wait for materials to arrive after the need for them has arisen. Hence firms must carry materials.

Because materials constitute a significant part of the total production cost of a product and since this cost is controllable to some extent, proper planning and controlling of inventories are of great importance. Material control is a planned method of determining what to indent, so that purchasing and storing cost are minimum without affecting production or sales. Without proper control, materials have a tendency to grow beyond economic limits. Funds are tied up unnecessarily in surplus stores and stocks, productive operations are stalled, and finances of the plant are severely strained. Lack of control over material also leads to excessive consumption and wastage as operatives are liable to become careless with irrational supply of materials.

## OBJECTIVES OF INVENTORY CONTROL

Scientific control of materials should serve the following purposes:

- (i) To provide continuous flow of required materials, parts and components for efficient and uninterrupted flow of production.
- (ii) To minimise investment in inventories keeping in view operating requirements.
- (iii) To provide for efficient store of materials so that inventories are protected from loss by fire and theft and handling time and cost are kept at a minimum.
- (iv) To keep surplus and obsolete items to minimum.

It might seem obvious that inventory control is efficient as long as material level is going down. Materials should increase or decrease in amount and time as related to sales requirements and production schedules.

Responsibility for control of materials is that of the top management, though decisions in this regard might well be based upon the combined judgment of the production manager, controller, the sales manager and the purchasing manager. This is desired in view of the financial considerations involved in the problem and also because of need for coordinating the different kinds of materials and conflicting view points of different departments. For example, sales manager, purchasing executive and production manager usually favour, though for different reasons, the policy of carrying larger amount of stock whereas the financial manager will prefer to keep investment in material at the lowest possible level. However, in a large number of organisations material control is generally made the specific responsibility of purchasing department.

## TECHNIQUES OF INVENTORY CONTROL

The following are the common techniques of inventory control:

- (i) Min-max Plan

- (ii) The Two-bin System
- (iii) Order Cycling System
- (iv) ABC Analysis
- (v) Fixation of various levels
- (vi) Use of Perpetual Inventory System and Continuous Verifications
- (vii) Use of Control Ratios
- (viii) Review of Slow and Non-moving Items.

### **(i) MIN-MAX PLAN**

It is one of the oldest methods of material control. Under this plan the analyst lays down a maximum and minimum for each stock item keeping in view its usage, requirements and margin of safety required to minimize risks of stock-outs. The minimum level establishes the reorder point and order is placed for that quantity of material which will bring it to the maximum level.

The method is very simple and based upon the premise that minimum and maximum quantity limits for different items can fairly be well defined and established. Considerations like economic order quantity and identification of high value and critical items of stock for special management attention are not cared for under this plan.

### **(ii) THE TWO-BIN SYSTEM**

The basic procedure used under this system is that for each item of stock, two piles, bundles, or bins are maintained. The first bin stocks that quantity of material which is sufficient to meet its usage during the period that elapses between receipt of an order and the placing of the next order. The second bin contains the safety stock and also the normal amount used from order to delivery date. The moment stock contained in the first bin is exhausted and the second bin is tapped, a requisition for new supply is prepared and submitted to the purchasing department. Since no bin-tag (quantity record of materials) card is maintained, there is absence of perpetual material record under this bin.

### **(iii) ORDER CYCLING SYSTEM**

In the order cycling system, quantities in hand of each item or class of stock is reviewed periodically say, 30, 60 or 90 days. If in the course of a scheduled periodic review it is observed that the stock level of a given item will not be sufficient till the next scheduled review keeping in view its probable rate of depletion, an order is placed to replenish its supply. Review period will vary from firm to firm and also among different materials in the same firm. Critical items of stock usually require a short review cycle. Order for replenishing a given stock item, is placed to bring it to some desired level which is often expressed in relation to number of day's or week's supply.

The scheduled periodic review plan does not consider differences in rates of usage for different items of stock with the result that items whose usage has declined will have surplus stock whereas for some items rate of depletion might have increased to the extent that their stock is exhausted much before the next review date. Moreover, the system tends to make procurement and purchasing activities reach their peak around the review dates.

**(iv) ABC ANALYSIS**

With the numerous parts and materials that enter into each and every industrial product, material control lends itself, first and foremost, to a problem of analysis. Such analytical approach is popularly known as ABC analysis (Always Better Control), which is believed to have originated in the 'General Electric Company' of America. ABC plan is based upon segregation of materials for selection control. It measures the money value, i.e., cost significance of each material item in relation to total cost and material value. The logic behind this kind of analysis is that the management should study each item of stock in terms of its usage, lead time, technical or other problems and its relative money value in the total investment in inventories. Critical, i.e., high value items deserve very close attention, and low value items need to be devoted minimum expense and effort in the task of controlling inventories.

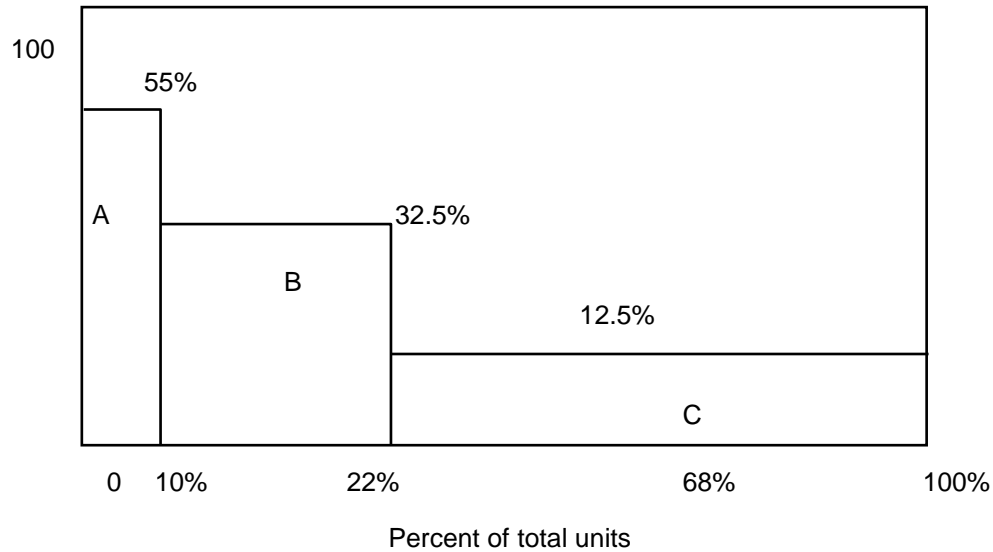
Under ABC analysis, the different items of stock may be ranked in order of their average material investment or on the basis of their annual rupee usage. The important steps involved in segregating materials or inventory control are:

- (i) Find out future use of each item of stock in terms of physical quantities for the review forecast period.
- (ii) Determine the price per unit for each item.
- (iii) Determine the total project cost of each item by multiplying its expected units to be used by the price per unit of such item.
- (iv) Beginning with the item with the highest total cost, arrange different items in order of their total cost as computed under step (iii) above.
- (v) Express the units of each item as a percentage of total costs of all items.
- (vi) Compute the total cost of each item as a percentage of total costs of all items.

If it is convenient different items may be classified into only three categories and labelled as A, B, and C respectively depending upon whether they are high value items, middle value items or low value items. If need be, percentage of different items may be plotted on a chart. The entire working of ABC analysis may be explained with the help of the following simplified example:

**Example****ABC Analysis**

<i>Items</i>	<i>Unit</i>	<i>% of total</i>	<i>Cost per unit</i>	<i>Total Cost</i> ₹	<i>% of total cost</i> ₹
1	400	4	50.00	20,000	25.0
2	600	6	40.00	24,000	30.0
3	1,000	10	14.00	14,000	17.5
4	1,200	12	10.00	12,000	15.0
5	2,800	28	2.00	5,600	7.0
6	<u>4,000</u>	40	<u>1.10</u>	<u>4,400</u>	<u>5.5</u>
	<b>10,000</b>		<b>100.0</b>	<b>80,000</b>	<b>100.0</b>



**Graphical Presentation of ABC Plan**

### **(v) FIXATION OF VARIOUS LEVELS**

#### **Fixation of Norms of Inventory Holdings**

Either the top management or by Materials department set the norms for inventories. The top management usually sets monetary limits for investment in inventories. The materials department has to allocate this investment to the various items and ensure the smooth operation of the concern. A number of factors enter into consideration in the determination of stock levels for individual items for the purpose of control and economy. Some of them are:

1. Lead time for deliveries.
2. The rate of consumption.
3. Requirements of funds.
4. Keeping qualities, deterioration, evaporation etc.
5. Storage cost.
6. Availability of space.
7. Price fluctuations.
8. Insurance cost.
9. Obsolescence price.
10. Seasonal consideration of price and availability.
11. EOQ (Economic Order Quantity), and
12. Government and other statutory restriction

Any decision involving procurement storage and uses of item will have to be based on an overall appreciation of the influence of the critical ones among them. Material control necessitates the maintenance of inventory of every item of material as low as possible ensuring at the same time, its availability as and

when required for production. These twin objectives are achieved only by a proper planning of inventory levels. If the level of inventory is not properly planned, the results may either be overstocking or under stocking. If a large stock of any item is carried it will unnecessarily lock up a huge amount of working capital and consequently there is a loss of interest. Further, a higher quantity than what is legitimate would also result in deterioration. Besides there is also the risk of obsolescence if the end product for which the inventory is required goes out of fashion. Again, a large stock necessarily involves an increased cost of carrying such as insurance, rent handling charges. Under stocking which is other extreme, is equally undesirable as it results in stock outs and the consequent production holds ups. Stoppage of production in turn, cause idle facility cost. Further, failure to keep up delivery schedules results in the loss of customers and goodwill. These two extreme can be avoided by a proper fixation of two important inventory level viz, the maximum level and the minimum level. The fixation of inventory levels is also known as the demand and supply method of inventory control. Generally the organisation fixes following stock levels:

- (a) **Maximum Level:** This represents the minimum quantity above which stocks should not be held at any time.
- (b) **Minimum Level:** This represents the minimum quantity of stock that should be held at all times.
- (c) **Danger Level:** Normal issues of stock are usually stopped at this level and made only under specific instructions.
- (d) **Ordering Level:** It is the level at which indents should be placed for replenishing stocks.
- (e) **Ordering Quantity:** It is the quantity that is ordered.

#### **(a) Maximum Level:**

It is normally a matter of policy. The various factors that should be taken into consideration are:

- (a) Capital Outlay: Investment to be made in stores, raw materials and other bulk items is an important consideration.
- (b) Available storage space for material.
- (c) Storage and insurance cost of material.
- (d) If certain goods are subject to obsolescence, the spare parts and components etc. of such products stocked should be limited.
- (e) Consumption of material periodically i.e. monthly, annually.
- (f) Lead time for delivery of material.
- (g) Certain goods are seasonal in nature and can be purchased only during specific period. Hence maximum level will be fixed for each season.
- (h) Price advantage arising out of bulk purchases should be availed.
- (i) The Economic Order Quantity also influences the maximum level.

Maximum stock level can be computed as follows:-

$$\text{Maximum stock level} = \text{Re-order level} + \text{Re-ordering quantity} - (\text{Minimum consumption} \times \text{Minimum re-order period}).$$



**(b) Minimum Level**

The minimum level is also a matter of policy and is based on :

- (a) Consumption of material periodically i.e. monthly, annually.
- (b) Lead time for delivery of material.
- (c) The production requirement.
- (d) The minimum quantity that could be advantageously purchased.
- (e) If an item is made to order then no minimum level is necessary.

The minimum stock level can be computed as follows:

$$\text{Minimum level} = \text{Re-order level} - (\text{Normal consumption} \times \text{Normal re-order period}).$$

**(c) Danger or Safety Level**

Material consumption varies from day to day, week to week and hence accurate forecasting is not possible. A safety or reserve stock is kept to avoid stock-out. The desirable safety stock level is that amount which minimises stock-out costs and also the carrying costs.

This level is a level of stock between the minimum level and nil stock. It is calculated for those items which can be utilised for multiple orders or products. The store-keeper usually does not issue once the danger level is reached. Usually priority is given to some order/product for the use of these items. This level is fixed up specially for control of production so that priority items can be produced.

This level is sometimes fixed above the minimum level. In this case, this level is preventive. If the level is below the minimum level, this level is corrective.

The safety stock level can be computed as follows:

$$\text{Safety stock level} = \text{Ordering level} - (\text{Average rate of consumption} \times \text{Re-order period})$$

OR

$$(\text{Maximum rate of consumption} - \text{Average rate of consumption}) \times \text{Lead time}$$

**(d) Ordering Level**

The annual consumption of an item and the time lag between ordering and receiving can be collected from past records. Based on these facts and policies, the ordering level and ordering quantity can be calculated, as follows:

$$\text{Ordering level} = \text{Minimum level} + \text{Consumption during time lag period}$$

OR

$$\text{Maximum consumption} \times \text{Maximum re-order period.}$$

OR

$$\text{Maximum consumption} \times \text{Lead time} + \text{Safety Stock}$$

The ordering level should be fixed so that when an indent is placed at the ordering level, the stock reaches the minimum level when the replenishment is received. The ordering level is calculated from the following factors:

- (a) The expected usage
- (b) The minimum level
- (c) The lead time.

The order point is calculated keeping in mind the worst conditions so that minimum stock is always maintained.

### **Illustration 1**

Materials X and Y are used as follows:

Minimum usage – 50 units each per week

Maximum usage – 150 units each per week

Normal usage – 100 units each per week

Ordering quantities X = 600 units

Y = 1,000 units

Delivery period X = 4 – 6 weeks

Y = 2 – 4 weeks

Calculate for each material (i) Maximum level (ii) Minimum level and (iii) Ordering level.

### **Solution:**

#### Material X

$$\begin{aligned}\text{Ordering level} &= \text{Maximum usage} \times \text{Maximum delivery period} \\ &= 150 \times 6 \\ &= 900 \text{ units.}\end{aligned}$$

$$\begin{aligned}\text{Minimum level} &= \text{Ordering level} - (\text{Normal usage} \times \text{Normal delivery period}) \\ &= 900 - (100 \times 5) \\ &= 400 \text{ units}\end{aligned}$$

$$\begin{aligned}\text{Maximum level} &= (\text{Ordering level} + \text{Ordering quantity}) - \\ &\quad (\text{Minimum usage} \times \text{Minimum delivery period}) \\ &= 900 + 600 - (50 \times 4) \\ &= 1,500 - 200 \\ &= 1,300 \text{ units}\end{aligned}$$

#### Material Y

$$\begin{aligned}\text{Ordering Level} &= \text{Maximum usage} \times \text{Maximum delivery period} \\ &= 150 \times 4 = 600 \text{ units}\end{aligned}$$

$$\begin{aligned}\text{Minimum Level} &= \text{Ordering level} - (\text{Normal usage} \times \text{Normal delivery} \\ &\quad \text{period}) \\ &= 600 - (100 \times 3) = 300 \text{ units.}\end{aligned}$$

$$\begin{aligned}\text{Maximum Level} &= (\text{Ordinary level} + \text{Ordering quantity}) - (\text{Minimum usage} \times \text{Minimum delivery period}) \\ &= 600 + 1,000 - (50 \times 2) \\ &= 1,600 - 100 = 1,500 \text{ units.}\end{aligned}$$

Normal delivery period has been computed as follows:

$$\text{Material X} = \frac{4+6}{2} = 5 \text{ weeks}$$

$$\text{Material Y} = \frac{2+4}{2} = 3 \text{ weeks}$$

### (e) Ordering Quantity or Economic Ordering Quantity

The basic problems of material control are two viz., what quantity of an item should be ordered at a time and when should an order be placed. While deciding economic ordering quantity, the efforts are directed to ascertain the ideal order size. While deciding the ideal order size, factors such as material carrying charges and the ordering cost associated with the placement of purchase orders are to be considered; the total of both has to be minimised. The material carrying charges include interest on the capital invested in the stores of materials, rent for the storage space, salaries and wages of the store-keeping department, any loss due to pilferage and deterioration, stores insurance charges, stationery, etc. used by the stores, taxes on inventories, etc. Ordering costs may include rent for the space used by the purchasing department, the salaries and wages of officers and staff in the purchasing department, the depreciation on the equipment and furniture used by the department, postage, telegraph charges and telephone bills, the stationery and other consumables required by the purchasing department, any travelling expenditure incurred, and the costs of inspection etc., on receipt of material.

The optimum ordering quantity, i.e., the quantity for which the cost of holding plus the cost of purchasing is the minimum is known as Economic ordering Quantity and is calculated by the following formula:

$$\text{E.O.Q.} = \sqrt{\frac{2U \times P}{S}}$$

Where,

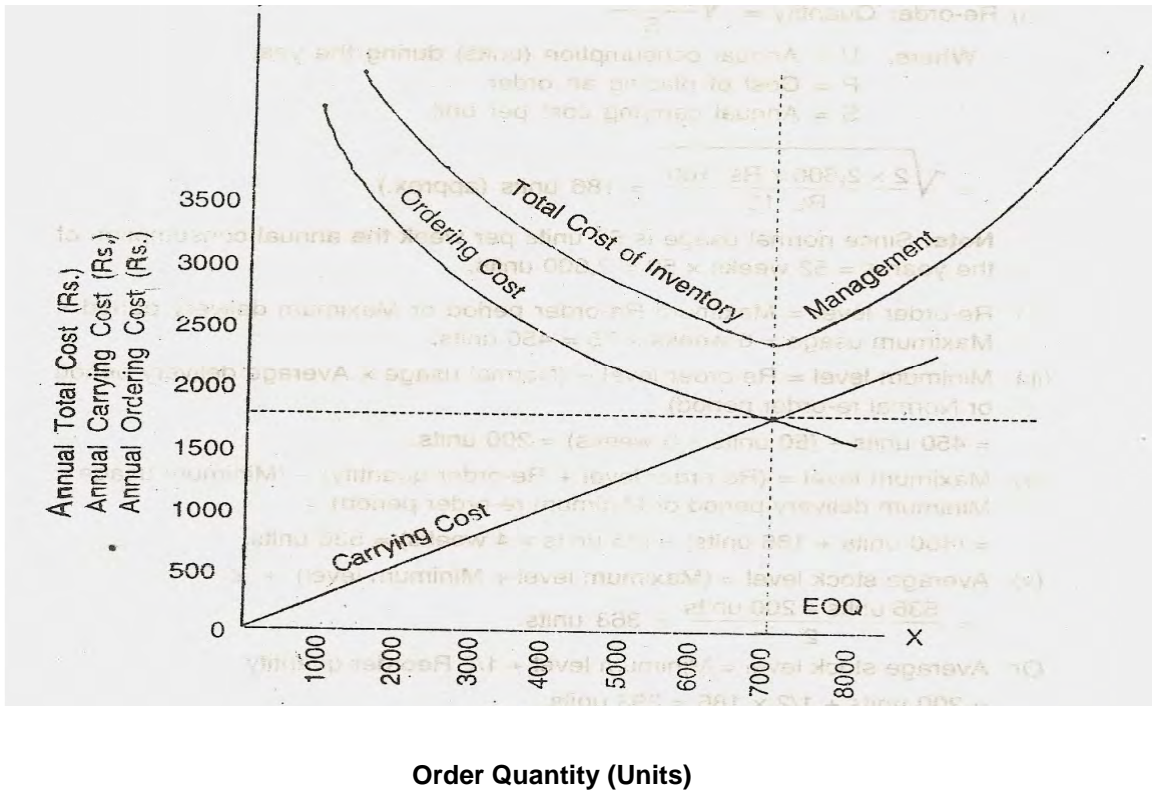
E.O.Q. = Economic Ordering Quantity

U = Annual consumption (units) during the year

P = Cost of placing an order

S = Annual cost of storage of one unit.

While deciding the question as to what should be the economic ordering quantity one has to ensure that the cost incurred should be minimum. An ideal order size, therefore, is at the quantity where the cost is minimum i.e., cost of holding the stock and ordering cost intersect each other. This is graphically shown hereunder:



**Order Quantity (Units)**

### Illustration 2

Ace Ltd. manufactures a product and the following particulars are collected for the year ended March, 2013:

— Monthly demand (units)	250
— Cost of placing an order (₹)	100
— Annual carrying cost (₹ per unit)	15
— Normal usage (units per week)	50
— Minimum usage (units per week)	25
— Maximum usage (units per week)	75
— Re-order period (weeks)	4–6

You are required to calculate:

- (i) Re-order quantity
- (ii) Re-order level
- (iii) Minimum level
- (iv) Maximum level
- (v) Average stock level.

### Solution:

(i) Re-order Quantity =  $\sqrt{\frac{2U \times P}{S}}$

Where, U = Annual consumption (units) during the year

P = Cost of placing an order

S = Annual carrying cost per unit

$$= \sqrt{\frac{2 \times 2,600 \times \text{Rs.}100}{\text{₹}15}} = 186 \text{ units (approx.)}$$

**Note:** Since normal usage is 50 units per week the annual consumption of the year is = 52 weeks x 50 = 2,600 units.

- (ii) Re-order level = Maximum Re-order period or Maximum delivery period x Maximum usage = 6 weeks x 75 = 450 units.
- (iii) Minimum level = Re-order level – (Normal usage x Average delivery period or Normal re-order period)  
= 450 units – (50 units x 5 weeks) = 200 units.
- (iv) Maximum level = (Re-order level + Re-order quantity) - (Minimum usage x Minimum delivery period or Minimum re-order period)  
= (450 units + 186 units) – (25 units x 4 weeks) = 536 units.
- (v) Average stock level = [(Maximum level + Minimum level) ] ÷ 2  
 $\frac{536 \text{ units} + 200 \text{ units}}{2} = 368 \text{ units.}$
- Or Average stock level = Minimum level + 1/2 Reorder quantity  
= 200 units + 1/2 x 186 = 293 units.

### Illustration 3

A factory requires 1,500 units of an item per month. The cost of each unit is ₹27. The cost per order is ₹150 and material carrying charge works out to 20% of the average material. Find out the economic order quantity (EOQ) and ascertain the number of orders to be placed per year. Would you accept a 2% price discount on a minimum supply of 1,200 units?

### Solution:

#### When No Discount is Available

Annual requirement 1500 units x 12 = 18,000 units

$$\begin{aligned} \text{EOQ} &= \sqrt{\frac{2 \times U \times P}{S}} = \sqrt{\frac{2 \times 18,000 \times 150}{20\% \text{ of } \text{₹}27}} = \sqrt{\frac{54,00,000}{5.40}} \\ &= \sqrt{10,00,000} \end{aligned}$$

= 1000 Units

No. of orders per year = 18000 ÷ 1000 = 18 orders

If discount is given (original price – 2% discount)

Cost price = ₹27 – 0.54 = ₹ 26.46

**When 2% Price Discount is Available**

No of orders to be placed:  $18000 \div 1200 = 15$  orders

Material carrying cost : 20% of ₹ 26.46 = ₹5.292

Total cost without discount = ordering cost + carrying cost + purchase price

$$\begin{aligned} &= 18 \times 150 + \frac{1}{2} \times 1000 \times 5.40 + 18000 \times 27 \\ &= 2700 + 2700 + 4,86,000 \\ &= ₹4,91,400 \end{aligned}$$

Total cost with 2% discount =  $15 \times 150 + \frac{1}{2} \times 1200 \times 5.292 + 18000 \times 26.46$

$$\begin{aligned} &= 2250 + 3175.20 + 4,76,280 \\ &= ₹4,81,705.20 \end{aligned}$$

Since the total cost is less with 2% discount, the proposal may be accepted.

**Illustration 4**

A company manufactures 5,000 units of a product per month. The cost of placing an order is ₹100. The purchase price of the raw material is ₹ 10 per kg. The re-order period is 4 to 8 weeks. The consumption of raw materials varies from 100 kg. to 450 kg. per week. The average weekly consumption being 275 kg. The carrying cost of inventory is 20% per annum.

Assuming 52 weeks in a year, you are required to calculate —

- (i) Re-order quantity;
- (ii) Maximum level;
- (iii) Minimum level; and
- (iv) Average level.

**Solution:**

$$(i) \text{ Re-order quantity (ROQ)} = \sqrt{\frac{2 \times \text{Annual Req} \times \text{Ordering Cost}}{\text{Carrying Cost Per Unit Per Annum}}}$$

$$\text{Annual Req} = \text{Weekly Req} \times 52 = 275 \times 52 = 14,300$$

$$\text{Ordering Cost} = 100$$

$$\text{Carrying Cost} = 20\% \text{ per annum}$$

$$= 20\% \times 10$$

$$= 2$$

$$\text{ROQ} = \sqrt{\frac{2 \times 14300 \times 100}{2}}$$

$$= 1.196 \text{ Kg.}$$

(ii) Reorder Level (ROL) = Maximum Usage × Maximum Reorder Period  
 Reorder Period = 4 to 8 weeks  
 Maximum Reorder Period = 8 Weeks  
 Consumption = 100 Kg. to 450 Kg.  
 Maximum Consumption = 450 Kg.  
 Reorder Level =  $450 \times 8 = 3,600$  Kg.  
 Maximum Level =  $ROL + ROQ - (\text{Minimum usage} \times \text{Minimum Reorder Period})$   
 =  $3,600 + 1,196 - (100 \times 4)$   
 =  $4,796 - 400$   
 = 4,396 Kg.

(iii) Minimum Level =  $ROL - (\text{Normal usage} \times \text{Normal Reorder Period})$   
 Normal Usage =  $(\text{Maximum Usage} + \text{Minimum Usage})/2$   
 =  $(450 + 100)/2$   
 = 275  
 Normal Reorder Period =  $(\text{Maximum Period} + \text{Minimum Period})/2$   
 =  $(4 + 8)/2$   
 = 6  
 Minimum Level =  $3600 - (275 \times 6)/2$   
 = 1,950 Kg.

(iv) Average Level =  $(\text{Maximum Level} + \text{Minimum Level})/2$   
 =  $(4,396 + 1,950)/2$   
 = 3173 Kg.

Or = Minimum Stock Level +  $\frac{1}{2}$  of 1,196 = 2,548 Kg.

**Illustration 5**

Following information is given:

Cost of placing a purchase order	₹ 20
No. of units to be purchased during the year	5,000 Nos.
Purchase price per unit inclusive of transport cost	₹ 50
Annual Storage cost per unit	₹ 5
Details of lead time:	
— Average	10 days
— Maximum	15 days
— Minimum	6 days
— For emergency purchase	4 days
Rate of Consumption per day:	
— Average	15 days
— Average	20 days

Calculate:

- (i) Re-ordering level
- (ii) Re-order quantity

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- (ii) Maximum level
- (iv) Minimum level
- (v) Danger level

Pooja Pipes Ltd. uses about 75,000 valves per year and the usage is fairly constant at 6,250 valves per month. The valve costs Rs. 1.50 per unit when bought in large quantities; and the carrying cost is estimated to be 20% of average inventory investment on an annual basis. The cost to place an order and process the delivery is Rs. 18. It takes 45 days to receive delivery from the date of an order and a safety stock of 3,250 valves is desired.

You are required to determine (i) The most economical order quantity and frequency of orders; (ii) the re-order point; and (iii) the most economical order quantity if the valves cost Rs. 4.50 each instead of Rs. 1.50 each.

**Solution:**

(i) Economic Order Quantity (EOQ) =  $\sqrt{\frac{2U \times P}{S}}$

Where -

U = Annual requirement = 75,000 Units  
P = Ordinary Cost = ₹ 18 per order  
S = Carrying Cost per unit per annum = 20% of average inventory  
=  $\sqrt{\frac{2 \times 75,000 \times 18}{0.30}}$   
= 3,000 units

Working Note:

Total Carrying Cost =  $\frac{75,000 \times ₹1.50 \times 20}{100}$

Carrying Cost per unit = ₹ 22,500/75,000 = ₹0.30

Frequency of Orders:

Number of order per year = 75,000/3,000 = 25 orders

Or Orders may be placed in every 14.6 days, i.e. 365/25 = 14.6 days

(ii) Re-order point = (Lead Time × Normal usage) + safety stock  
= (1.5 months × 6,250 units per month) + 3,250 units = 12,625 units

(iii) EOQ when the cost per valve is ₹4.50



$$= \sqrt{\frac{2 \times 75,000 \times 18}{0.90}} = 1732 \text{ units}$$

$$\text{Total Carrying Cost} = \frac{75,000 \times ₹4.50 \times 20}{100} = ₹ 67,500$$

$$\text{Carrying Cost per unit} = ₹ 67,500 / 75,000 = ₹ 0.90$$

### (vi) Perpetual inventory system and continuous stock verification

The perpetual inventory system is intended as an aid to material control. It is a system of stock control followed by stores department. The system follows a method of recording stores by which information about each receipt, issue and current balance of stock is always available.

The Institute of Cost and Management Accountants of England and Wales, defines perpetual inventory as "A system of records maintained by the controlling department, which reflects the physical movement of stocks and their current balances."

According to Weldon, "Perpetual inventory system is a method of recording stores balances after every receipt and issue, to facilitate regular checking and obviate closing down of work for stock-taking."

Thus, it is a system of ascertaining current balance after recording every receipt and issue of materials through stock records. An important point which should be kept in mind is that the perpetual inventory is usually checked by a programme of continuous stock-taking. Perpetual inventory means the system of records whereas continuous stock-taking means the physical checking of those records with actual stocks. '

#### Perpetual inventory system comprises of:

- (a) Comparison of Bin Cards (quantitative perpetual inventory) and Stores Ledger Accounts (quantitative-cum-valued perpetual inventory),
- (b) Continuous Stock-Taking (Physical perpetual inventory)

#### (a) Comparison of Bin Cards and Stores Ledger Account

Bin card is maintained by the store-keeper and stores ledger account is maintained by stores accountant. Each item of stores is recorded at these places simultaneously. Normally the balances shown by the two records tally. However, there may arise some differences between these two records due to the following reasons:

- (i) Omission of an item of store in bin card or stores ledger account.
- (ii) Wrong posting of an item of store either in bin card or in stores ledger account.
- (iii) Arithmetical error in working out their balances. Therefore, the balances of the two records should be reconciled at frequent intervals and correct balances should be drawn.

#### (b) Physical Stock Verification

The perpetual inventory system is not complete without a systematic procedure for physical verification of stores. The correctness of balances as shown in the bin card or stores ledger account should be verified by means of physical stock verification. Physical stock verification may be conducted in the following two ways:

- (i) Periodic stock verification
- (ii) Continuous stock verification
- (i) Periodic stock verification: It refers to a system where physical stock verification is normally done periodically, i.e., once or twice in a year. Under this method, value of stock is determined by physical counting of the stock on a particular date, usually at the end of the year.
- (ii) Continuous stock verification: This system comprises of counting and verifying a number of items at random daily throughout the year so that all items of stores are verified several times during the year. Notice of the particular stock to be verified each day is given to the store-keeper only on the date of actual verification.

### **Advantages of Perpetual Inventory System**

- (i) Easy detection of errors - Errors and frauds can be easily detected at an early date. It helps in preventing their occurrence.
- (ii) Better control over stores- The system exercises better control over all receipts and issues in such a manner so as to give a complete picture of both quantities and values of stock in hand at all times.
- (iii) No interruption of production process- Production process is not interrupted as the physical verification of stock is made on a planned and regular basis.
- (iv) Acts as internal check- Under the system, records are made simultaneously in the bin cards and stores ledger accounts which acts as a system of internal check for detection of errors as and when they are committed.
- (v) Investment in materials kept under control - The investment in materials is kept at a minimum level as the actual stock is continuously compared with the maximum level and minimum level.
- (vi) Early detection of loss of stock- Loss of stock due to shrinkage, evaporation, accident, fire, theft, etc. can be easily detected.
- (vii) Accurate and up-to-date accounting records- Due to continuous stocktaking, the store-keeper and stores accountant become more vigilant in their works and they maintain accurate and up-to-date records.
- (viii) Easy to prepare interim accounts- It is possible to prepare periodical profit and loss account and balance sheet without physical stock-taking being made.

Availability of correct stock data- Correct stock data is readily available for settlement of insurance claims.

### **Disadvantages of excessive Stock are avoided - The following disadvantages of excessive stock are avoided:**

- (a) Loss of interest on capital locked up in stock.
- (b) Loss through deterioration.
- (c) Risk of obsolescence.
- (xi) Employment of specialised staff - Since the work is spread throughout year, whole time specialised staff can be engaged for the purpose.
- (xii) Moral check on employees - The system acts as a moral check on the employees working in the stores which increases their efficiency.

Such losses increase the cost of production. These losses may be in the form of wastage scrap, defective and spoilage. The problems of waste, scrap, spoilage or defectives materials must arise in almost all manufacturing industries. There is no uniformity the meaning and accounting treatment of waste, scrap,

spoilage and defective. However, steps should be taken to minimise the discrepancy so that efficiency can be increased and proper material control is ensured.

**Bin Card**

A bin card is a quantitative record of receipts, issues and closing balances of items of stores. Each item is accompanied by a separate bin card. The bin card is posted as and when a transaction takes place. Only after the transaction is recorded, the items are received/issued. On receipt of materials, the quantity is entered in the bin card from the goods received note in the receipt column and the issues to various departments in the issue column. The balance quantity is calculated and recorded.

The various levels indicated in a bin card enables the store-keeper to requisition materials as and when required. Sometimes quantity on order and quantity reserved is also noted separately.

Code No.:	Level of Stock
Description:	Maximum:
Unit of Quantity:	Minimum:
Location Code:	Danger:
	Ordering:
	Ordering Qty:

Date	Doc. No.	Receipts	Issues	Balance	On Order	Reserved

**BIN CARD**

**Stores Ledger**

The store ledger is maintained to record all receipt and issue transactions in respect of materials. The quantities and the values are entered in the receipts, issues and balance columns. Additional information regarding quantity on order and quantity reserved may be recorded. Separate sheets for each item or continuous stores ledger may be maintained. The sheets should be serially numbered to obviate the risk of removal or loss.

Code No.:	Maximum Level:	Suppliers' Name
Description:	Minimum Level:	1.
Substitute:	Danger Level:	2.
Location Code:	Ordering Level:	3.
	Ordering Quantity:	

Date	Receipts				Issues				Balance			On Order		Reserved	
	Doc. No.	Qty.	Rate	Value	Doc. No.	Qty.	Rate	Value	Qty.	Rate	Value	P.O. No.	Qty.	G.R. No.	Qty.

**STORES LEDGER**

### Difference between Bin Card and Stores Ledger

Bin Card	Stores Ledger
(a) It is a quantity record	(a) It is a record of quantity and value.
(b) It is kept inside the stores	(b) It is kept outside the stores.
(c) It is maintained by the store keeper	(c) It is maintained by the accounts department
(d) The postings are done before the transactions take place	(d) The postings are done after the transactions take place.
(e) Each transaction is individually posted	(e) Transactions may be posted periodically and in total.

### Reconciliation of Bin Card and Stores Ledger

Though there should not be any difference between the balances shown in the Bin Card and Stores Ledger, differences may arise due to the following reasons:

- (a) Arithmetical error in working out the balances.
- (b) Posting in the issue column when it should have been posted in the receipts column.
- (c) Non-posting of a voucher either in the Bin Card or the Stores Ledger.
- (d) Posting in the wrong Bin Card or Stores Ledger sheet.
- (e) Material may be issued or received on loan/approval. They may be entered in the Bin Card for the purpose of record. These transactions do not find a place in Stores Ledger.

The differences should be reconciled at regular intervals.

### Continuous Physical Stock Verification

The stores accounts reveal what the balances should be and a physical verification reveals the actual stock position.

Under this system of verification, the total number of man-days available for verification is calculated. The items to be verified per man-day is selected by classifying the various items into groups depending upon the time required. The stock verification staff plan the programme and divide the work among themselves. The plan is such that all the items are verified in the year. Items of small value may be verified twice or more in a year. Bulky items are usually verified when stocks are comparatively low.

There is an element of surprise and sometimes the stock verifier knows of the items to be verified only on the actual date of verification. Stock not recorded should not be mixed up with the stock. After counting or weighing the results are recorded.

### Reasons for Surpluses and Deficiencies in Stock-taking and Accounting thereof

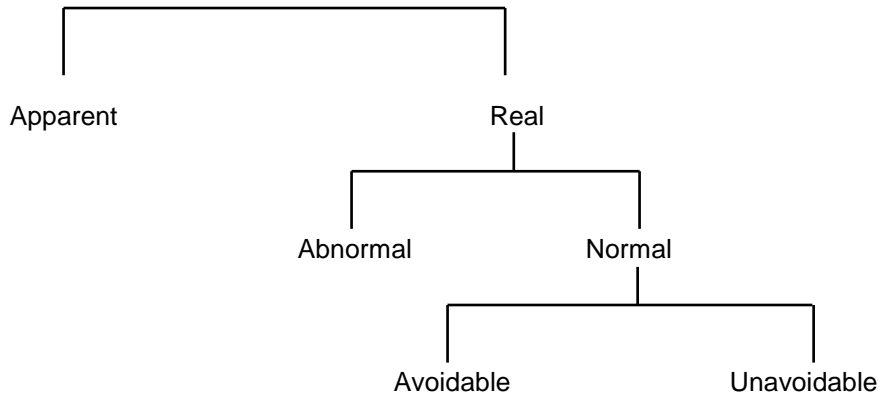
Differences in stock arise occasionally. The difference in the stock verification sheet should be verified with the bin card balance. There may be differences between the Stores Ledger and the Bin Card. But the Bin Card reflects the stock in hand and hence no adjustment is needed. The balance in Stores Ledger and Bin Card should be reconciled first.

A surplus/deficiency should be kept at the minimum. A deficiency may be due to malpractices in stores while

surplus may encourage malpractices. Wherever possible preventive measures should be taken to prevent their recurrence in future.

The difference may be analysed as follows:

### SURPLUS OR DEFICIENCY



If there is difference between the Bin Card and physical stock, it may be due to clerical mistake in posting and casting in the Bin Card or due to inaccuracies in measuring standards and conversion ratios used. This difference is apparent and either the Bin Card has to be corrected or the stocks re-verified.

The first stage of analysis is to distinguish between the differences due to normal and abnormal causes. Differences are abnormal when they are beyond the control of the stores management and hence written off, e.g., fire, riot, burglary, etc. If the differences are due to normal causes, the stores management should take effective steps to prevent them.

Differences due to normal causes may be avoidable or unavoidable. Some of the avoidable causes are:

- (i) Incorrect measurement of issues
- (ii) Carelessness in material handling
- (iii) Improper storage of material
- (iv) Pilferage, theft etc.
- (v) Stores misplaced
- (vi) Errors in stock-taking.

The storekeeper is responsible for all differences arising out of avoidable causes and he should ensure that adequate steps are taken to reduce and eliminate the differences. Sometimes, even though the store keeping is efficient, some surplus or deficiency occur. These are called unavoidable. The storekeeper should be able to foresee the nature, the magnitude of the differences and lay down proper accounting methods.

Some of the unavoidable causes are:

- (i) Handling losses arising out of issuing in small units, e.g., starch powder in bags.
- (ii) Loss or gains arising out of atmospheric conditions; certain chemicals gain in weight and others lose weight.
- (iii) Gains that arise due to seasoning and preservation of materials when specially processed, e.g., wooden and leather items are seasoned in oil.

### Accounting of Surpluses and Deficiencies

- (i) Apparent differences need no adjustment. Either the Bin Card is corrected or the stocks are re-verified.
- (ii) Differences due to abnormal causes are written off to profit and loss account and do not form part of manufacturing cost.
- (iii) Differences due to avoidable causes should be valued and adjusted through the stores consumption account and recovered in cost as an item of stores overhead expenses.
- (iv) Differences due to unavoidable causes get accounted for as a part of the material cost itself. Through past observations, the loss or gain percentage is worked out. Whenever material is issued, adjustment is made by this percentage. Stocks are adjusted in a similar manner. This percentage should be reviewed and corrected periodically.

Any difference between the anticipated and actual difference is noted on a stores adjustment note and the difference is transferred to overhead or the Costing Profit and Loss Account or Profit and Loss Account as the case may be.

### (vii) Use of Control ratio

**(a) Inventory turnover ratio:** It helps management to avoid capital being locked up unnecessarily. This ratio reveals the efficiency of stock-keeping.

Inventory turnover ratio is given by the formula: 
$$\frac{\text{Cost of material consumed}}{\text{Cost of average stock held during the period}}$$

Cost of average stock = 
$$\frac{\text{Cost of opening stock} + \text{Cost of closing stock}}{2}$$

The inventory turnover ratio can be calculated (in days) as follows: 
$$\frac{\text{Days during the period}}{\text{Inventory turnover ratio}}$$

This will reveal the number of days for which the stocks are held.

**(b) Input-output ratio:** It is the ratio of the quantity of input of material to production. This ratio enables comparison of actual consumption and standard consumption, indicating whether the usage of material is favorable or adverse.

### (viii) Review of slow and non-moving items

The money locked up in inventory is money lost to the business. If more money is locked up, lesser is the amount available for working capital and the cost of carrying inventory also increases.

Stock turnover ratio should be as high as possible. Loss due to obsolescence should be eliminated or these items used in some profitable work. Slow moving stocks should be identified and speedily disposed of. The speed of movement should be increased. The turnover of different items of stock can be analysed to find out the slow moving stocks.

Materials become useless or obsolete due to changes in product, process, design or method of production, slow moving stocks have a low turnover ratio. Capital is locked up and cost of carrying have to be incurred. Hence management should take effective steps to minimise losses



## PROCUREMENT PROCEDURES & DOCUMENTATION

Procurement is the purchase of goods and services at the best possible price to meet a purchaser's demand in terms of quantity, quality, dimensions and site. It means that the goods/services are appropriate and that they are procured at the best possible cost in terms of quality and quantity, time, and location. Every business should define procurement processes intended to promote fair and open competition while minimizing exposure to fraud and collusion.

Every business/firm has standard procurement procedures for getting goods or services. These procedures cover all aspects of the procurement cycle, including the selection of the supplier, contract negotiations, order placement and payment. All firms have procurement procedures and they are used to control spending activity, ensure appropriate approvals are in place and reduce the risk of overpayment. An appropriate approval procedure is to limit access to the purchase order forms and require signed authorization from a competent person. This separation of the goods recipient and the approval is designed to ensure that a competent person generally senior person is aware of the order and can confirm that the materials are required for business purpose.

In short we can say procurement procedure includes:

- Planning,
- Standards determination,
- Specifications development,
- Selection of supplier
- Value analysis,
- Funding,
- Price determination,
- Supply contract administration,
- Inventory control and stores, and
- Disposals and other related functions.

## PROCUREMENT DOCUMENTATION

Documents which are involved in the procurement are called procurement documents. Procurement documents serve an important aspect of the organizational element in the project process. It is a kit which is used in process bidding and submitting project proposals and the facets of work that make up a project. In a simple way, these are the contractual relationship between the purchaser and the supplier of goods or services.

The procurement documents will differ according to type of contract which will be executed. Basically procurement documents include of all documents that serve as invitations to tender, solicit tender offers and establish the terms and conditions of a contract. Generally these documents may be required for procuring any good/services, which as are under:

**Request for Proposal (RFP):** It is an early stage in a procurement process. Purchaser issues an invitation to supplier for submitting a proposal on a particular goods or service often through a bidding process.

**Request for Information (RFI):** A request for information (RFI) is a standard business process whose purpose is to collect written information about the capabilities of various suppliers. Normally it follows a format that can be used for comparative purposes. It is a proposal requested from a prospective seller or a service provider to determine what products and services are potentially available in the marketplace to meet a buyer's needs and to know the capability of a seller in terms of offerings and strengths of the seller.

**Request For Quotation (RFQ):** A request for quotation (RFQ) is a standard business process whose purpose is to invite suppliers into a bidding process to bid on specific products or services. RFQ, generally means the same thing as IFB (Invitation For Bid). An RFQ typically involves more than the price per item. Information like payment terms, quality level per item or contract length are possible to be requested during the bidding process. These may serve as a binding contract.

**Offers:** This type of procurement documents are bids, proposals, and quotes made by potential suppliers to prospective clients.

**Contracts:** Contracts refer to the final signed agreements between clients and suppliers.

**Amendments/Modifications:** This refers to any changes in solicitations, offers and contracts. Amendments/Modifications have to be in the form of a written document.

## METHODS OF PURCHASING

Purchasing is an art. Wrong purchases increase the cost of materials, store equipments and the finished goods. Hence, it is imperative that purchases should be effectively, efficiently and economically performed.

The methods of purchasing can be broadly classified as centralised and localised purchasing.

### Centralized Purchasing

In a large organisation, manufacturing units are many. In such cases centralized purchasing is beneficial. Centralised purchasing means that all purchases are made by a single purchase department. The advantages are:

- (i) Specialised and expert knowledge is available.
- (ii) Advantages arise due to bulk purchases.
- (iii) The cost of purchasing can be reduced and selling price can be lowered.
- (iv) As there is good knowledge of market conditions, greater control can be exercised.
- (v) When materials have to be imported, it is advantageous to centralise the buying.
- (vi) Economy and ease in compilation and consultation of results.
- (vii) It can take advantage of market changes.
- (viii) Investment in inventories can be reduced.
- (ix) Other advantages include undivided responsibility, consistent buying policies.

The factors to be considered when decision regarding centralisation has to be taken are geographical separation of plants, homogeneity of products, type of material bought, location of supplies etc.



### Decentralisation of Purchases

In decentralised purchasing, each department or branch makes its own purchases. The advantages of localised purchasing are:

- (i) Each plant may have its own particular need. This can be given special attention.
- (ii) Direct contact can be established with suppliers.
- (iii) The time lag between indenting and receiving materials can be reduced.
- (iv) Technical requirements of each plant can be ascertained.

### PURCHASE PROCEDURE

Though different concerns adopt different practices regarding details recorded, forms and records used. The routine followed for the purchase of materials is usually the same. The steps may be enumerated as follows:

- (i) Indenting for materials
- (ii) Issuing of tenders and receiving quotations
- (iii) Placing of order
- (iv) Inspecting stores received
- (v) Receiving the stores accepted in inspection
- (vi) Checking and passing bills for payment.

### Indenting for Materials

The stores department prepares indents for the purchase of materials and sends it to the purchase department. The indents may be for replenishment of stocks or for a special job. The former are called regular indents and the latter special indents.

Regular indents are prepared periodically and placed when the ordering level for different items of stocks are reached. The quantity indented is equal to the ordering quantity fixed for each item. The special indents are based on the demands received either from the planning or production department. They should be certified by the department originating it. They are purchased as and when required. Every document is usually linked with the previous and succeeding transaction to facilitate back references.

### Issue of Tenders to Suppliers

The purchase department issue tenders to suppliers or publish them in papers. The suppliers quote their terms of price and delivery/payment. After the last date for receipt of quotations is over, the tenders are opened and a comparative statement is prepared. Tenders are prepared in triplicate. Of them, two are sent to the suppliers and one is retained with the purchase department. The supplier mentions his terms in the original.

While considering the tenders, the reliability of the supplier has to be taken into account. The quality of goods and time taken to deliver the goods on previous occasions should be checked. The financial stability and capacity to deliver goods should be ensured.

Sometimes purchases may be made without inviting quotations. The circumstances are when prices are controlled, or purchases are made under long-term contracts, or catalogue prices are available or when there is a cost plus contract. If, purchase is made under cost plus profit basis, the cost composition and reasonableness of price should be checked.

**Placing of Purchase Orders**

Normally six copies of purchase orders are made. The supplier, stores, inspection department, store accounting section, purchase department and progress department are sent one copy each.

The purchase order has legal and accounting significance. From legal point of view, it binds both the parties to the terms of the contract. From accounting point of view, it signifies the amount which has to be spent. It signifies the stores department to accept the goods and the accounts department to accept the bill.

<b>A.B.C. CO. LTD.</b>						
<b>MATERIALS PURCHASE ORDER</b>						
Order No.:	Indent No.:	Store Receipt No.:				
Date:	Quotation No.:	Inspection Note No.:				
To						
.....						
.....						
.....						
This is in response to your quotation against our Tender No.:..... The terms and conditions mentioned overleaf will be applicable. Please supply the following items at the prices indicated below:						
Sl. No.	Description	Stores Code No.	Specification	Quantity	Unit	Price
Terms of Delivery:					Please send bill to:	
Terms of Payment:					For A.B.C. Co. Ltd.	
Special Conditions:						

SPECIMEN OF PURCHASE ORDER

**Inspection**

The supplier delivers goods at the place specified. Two delivery challans are prepared by the supplier one of which is returned. It is a proof of delivery. After receiving the goods, the inspection department or production department or maintenance department (as the case may be) is intimated.

The quality of materials should be in accordance with the standards. The inspector should examine the various points to be checked, the standard expected, tolerances allowed and method to be followed. After inspection, as inspection note has to be prepared in triplicate, one copy is sent to the supplier, one to the stores and one to the inspection department.

**Receiving Stores**

The stores department prepares a Stores Receipt Note for the quantity of stock accepted in inspection. After issuing of the Stores Receipt, the storekeeper is responsible for the stocks. The stores receipt is the document for the posting of receipts in Bin Card and the Stores Ledger. It is prepared in quadruplicate. The supplier, stores accounting section and purchase department are sent one copy each and one copy is retained with the stores. The supplier encloses this copy along with his bill. The stores accounting section prices the note on the basis of the purchase order.

### Checking and Passing of Bills for Payment

Bills received by the purchase department are forwarded to the Stores Accounting Section to check the authenticity regarding quantity and price and the arithmetical accuracy. Special items included in the bills, e.g., freight, packing charges are verified with the purchase order. The bill is later passed for payment.

### PRICING OF STORES RECEIPTS

Stores have to be valued carefully. All expenses incurred to receive and store the material forms part of the cost. The purchase price comprises of elements such as cost of raw material/item, sales-tax, cash discount, freight and delivery charges, etc. It will not be possible to calculate the exact cost as some items of expenses have low values and there is inconvenience in computing the cost. Generally all the items of cost except the basic raw material cost is charged to a “Stores Receiving and Handling Charges Account” and recovered as a percentage of stores consumed.

Items of expenses can be classified as follows:

- (a) **Sales-tax and Other Taxes:** Sales tax is usually a small percentage of the basic value. If it is added to the cost of material, it increases clerical work and fractional figures may be there. For convenience it is accumulated under one account and is recovered through the stores receiving and handling charges account.

Other charges can be excise duty, custom duty, octroi etc.

- (b) **Cash Discount:** It is an inducement/incentive offered by the supplier so that dues can be settled promptly. As it is a financial decision, it should not be included in costs. The company can take advantage of the discount provided it is in conformity with the company's policy. But the discount is lost if payment is not made in time. Since there is uncertainty regarding the credit, it is better to account for the discount separately.
- (c) **Trade and Quantity Discounts:** Since it is deducted from the invoice price, there is no difficulty in accounting.
- (d) **Joint Purchase Cost:** Sometimes, several materials or several grades of materials are purchased. Different grades may be used for different production orders, if all issues are priced at the same rate, there will over/under statement of costs.

Hence each grade of material is entered in different Bin Cards, and valued at current prices. The incidental costs are apportioned to the various grades according to the market price for each.

- (e) **Extra/Spare Parts:** Sometimes spare parts are given by suppliers for which no charges are made. These should be properly accounted for. As no value is given, it reduces the unit cost of the goods.
- (f) **Receiving, Loading, Inspection, Storage, Material Accounting Charges:** These expenses cannot be easily allocated to the materials. Hence, it is recovered as an overhead either on the basis of material consumed or as general overhead. Sometimes allocation rates are determined.
- (g) **Transport Costs, Freight and Delivery Charges:** If materials transported and handled are bulky, then these costs can be ascertained separately for each item and included in the cost of material. If it is incurred collectively for many items, it is recovered through the Stores Receiving and Handling Charges Account. Another method is to pre-determine the transport cost for each material and add it to the cost of materials purchased. Any difference between the amount allocated and actuals is adjusted by transferring it to the Costing Profit and Loss Account.

- (h) **Receiving and Handling Expenses:** These are the expenses incurred after materials are delivered

and till they are stored. These expenses are recovered as a percentage of value of stores consumed through the Stores Receiving and Handling Charges Account. If these expenses are recovered as a percentage of purchases, we are capitalising the expenses. Part of the expenses will form part of value of unconsumed stock. But it is not a good accounting practice to carry it over from period to period. Hence, it is preferable to recover it as a percentage of consumption.

**Cost of Containers:** There may be following four cases;

- (i) Boxes are issued free of cost but sold at a price;
- (ii) Their value is included in the invoice price but they are not returnable;
- (iii) It is charged separately though the full value is recoverable from the supplier;
- (iv) The recoverable value is lesser than the price charged.

If the containers are not returnable, the material is issued at a price which includes this cost. When the empty containers have a disposal value, the sale price is credited to overhead. Alternatively, it can be deducted from the invoice price of the container.

Under the third method, the empty containers are returned and entered in the material return notes. The credit is given to the production order to which it was earlier charged.

If the containers are returnable, the containers are kept as a temporary charge/ loan. There should be entries to record the receipt/return of the containers. If full credit is not given, the difference should be charged to the cost of the material.

### Provisional Pricing of Receipts

There is a time lag between the date of supplying material and the date of submitting the bill. Pricing cannot be done unless the bill is presented as the bill gives costs of transport charges, taxes, etc.

But the receipts have to be valued. The price can be ascertained from the purchase order and the past actuals. Escalation clause, if any, has to be taken into account.

Receipts provisionally priced should be recorded so that adjustments can be made when actual prices are available.

### Illustration 6

One parcel containing two important materials was received by a factory and the invoice pertaining to the same discloses the following information:

	₹
Material-I 500 kgs. @ ₹2.00 per kg.	1,000.00
Material-II 600 kgs. @ ₹1.60 per kg.	960.00
Insurance	39.20
Sales Tax	98.00
Freight etc.	55.00

Due to mishandling in the factory's store a loss of 10 units of material-I and 6 units of material-II was noted. What rate would you adopt, for issuing these vital components to the jobs? Also give your changed rate, if a provision of 10% is to be kept for probable risk of obsolescence.

**Solution:**

	<i>Material-I</i>	<i>kgs.</i>	<i>Material-II</i>	<i>kgs.</i>
	₹		₹	
Material Price	1,000	500	960.00	600
Insurance (value)	20		19.20	
Sales tax (value)	50		48.00	
Freight (weight)	25		30.00	
	1,095	500	1,057.20	600
(-) Loss due to mishandling (normal loss)		10		6
Total	1,095	490	1,057.20	594

Rate of issue = ₹1,095 ÷ 490 = ₹2.23 (approx.) for material-I.

= ₹1,057.20 ÷ 594 = ₹1.78 (approx.) for material-II.

**Revised Rate for issue**

	Material.-I (kgs.)	Material-II (kgs.)
Qty. available for issue	490	594.0
Less: 10% provision for obsolescence	<u>49</u>	<u>59.4</u>
Effective quantity for issue	<u>441</u>	<u>534.6</u>

∴ Revised rate for issue = ₹1,095 ÷ 441 = ₹2.48 (approx.) for Material-I

= ₹1,057.20 ÷ 534.6 = ₹1.98 (approx.) for Material.-II

**Illustration 7**

A consignment was received from a foreign supplier, containing four types of material. The invoice reveals the following :

	₹
Material A 2,000 kgs. @ ₹2.00 per kg.	4,000.00
Material B 1,000 kgs. @ ₹3.00 per kg.	3,000.00
Material C 1,500 kgs. @ ₹4.00 per kg.	6,000.00
Material D 500 kgs. @ ₹4.50 per kg.	2,250.00
Freight paid by supplier	1,000.00
Expenses incurred by importer	1,600.00
Duty paid by the importer	610.00
Insurance	152.50

Loss due to breakage was recorded as follows:

Material A - 20 kgs.; Material B - 20 kgs.; Material C - 45 kgs.; and Material D - 10 kgs.

Provision of 10% is made for evaporation and minor losses due to seasonal variations. Calculate the rate at which these should be issued.

### **Solution:**

Insurance and duty have been apportioned on the basis of value, whereas freight and other expenses have been apportioned on the basis of weight.

	A		B		C		D	
	₹	Units	₹	Units	₹	Units	₹	Units
Material cost	4,000	2,000	3,000	1,000	6,000	1,500	2,250.00	500
Insurance	40		30		60		22.50	
Freight	400		200		300		100.00	
Expenses paid by importer	640		320		480		160.00	
Duty	160		120		240		90.00	
Total	5,240		3,670		7,080		2,622.50	
(-) Loss due to breakage		20		20		45		10
Rate of issue	5,240	1,980	3,670	980	7,080	1,455	2,622.50	490
(-) 10% provision for evaporation	2.65	198	3.74	98	4.87	145.5	5.35	49
	5,240	1,782	3,670	882	7,080	1,309.5	2,622.50	441
Rate of issue after providing for loss	2.94		4.16		5.40		5.95	

### **STORE-KEEPING**

Storekeeping is a service function. Storekeeping is the function of receiving materials, storing them and issuing these to workshops or departments.

The stores department is under the control of a person known as storekeeper. The storekeeper is a custodian of all the items kept in the store. The stores should be spacious, well lit and well equipped so that costs can be minimised and service can be provided effectively.

The main objectives of store-keeping are:

- (i) To protect stores against losses.
- (ii) To keep goods ready for delivery/issue.
- (iii) To provide maximum service at minimum cost.
- (iv) To avoid over-stocking and under-stocking.
- (v) To facilitate perpetual inventory.

## FUNCTIONS OF STORE-KEEPING

The function of store-keeping may be summarised as follows :

- (a) **Receipt of material into storage:** Materials should be received unloaded, inspected and then moved to stores. The storekeeper classifies the materials, stores it in appropriate places and records the receipts in proper books.
- (b) **Record keeping:** The stores records should be maintained in an efficient and orderly manner so that materials can be easily located and information can be obtained for various departments.
- (c) **Storage of materials:** The stores should provide maximum protection and safety and accessibility and utilize minimum space. Suitable storage device should be installed.
- (d) **Maintaining stores:** To keep the stores in the desired condition over a period of time depends on the nature of the material, length of time in storage, rates of deterioration. Special covering or periodic lubrication is necessary to prevent damage due to atmospheric conditions.
- (e) **Issuing stores:** This function should be performed most efficiently, promptly and accurately. All issues should be properly recorded. All issues should be duly authorised and procedures laid down should be duly followed.
- (f) **Co-ordination with materials control:** The storekeeper is partly responsible for such co-ordination. Much depends on the type of production, size of the company, the organisation structure, etc.
- (g) Ensure that all transactions are posted in the Bin Card and that the Bin Card is up-to-date.
- (h) All items should be in its proper place.
  - (i) Maintenance of stores at required levels.
  - (j) Neatness in stores to facilitate physical verification.
- (k) Co-ordination and supervision of staff in the stores department.
  - (l) Periodical review of various scales, measuring instruments, conversion ratios etc.
- (m) Protect stores from fire, rust, erosion, dust, theft, weather, heat, cold, moisture and deterioration etc.

## CLASSIFICATION AND CODIFICATION OF MATERIALS

For facilitating identification of materials, each item of stores is given a distinct name. Similar items are divided into sub-groups and a number of sub-groups are classified under major groups. Stores are usually classified either by nature or usage of stores.

Codification is the procedure for assigning symbols for each item in accordance with a proper plan.

The advantages of codification are:

- (i) Lengthy descriptions are replaced by a simple code.
- (ii) Hence, it economises space in forms and reduces clerical work.
- (iii) Ease in identification of stores.
- (iv) It is comprehensive.
- (v) It facilitates mechanised accounting.
- (vi) Secrecy of description can be maintained.
- (vii) It ensures clarity.

## ISSUE OF MATERIALS

While issuing materials, the following points should be kept in mind:

- (a) **Planning of material requirement:** All requirements of materials should be thoroughly planned. The bill of materials gives estimates of different items of stores required.
- (b) **Requisition of materials:** Based on the quantities mentioned in the bill of materials, materials are requisitioned. Materials should not be issued in excess of standards. If necessary, an additional bill of materials can be issued by competent authority.
- (c) **Internal audit of issues:** All issues should be audited. Any excess/shortfall in issues should be explained and accounted for.
- (d) **Control of wastage:** Actual wastage should not exceed the standard wastage fixed. Wastages should be examined and any variance should be reported.
- (e) **Issues of sundry items:** Certain stores are required in various departments. Either the requirement can be budgeted or order can be placed strictly on the basis of requirement.

## MATERIAL (STORES) REQUISITION NOTE

A material requisition note is a formal written demand or request usually from the production department to the stores for the supply of specified materials, stores etc. It authorises the stores keeper to issue the requisitioned materials and record the same in the bin card. It contains information about the description, code, quantity of material and job or work order for which it is needed. It also contains columns for calculating the cost of material issues. Generally a material requisition note is prepared in triplicate. One copy is sent to the stores, one copy to the costing department and the third copy is retained by the department making the requisition for its future reference. A specimen of material requisition note is given below:

Material Requisition Note						
Department _____			No. _____			
Job/work order No. _____			Date _____			
S.No.	Description	Code No.	Quantity	Rate ₹	Amount ₹	Remarks
Foreman		Storekeeper		Cost Accountant		

## BILL OF MATERIALS

A bill of materials is a comprehensive list of materials with specifications, material codes and quantity of each material required for a particular job, process or service. Substitute materials which may be used when the original materials are not available also indicated in the bill of materials. It is prepared by the production planning department or engineering department. It is a method of documenting materials required for execution of the specified job or work. A bill of materials acts as an authorisation to the stores department in procuring the materials and all materials listed on the bill are sent to the production department. Generally four copies of a bill of materials are prepared. One copy is sent to the stores department, one copy to the purchase department, one copy to the costing department and the fourth copy is retained by the production planning department for future reference. The following advantages may be derived from a bill of materials:

- (a) It serves as an advance intimation to stores department about the raw material requirement.
- (b) Suitable action for purchase of materials can be taken on the basis of the bill of materials.



- (c) It is a good control measure on materials cost.
- (d) It serves the purpose of an indent or purchase requisition upon the purchase officer for the purchase of materials required for a particular job.
- (e) The material cost to be charged to a particular unit, job or process can be easily determined before hand.
- (f) It helps in submission of tenders and quotations.
- (g) It also serves as a work order to the production department and a document for computing the cost of material for a particular job or work order to the cost department.

A specimen of the bill of materials is as follows:

Bill of Materials						
Job/work order No. _____			No. _____			
Description of job _____			Date _____			
S.No.	Description	Code No.	Details of Issue			Remarks
			Date	Rate ₹	Amount ₹	
Prepared by _____		Stores department			Cost department	
Checked by _____		Stores department			Cost department	

**Notes:**

- (i) Details of issues regarding date and quantity will be filled by the stores department.
- (ii) Rate and amount columns will be completed by the cost department.

**STOCK VERIFICATION**

Stock verification is the process of checking/verifying the stock physically held in warehouse in terms of quantity and quality. It is required to provide an audit of existing stock valuation. It is also the source of stock discrepancy information. Stock verification may be performed as an intensive annual check or may be done continuously by means of a cycle count. In short it refers to the process of physically checking the quantities of different items of material available in stock in a warehouse and tallying these physically available quantities with the quantities shown in stores stock records.

Depending on timing of physical check of the quantity in stock, different types of stock verification can be designed. The common types of stock verification systems are as under:

**Periodic stock verification:** It is done at predetermined periodical intervals, e.g. many businesses do their stock verification just before the financial year end (i.e. March 31) so that the final accounts of the business will reflect the accurate position of stocks. In this system all items in the stock is divided in 12 groups and a particular month is fixed for stock verification of the items in the group. Consequently every item in store gets verified once a year, in different month. It allows the workload of stock verification to be divided evenly throughout the year.

**Perpetual stock Verification:** In this system the stock of every item is verified every time there is an issue or receipt transaction for the item. This means a much stricter control over physical stock.

## METHOD OF PRICING OF MATERIAL ISSUES

When materials are issued to production department, a difficulty arises regarding the price at which materials issued are to be charged. The same type of material may have been purchased in different lots at different times at several different prices. This means that actual cost can take on several different values and same method of pricing the issue of materials must be selected.

There are numerous methods of pricing issues. They may be classified as follows:

<b>I. Cost Price Methods</b>	<b>II. Average Price Method</b>	<b>III. Notional Price Methods</b>
(a) Specified Price	(a) Simple Average	(a) Standard Price
(b) First-in First-out (FIFO)	(b) Weighted Average	(i) Current Standard
(c) Last-in First-out (LIFO)	(c) Periodic Simple Average	(ii) Basic Standard
(d) Highest-in First-out (HIFO)	(d) Moving Simple Average	(b) Inflated Price
(e) Base Stock	(e) Moving Weighted Average	(c) Market Price
		(i) Replacement Price
		(ii) Realisable Price

### I. Cost Price Methods

#### (a) Specified Price (Identifiable) Method

Sometimes materials are purchased to be utilised in a particular job or issues can be identified with a particular receipt. In these cases, the actual purchase price can be charged. This method can be adopted when prices are stable or when the materials are covered by price control orders. This method has limited application only.

#### (b) First-in First-out (FIFO) Method

This method is based on the assumption that materials which are purchased first are issued first. It uses the price of the first batch of materials purchased for all issues until all units from this batch have been issued. In other words the materials are issued at the oldest cost price listed in the stores ledger account and thus, the materials in stock are valued at the price of the latest purchases. It should be noted that the assumption of FIFO is only for accounting purpose i.e. the physical flow of materials need not necessarily be in the order of the flow of cost, though normally materials would be expected to move out of stock on approximately a FIFO basis because oldest stocks are usually used up first.

#### Example

##### Receipts

20th Oct. 500 kgs. @ 5.00 per kg.

23rd Oct. 250 kgs. @ 5.50 per kg.

##### Issues

25th Oct. Issue of 600 kgs. will be valued as follows:

500 kgs. @ ₹5 per kg.

100 kgs. @ ₹5.50 per kg.

**Advantages:**

- (i) It is a good inventory management system since the oldest units are used first and inventory consists of the latest stock.
- (ii) It is logical.
- (iii) It is easy to understand and operate.
- (iv) It facilitates inter-firm and intra-firm comparisons.
- (v) Valuation of inventory and cost of finished goods is consistent and realistic.

**Disadvantages:**

- (i) The cost of production is not linked to the current prices.
- (ii) If prices are rising, production cost is understated. But if stock turnover rate is high, the inventory will reflect current prices. The effect of current market prices is not revealed in issues when prices are rising.
- (iii) It does not present the true picture when many lots are purchased at different prices. The calculation become complicated.
- (iv) The pricing of material returns is difficult.
- (v) High inflation creates problems in replacing used materials, this aspect is not dealt with in FIFO.
- (vi) Usually more than one price has to be adopted for a particular issue.
- (vii) Cost comparisons between two batches of production becomes difficult when issues are priced differently.

**(c) Last-in First out (LIFO) Method**

The principle adopted is that the materials used in production is from the latest purchase. The inventory is priced at the oldest costs. As the method applies the current cost of materials to the cost of units, it is also known as the replacement cost method. It is the most significant method in matching cost with revenue in the income determination procedure.

**Example**

Assuming the same facts as given under FIFO, the issues will be valued as follows:

250 kgs. @ ₹5.50 per kg.

350 kgs. @ ₹5.00 per kg.

**Advantages:**

- (i) It is simple and useful when transaction are few.
- (ii) It is a good method of avoiding tax.
- (iii) It is a systematic method. It matches current costs with current revenues in a better way.
- (iv) It reveals real income in times of rising prices.
- (v) It minimises unrealised inventory gains and losses and tends to stabilise reported operation profits especially when the industry is prone to sharp price fluctuations.

**Disadvantages:**

- (i) When rates of material receipts are highly fluctuating, the method becomes complicated.
- (ii) More than one price may have to be adopted for an issue.
- (iii) Cost of different batches vary greatly, making inter-firm and intra-firm comparison difficult.
- (iv) The stocks require to be adjusted during falling prices.
- (v) Unless purchases and sales occur in equal quantities the current costs cannot be easily matched with current revenue.
- (vi) The company can time the purchases to cause high or low costs thus changing reported income at will.
- (vii) Existing profit sharing and bonus can be effected by an accounting change. Employees will have difficulty in understanding the cause for these changes.

**(d) Highest-in First-out (HIFO) Method**

The principle adopted is that costliest materials are issued first, Inventory is valued at the lowest possible price. The method requires detailed records. It is mainly used for monopoly products or cost plus contracts. When stocks are undervalued, a secret reserve is created.

**(e) Base Stock Method**

A certain minimum stock of a material is always carried and is priced at the original cost (usually at the lowest purchase price). The portion of stock above this level is issued and priced under any one of the methods.

The disadvantages of this method is that the stock may be under valued and hence the computation of return on capital will not be reliable.

**II. Average Price Methods****(a) Simple Average Method**

The simple average is the average of prices ignoring the quantities involved. It can be used when the prices are normally stable and the stocks purchased are in equal quantities or the stock value is small. It is calculated by dividing the total rates of materials by the number of rates of prices. A new average is worked out after every receipt.

Example:

Assuming the facts given in FIFO the average will be:

$$₹ \frac{5 + 5.5}{2} = ₹5.25 \text{ per kg.}$$

**(b) Weighted Average Method**

In this method, the total quantities and total costs are taken into account while calculating the average price. It is calculated after every purchase by adding the quantity received to the stock in hand and the cost of this purchase to the cost of stock in hand. The total cost is divided by the total quantity to arrive at the value. This method avoids price fluctuations and reduces the number of calculations and gives an acceptable figure for stock.

**Example**

The weighted average will be calculated as follows (with previously given data):

$$\frac{5 \times 500 + 5.5 \times 100}{600} = ₹5.083$$

**Advantages:**

- (i) It is logical and consistent.
- (ii) Changes in prices do not affect issues and inventory.
- (iii) The values reflect actual costs.

**Disadvantages**

- (i) It involves considerable amount of clerical work.
- (ii) When prices change frequently, it is inconvenient and complex.
- (iii) As it is not the actual price, it is not realistic.

**(c) Periodical Simple Average Method**

Some companies may price materials by taking average of the prices of all receipts during a period, e.g., a month, a week, etc. for the subsequent period. Only those prices - relevant to the period is taken into account. Purchases made during the period and closing stock are taken into account.

**Example**

The receipts during the month were at the rates of ₹ 5, ₹ 5.50, ₹ 6 and ₹ 4.50. The periodic simple average will be:

$$\begin{aligned} \frac{\text{Total Prices of Materials}}{\text{Total Number of Prices}} &= \frac{5 + 5.50 + 6 + 4.50}{4} \\ &= ₹ 5.25 \end{aligned}$$

**Disadvantages:**

- (i) Pricing of issues ignores heavy fluctuations in price during the current period.
- (ii) it is not an exact cost method.
- (iii) It involves heavy clerical work.

**(d) Periodic Weighted Average Method**

The average price is calculated periodically and not every time the material is received. It is calculated by dividing the total value of materials purchased during a period by the total quantity purchased.

**Example**

If the total receipts during a month is 1,000 kg. costing ₹25,000, the periodic weighted average will be

$$\frac{₹ 25,000}{1,000} = ₹ 25 \text{ per kg.}$$

**Advantages:**

- (i) Clerical costs are reduced.
- (ii) It is useful in process costing.
- (iii) The issue price is not affected by short-term fluctuations.

**Disadvantages:**

- (i) At the end of the accounting period, heavy clerical work is involved.
- (ii) Violent fluctuations are ignored till the end of the period.
- (iii) Closing stock can be erroneously valued and nil stock may have a residual value.

**(e) Moving Simple Average Method**

In this method, periodic simple average prices are further averaged. By dividing periodic average prices by the number of periods taken, the moving average is calculated. The period chosen should cover the period in which the material is issued.

The value of closing stock may be under valued or over valued. When prices are rising, the issue price worked out is lower than the periodic average prices for the period concerned and vice versa.

**Example**

Month	Periodic Average Price (₹)	Moving Average Price (₹)
January	2.50	
February	2.60	2.60
March	2.70	2.72
April	2.85	2.85
May	3.00	3.03
June	3.25	

**(f) Moving Weighted Average Method**

The material issue price is calculated by dividing the total of the periodic weighted average prices for a number of periods by the total number of such periods.

**III. Notional Price Methods****(a) Standard Price Method**

The price of issues for each item is pre-determined for a stated period taking into account all the factors affecting price, e.g., market trends, transportation costs, etc. Standard prices are determined for each material. All issues and inventory are kept at the standard price. These should be revised from period to period.

Standard can be basic or current standard. The basic standard is fixed for long periods and it gives the ideal price. It assists forward planning. Current standard keeps costs of the products adjusted to prevailing trends in markets. Basic standard on the other hand, helps to study trends in production costs over a period.

The difference between standard and actual is transferred to the purchase price variance account.

**Advantages:**

- (i) It simplifies accounting as only quantities are recorded.
- (ii) As only one rate is adopted, inconsistency is avoided.
- (iii) It helps to determine purchase efficiency. If actual cost is more than the standard than there is unfavourable purchasing efficiency and vice versa.
- (iv) It is simple to operate.
- (v) It provides stability to the costing system.

**Disadvantages:**

It does not reflect the actual or expected cost but only a target.

**(b) Inflated Price Method**

Inflated price includes carrying costs, losses due to evaporation etc. It aims to recover full costs of materials purchased.

**(c) Market Price Method**

Materials may be issued at the replacement price. The replacement price is the cost of the same type of materials in the market at any given time.

**Advantages:**

- (i) It measures results correctly and accurately as current revenues are matched against current costs.
- (ii) It differentiates between holding gains and operating gains.
- (iii) A realistic and competitive selling price can be determined.

**Disadvantages:**

- (i) In the absence of a market price, replacement price cannot be determined.
- (ii) As it is not based on actual cost, they may increase the confusion and complication in accounting.

The replacement price is used in respect of items used in manufacturing whereas the realisable price is used for items kept in stock.

The realisable price is useful for calculating the issue price of obsolete and slow-moving stores. If issues are priced at current market price, price reduced due to bulk purchases, are not reflected.

The market price method introduces elements of uncertainty and involves excessive classical labour to maintain records of latest prices for various items.

**Selection of Material Pricing Method**

The various method of pricing issues have merits and demerits. The choice of any method depends on many factors which can be summarised as under :

- (i) the frequency of purchases.
- (ii) price fluctuations and its range.

- (iii) method of stock valuation.
- (iv) customs and practices followed in the industry, whether uniform costing system is being followed.
- (v) stock turnover rate.
- (vi) percentage cost of raw materials to total cost of products.
- (vii) economic order quantity.
- (vii) effect of pricing method on tax payable.
- (ix) the accuracy required and the accuracy which would be obtained.
- (x) clerical work involved.
- (xi) costing system adopted.
- (xii) traceability of issue to purchase lot.
- (xiii) frequency of receipts and issues.
- (xiv) whether standard costing system is adopted.
- (xv) the nature of business.
- (xvi) the possibility of using different methods for different classes of items.

In addition to the above, the following factors have to be satisfied:

- (i) The purchase cost is covered.
- (ii) The issue price reflects the market price,
- (iii) There is no significant variation in cost from period to period, and
- (iv) The system does not necessitate heavy adjustment at the time of valuing closing stock.

### **Illustration 8**

The following is a summary of the receipts and issues of materials in a factory during a month:

Date

- 1 Opening balance 500 units at ₹25 per unit.
- 3 Issue 70 units
- 4 Issue 100 units
- 8 Issue 80 units
- 13 Received 200 units @ ₹24.50 per unit.
- 14 Returned to store 15 units @ ₹24 per unit
- 16 Issue 180 units
- 20 Received 240 units @ ₹24.75 per unit
- 24 Issue 304 units
- 25 Received 320 units @ ₹24.50 per unit
- 26 Issue 112 units
- 27 Returned to store 12 units @ ₹24.50 per unit
- 28 Received 100 units at ₹25 per unit.



Work out on the basis of 'FIFO'. It was revealed that on 15th there was a shortage of 5 units and on 27th of 8 units.

**Solution:**

Shortage can either be adjusted in works overhead or the issue price enhanced accordingly. If the shortage is abnormal, it is to be charged to Costing Profit and Loss Account.

**STORES LEDGER ACCOUNT**

Material Code \_\_\_\_\_ Bin No. \_\_\_\_\_ Maximum Level \_\_\_\_\_  
 Type or Size \_\_\_\_\_ Location Code \_\_\_\_\_ Minimum Level \_\_\_\_\_

Receipts					Issues					Balance		
Date	P.O. No.	Qty.	Rate (₹)	Amount (₹)	Date	M.R. No.	Qty.	Rate (₹)	Amount (₹)	Qty.	Rate (₹)	Amount (₹)
1st	Balance									500	25.00	12,500
					3rd		70	25.00	1,750	430	25.00	10,750
					4th		100	25.00	2,500	330	25.00	8,250
					8th		80	25.00	2,000	250	25.00	6,250
13th		200	24.50	4,900						250	25.00	6,250
										200	24.50	4,900
14th	Refund	15	24.00	360						250	25.00	6,250
										200	24.50	4,900
										15	24.00	360
					15th	Shortage	5	25.00	125	245	25.00	1,625
										200	24.50	4,900
										15	24.00	360
					16th		180	25.00	4,500	65	25.00	1,625
										200	24.50	4,900
										15	24.00	360
20th		240	24.75	5,940						65	25.00	1,625
										200	24.50	4,900
										15	24.00	360
					24th		65	25.00	1,625	240	24.75	5,940
							200	24.50	4,900			
						304	15	24.00	360			
							24	24.75	594	216	24.75	5,346
25th		320	24.00	7,680						216	24.75	5,346
										320	24.00	7,680
					26th		112	24.75	2,772	104	24.75	2,574
										320	24.00	7,680
27th	Refund	12	24.50	294						104	24.75	2,574
										320	24.00	7,680
										12	24.50	294
					27th	Shortage	8	24.75	198	96	24.75	2,376
										320	24.00	7,680
										12	24.50	294
28th		100	25.00	2,500						96	24.75	2,376
										320	24.00	7,680
										12	24.50	294
										100	25.00	2,500

CLOSING STOCK: 528 Units = ₹12,850.

**Illustration 9**

From the following you are required to prepare a statement showing the issues made under LIFO method:

Date	Opening Balance	100 units at ₹10 each
1	Received	200 units at ₹10.50 each
2	Received	300 units at ₹10.60 each
4	Issued	400 units to Job A vide MR No. 3
6	Issued	120 units to Job B vide MR No. 4
7	Received	400 units at ₹11 each
10	Issued	200 units to Job C vide MR No. 5
12	Received	300 units at ₹11.40 each
13	Received	200 units at ₹11.50 each
15	Issued	400 units to Job D vide MR No. 6

**Solution:****STORES LEDGER ACCOUNT**

Receipts					Issues					Balance		
Date	P.O. No.	Qty.	Rate (₹)	Amount (₹)	Date	M.R. No.	Qty.	Rate (₹)	Amount (₹)	Qty.	Rate (₹)	Amount (₹)
										100	10.00	1,000
1st		200	10.50	2,100						100	10.00	1,000
										200	10.50	2,100
2nd		300	10.60	3,180						100	10.00	1,000
										200	10.50	2,100
										300	10.60	3,180
					4th	3	(400)					
							300	10.60	3,180	100	10.00	1,000
							100	10.50	1,050	100	10.50	1,050
					6th	4	(120)					
							100	10.50	1,050	80	10.00	800
							20	10.00	200			
7th		400	11.00	4,400						80	10.00	800
										400	11.00	4,400

					10th	5	200	11.00	2,200	80	10.00	800
										200	11.00	2,200
12th		300	11.40	3,420						80	10.00	800
										200	11.00	2,200
13th		200	11.50	2,300						300	11.40	3,420
										80	10.00	800
										200	11.00	2,200
										300	11.40	3,420
					15th	6	(400)			200	11.50	2,300
										80	10.00	800
							200	11.50	2,300	200	11.00	2,200
							200	11.40	2,280	100	11.40	1,140

CLOSING STOCK: 380 Units, Value: ₹4,140.

**Illustration 10**

Prepare a statement showing the pricing of issues, on the basis of (a) Simple Average, and (b) Weighted Average Methods from the following information pertaining to material 'X'.

Date

- 1 Purchased 100 units @ ₹10.00 each.
- 2 Purchased 200 units @ ₹10.20 each.
- 5 Issued 250 units to Job A vide MR No. 1
- 7 Purchased 300 units @ ₹10.50 each
- 10 Purchased 200 units @ ₹10.80 each
- 13 Issued 200 units to Job B vide MR No. 2
- 18 Issued 200 units to Job C vide MR No. 3
- 20 Purchased 100 units @ ₹11.00 each.
- 25 Issued 150 units to Job D vide MR No. 4.

**Solution:**

**SIMPLE AVERAGE METHOD**

**STORES LEDGER ACCOUNT**

Receipts					Issues					Balance	
Date	P.O No.	Qty.	Rate (₹)	Amount (₹)	Date	M.R No.	Qty.	Rate (₹)	Amount (₹)	Qty.	Amount (₹)
1st		100	10.00	1,000						100	1,000
2nd		200	10.20	2,040						300	3,040

					5th	1	250	$\frac{10 + 10.20}{2}$	2,525	50	515
7th		300	10.50	3,150						350	3,665
10th		200	10.80	2,160						550	5,825
					13th	2	200	$\frac{10.20 + 10.50 + 10.80}{3}$	2,100	350	3,725
					18th	3	200	$\frac{10.50 + 10.80}{2}$	2,130	150	1,595
20th		100	11.00	1,100						250	2,695
					25th	4	150	$\frac{10.80 + 11.00}{2}$	1,635	100	1,060

CLOSING STOCK: 100 Units, Value: ₹ 1,060.

#### WEIGHTED AVERAGE METHOD

Receipts					Issues					Balance		
Date	P.O No.	Qty.	Rate (₹)	Amount (₹)	Date	M.R No.	Qty.	Rate (₹)	Amount (₹)	Qty.	Rate (₹)	Amount (₹)
1 <sup>st</sup>		100	10.00	1,000						100	10.00	1,000.00
2 <sup>nd</sup>		200	10.20	2,040						300	10.13	3,040.00
					5th	1	250	10.13	2,533.30	50	10.13	506.70
7 <sup>th</sup>		300	10.50	3,150						350	10.45	3,656.70
10th		200	10.80	2,160						550	10.58	5,816.70
					13 <sup>th</sup>	2	200	10.58	2,116.00	350	10.58	3,700.70
					18th	3	200	10.58	2,116.00	150	10.58	1,584.70
20th		100	1,100	1,100						250	10.74	2,684.70
					25th	4	150	10.74	1,611.00	100	10.74	1,073.70

CLOSING STOCK: 100 Units, Value: ₹1073.70.

$$\text{Rate} = \frac{3,040}{300} = ₹10.13$$

$$\text{Rate} = \frac{5,816.70}{550} = ₹10.58$$

$$\text{Rate} = \frac{3,656.70}{350} = ₹10.45$$

$$\text{Rate} = \frac{2,684.70}{250} = ₹10.74$$

#### Illustration 11

The stock of material in hand on 1st April, 2013 was 400 units at ₹50 per unit. The following receipts and

issues were recorded. Prepare a Stores Ledger Account under 'Base Stock Method' both by adopting FIFO and LIFO Methods, Base stock being 100 units.

Date

- 2 April Purchased 100 units @ ₹55 each
- 6 April Issued 400 units
- 10 April Purchased 600 units @ ₹60 each
- 13 April Issued 500 units
- 20 April Purchased 500 units @ ₹ 65 each
- 25 April Issued 600 units
- 10 May Purchased 800 units @ ₹70 each
- 12 May Issued 500 units
- 13 May Issued 200 units
- 15 May Purchased 500 units @ ₹75 each
- 12 June Issued 400 units
- 15 June Purchased 300 units @ ₹80 each.

**Solution:**

Base Stock with FIFO and LIFO      Stores Ledger Account No.....      Maximum No.....  
 Material.....      Bin No.....      Minimum No.....  
 Code.....      Location.....      Base Stock = 100 units  
 Type and size.....      Folio.....

Receipts					Issues							Balance				
Date	P.O. No.	Qty.	Rate (₹)	Amt. (₹)	Date	M.R. No.	Quantity	FIFO Rate (₹)	LIFO Rate (₹)	FIFO Amt. (₹)	LIFO Amt. (₹)	Quantity	FIFO Rate (₹)	LIFO Rate (₹)	FIFO Amt. (₹)	LIFO Amt. (₹)
1st Apr.	Bal. B/d											400	50	50	20,000	20,000
2nd Apr.	-	100	55	5,500								400	50	50	20,000	20,000
							100	55	55	5,500	5,500	100	55	55	5,500	5,500
					6th Apr.	-	400	300	50	15,000	15,000	100	50	50	5,000	5,000
							100	55	55	5,500	5,500					
10th Apr.	-	600	60	36,000								100	50	50	5,000	5,000
												600	60	60	36,000	36,000

					13th Apr.	-	500		60	60	30,000	30,000	100		50	50	5,000	5,000
													100		60	60	6,000	6,000
20th Apr.	-	500	65	32,500									100	100	50	50	5,000	5,000
													100	500	60	65	6,000	32,500
													500	100	65	60	32,500	6,000
					25th Apr.	-	600	500	65	65	32,500	32,500	100		50	50	5,000	5,000
								100	60	60	6,000	6,000						
10th May	-	800	70	56,000									100		50	50	5,000	5,000
													800		70	70	56,000	56,000
					12th May	-	500		70	70	35,000	35,000	100		50	50	5,000	5,000
													300		70	70	21,000	21,000
					13th May	-	200		70	70	14,000	14,000	100		50	50	5,000	5,000
													100		70	70	7,000	7,000
15th May	-	500	75	37,500									100	100	50	50	5,000	5,000
													100	500	70	75	7,000	37,500
													500	100	75	70	37,500	7,000
					12th June	-	400	100	70	75	7,000	30,000	100	100	50	50	5,000	5,000
								300	75		22,500		200	100	75	75	15,000	7,500
													100		70			7,000
15th June	-	300	80	24,000									100	100	50	50	5,000	5,000
													200	300	75	80	15,000	24,000
													300	100	80	75	24,000	7,500
													100		70			7,000

Base Stock: Closing Stock of Material (FIFO) 600 units = ₹44,000

(LIFO) 600 units = ₹43,500

### Illustration 12

Prepare Stores Ledger Account showing pricing of material issues on Replacement Price basis, from the following particulars:

Opening Balance 400 units @ ₹4 each.

10th March Received 100 units @ ₹4.10 each.

15th March Issued 300 units to job XY vide M.R. No. 1

17th March Received 200 units @ ₹4.30 each.

20th March Issued 250 units to job AB vide M.R. No. 2.

25th March Received 400 units @ ₹4.50 each.

26th March Issued 200 units to job JK vide M.R. No. 3.

27th March Received 100 units @ ₹4.60 each.

30th March Issued 300 units to job PQ vide M.R. No. 4.

Replacement price on various dates: 15th March ₹4.20; 20th March ₹4.40; 26th March ₹4.60 and 30th March ₹4.80.

### Solution:

#### STORES LEDGER ACCOUNT

Material..... Bin No..... Folio.....  
 Size..... Code..... Maximum No.....  
 Location..... Minimum No.....

Receipts					Issues					Balance	
Date	P.R. No.	Qty.	Rate (₹)	Amt. (₹)	Date	P.R. No.	Qty.	Rate (₹)	Amt. (₹)	Qty.	Amt. (₹)
1st Mar.										400	1,600
10th Mar.	-	100	4.10	410	-	-	-	-	-	500	2,010
-	-	-	-	-	15th Mar.	1	300	4.20	1,260	200	750
17th Mar.	-	200	4.30	860	-	-	-	-	-	400	1,610
-	-	-	-	-	20th	2	250	4.40	1,100	150	510

25th Mar.	-	400	4.50	1,800	Mar.	-	-	-	-	-	550	2,310
-	-	-	-	-	26th Mar.	3	200	4.60	920		350	1,390
27th Mar.	-	100	4.60	460	-	-	-	-	-	-	450	1,850
-	-	-	-	-	30th Mar.	4	300	4.80	1,440		150	410

Closing Stock: 150 Units; Value ₹ 410.

### Illustration 13

Stocks are issued at standard price and the following transactions occurred in a specific material:

Date

April

2013

1	Stock	10 tons	at ₹240 per ton
4	Purchased	5 tons	at ₹260 per ton
5	Issued	3 tons	
12	Issued	4 tons	
13	Purchased	3 tons	at ₹250 per ton
19	Issued	4 tons	
26	Issued	3 tons	
30	Purchased	4 tons	at ₹280 per ton
30	Issued	3 tons	

The debit balance of price variation on 1st April 2013 was ₹20. Show the stock account for the material for the month of April indicating how would you deal with the difference in material price variance, while preparing the Profit and Loss Account for the month.

### Solution:

Calculation of Standard Price

	₹
Value of Opening stock = 10 x ₹240	2,400
Add: Price variance, not yet transferred to Costing P & L A/c	20
Total value of 10 tons	2,420
∴ Standard price for issue per ton = ₹242	



## STORE LEDGER ACCOUNT

Material..... Bin No..... Maximum No.....  
 Code..... Location..... Minimum No.....  
 Type and size..... Folio.....

Receipts					Issues					Balance	
Date	P.O. No.	Qty.	Rate (₹)	Amount (₹)	Date	M.R.O. No.	Qty.	Rate (₹)	Amount (₹)	Qty.	Amount (₹)
1st Apr.	Bal.	-	-	-	-	-	-	-	-	10 tons	2,400
4th Apr.	-	5 tons	260	1,300	-	-	-	-	-	15 tons	3,700
-	-	-	-	-	5th Apr.	-	3 tons	242	726	12 tons	2,974
-	-	-	-	-	12th Apr.	-	4 tons	242	968	8 tons	2,006
13th Apr.	-	3 tons	250	750	-	-	-	-	-	11 tons	2,756
-	-	-	-	-	19th Apr.	-	4 tons	242	968	7 tons	1,788
-	-	-	-	-	26th Apr.	-	3 tons	242	726	4 tons	1,062
30th Apr.	-	4 tons	280	1,120	-	-	-	-	-	8 tons	2,182
-	-	-	-	-	30th Apr.	-	3 tons	242	726	5 tons	1,456
		<b>12</b>		<b>3,170</b>			<b>17</b>		<b>4,114</b>		

Note: As the issues are priced at standard rate of ₹242 per ton the difference on account of this policy, between actual and standard value of closing stock, would be transferred to Costing Profit and Loss Account and would be debited to Material Price Variance.

Closing stock - Standard 5 tons @ ₹242	= ₹1,210
Actual 5 tons	= ₹1,456
∴ Difference (Adverse)	= ₹ 246
Material Control A/c	Dr. 4,114
Material Price Variance A/c	Dr. 246
To Cost Ledger A/c	

**Illustration 14**

Using the following data, compute (i) Closing Inventory and (ii) Cost of sales under 'current purchasing power' (CPP) method assuming that the firm is following LIFO method of inventory valuation:

Inventory as on 1/04/2012:	₹ 2,40,000
Purchases during 2012:	₹ 14,40,000
Inventory as on 31/03/2013:	₹ 3,60,000
Price index as on 01/04/2012:	100
Price index as on 31/03/2013:	130
Average price Index for 2012:	120

**Solution:**

The converted amount of closing stock under CPP considering LIFO method :

Value of Closing Stock = ₹3,60,000

Out of the above, ₹2,40,000 is deemed to be from the opening stock and the balance ₹1,20,000 from the current purchases since LIFO method is being followed.

Relevant conversion factor for ₹2,40,000

= ₹2,40,000 x 130/100 = ₹3,12,000

The conversion factor for the balance ₹1,20,000

= ₹1,20,000 x 130/120 = ₹1,30,000

Value of closing Stock under CPP = ₹3,12,000 + ₹1,30,000 = ₹4,42,000

Calculation of Cost of Sales under CPP when LIFO method of inventory valuation is used:

	Historical Cost Basis	Conversion Factor	Converted Amount
	₹		₹
Inventory as on 01/04/2010	2,40,000	130/100	3,12,000
Add: Purchases	<u>14,40,000</u>	130/120	<u>15,60,000</u>
Total	16,80,000		18,72,000
Less: Closing Inventory as			
calculated above	<u>3,60,000</u>		<u>4,42,000</u>
	<u>13,20,000</u>		<u>14,30,000</u>

**PRICING OF MATERIAL RETURNS**

Some materials issued to a job may be left over. These should be returned to the stores. A Material Return Note is prepared in triplicate. The jobs should be charged correctly and materials should not be lying around. Hence, these notes are prepared.

The rate adopted depends upon the nature of material returned. If the material is unused, it should be returned at the price originally charged and if the price is not available, then at the latest issue price. If the material is scrap/cut pieces, then the price will be related to the utility value of the material. If the firm is

following the average price method, the return should be recorded at the original price but a new price has to be calculated for further issues.

**MATERIAL TRANSFER NOTE**

Surplus material drawn against one job can be used in another instead of transferring it to the stores. These transfers are recorded in Material Transfer Note to charge individual jobs correctly.

The material transferred is, no doubt, in its original condition. Hence, it should be valued at the original issue price. If the price is not available, then it is priced at the latest issue price.

<b>PQR CO. LTD.</b>						
<b>MATERIAL TRANSFER NOTE</b>						
From Cost Centre:				S.No.:		
To Cost Centre:				Date:		
Transfer from Job No.: _____ to Job No. _____						
Stores Code No.	Description	Unit	Qty.	Rate	Value	Remarks
Sent by _____		Received by _____		Store Accountant _____		

**SPECIMEN OF MATERIAL TRANSFER NOTE**

**ACCOUNTING OF MATERIAL LOSSES**

Losses of materials may arise during handling, storage or during process of manufacture. Such losses may be classified into two categories, i.e. normal loss and abnormal loss. Normal loss is that loss which has necessarily incurred and thus is unavoidable. Examples:

- Loss by evaporation
- Loss due to loading and unloading
- Loss due to breaking the bulk, etc.

Normal losses of material cannot be completely avoided but may be controlled to a limited extent.

Abnormal loss is that loss which arises due to inefficiency in operations, mischief, carelessness, etc. Examples –

- Theft or pilferage
- Breakage
- Fire, accident, flood, etc.
- Use of inaccurate instruments
- Improper storage, etc.

### Accounting Treatment

As a principle, all normal losses which are necessarily incurred are treated as a part of the cost and abnormal losses should not be included in the cost. In order to absorb normal material losses in cost, the rates of usable units are inflated so that such losses are absorbed. Alternatively, normal material loss is transferred to factory overhead. However abnormal loss of material are charged to Costing Profit and Loss account.

Materials losses may arise in the form of waste, scrap, spoilage or defectives.

### Waste

Waste comprises of invisible loss, visible loss that cannot be collected and also the unsaleable portion of the collected loss. Waste is excluded from output quantity. Examples of waste are smoke, dust, gases, slag, etc.

In certain cases, the waste involves further costs of disposing it, e.g., cost incurred for disposal of effluent, obnoxious gases etc.

### Accounting Treatment

Standards are established for waste. Actual wastage is recorded and variation from standards are reported.

**(i) Normal Waste:** This is unavoidable and uncontrollable and treated as part of the product cost. The wastage cost is borne by the good units.

**(ii) Abnormal Waste:** It is valued as if the output is good. This cost is transferred to the Costing Profit and Loss Account.

Sometimes a demand may arise for the waste, e.g., it may be used as a substitute raw material. The selling price has to be suitably fixed on the basis of the market value of the raw material substituted.

### Scrap

Scrap represents the unusable loss which can be sold. It is a residue which is measurable and has a minor value. It may result from the processing of materials, obsolete stock or defective parts. The sale value is credited to the concerned department which produced it. If the value is negligible, it is credited to the Costing Profit and Loss Account.

Scrap may arise in the form of turnings, boring's, filings etc. from metal; sawdust in timber industry, off-cuts and cut pieces in leather industry.

A committee may be constituted which classifies the various types of scrap, calculates their value and quantity and also determine the method of use/disposal.

### Accounting Treatment

- (i) Where the scrap has negligible value, it is charged to good units. Income is credited to other income.
- (ii) The sale value can be reduced from the material cost.
- (iii) If the scrap has very little value, only a quantity record need be kept.
- (iv) The cost is calculated by reducing the sale price by the selling cost and this sum is taken as a credit to the production overhead account.

- (v) Scrap arising in one job may be used in another. Such transfers should be properly recorded on material transfer notes.

The actual quantity of scrap is compared with the standard quantity. Excess scrap is investigated so that corrective action can be taken. At the designing stage, such a type, form and shape of material are chosen which will minimise the waste/scrap. Best equipments should be used and personnel should be properly trained.

### Spoilage

Spoilage are those materials or components which are so damaged in the manufacturing process that they cannot be repaired or reconditioned. Some spoilage may be sold as seconds. If they are badly spoiled they can be sold as waste or scrap. Spoiled units do not attain the quality required and it is not economic to correct them.

Spoilage occurs due to some defect in operations or materials. Sometimes the entire production in a batch may have to be rejected or a part of it may be rejected.

### Accounting Treatment

- (i) Loss due to spoilage can be debited to the job/product/process in which it occurred.
- (ii) It may be charged to factory overheads so that the loss is borne by all products.
- (iii) Abnormal loss which is unexpected but controllable should be transferred to the Costing Profit and Loss Account.

If spoilage occurs on a specific job/special order, it is charged to that job itself. Sometimes loss is prorated on the basis of percentage of scrap anticipated from each job.

The method of apportionment of spoilage between normal and abnormal is explained below:

Total input	5,000 units
Normal spoilage	5% of input
Total spoiled units	550 units
Total Cost	₹10,000
Sale value of spoilage	₹0.50 per unit
Standard output	Input less 5% of Spoilage 4,750 units
Cost of abnormal spoilage	$\frac{10,000 - (250 \times .5) \times 300}{4,750}$
	$\frac{10,000 - 125}{4,750} \times 300$
	$\frac{9,875 \times 300}{4,750} = ₹623.68$
Net cost of abnormal spoilage	₹623.68 – (300 x 0.50) = ₹473.68

The cost of abnormal spoilage is charged to Costing Profit and Loss Account and sale value is credited to Costing Profit and Loss Account.

The cost of normal spoilage is charged as product cost.

$$\begin{aligned} \text{Units Cost of production} &= \frac{\text{Rs. } 10,000 - 125 - 623.68}{5,000 - 550} \\ &= \frac{\text{Rs. } 9,251.32}{4,450} = ₹2.0789 \end{aligned}$$

## Defectives

Defectives are that portion of the process loss which can be converted into a finished product by incurring more material and labour expenses. The additional expenses are added to the cost of manufacture and the rectified units to total units. Imperfections may arise because of sub-standard materials, bad workmanship, inadequate inspection, lack of plans, etc. It should be ensured that the benefit resulting from rectification is more than the cost incurred on rectifications.

Rectification of defective units may be done by the department in which it was produced. In larger concerns a separate Department may be set up for this purpose.

## Accounting Treatment

- (i) Defectives inherent in the manufacturing process are classified as normal and treated in the following manner:
  - (a) The loss is charged to good products.
  - (b) The additional cost of rectification is charged to factory overheads and apportioned to various goods as part of the factory overhead.
  - (c) If a particular department is responsible for the additional cost of rectification, it can be charged to that department.
- (ii) If the defective units can be traced to a specific job/order, the additional costs can be charged to that job/order.
- (iii) If the defectives are abnormal and due to uncontrollable factors, the additional costs are charged to Costing Profit and Loss Account.

In many concerns, inefficient and bad workmanship results in defective units. To minimise defective work, suitable financial and non-financial incentives based on the quantity or percentage reduction in defective work should be provided.

## CONTROL OF MATERIAL LOSSES

While designing a control system, controllable and uncontrollable losses should be distinguished. The system should determine standard levels which can be attained. Losses may be uncontrollable in the short-term but controllable over a period of time. Moreover, it takes time to control a new process. The various levels should be frequently reviewed. Losses can be minimised by proper storage, proper handling, maintenance of suitable inventory levels etc.

A control system should calculate and report production and data regarding waste, scrap, spoilage and defectives should be regularly collected. Periodic reports help to evaluate performance and also in taking corrective action. Standards should be set. Variances of actuals from standards should be examined so that it can be effectively controlled.

The control of losses can be exercised at three levels:

- (i) Occurrence
- (ii) Recovery, handling and storage
- (iii) Disposal.

### Control Over Occurrence

Losses are incurred due to nature of the product, quality control, method of production etc. The causes may be summarized as follows:

- (a) **Labour-related causes:** Lack of training errors committed by machine operator, inadequate supervision, damage caused by handling carelessness, fatigue etc.
- (b) **Causes related to manufacturing method:** Defective equipments, pitfall in design, machine jams, trials and adjustments, overloading and excessive utilisation of resources, problems associated with new products, standards set etc.
- (c) **Materials related causes:** Defective materials, obsolescence, evaporation, deterioration.
- (d) **Others:** Strict inspection, thefts, etc.

### Control Over Recovery Handling and Storage

As soon as stores are received they should be handled and stored properly. Different types of losses should be identified at different stages of production. Items to be rectified should be identified. Good handling and proper storage protect goods from damage, theft and misappropriation.

### Control over Disposal

To maximise the sales value of waste, scrap, spoilage etc. the following points are to be considered :

- (i) make the goods ready for sale
- (ii) select the best buyer
- (iii) control the quantities of losses.

Bids may be obtained and prices obtained should be comparable with market prices.

Physical control should be exercised over the quantities of scrap, spoilage leaving the factory and the quantities produced, repaired and sold must be continuously reviewed.

### Illustration 15

2,000 kgs. of Art Board valued at ₹8,000 were issued for the manufacture of medium sized cartons. The following details were collected:

- (a) 2,400 Nos. medium sized cartons weighing 0.50 kg. each were manufactured.
- (b) 480 kg. of offcuts were used for the manufacture of small sized carton. This would have amounted to ₹1,000.
- (c) 320 medium sized cartons were damaged and rectification costs came up to ₹160.
- (d) 120 kg. of offcuts were sold as scrap for ₹20.

You are required to calculate the cost of one medium sized carton assuming that there are no opening or closing stocks.

**Solution:**

	Quantity (Kgs.)	Value (₹)
Input	2,000	8,000
Less: offcuts transferred to small size cartons	<u>480</u>	<u>1,000</u>
	1,520	7,000
Less: value of scrap sold	<u>120</u>	<u>20</u>
	1,400	6,980
Add: cost of rectification	—	<u>160</u>
	1,400	7,140
Less: waste in process	<u>40</u>	
Cost of 2,720 medium sized cartons	<u>1,360</u>	<u>7,140</u>

$$\text{Cost per carton} = \frac{\text{₹7,140}}{2,720} = \text{₹2.62}$$

**Notes:**

- (1) Calculation of waste in process : Each carton weighs 0.5 kg. Total medium sized cartons produced are 2,720. This means that quantity should be  $2,720 \times 1/2 = 1,360$  Kgs. The balance quantity is presumed to be normal waste in process.
- (2) The waste in one process may be used in another. The credit given to the process where loss occurs depends upon the utility value of this material for the process in which it is used, i.e., the value if it is directly purchased from the market.

**Illustration 16**

A company draws up the standard cost of a product as follows:

	₹	₹	₹
Direct Materials		12	
<u>Direct Wages:</u>			
Dept. A 3 hours	15		
Dept. B 2 hours	12		
Dept. C 5 hours	<u>20</u>	47	
<u>Factory Overhead:</u>			
Dept. A	18		
Dept. B	18		
Dept. C	<u>40</u>	<u>76</u>	
Factory Cost			135
Administration Cost			12
Selling Cost			15
Distribution cost			<u>18</u>
Total			180
Net Profit			<u>20</u>
Selling Price			<u>200</u>

Factory overhead is absorbed by means of departmental hour rates. Analysis of these overheads reveal that



in each department a rate of ₹2 per hour is required to absorb the variable portion, the balance being of a fixed nature. As a general rule, all production is of first class quality.

After a batch of 1,000 units has been processed through all three departments, inspection reveals that half are faulty. The faulty products can be rectified by completely re-processing through departments B and C. Alternatively, they can be sold for ₹20 each.

Present figures which indicate to management the most economic method of dealing with the faulty products.

**Solution:**

Time taken for original processing and rectification:

Dept. A	3 x 1,000	= 3,000 hrs.
B	2 x 1,000 + 2 x 500	= 3,000 hrs.
C	5 x 1,000 + 5 x 500	= 7,500 hrs.
Fixed Cost		
Dept. A	₹18 - (₹2 x 3 hrs)	= ₹12 per unit
B	₹18 - (₹2 x 2 hrs)	= ₹14 per unit
C	₹40 - (₹2 x 5 hrs)	= ₹30 per unit

**Alternative 1**

Cost of production (includes reprocessing cost)		₹
Direct material 1,000 x ₹12		12,000
Wages and factory overhead:		
Dept. A	3,000 x ₹ (5+2) + 1,000 x ₹12	33,000
B	3,000 x ₹ (6+2) + 1,500 x ₹14	45,000
C	7,500 x ₹ (4+2) + 1,500 x ₹30	90,000
		1,80,000
Administrative, selling and distribution overhead for 1,000 units	45,000	
Loss on non-recovery of 500 units re-processed	<u>22,500</u>	<u>67,500</u>
Total Cost		2,47,500
Sales 1,000 @ ₹200 each		<u>2,00,000</u>
Loss		<u>47,500</u>

**Alternative 2**

Cost of production of 1,000 units of which 500 units are disposed off:

Sales	500 x 200 + 500 x 120	₹1,60,000
Cost	1,000 x 180	<u>₹1,80,000</u>
Loss		<u>₹ 20,000</u>

The second alternative is better as the loss involved is less.

## INVENTORY MANAGEMENT

First of all we should know the meaning of inventory. Inventory is an idle stock of physical goods that contain economic value which are held in various forms by an organization in its custody awaiting packing, processing, transformation, use or sale in a future point of time. Any organization which is into production, trading, sale and service of a product will necessarily hold stock of various physical resources to aid in future consumption and sale. The organizations hold inventories for various reasons, e.g. speculative purposes, functional purposes, physical necessities etc.

Inventory of materials occurs at various stages and departments of an organization. A manufacturing organization holds inventory of raw materials and inventory of semi-finished goods at various stages in the plant with various departments. Finished goods inventory is held at plant, FG Stores, distribution centers etc. Organizations also hold inventories of spare parts to service the products. Defective products, defective parts and scrap is also a part of inventory.

Inventory management is the process of efficiently supervision the constant flow of units into and out of an existing inventory. This process usually involves controlling the transfer in of units in order to prevent the inventory from becoming too high, or too low that could put the operation of the company into difficulty. Competent inventory management also seeks to control the costs associated with the inventory.

Inventory management plays a significant role in determining the:

- What should purchase
- How much should purchase
- Where from should purchase
- Where should store

### Objective of Inventory Management

- To ensure timely delivery of inventory for production
- To avoid over or under level of stock
- To maintain investment in inventories at optimum level
- To minimize the loss in inventory control

In addition to maintaining control of the volume and movement of various inventories, inventory management also makes it possible to prepare accurate records that are used for accessing any taxes due on each inventory type. Without precise data regarding unit volumes within each phase of the overall operation, the company cannot accurately calculate the tax amounts. This could lead to underpaying the taxes due and possibly incurring stiff penalties in the event of an independent audit.

## LESSON ROUND UP

- The materials are of two types, namely:
  - (i) direct materials, and (ii) indirect materials.
- The methods of purchasing can be classified as centralised and localised purchasing, centralised purchasing means that all purchases are made by a single purchase department while in localized purchasing each department or branch makes its own purchases.
- The routine followed for the purchase of materials may involve: indenting for materials, issuing of tenders and receiving quotations, placing of order, inspecting stores received, receiving the stores, and checking and passing bills for payment.

- Storekeeping is the function of receiving materials, storing them and issuing these to workshops or departments.
- Inventory control is the systematic control and regulation of purchase, storage and usage of materials in such a way as to maintain an even flow of production and at the same time avoiding excessive investment in inventories.
- ABC analysis is a value based system of material control, in which materials are analysed according to their value so that costly and more valuable materials are given greater attention and care.
- Economic Ordering Quantity (EOQ) is that size of the order which gives maximum economy in purchasing any material and ultimately contributes towards maintaining the material at the optimum level and at minimum cost.
- Perpetual inventory system is a method of recording stores balances after each receipt and issue to facilitate regular checking and obviate closing down for stock taking.
- Materials are issued to production department on cost price, average price or notional price methods.
- Losses of materials may be either normal loss or abnormal loss.
- Materials losses may arise in the form of waste, scrap, spoilage or defectives.

### SELF TEST QUESTIONS

1. Define inventory control. Why is inventory control necessary?
2. Distinguish between direct material and indirect material.
3. What are the requisites of a good inventory control system?
4. What are the different methods of controlling inventory ?
5. Discuss the advantages and disadvantages of centralised purchasing of raw materials.
6. Explain what is 'minimum level', 'maximum level', 'ordering level', quantity. How are they determined?
7. Explain ABC analysis. What are its merits ?
8. What is perpetual inventory system ?
9. Re-write the following sentences after filling-in the blank spaces with appropriate word(s)/figure(s) :
  - (a) Quantitative records of receipts, issue and balance items of material in stores are entered in \_\_\_\_\_.(June-2012)
  - (b) Two important opposing factors in fixing the economic order quantity are \_\_\_\_\_ and Carrying Cost.(June-2012)
  - (c) The process of physical verification of stores throughout the year is known as \_\_\_\_\_.
  - (d) The three categories of inventory for a manufacturer are raw material, work-in-process and \_\_\_\_\_.(December-2010)
  - (e) A system that keeps a running and continuous record that tracks inventories and cost of goods sold on day-to-day basis is called \_\_\_\_\_.

[bin-card, Ordering cost, Perpetual Inventory system, finished goods, Perpetual Inventory system]

10. Define and explain the following terms and the treatment given in Cost Accounts:

- (a) Waste
- (b) Scrap
- (c) Spoilage
- (d) Defectives.

11. Write the most appropriate answer from the given options in respect of the following :

The annual demand is 1,000 units. The unit price is ₹ 10 per unit.

The carrying cost of inventory is 10% and the ordering cost is ₹ 5 per order. The economic order lot to be ordered is —

- (a) 100 units
- (b) 800 units
- (c) 200 units
- (d) 400 units. (June-2012)

Continuous stock taking is a part of —

- (a) Annual stock taking
- (b) Perpetual inventory
- (c) ABC Analysis
- (d) None of the above. [(a) 100, (b) Perpetual inventory]

12. From the following records regarding material calculate (i) the re-order level, (ii) the maximum stock level, and (iii) the minimum stock level.

Re-order quantity	6,000 units
Minimum stock (for emergencies)	5 weeks
Average delivery time	4 weeks
Maximum stock level	20 weeks
Average consumption per week	400 units
Minimum consumption in 4 weeks	1,200 units

13. Two components X and Y are used as follows:

Normal usage	50 units each per week
Minimum usage	25 units each per week
Maximum usage	75 units each per week
Re-order quantity	X: 400 units; Y: 600 units
Re-order period	X: 4 to 6 weeks; Y: 2 to 4 weeks.

Calculate for each components: (1) the re-order level, (2) the minimum level, (3) the maximum level, and (4) the average stock level.

14. From the following transactions, prepare separately the Stores Ledger Accounts, using the following pricing methods: (i) the FIFO, (ii) the LIFO.

January	1	Opening balance 100 units @ ₹5 each
January	5	Received 500 units @ ₹6 each
January	20	Issued 300 units
February	5	Issued 200 units
February	6	Received 600 units @ ₹5 each
March	10	Issued 300 units
March	12	Issued 250 units

15. The following receipts and issues of materials were made during the month of January.

January 1	Opening stock 80 units @ ₹1.00 each
January 7	Received from vendors 40 units @ ₹1.10 each
January 12	Received from vendors 60 units @ ₹1.20 each
January 22	Received from vendors 72 units @ ₹1.25 each
January 4	Issued 60 units
January 9	Issued 40 units
January 14	Issued 40 units
January 30	Issued 80 units

Prepare the Stores Ledgers maintained under (i) the FIFO, (ii) the LIFO methods.

16. The following transactions took place in respect of a material item during the month of March:

Date	Receipt Qty.	Rate	Issue Qty.
March 2	200	2.00	
March 10	300	2.40	
March 15		250	
March 18	250	2.60	
March 20		200	

Prepare the Stores Ledger Sheet, pricing the issue at the simple average rate and the weighted average rate.

17. Stocks are issued at the standard price and debit balance of variance amount before transfer to Costing Profit and Loss Account was ₹500. The following purchases and issues were made during the month of April:

April 1	Opening Balance	100 units @ ₹90.00 per unit
April 5	Purchased	500 units @ ₹85.00 per unit

April 6	Issued	60 units
April 12	Issued	375 units
April 23	Issued	65 units
April 30	Purchased	250 units @ ₹80.00

Find out the standard price for the issue and prepare the Stores Ledger Account. Also calculate the material price variance.

18. After inviting tenders two quotations are received as follows:

- (a) ₹1.20 per unit.
- (b) ₹1.10 per unit plus ₹3,000 fixed charges to be added irrespective of units ordered.

Advise with your arguments on whom orders should be placed and what quantity is to be ordered.

The following additional information may be of interest:

	Units
Present Stock	35,000
Average Monthly Requirement	10,000
Maximum Level	80,000
Minimum Level	30,000

(Sales tax to be ignored in both cases).

19. The following discrepancies have been reported by the company's internal auditor. Suggest the action to be taken by the management:

- (a) Large deficiencies in important items of stores.
- (b) Accumulation of stocks in the departments due to excess requisitioning.
- (c) Items purchased but not issued, resulting in increased stock value.

20. Different methods are used for the verification of physical stores depending upon the nature of the item involved. Detail the method you would adopt for verification of the following stock:

- (a) 200 tons of coal.
- (b) 40,000 gallons of oil in tanks.
- (c) 15,000 yards of belting in rolls.
- (d) 2,000 nos. of bolts in bags.
- (e) 500 kilos of leather rings part of which is dry and the balance is soaked in oil.

21. During the year, your company has purchased and received 1,500 tons of bulky raw materials which is stored in the factory yard. Issues have been recorded amounting to 1,200 tons. Physical stock-taking at the accounting year end reveals only 200 tons in stock. How would you deal in your cost records with the deficit of 100 tons in physical stocks? What procedure would you instal to ensure that deficit will not occur in the future?

22. A consignment consisted of two chemicals A and B. The invoice gave the following data:

	₹
Chemical A - 4,000 kgs. @ ₹2.50 per/kg.	10,000
Chemical B - 3,200 kgs. @ ₹3.25 per/kg.	10,400
Sales Tax	816
Railway Freight	384
Total cost	21,600

A shortage of 200 kgs. in A and 128 kgs. in B was noticed due to breakage. What is the stock rate you would adopt for pricing issues assuming a provision of 5% towards further deterioration? (A: ₹2.94 per kg.; B: ₹3.76 per kg.)

23. The following is an extract of the record of receipt and issues of sulphur in a chemical factory during February:

- 1 Opening balance 500 tons @ ₹200
- 3 Issued 70 tons
- 4 Issued 100 tons
- 8 Issued 80 tons
- 13 Received from supplier 200 tons @ ₹190
- 14 Returned from Deptt. 15 tons
- 16 Issued 180 tons
- 20 Received from supplier 240 tons @ ₹190
- 24 Issued 300 tons
- 25 Received from supplier 320 tons @ ₹190
- 26 Issued 115 tons
- 27 Returned from Deptt. 35 tons
- 28 Received from supplier 100 tons @ ₹190

Issues are to be priced on the principle of 'First-in First-out'. The stock verifiers of the factory had found a shortage of 10 tons on the 22nd and left a note accordingly. Draw up a priced stores ledger card for the material showing the above transactions. (Stock on 28th Feb., 555 tons; ₹1,05,450)

24. X Ltd. has purchased and issued the materials in the following order:

		Unit	Unit Cost ₹
1st January	Purchased	300	3
4th January	Purchased	600	4
6th January	Issued	500	
10th January	Purchased	700	4
15th January	Issued	800	
20th January	Purchased	300	5
23rd January	Issued	100	





# Lesson 3

## LABOUR COST

### LESSON OUTLINE

- Meaning and Classification of Labour Costs
- Accounting and Control of Labour Costs
- **Time Recording:**
  - Time Keeping and its method
  - Time Booking and its method
- Attendance and Payroll Procedures,
- Overtime and its causes, disadvantages, accounting treatment and control
- Idle Time and its causes, accounting treatment and control
- Labour turnover, its causes and effect
- Measurement, Cost Control and Treatment of Labour Turnover
- Remedial Steps to minimise Labour Turnover
- Labour Remuneration System
- Basic Method of Remuneration system
- Incentive scheme and its classification
- Indirect monetary incentive schemes
- Miscellaneous Topics
- Lesson Round Up
- Self Test Question

### LEARNING OBJECTIVES

Labour cost is a very important constituent of total cost of any product/services. It is very necessary to account for labour cost properly so that we may be able to analyze it and control the avoidable part of labour cost. After going through this lesson, one should be able to understand:

1. The need of labour cost control.
2. The classification of labour cost.
3. The meaning of various components of labour cost i.e. idle time cost, overtime premium, labour turnover cost.
4. Meaning of labour turnover, its reasons and remedial measures.
5. Calculation of labour turnover ratio.
6. Accounting treatment of overtime premium, labour turnover cost and idle time cost.
7. Various incentive schemes i.e. Rowan Plan, Halsey system etc.

Labour Costs include besides wages paid to the workers all other benefits which accrue to the workers on account of their employment with the organisation.

## LABOUR COST

Labour cost is a significant element of cost specially in an organisation using more manual operations. It is the cost of human endeavour in the product and requires coordinated efforts for its control. The management objective of keeping labour cost as low as possible is achieved by balancing productivity with wages. Low wages do not necessarily mean low labour cost. Low labour cost is possible by giving substantial increase in wages against corresponding increase in productivity. The gain is reflected both in labour cost as well as in overheads expense per unit, since overheads are distributed over larger volume. Again, the productivity of labour is quite flexible. Given right type of motivation and incentive, it can reach amazing scale. It does not have any limitation like machines. Labour cost is a vital factor not only affecting the cost of production but also industrial relations of the organization. No organization can expect to attract and attain qualified and motivated employees unless it pays them fair remuneration. Employee remuneration therefore influences vitally the growth and profitability of the company. For employees remuneration is more than a means of satisfying their physical needs. Wages and salaries have significant influence on our distribution of income, Consumption savings employment and prices. Thus employee remuneration is a very significant issue from the viewpoint of employer's employees and the nation as whole.

## CLASSIFICATION OF LABOUR COST

The total labour cost can be classified as follows:

- (a) Direct labour costs;
- (b) Indirect labour costs.

### Direct Labour Cost

It refers to all labour expended in altering the construction, composition, conformation or condition of the product. The wages paid to skilled and unskilled workers for his labour can be allocated specifically to the particular product or the process as the case may be. In any manufacturing process or department, the workers employed may be of the following two categories:

- (i) Those who are directly engaged on the production or in the carrying out of an operation or process;
- (ii) Those who are assisting in the process by way of supervision, maintenance, transportation of materials, etc.

The workers coming under the first category constitute direct labour and the wages paid to them are called direct wages. In a factory, where production of a number of products is undertaken or in a jobbing concern, workers are given job cards on which they note the time devoted to each job or product. These job cards are then analysed job wise so that the wages attributable to each job can be computed.

Direct labour cost is that portion of wages or salaries which can be identified with and charged to a single costing unit. It can be easily identified with and charged to a single costing unit as there is a direct relationship with the product/process. Direct labour cost can be easily calculated and is quite significant in amount.

### Indirect Labour Costs

It refers to labour expended that does not alter the construction, conformation, composition or condition of the product, but which contributes generally to such work and to the completion of the product and its progressive movement and handling up to the point of dispatch. In other words, labour employed for the

purpose of carrying out tasks incidental to goods produced or services provided is regarded as indirect labour. Wages or salaries paid to foremen, supervisors, inspectors, clerks, store-keepers, managers, accountants, salesmen, directors, etc., are examples of indirect labour cost.

These costs are not easily identifiable with particular units of cost. Indirect labour cost can be classified as that expended in production departments and that in service departments. (bulk of the labour cost in a production department will be direct). The classification should enable control over such costs and codification of indirect labour accounts.

#### **Need for distinguishing between direct and indirect labour cost:**

The distinction has to be made

- (a) for calculating accurate labour cost and thus provide a basis for strict control;
- (b) for facilitating calculation of labour efficiency;
- (c) for proper allocation of overheads;
- (d) for introduction of incentive schemes;
- (e) for inter-unit comparison; and
- (f) for estimating total labour costs.

### **ACCOUNTING AND CONTROL OF LABOUR COST**

Accounting for labour by a manufacturer usually involves three activities:

- (1) Time keeping;
- (2) Computation of total payroll; and
- (3) Allocation of payroll costs.

These activities must be performed before the payroll is recorded in the accounting records. In a large organisation, the control of labour cost involves the coordinated efforts of the following departments :—

- (a) **Personnel department** — This department is responsible for manpower planning, recruitment, training, maintaining records of staff and workmen and reporting to chief inspector of factories and to top management on performance, overtime, absenteeism, leave, etc.
- (b) **Industrial engineering department** — This department prepares plans and specifications of each job, supervises production activities, undertakes time and motion studies, performs job-analysis, etc.
- (c) **Time-office** — This department is primarily responsible for collection of data relating to attendance, time spent on jobs or process by the workmen, and providing information on attendance and leave to Payroll department.
- (d) **Payroll department** — This department is responsible for computing total and net earnings of each worker, preparation of payroll and maintenance of various records relating to payroll.
- (e) **Cost department** — This department collects and classifies all cost data relating to labour utilisation by departments, and allocates them to respective job or process as per available documents.

## TIME RECORDING

Recording of time has two purposes - time-keeping and time-booking. It is necessary for both type of workers: direct and indirect. It is necessary even if the workers are paid on piece basis.

Time-keeping is necessary for the purpose of recording attendance and for calculating wages. Time-booking means a record from the utilisation point of view; the purpose is cost analysis and cost apportionment. Record keeping is correct when time-keeping and time-booking tally.

## TIME-KEEPING

The purpose of time-keeping is to provide basic data for:

- (i) pay-roll preparation;
- (ii) finding out the labour cost of a job/product/service;
- (iii) attendance records to meet statutory requirements;
- (iv) determining productivity and controlling labour cost;
- (v) calculating overhead cost of a job, product or service;
- (vi) to maintain discipline in attendance;
- (vii) to distinguish between normal and over-time, late attendance and early leaving; and
- (viii) to provide internal check against dummy workers.

The time-keeping office records the attendance of workers. Depending on the number of workers, a separate department may be established or it may form part of the personnel department.

Wages paid on the piece rate basis also require that attendance be recorded for the following reasons:

- (a) Records of attendance is necessary for statistical purposes.
- (b) If overhead rates are based on labour rates, time recording is necessary.
- (c) Output will decrease if attendance is unchecked. There may be more idle time and production schedules may not be followed.
- (d) Some workers may not be punctual. This will affect the morale of the workers.
- (e) It is necessary to ensure that production hours have been properly utilised.
- (f) It provides data for calculating bonus and overtime.
- (g) Labour costs can be allocated on this basis.
- (h) For calculating dearness allowance, it is necessary.
- (i) For ascertaining payment under certain schemes of benefits, e.g., P.F., Pension, etc.
- (j) For calculating leave with pay, etc.

## METHODS OF TIME KEEPING

Various methods of time keeping are available, which may be grouped under manual and mechanical methods, as under:

### (1) **Manual methods:**

- (a) **Attendance register method:** An attendance register is kept at the entrance of the factory gate

in this method. The in and out timing are noted, either by the worker himself or by a staff of the time office. Later, entries are made to the individual attendance records of the workmen.

- (b) **Disc method:** Under this method, metal discs bearing employee's numbers allotted by the personnel department are placed on hooks on a board provided either at the gate or at the entrance of the department. On entering the factory, the worker removes the disc bearing his number from the board and places it in a box kept for this purpose. The box is taken away as soon as normal reporting time is over. A worker coming late will pick up the disc and put it in the "Late" box provided in the department. Such late box is normally changed every half an hour upto the maximum late attendance time allowed. The timekeeper records the attendance in the register on the basis of these discs.

(2) **Mechanical methods:**

The attendance cards are used in time clocks installed at the entrance of the factory. On entering the factory, the worker takes his card from 'OUT' racks and press it inside the clock, which will print arrival time in 'IN' column. He then places it in 'IN' rack of the department where he reports for duty. Late attendance is normally reported in red ink. Similarly, when the employee leaves the factory, he collects the card from the 'IN' rack and punches the time in the clock and keeps it in the 'OUT' rack. It is necessary that the timekeeping staff are present at the time of punching the cards to supervise the procedure. The clock cards are Collected by the timekeeping staff daily or weekly for recording in Statutory Attendance Register. Correct recording of attendance time is very important where wages are paid on the basis of time worked. Where payment is made by results, such as, by piece rate method, it would still be necessary to record correctly the 'in' and 'out' timings.

## TIME-BOOKING

The objectives of time-booking are:

- (i) to apportion overheads against jobs;
- (ii) to calculate the labour cost of jobs done;
- (ii) to ascertain idle time for the purpose of control;
- (iv) to find out that the time during which a worker is in the factory is properly utilised;
- (v) to evaluate labour performance, to compare actual and budgeted time;
- (vi) to determine overhead rates of absorbing overhead expenses under the labour hour and machine hour methods;
- (vii) to calculate wages and bonus provided the system of payment depends on the time taken.

## METHOD OF TIME-BOOKING

Different methods used for time booking are:

- (1) Daily Time Sheets
- (2) Weekly Time Sheets
- (3) Job Cards

### Daily Time Sheets

Under this method, a daily time sheet is provided to each worker on which time spent by him on various work

orders is mentioned. This method can be conveniently used if the worker works on various jobs of short duration like in maintenance jobs. But this method is disadvantages also as it involves considerable paper work.

### **Weekly Time Sheets**

In this method time is recorded for all the jobs done during the week instead of recording the work done for a day only. One sheet is allotted to each worker. It involves less paper work. These types of weekly time sheets are useful for intermittent types of jobs like construction work.

### **Job Card**

Job Card is a method of recording details of time with reference to the jobs or work orders undertaken by the workers. This method facilitates the computation of labour cost with reference to jobs or work orders. Job cards may be of two types, one, which is a job order cost card, and contains information regarding material consumption as well as time spent by operators. The other one is, in effect, a job ticket, which is issued to an operator by the supervisor and contains only the operation details. When the operator starts the work, he records the time either manually or through time recording clock on the card.

## **ATTENDANCE AND PAYROLL PROCEDURE**

### **PREPARATION OF PAYROLLS**

The payroll is a record which shows details of the gross wages earned by each worker in a particular period, the deductions made and the net wages payable. The payroll can be prepared at weekly, fortnightly or monthly periods. It can be prepared departmentwise or shiftwise.

The payroll records contain information regarding:

- (a) Department
- (b) Wage period
- (c) Workers' ticket number
- (d) Workers name
- (e) Normal hours worked
- (f) Overtime
- (g) Output in the period
- (h) Rate of wages/hour
- (i) Rate of wages/unit
- (j) Total basic wages
- (k) Dearness Allowance (DA)
- (l) Bonus
- (m) Deductions from Wages
- (n) Net wages.

The labour cost charged to costs is the gross wages of the worker and the employer's contribution to the Provident Fund and ESI etc.

The preparation of payroll involves three steps, viz.

- (a) Collection of basic data;
- (b) Determining the wages payable;
- (c) Preparing the actual payroll.

The attendance of time-rated workers can be verified from the clock cards. Production can be verified from piece work tickets and job card for piece rated workers.

The cost department checks the particulars and calculates the gross wages, the deductions to be made and the net wages payable.

A wage ticket is then prepared for each worker. This enables the worker to verify the amount of wages and also acts as an identification at the time of payment.

A denominational analysis of the money required by different departments or shifts is prepared. The required amount is withdrawn in the required denominations.

The wages of each worker is put in an envelope and paid in the concerned department in the presence of the departmental manager.

Some companies have a practice of preparing a pay slip of each worker, which may be handed over to the worker in advance of the actual payment of wages. The pay slip shows basic wages and details of various allowances like house rent allowance, dearness allowance and other payments like, overtime, bonus etc. and various deductions on account of P.F. contributions, income-tax, recovery of loans, and any other deduction. The net amount payable is shown after making all these adjustments.

## **OVERTIME**

Overtime refers to the situation when a worker works beyond his normal working hours. The overtime rate is always higher than the normal rate and is usually double the normal rate. The Factories Act and Shops and Establishments Act have fixed the normal working hours, defined what constitutes overtime, the rate of overtime and maximum hours of overtime.

Overtime consists of two elements viz. the normal cost and the extra payment or premium. The premium is known as overtime cost. The normal cost is allocated to the Production Order or cost centre/unit on which the worker is working. The treatment of overtime cost varies according to the circumstances.

## **Causes of Overtime**

Overtime arises due to the following circumstances:

- (a) for working due to seasonal rush;
- (b) for making up time lost due to unavoidable reasons;
- (c) for completing a job or order within a specified period as requested by the customer;
- (d) for working due to policy decisions, i.e. when there is general pressure of work and labour shortage etc.

## **Disadvantages of Overtime**

- (a) Output is not proportionate to the extra time taken. Hence, there is decrease in productivity.
- (b) It increases labour cost.

- (c) If overtime is done during night, it increases lighting cost.
- (d) Go slow tactics may be adopted during normal working hours to necessitate overtime.
- (e) Workers may treat overtime wages as a part of normal wages and resist discontinuance of overtime.
- (f) If the work is distributed unevenly, the workers may feel discontented.
- (g) It affects the health of workers.
- (h) Overtime over a long period leads to fatigue and increase in defective products.

Overtime is helpful in clearing backlog of work and in emergencies or when it is necessitated by uncontrollable causes. Existing resources are fully utilised.

### **Treatment of Overtime premium in Cost Accounting**

In cost accounting the treatment of overtime premium will be as follows:

1. If the overtime is resorted to at the desire of the customer, then the entire amount of overtime including overtime premium should be charged to the job directly.
2. If it is due to a general pressure of work to increase the output, the premium as well as overtime wages may be charged to general overheads.
3. If it is due to the negligence or delay of workers of a particular department, it may be charged to the concerned department.
4. If it is due to circumstances beyond control, it may be charged to Costing Profit & Loss Account.

### **Steps for Controlling Overtime**

Important steps for controlling overtime work are as follows :

- (a) Entire overtime work should be duly authorised after investigating the reasons for it.
- (b) Overtime cost should be shown against the concerned department. Such a practice should enable proper investigation and planning of production in future.
- (c) If overtime is a regular feature, the necessity for recruiting more men and adding a shift should be considered.
- (d) If overtime is due to lack of plant and machinery or other resources, steps may be taken to install more machines, or to resort to sub-contracting.
- (e) If possible an upper limit may be fixed for each category of workers in respect of overtime.

### **IDLE TIME**

When workers are paid on time basis there is usually a difference between the time for which the workers are paid and the time actually spent by them in production. The loss of time for which the employer pays but obtains no direct benefit is termed as idle time.

In other words, Idle time cost represents the wages paid for the time lost, i.e., time during which the worker was idle.

### **Causes of idle time**

The causes of idle time can be classified into the following groups:

- (i) According to controllability



- (ii) According to functions.

**(i) According to the controllability classification, the causes are:**

- (a) Normal idle time such as time lost between gate and place of work, time interval between one job and another, rest pauses, tea break, tool setting time, time taken to adjust machines etc.
- (b) Abnormal idle time due to break downs, scarcity, non-availability of raw materials, negligence of supervision, strikes or lockouts.

The idle time may be due to avoidable causes i.e., the causes can be controlled and due to unavoidable causes, i.e., the causes beyond control.

Normal idle time occur due to unavoidable causes and abnormal idle time occur due to avoidable causes.

The classification according to functions, the functional causes of idle time are analysed as the treatment depends on the causes affecting idle time. The causes can be classified as follows:

- (a) Productive causes;
- (b) Administrative causes; and
- (c) Economic causes.

**(a) The productive causes can be listed as follows:**

- (i) machine breakdown;
- (ii) unutilised manpower;
- (iii) waiting for work;
- (iv) power cuts;
- (v) waiting for tools/raw materials;
- (vi) waiting for instructions.

Time lost due to the causes mentioned above can be controlled internally. Proper planning helps control.

All engineering organisations should prepare a report showing lost and setting time. The departments in which time was lost can be identified and effective remedial measures taken. It is charged as an item of departmental overhead.

**(b) Idle time arising due to administrative causes are:**

- (i) Poor planning,
- (ii) Delayed/unproper instructions,
- (iii) Unutilised capacity due to management decisions.

Idle time arising due to these uncontrollable causes can not be controlled. It is recovered as a part of general works overhead.

**(c) Idle time arising due to economic causes are:**

- (i) lack of demand resulting in unutilised capacity,
- (ii) lock outs and strikes,

- (iii) non-dismissal of workers in the off-season in the case of seasonal industries.

Such idle time is not a part of cost of production. It is directly transferred to Costing Profit and Loss Account.

### Accounting Treatment of Idle Time

Idle time cost arising due to normal and unavoidable causes should be charged as overheads and those due to abnormal causes should be charged to Costing Profit and Loss Account.

Normal idle time such as loss in tool setting etc. can be charged at inflated rate. Jobs are charged at inflated rate.

### Control of Idle Time

Idle time arising due to normal and controllable causes can be controlled by proper planning but those arising due to abnormal causes cannot be controlled. Idle time is bound to occur due to setting up of tools for various jobs, time interval between two jobs, time to travel from factory gate to work place.

Idle time can be eliminated/minimised by taking the following steps:

- (i) Production should be properly planned in advance;
- (ii) Purchasing/requisitioning of materials in time;
- (iii) Proper maintenance of machines;
- (iv) Utilising man power effectively.

Responsibility for controlling idle time should be properly defined and fixed. The different causes should be properly analysed by a detailed break up under each head.

Person/department responsible for the idle time should be identified and remedial steps should be taken.

## LABOUR TURNOVER

It is a common feature in any concern that some employees leave the concern and others join it. Workers change the job either for personal betterment or for better working conditions or due to compulsion. Labour turnover is the ratio of the number of persons leaving in a period to the average number employed. *It is the change in the composition of the labour force in an organisation.* It can be measured by relating the engagements and losses in the labour force to the total number employed at the beginning of the period. All the losses must be taken into account regardless of the cause for leaving.

### Example

If 20 employees leave an organisation in a year and the average labour force is 400, then the labour turnover is 5%.

An index or norm may be fixed depending on the usual labour turnover in the industry or the labour turnover in the past. The rate of labour turnover depends on a number of factors like the nature of the industry, its size, location, nature of labour etc. A high labour turnover must be investigated. A low labour turnover points out the lack of flexibility or it may be due to inefficient workers not willing to leave the organisation.

Labour turnover reduces the labour productivity and increases costs. Hence, it should be kept at a minimum level.

### Causes of Labour Turnover

Causes of labour turnover: The main causes of labour turnover in an organisation/industry can be broadly classified under the following three heads:

- a. Personal Causes
- b. Unavoidable Causes, and
- c. Avoidable Causes

**(a) Personal causes are those which induce or compel workers to leave their jobs such causes includes the following:**

- i. Change of jobs for betterment.
- ii. Premature retirement due to ill health or old age.
- iii. Domestic problems and family responsibilities.
- iv. Discontentment over the jobs and working environment.

In all the above cases the employee leaves the organisation at his will and, therefore, it is difficult to suggest any possible remedy in the first three cases. But the last one can be overcome by creating conditions leading to a healthy working environment. For this, officers should play a positive role and make sure that their subordinates work under healthy working conditions.

**(b) Unavoidable causes are those under which it becomes obligatory on the part of management to ask some or more of their employees to leave the organisation, such causes are summed up as listed below :**

- i. Seasonal nature of the business;
- ii. Shortage of raw materials, power, slack market for the product etc :
- iii. Change in the plant location;
- iv. Disability, making a worker unfit for work;
- v. Disciplinary measures;
- vi. Marriage (generally in the case of women).

**(c) Avoidable causes are those which require the attention of management on a continuous basis so as to keep the labour turnover ratio as low as possible. The main causes under this case are indicated below;**

- i. Dissatisfaction with job, remuneration, hours of work, working conditions, etc
- ii. Strained relationship with management, supervisors or fellow workers;
- iii. Lack of training facilities and promotional avenues;
- iv. Lack of recreational and medical facilities;
- v. Low wages and allowances.

Proper and timely management actions reduce the labour turnover appreciably so far as avoidable causes are concerned.

### Effects of Labour Turnover

It increases cost of production due to the following reasons:

- (i) Cost of selecting/replacing workers

- (ii) Cost of training imparted to new workers
- (iii) Production planning cannot be properly executed and this results in production loss
- (iv) Loss due to defectives and wastage
- (v) Loss due to mishandling of tools, equipments, breakages, etc.

### Measurement of Labour Turnover

<i>Method</i>	<i>Labour turnover</i>
Separation Rate Method	$\frac{\text{Separation during a given period}}{\text{Average number of workers during the period}}$ <p>(The average of workers is calculated by taking a simple average of workers at the beginning and end of the period.)</p>
Net Labour Turnover Rate Method or Replacement Method	$\frac{\text{Number of replacements during a given period}}{\text{Average working force during the period}} \times 100$
Labour Flux Rate Method	$\frac{\left( \text{Number of separation during a period} \right) + \left( \text{Number of new employees during a given period} \right)}{\left( \text{Average number of workforce during the given period} \right)} \times 100$

### Costs of Labour Turnover

The cost of labour turnover can be either preventive costs or replacement costs. Preventive costs are incurred to keep the workers satisfied and discourage them from leaving the concern. Replacement costs are incurred for recruiting and training labour and the loss arising due to wastages, reduced productivity of new labour force.

#### Examples of Preventive Costs

- (i) costs of providing medical services;
- (ii) personnel administration cost;
- (iii) cost of labour welfare activities;
- (iv) costs incurred for providing pension, provident fund and retirement schemes.

#### Examples of Replacement costs

- (i) Decline in output due to inexperience of new workers.
- (ii) Decline in quality due to the lack of experience of new workmen.
- (iii) Loss of output during the time lost while recruiting new workers.
- (iv) Cost of recruitment/selection.
- (v) Cost of training.
- (vi) Cost of tool, equipment and machine breakages.

- (vii) Waste, scrap and defectives arising due to lack of experience of new workers.
- (viii) Cost of accidents, compensation paid, damage to property, assets etc.

### Remedial steps to minimise labour turnover

The following steps are useful for minimising labour turnover.

1. Exit Interview: An interview may be arranged with each outgoing employee to ascertain the reasons of his leaving the organisation.
2. Job analysis and evaluation: Before recruiting workers, job analysis and evaluation may be carried out to ascertain the requirements of each job.
3. Scientific system of recruitment, placement and promotion: The organisation should make use of a scientific system of recruitment selection, placement and promotion for employees.
4. Enlightened attitude of management : The management should introduce the following steps for creating a healthy working atmosphere. Service rules should be framed, discussed and approved among management and workers, before their implementation. Provide facilities for education and training of workers. Introduce a procedure for settling workers grievance.
5. Use of Committee: Issues like control over workers handing their grievances etc., may be dealt by a committee, comprising of members from management and workers.

### Treatment of Labour Turnover

The various methods of treating labour turnover are:

- (a) Preventive costs are treated as overhead expenses and apportioned to departments on the basis of number of persons employed in each department.
- (b) Replacement costs may arise either due to faults of departments or due to faulty management policy. In the first case the cost is charged as overhead to the concerned department. In the latter case, the overhead cost is apportioned to different departments, on the basis of number of persons employed in each department.

### Illustration 1

The cost accountant of Akash Ltd. has computed labour turnover rates for the quarter ended 31st March, 2013 as 20%, 10% and 6% respectively under 'flux method', 'replacement method' and 'separation method'. If the number of workers replaced during that quarter is 80, find out the number of (i) workers left and discharged; and (ii) workers recruited and joined including replacements.

**Solution:**

**Working Note:**

Average number of workers on roll:

$$\text{Labour Turnover rate (Under replacement method)} = \frac{\text{No. of replacements}}{\text{Average No. of workers on roll}}$$

$$\text{OR } \frac{10}{100} = \frac{80}{\text{Average number of workers on roll}}$$

$$\text{OR Average No. of workers on roll} = \frac{80 \times 100}{10} = 800$$

(i) Workers left and discharged:

$$\text{Labour turnover rate (Separation method)} = \frac{\text{No. of separations (S)}}{\text{Average No. of workers on roll}} \times 100$$

$$\text{OR } \frac{6}{100} = \frac{S}{800} \quad \text{or} \quad S = 48$$

Hence the number of workers left and discharged = 48

(ii) No of workers recruited and joined:

$$\text{Labour turnover rate (Flux method)} = \frac{\text{No. of separations (S)} + \text{No. of Accessions (A)}}{\text{Average No. of workers on roll}}$$

$$\frac{20}{100} = \frac{48 + A}{800} \quad \text{or} \quad A = \frac{16,000}{100} - 48 = 112$$

No. of workers recruited and joined (including replacement) = 112

### Illustration 2

The management of Twin sharing limited wants to have an idea of the profit lost/foregone as a result of labour turnover last year.

Last year sales accounted to ₹ 66,000,000 and the P/V Ratio was 20%. The total number of actual hours worked by the direct labour force was 3.45 lakhs. As a result of the delays by the Personnel Department in filling vacancies due to labour turnover, 75,000 potential productive hours were lost. The actual direct labour hours included 30,000 hours attributable to training new recruits, out of which half of the hours were unproductive. The costs incurred consequent on labour turnover revealed on analysis the following :

Settlement cost due to leaving	₹ 27,420
Recruitment costs	₹18,725
Selection costs	₹12,750
Training costs	₹16,105

Assuming that the potential production lost due to labour turnover could have been sold at prevailing prices, ascertain the profit foregone/lost last year on account of labour turnover

### Solution

#### Statement of Profit foregone as a result of labour turnover of M/s. SS Ltd.

	₹
Contribution foregone (Refer to working note 5)	3,00,000
Settlement cost due to leaving	27,420
Recruitment costs	18,725
Selection costs	12,750
Training costs	16,105
Total profit foregone	3,75,000

**Working Note:**

1. Actual productive hours 3,30,000  
(Actual hours worked – Unproductive training hours)  
(3,45,000 hrs. – 15,000 hrs.)
2. Sales per productive hour (₹20)  
(Total Sales/Actual productive hours)  
(₹66,00,000/3,30,000 hrs.)
3. Potential productive hours lost 75,000
4. Sales foregone (₹) 15,00,000  
(75,000 hours × ₹ 20)
5. Contribution foregone (₹) 3,00,000  
P/V ratio × Sales foregone)  
(20% × ₹15,00,000)

**LABOUR REMUNERATION SYSTEM****Objectives of an Ideal Remuneration System**

An ideal wage system is required to achieve the following objectives:

- (1) The wage system should establish a fair and equitable remuneration.
- (2) A sound wage system helps to attract qualified and efficient worker by ensuring an adequate payment.
- (3) It assists to improve the motivation and moral of employees which in turn lead to higher productivity.
- (4) It enables effective control of labour cost.
- (5) An Ideal wage system helps to improve union-management relations. It should reduce grievances arising out of wage inequities.
- (6) It should facilitate job sequences and lines of promotion wherever applicable.
- (7) An ideal system seeks to project the image of a progressive employer and to comply with legal requirements relating to wages and salaries.

**Principles of an Ideal Remuneration System**

The following principles should be adopted for an ideal wage system

1. Differences in pay should be based on differences in job requirements.
2. Follow the principle of equal pay for equal work.
3. The scheme should be based on work study, and the work contents of various jobs should be stabilized.
4. Recognize individual differences in ability and contributions.

5. The scheme should not be very costly in operation.
6. The scheme should be flexible.
7. The scheme should encourage productivity.
8. The scheme should not undermine co-operation amongst the workers.
9. The scheme should be sufficient to ensure for the worker and his family reasonable standard of living.

## **BASIC METHODS OF REMUNERATION SYSTEM**

### **(1) Time Rate System**

The time rate or day rate is related to the hours of wage and is commonly used. The wage rate can be fixed on hourly, daily, weekly, fortnightly or monthly basis depending on the nature of his skill.

This method can be applied in the following circumstances:

- (a) The quality of work is more important;
- (b) The output of a worker cannot be measured;
- (c) Where output of a worker is not in his control;
- (d) Where the work can be closely supervised;
- (e) Where increase in output is negligible compared to the incentive.

#### **Advantages of Time Rate System**

The advantages of time rate system are:

- (a) It is simple and easy to understand;
- (b) It is recognised by trade unions as all workers are paid alike;
- (c) It involves less clerical expenditure;
- (d) A steady income is assured;
- (e) As there is no hurry, tools and materials are handled carefully. Wastage is minimised.

#### **Disadvantages of Time Rate System**

- (a) It does not encourage initiative;
- (b) Labour cost may rise thereby decreasing profit. This may be caused by decrease in productivity;
- (c) Standards for labour are difficult to set;
- (d) Production may decrease thus upsetting production schedules, creating production bottlenecks and increasing cost per unit;
- (e) Labour cost cannot be estimated for the purpose of quotations;
- (f) It creates more idle time;
- (g) This system encourages inefficiency;
- (h) It requires close supervision to ensure that employees are working.



A few variations of this system are in use. They are:

**(a) High Wage Plan:** Compared to the wage rate prevailing in the region, a higher time rate is fixed. This is done to attract efficient workers so that output is high. To enable the workers to achieve the standard, suitable working conditions are created.

Unsuitable or inefficient workers are taken off the scheme.

The employer benefits because overheads and wage costs per unit are reduced.

This scheme is suitable when high quality and productivity are required. But it should be possible to set up standards and measure the output.

The advantages are:

- (a) reduces supervision;
- (b) simple and inexpensive (because of lower labour cost per unit);
- (c) attracts skilled workers;
- (d) increases productivity;
- (e) decreases wages and overhead cost per unit.

**(b) Different Time Rates:** For different levels of efficiency, different rates are fixed. For efficiency upto the standard level, normal wages are paid and for efficiency beyond the standard level, the rate is gradually increased. This is similar to differential piece rate system.

**(c) Measured Day Work (Graduated):** The hourly rates are divided into two parts. One part is the fixed part which depends on the nature of the job and the other part is variable depending on the merit rating and cost of living.

This system is very complicated. The calculations involved increase when the workers change jobs frequently. Merit rating may be arbitrary. There is multiplicity of rates. The workers do not easily understand the system. Because of all these factors this system is not popular.

## (2) Payment by Results

Payment by results is a method of paying wages which depends on the output or units produced by the worker. The worker can increase his income by producing more units. The main classifications of payment by results are:

- (i) payment is directly proportionate to the worker's production; for example, straight piece work system;
- (ii) payment proportionately increases as the production increases, like the differential piece-work system;
- (iii) the rate of payment decreases as output increases e.g. premium bonus methods;
- (iv) the payment varies at different levels of production like the accelerated premium method.

### (a) Piece Rate System

The wages are paid on the basis of the output of workers, i.e., on the basis of quantity of output. It is simple

and common method of wage payment. The worker is paid on the basis of his work, not taking into account the time involved.

The wage is calculated as follows:

$$\text{Wage} = \text{Number of units produced} \times \text{Rate per unit.}$$

The piece rate can be applied in the following cases:

- (a) the work is of standard or repetitive nature;
- (b) piece rate can be easily fixed;
- (c) there is uninterrupted flow of work;
- (d) it is necessary for the employer to get maximum production; and
- (e) quantity of output depends on effort and does not require skill.

The piece rate can be fixed by determining the time required to complete a piece. This can be done from past experience or estimation or time and motion study. In case the job is new, a few trial runs can enable fixation of piece rates. After this, the time is correlated to the wage rate to determine the piece rate.

***Merits of Piece Rate System***

- (a) A worker becomes an expert by continuously doing the work. Thus he can earn more.
- (b) It increases efficiency.
- (c) It reduces costs.
- (d) Idle time is automatically controlled.
- (e) The reward is related to effort. Efficiency is recognized.
- (f) Quotations can be easily made as cost per unit is known.
- (g) Supervision can be reduced as workers are paid according to performance.
- (h) Workers endeavor to increase production by discovering new techniques of producing goods.

***Demerits of Piece Rate System***

- (a) Quality may be sacrificed to increase production.
- (b) Wastage may be high if not properly supervised.
- (c) It necessitates more supervision and inspection so that units attain the standard quality.
- (d) In order to maximize output, the workers may use machines and tools recklessly.
- (e) If work stops due to machine break down, power failure etc., the workers may feel insecure.
- (f) The workers' health may be affected due to over-strain.
- (g) The inefficient and less efficient people may feel frustrated.
- (h) Lack of ready market may cause over production and surplus.
- (i) Determination of piece rate is difficult.

### (b) Piece Rate with Guaranteed Time Rate

A certain level of output is determined. Workers are paid on the basis of output. If the output is less than the standard, the worker is paid on time rate basis.

Thus, this system incorporates the merits of the time rate and piece rate system and eliminates the demerits of them.

But it is very complicated and misunderstandings may arise.

### INCENTIVE SCHEMES

Both time rate and piece rate systems have their merits and demerits. Incentive system attempts to combine the good aspects of both systems. The main objective of incentive plan is to induce a worker to produce more to earn a higher wage. Producing more in the same period of time should result in higher pay for the worker. Because if greater number of units produced, it should also result in a lower cost per unit for fixed factory cost and also for labour cost.

A good incentive plan should have the following characteristics:

- (1) It should be simple and easy to understand;
- (2) Operating cost of the system should be low;
- (3) It should permit less supervision;
- (4) The time lag between effort and reward should be minimum;
- (5) It should be fair to the employees and employer;
- (6) The standard set should be attainable;
- (7) Performance above standard should be well rewarded;
- (8) It should be flexible;
- (9) The premium should be large enough to induce workers to work hard;
- (10) All workers should be given equal opportunity to earn;
- (11) It should facilitate the budgetary control and standard cost systems;
- (12) Inspection should be good;
- (13) Good working conditions must be available;
- (14) The system should be introduced on a permanent basis and should not be ambiguous;
- (15) No rate cutting should be permitted and an individual's earnings should not be curtailed;
- (16) There should be uniformity of reward for same amount of effort;
- (17) Indirect workers should also be included.

#### Advantages of Incentive Schemes

- (1) Less supervision is required;
- (2) The employee morale is high because they can earn more;
- (3) There is increased productivity;

- (4) Increased production reduces cost;
- (5) Labour cost can be estimated;
- (6) It is possible to set standards for labour with accuracy;
- (7) There is maximum utilization of resources;
- (8) A task is done in the most economical manner which reduces labour cost.

#### **Disadvantages of Incentive Schemes**

- (1) If rates are not uniform for same type of jobs, it causes discontent.
- (2) Quality may deteriorate and may be sacrificed in order to increase quantity.
- (3) It involves more calculations.
- (4) The workers may not adhere to the safety precautions in order to increase production. Hence accidents may occur.
- (5) The workers' health may be affected due to over-strain.
- (6) There may be apprehensions regarding rate cutting.
- (7) Inefficient workers may envy the efficient ones which may cause unrest.
- (8) Unskilled workers sometimes earn more than skilled workers if the latter have to work on time basis.

### **CLASSIFICATION OF INCENTIVE SCHEMES**

Incentive schemes can be classified as follows:

- (a) Differential piece rate
- (b) Premium bonus schemes
- (c) Group bonus plans
- (d) Bonus schemes for indirect workers.

#### **(A) DIFFERENTIAL PIECE RATE**

Efficient and inefficient workers are distinguished. More than one piece rate is determined. Standards are set for each operation or job. Efficient workers, i.e., those who attain or better the standard set are given a higher rate and inefficient ones are given a lower rate. Hence, there is encouragement to improve the performance. As the level of output increases the piece rate also increases. This ratio may be proportionate or proportionately less or more than the increase in output. Hence output is maximised.

This system is suitable where:

- (a) the methods of working are standardised;
- (b) the workers do the same job over a long period;
- (c) the nature of work is repetitive;
- (d) output of each person can be measured;
- (e) the standard time for each job can be determined with precision.

The advantage of this scheme is that workers are encouraged to increase their efficiency and earn higher

wages. But the system is complicated and difficult to understand. It is expensive to operate. A stage may be reached when the increased labour cost will equalise the benefit arising due to reduced overhead.

### Taylor's Differential Piece Rate System

F.W. Taylor (known as the father of scientific management) originated this scheme. No minimum wage is guaranteed. The standard output is determined on the basis of time and motion studies. Wages are calculated on the basis of two widely different piece rates. Those attaining or crossing the standard get a higher piece rate and those not attaining it get a lower rate.

The lower rate is based on 83% of the day wage rate. This rate is applicable to those who don't attain the standard. The higher rate is based on 125% of the day rate and an incentive of 50% of the day rate.

The efficiency of a worker can be determined either by comparing standard time and actual time taken or by comparing actual output and standard output.

Hence, this system penalises the slow worker and rewards the efficient one. This principle is based on the fact that slow production increases the cost of production.

If the wage rate is	= ₹0.50 per unit
The low piece rate will be	= $0.50 \times 83\% = ₹0.415$ per unit
The high piece rate will be	= $125\% \times ₹0.50 + 50\% \times ₹0.50$ = ₹0.875 per unit.

### Merrick's Differential Rate Scheme (Multiple Piece Rate System)

This is a modification of the Taylor's scheme. This system smoothens the sharp differences in Taylor's scheme by determining 3 gradual rates. It does not guarantee time rate but each one is paid according to his efficiency.

<i>Efficiency level</i>	<i>Piece rate</i>
Upto 83%	Normal rate
83% to 100%	110% of normal rate
Above 100%	120% of normal rate.

The performance below standard is not penalised.

### Gantt's Task and Bonus Plan

Under N.L. Gantt's scheme, time wages are guaranteed to every worker. Standards are set. Bonus is generally 20% at 100% efficiency. If a worker takes the standard time to perform the task (100% efficiency), he is given wages for standard time and bonus of 20% on wages earned. If the worker completes the task in less than standard time he is given wages for the standard time (for actual output) and a bonus of 20% of the wages for the standard time. A high piece rate may also be offered for performance above 100% efficiency.

### Baum's Differential Scheme (Milwaukee Scheme)

It is a combination of Halsey and Taylor's differential piece rate system. This system provides incentives at different levels of efficiency.

## (B) PREMIUM BONUS PLANS

All the gains of efficient workers and all the losses of inefficient workers benefit the employer under the time rate system. Under the piece rate system, it is the workers who gain or lose.

Under the premium bonus system, the gains are shared by the employer and employees in agreed proportions. Apart from the minimum guaranteed wages, the efficient workers get bonus which depends on the time saved. The standard is determined scientifically. The various incentive schemes should be chosen keeping in mind the nature of the work, with the consent of trade unions in order to make it successful.

These plans regulate the speed of work so that the pace of work is not slow and at the same time it is not fast. Basically, there are two types of plans. Under the constant sharing plans, the proportion of sharing is constant at all levels of efficiency, but under variable sharing plans, it varies with the time saved.

### Emerson's Efficiency (or Empiric) System

Though minimum daily wages is guaranteed, efficiency is also rewarded. Standard is set based on the time and motion study.

Bonus is payable when efficiency reaches 66-2/3% and increases as the output increases.

<i>Levels of Efficiency</i>	<i>Piece Rate</i>
66-2/3%	Guaranteed time rate
90%	Time rate + 10% as bonus
100%	Time rate + 20% as bonus
above 100%	Time rate + 20% as bonus + additional bonus of 1% for every increase of 1% beyond 100% efficiency

The bonus is usually calculated on the efficiency achieved for all the jobs in a wage period taken together.

$$\text{Efficiency \%} = \frac{\text{Standard time for all jobs done in a period}}{\text{Time taken for doing all jobs in a period}} \times 100$$

Slow work is avoided and work is done at a uniform rate.

But under this scheme, the incentive for efficiency beyond the standard is not appreciable.

### Halsey plan

Under this plan originated by T.A. Halsey, time rate is guaranteed. Standard time and work are predetermined. The bonus is 50% of the standard time saved.

$$\text{Total wages} = \text{Time taken} \times \text{Hourly rate} + 1/2 (\text{Time saved}) \times \text{Hourly rate.}$$

### Halsey Weir plan

The bonus under this plan is 33-1/3% of the standard time saved.

$$\text{Total wages} = \text{Time taken} \times \text{Hourly rate} + 33-1/3\% (\text{Time saved}) \times \text{Hourly rate}$$

### Rowan Plan

The time rate is guaranteed under the plan originated by J. Rowan. The percentage of bonus to the wages earned is that which the time saved bears to the standard time.

$$\text{Total wages} = \text{Time taken} \times \text{Hourly rate} + \left( \frac{\text{Time saved}}{\text{Standard time}} \right) \times \text{Time taken} \times \text{Hourly rate}$$

### Comparison of Halsey and Rowan Plan

If the worker finishes the work in half the time fixed for it, the result under Rowan and Halsey plan will be same. If the time saved is less than 50% of the standard time, the Rowan plan is better. If time saved is greater than 50% of the standard time, the Halsey plan is better.

### Bedauxe Point System

Under the scheme originated by C.E. Bedauxe, time wages is guaranteed. Earnings increase after the worker attains 100% efficiency level. Standard time and standard work is measured in terms of Bedauxe points, which are also known as B's. 'B' means a standard work performed in a standard minute. In other words, one 'B' unit represents the amount of work which an average worker can do under normal conditions in one minute allowing for the relaxation needed. Workers get a bonus which is equal to 75% of B's saved.

$$\text{Bonus} = \text{B's saved} \times \frac{\text{Hourly rate}}{60} \times \frac{75}{100}$$

Thus, if a person gets 90 B's and hourly rate is ₹1.20, then his bonus will be:

$$\text{B's saved} = 90 - 60 = 30 \text{ B's}$$

$$\text{Bonus} = 30 \times \frac{1.20}{60} \times \frac{75}{100} = 45 \text{ paise}$$

If bonus is given to the extent of the value of the entire time saved, then the scheme will be called the 100% Bedauxe Scheme. But if nothing is mentioned, it is assumed that it is 75% Bedauxe Scheme.

Under 75% Bedauxe Scheme, the labour cost increases till 100% efficiency and then starts declining. Under the 100% Bedauxe Scheme, the labour cost remains constant after the 100% level is reached.

### Hayne's Scheme

Time wages are guaranteed. The standard time is set in terms of standard man minutes called 'manits'. A manit means a standard work performed in a standard minute. Bonus is given for the time saved. The value of the time saved is shared by the worker and foreman in the ratio of 5 : 1 if the work is standardised and repetitive in nature. Otherwise, the ratio of sharing between worker, employer and supervisor will be 5 : 4 : 1.

The labour cost falls until 100% efficiency is reached. Thereafter, it falls at a decreasing rate if work is non-standardised or remains constant if the work is standardised.

### Barth's Scheme

This scheme does not guarantee wages. Under this scheme,

$$\text{Total wages} = \text{Hourly rate} \sqrt{\text{Standard time} \times \text{Time taken}}$$

Total wages is higher for less efficient people. As the efficiency increases, the earnings decrease. Hence, this plan is suitable for beginners and trainees. Since it is complicated, workers cannot understand it. Moreover, it does not encourage efficient workers.

**Diemer Scheme**

It is a combination of Halsey's and Gantt's schemes. A straight line increasing incentive is given beyond 100% efficiency.

**Accelerated Premium Systems**

Increments of bonus increase at a faster rate as production increases. This scheme provides a strong incentive to increase efficiency at all levels. Though labour cost per unit decreases, it may rise at a very high level of output.

The formula for calculating wages differ from one concern to another. To understand the scheme, graph of  $y=0.6x^2$  may be used, where  $y$  = wages and  $x$  = efficiency.

If x is	1	1.5	2	2.5	3
y will be	0.6	1.35	2.4	3.75	5.4

Calculation can be expressed in percentages also.

This scheme is complicated. It is difficult for workers to understand it. This scheme should not be used where quality of output is important.

It is most suitable for foremen and supervisors. This scheme will encourage them to get higher production from their workers.

**(C) GROUP BONUS PLANS**

There are certain jobs which have to be performed collectively by a group of workers. The ultimate production depends on the efficiency of the whole group. Under group bonus plans, payment is made by results to all the workers in the group. Bonus may be shared equally or in different proportion according to the levels of skill required. These proportions may be based on time rates or some previously agreed ratios.

These plans may increase production and reduce costs per unit. It creates team spirit. But efficient and inefficient workers are rewarded alike. Efforts and rewards are not properly linked.

These plans can be used where:

- (a) it is required to reward both direct and indirect workers;
- (b) output depends on team work;
- (c) it is desirable to create team spirit; and
- (d) it is not possible to measure the output of an individual person.

The incentive can be made attractive by:

- (a) creating small groups;
- (b) forming a group where degree of skill required does not vary widely; and
- (c) making the group independent of any other group, machines, etc.

**Advantages of group bonus plans**

- (a) There is more co-operation and team work;
- (b) Inspection and supervision can be reduced as every worker is concerned about output;



- (c) There is self-discipline;
- (d) Production increases;
- (e) Cost of production decreases and also the spoiled and defective goods;
- (f) It simplifies payroll and cost accounting.

#### **Disadvantages of group bonus plans**

- (a) The amount of bonus given is too insignificant.
- (b) No distinction is made between efficient and inefficient workers.
- (c) Time gap between effort and reward is very wide.

The following are some of the group bonus plans:

#### **(i) Priestman Production Bonus Plan**

For each department, the standard output and standard time are calculated. Bonus is payable to the department in which actual output is greater than standard output. The bonus is given on the basis of the percentage by which actual output exceeds the standard output.

#### **(ii) Cost Premium System**

Payment is made on an agreed basis, for any costs saved, for the factory as a whole. Bonus is dependent on output and also the economy effected in the use of materials and services. But this system is not very common and there is no direct relation between the incentive and the efforts of the workers.

#### **(iii) Rucker's Plan (Share of Production Plan)**

The ratio of earning and added value is calculated. Added value is the change in the market value because of change in form, availability or location of the product. Any reduction in this ratio increases the wages.

#### **(iv) Scanlon Plan**

This is similar to Rucker's plan but the meaning of 'added value' is different. Bonus depends on the ratio between earnings and production achieved at selling price.

#### **(v) Towne Gain Sharing Plan**

Bonus depends on the reduction in labour cost as compared to the standard set. In addition to wages earned, half of any saving in cost is paid to workers and supervisors.

### **(D) BONUS SCHEME FOR INDIRECT WORKERS**

Production cannot be increased by giving incentives to direct workers only. It is necessary to have the cooperation of indirect workers to attain maximum efficiency. Indirect workers are equally important and should be given incentives.

It is difficult to introduce an incentive scheme for indirect workers because standards cannot be set easily, efficiency is difficult to measure and actual output cannot be determined in relation to set standards.

In spite of the difficulties, the purposes of establishing an incentive scheme are the following:

- (a) to reduce costs by increasing departmental efficiency;

- (b) to avoid discrimination among different types of workers. It is illogical to reward the efficiency of direct workers and not to reward the efficiency of indirect workers;
- (c) to create team spirit;
- (d) to avoid labour unrest and dissatisfaction among indirect workers;
- (e) to reward good work;
- (f) to increase the efficiency of providing services to direct workers;
- (g) to reduce waste, scrap idle time;
- (h) in certain cases, work of direct workers depends on the services provided by the indirect workers. Inefficiency of indirect workers due to lack of incentives will affect the efficiency of the direct workers.

The following points should be kept in mind while introducing an incentive scheme:

- (a) It should be able to achieve all round efficiency.
- (b) It should relate rewards to efforts.
- (c) The bonus should be payable at some regular intervals.
- (d) It should be introduced for a certain period.

Indirect workers can be grouped for facilitating the introduction of a suitable incentive scheme. Indirect workers can be associated with direct workers, e.g., supervisor, material handling workers, internal transport workers, etc. Bonus in this case, can be linked to the output of direct workers as they help to increase the production. The bonus can be a percentage of the average bonus earned by direct workers.

Indirect workers provide some general services, e.g., canteen staff, cleaners, etc. Their bonus can be based on the output of a department, output of the entire organisation, merit rating, job evaluation, percentage of bonus for direct workers or high time-rates.

Sometimes, bonus of indirect workers can be related to the total production of the department or cost centre. In case of higher levels of production, higher rate of bonus are applicable. This system is better as the bonus of one person is not dependent on the efforts of another but on the total production.

## **INDIRECT MONETARY INCENTIVE SCHEMES**

### **Profit Sharing**

**Henry R. Seagar has defined profit sharing “as an agreement freely entered into, by which employee receives a share, fixed in advance, of the profits.”**

The workers get a share in the profit of the undertaking in a certain agreed percentage which is in addition to the normal wages of the workers. The profit percentage is predetermined and may be given in cash or in the form of shares. The percentage is often governed by the Payment of Bonus Act. If profit is given in the form of shares, it is called co-partnership.

#### **Advantages of Profit Sharing**

The advantages of profit sharing are:

- (a) Relations between labour and management improve because labour take interest in management.

- (b) This method assumes that every worker contributes towards profit. It is applicable to all workers irrespective of their efficiency. There is better employer-employee relationship.
- (c) Labour morale is boosted. Hence, there is industrial peace.
- (d) The employees get a share of profit, capital and control of the management. This creates a sense of belonging to the company and the workers contribute to the welfare of the company. Materials and plant will be handled with care, thus minimising loss and wastage.
- (e) As bonus is given annually there will be low labour turnover.
- (f) There is a direct relationship between profits and bonus. The workers try to increase bonus by increasing efficiency and production.
- (g) There is greater co-operation and better team spirit.
- (h) Because of this scheme, quality workers are attracted to the industry.

#### **Disadvantages of Profit Sharing**

- (a) The workers may not be satisfied as there is uncertainty of profits inspite of the efforts taken.
- (b) Labour unions also oppose the scheme as it may alienate the workers from unions.
- (c) Profits depend on many factors. Many are beyond the control of the workers and are not directly related to their efforts.
- (d) Apportionment of profit on a suitable basis is difficult.
- (e) Once the workers are used to bonus, non-payment of bonus in a year may give rise to discontent. Fluctuations in bonus also create bad industrial relations.
- (f) The workers may not trust the figures presented by the employer and resort to strikes.
- (g) The efficiency of worker may not increase as they have to wait for the year end to get reward for their efforts.
- (h) The efficiency may be adversely affected as both efficient and inefficient workers are treated alike.
- (i) The employers object to this scheme as the workers share the profits but not the losses.

#### **Co-partnership**

Sometimes labour is given a share of the profit in the form of shares. This form of profit-sharing is called labour co-partnership. It gives the labour a permanent interest in the future of their organisation. Hence, this scheme is also known as co-ownership.

Though the employees get part of the capital and profits accruing thereon, these shares may or may not carry the voting rights. The employees may freely deal with these shares or a few restrictions may be placed on them. Sometimes, employers may be given a loan to buy the company's shares.

#### **Advantages of Co-partnership**

- (a) Because the employees have a share in the capital, they have a greater sense of belonging and hence they evince more interest in the concern.
- (b) It reduces labour turnover.
- (c) As the employees contribution to the profit of the concern is recognised, their morale is high.

### Disadvantages of Co-partnership

- (a) Efforts and rewards are not properly related.
- (b) The importance of incentive is reduced as date of payment is too far.
- (c) It does not differentiate between efficient and inefficient workers.
- (d) Misunderstanding between employee and employer may arise because employees cannot verify the shares allotted to them.

### OTHER NON-MONETARY INCENTIVE SCHEMES

These are also known as psychological incentives. This benefit is given to all employees in the organisation. These are provided free or employees may partially contribute towards them. These benefits are not given for any specific job done rather these are conditions and terms of employment. Examples of non-monetary incentives are:

- (a) Health and safety benefits.
- (b) Favorable working conditions.
- (c) Cheap grains.
- (d) Housing facility.
- (e) Subsidised canteen.
- (f) Sports and recreational facilities.
- (g) Welfare measures.
- (h) Medical facilities for the individual and family.
- (i) Education (free or subsidised) to employees and their dependents.
- (j) Leave travel facilities
- (k) Pension, contribution to P.F., gratuity.
- (l) Subsidized excursions and tours.
- (m) Free tea, milk, snacks etc.
- (n) Free uniforms, protective clothing etc.

Because some of the incentives are obligatory under law or given as matter of convention, they cannot be called incentives even though the employer incurs extra expenses to provide them.

The merits of the scheme are:

- (a) A good reputation is created for the undertaking and hence best labour is attracted.
- (b) It reduces labour turnover.
- (c) It reduces absenteeism.
- (d) It encourages employees' loyalty to the concern.
- (e) It makes the employment attractive.
- (f) It helps to build a happy, contented and satisfied staff.

**Illustration 3**

Three workers — X, Y and Z - work in a factory. The following particulars apply to them:

Normal rate per hour	₹4.00
Piece rate	₹3.00 per unit

Standard 2 units per hour

In a 40 hour week, the production of the workers is as follows:

X	50 units
Y	80 units
Z	120 units

Calculate the earnings of the workers under (a) Taylor differential piece rate system, (b) Merrick differential piece rate system, and (c) Gantt's task bonus system. Also show cost per unit under these methods.

**Notes:**

(a) The two rates under Taylor's system have been found as follows:

Low piece rate	= 83% of ₹3.00	= ₹2.50 (approx.)
High piece rate	= 175% of ₹3.00	= ₹5.25

(b) Below standard time, wages are guaranteed under Gantt's task bonus system. At standard, 20% bonus is allowed in time wages and above standard, wages are allowed for standard time for actual output with a bonus of 20% of time wages has been allowed.

**Solution:**

Workers	Output (Units)	Efficiency (%)	Taylor System		Merrick System		Gantt System	
			Earnings ₹	Cost per Unit ₹	Earnings ₹	Cost per Unit ₹	Earnings ₹	Cost per Unit ₹
X	50	62.5	125	2.50	150	3.00	160	3.20
Y	80	100	420	5.25	264	3.30	192	2.40
Z	120	150	630	5.25	432	3.60	288	2.40

**Illustration 4**

In a factory Bedaux Point Premium System is in operation. The following are the particulars with regard to a job in a factory:

Allowed time for the job 600 minutes (or B's)  
 Time taken 480 minutes (or B's)  
 Rate ₹12.00 per hour  
 Calculate bonus and earnings.

**Solution:**

Earnings (When 75% scheme is adopted)

$$= T \times R + \frac{75}{100} \left( \frac{P \times R}{60} \right)$$

$$\begin{aligned}
&= 8 \times 12.00 + \frac{75}{100} \left( \frac{600 - 480}{60} \right) \times 12.00 \\
&= ₹96.00 + ₹18.00 \\
&= ₹114.00
\end{aligned}$$

Earnings (When 100% scheme is adopted)

$$\begin{aligned}
&= T \times R + \frac{75}{100} \left( \frac{P \times R}{60} \right) \\
&= 8 \times 12.00 + \frac{120}{60} \times 12.00 \\
&= ₹96.00 + ₹24.00 = ₹120 \\
&(T = 480 \text{ mts} \div 60 = 8 \text{ hours})
\end{aligned}$$

### Illustration 5

The following particulars apply to a particular work situation:

Standard time allowed 6 hours  
 Rate per hour Re. 10.00  
 Actual time taken by  
 Worker P - 8 hours  
 Worker Q - 6 hours  
 Worker R - 4 hours

Calculate the wages of the workers under Barth Premium System. Also calculate labour cost per hour.

### Solution:

Remuneration under Barth Premium System will be calculated as follows:

$$\text{Total wages} = \sqrt{(\text{Time taken} \times \text{Standard time})} \text{ Hourly Rate}$$

Worker P's remuneration:

$$(\sqrt{8 \times 6})10.00 = ₹ 69.30$$

Worker Q's remuneration:

$$(\sqrt{6 \times 6})10.00 = ₹ 60.00$$

Worker R's remuneration:

$$(\sqrt{4 \times 6})10.00 = ₹ 49.00$$

Labour cost per hour

$$\begin{aligned}
\text{Total wages paid} &= ₹178.30 \\
\text{No. of hours worked} &= 18 \text{ hrs.} \\
\text{Labour cost per hour} &= ₹178.30 \div 18 = ₹9.90.
\end{aligned}$$

### Illustration 6

From the following information, calculate the bonus and earnings under Emerson Efficiency Bonus Plan:

Standard output in 12 hours ... 48

Actual output in 12 hours ... 42

Time rate ₹7.50 per hour

If the actual output is 60 units, what will be amount of bonus and earnings?

### Solution:

Under Emerson Efficiency Bonus Plan earnings will be calculated as follows:

$$E = T \times R + P (T \times R)$$

P (bonus percentage) will vary as follows:

<i>Efficiency</i>	<i>Bonus</i>
(i) Below 66-2/3% efficiency	Time wages. No bonus.
(ii) 66-2/3% to 100% efficiency	A bonus increasing from 0.01% to 20% above basic wages on 100% efficiency.
(iii) Over 100%	A bonus of 20% above basic wages plus 1% for each 1% increase in efficiency.

$$\begin{aligned} \text{Efficiency in terms of output} &= \frac{\text{Actual output}}{\text{Standard output}} \times 100 \\ &= \frac{42}{48} \times 100 = 87.5\% \end{aligned}$$

Bonus percentage at 87% efficiency is 7.56 and at 88% efficiency is 8.32, given in Emerson Bonus Percentage Table. Thus at 87.5% efficiency we can take bonus percentage as 7.94 (average of 7.56 and 8.32%). Bonus will, therefore, be

$$= \frac{7.94}{100} \times 12 \times 7.5 = ₹7.15$$

$$\begin{aligned} \text{Earnings} &= 12 \times 7.5 + \left( \frac{7.94}{100} \times 12 \times 7.5 \right) \\ &= 90.00 + 7.15 = ₹97.15 \end{aligned}$$

(b) If the actual output in 12 hours is 60 units, efficiency will be:

$$\frac{60}{48} \times 100 = 125\%$$

$$\begin{aligned} \text{Bonus percentage} &= 20\% + (125 - 100) \times 1\% \\ &= 20 + 25 = 45\% \end{aligned}$$

$$\text{Bonus} = \frac{45}{100} \times 12 \times 7.5 = ₹40.50$$

$$\begin{aligned} \text{Earnings} &= 12 \times 7.5 + \left( \frac{45}{100} \times 12 \times 7.5 \right) \\ &= 90.00 + 40.50 = ₹130.5 \end{aligned}$$

**Illustration 7**

The existing incentive system of a certain factory is:

Normal working week	5 days of 9 hours plus 3 late shifts of 3 hours each
Rate of payment	Day work = ₹10.00 per hour Late shift = ₹15.00 per hour
Additional bonus payable	₹25.00 per day shift ₹15.00 per late shift
Average output per operative for 54 hours week i.e., including 3 late shifts	120 articles

In order to increase output and eliminate overtime it was decided to switch on to a system of payment by results. The following information is obtained:

Time rate (as usual)	₹10.00 per hour
Basic time allowed for 15 articles	5 hours
Piece-work rate	Add: 20% to piece
Premium	Add: 50% to time

You are required to show:

- (i) hours worked;
- (ii) weekly earnings;
- (iii) number of articles produced; and
- (iv) labour cost per article for one operative under the following systems:
  - (a) Existing time rate.
  - (b) Straight piece-work.
  - (c) Rowan system.
  - (d) Halsey-Weir.

Assume that 135 articles are produced in a 45-hour week under (b), (c) and (d) and that the worker earns half the time saved under the Halsey-Weir System. The additional bonus under the existing system will be discontinued in the proposed incentive scheme.

**Solution:****(a) Existing Time Rate**

Weekly wages:		₹
	45 hrs. @ ₹10.00 per hour	450.00
	9 hrs. @ ₹15.00	135.00
	Day shift bonus 5 x 25.00	125.00
	Late shift bonus 3 x 15.00	<u>45.00</u>
		<u>755.00</u>



**(b) Peice Rate System**

	₹
Basic time: 5 hours for 15 articles	
∴ Cost of 15 articles	50.00
Add: 20%	<u>10.00</u>
	<u>60.00</u>

Rate per article ₹60.00 ÷ 15 = ₹4.00

Articles produced in a week = 45 × 15/5 = 135

Hence, earnings = 135 × ₹4.00 = ₹540.00

**(c) Rowan Premium System**

Basic time	= 5 hrs. for 15 articles
Adding 50%	= 7.5 hrs. for 15 articles
∴ Time for producing one article	= 7.5 ÷ 15 = 30 mts.
∴ Time allowed for 135 articles	= 67.5 hrs.
Actual time taken for 135 articles	= 45 hrs.

$$\begin{aligned} \therefore E &= RT + \left( \frac{S-T}{S} \right) \times T \times R \\ &= 45 \times 10 + \left( \frac{67.5 - 45}{67.5} \right) \times 45 \times 10 \\ &= 450 + 150 = ₹600 \end{aligned}$$

**(d) Halsey-Weir Premium System**

$$\begin{aligned} E &= RT + 50\% (S - T) \times R \\ &= 45 \times 10 + 50\% (67.5 - 45) \times 10 \\ &= 450 + 112.5 = ₹562.5 \end{aligned}$$

The other requirements of the question have been shown in the following table:

	<i>Methods</i>			
	<i>(a)</i>	<i>(b)</i>	<i>(c)</i>	<i>(d)</i>
(i) Hours worked	54	45	45	45
(ii) Weekly earnings (₹)	755	540	600	562.5
(iii) Articles produced	120	135	135	135
(iv) Labour cost per article (₹)	6.29	4.00	4.44	4.17

**Illustration 8**

In a factory guaranteed wages at the rate of ₹18.00 per hour are paid in a 48-hour week. By time and motion study it is estimated that to manufacture one unit of a particular product 20 minutes are taken. The time allowed is increased by 25%. During one week Abraham produced 180 units of the product. Calculate his wages under each of the following methods: (a) Time rate, (b) Piece-rate with a guaranteed weekly wage, (c) Halsey premium bonus and (d) Rowan premium bonus.

**Solution:****(a) Time Rate:**

$$E = T \times R$$

$$= 48 \times 18.00 = ₹864.00$$

**(b) Piece Rate:**

$E = N \times R$ , where N means number of units produced  
and R means rate per unit.

$$= 180 \times 7.5 = ₹1,350$$

Rate per unit will be found as follows:

Time taken	20 minutes
Incentive allowance 25%	<u>5 minutes</u>
Standard time to manufacture one unit	25 minutes

$$\text{Rate per minute} = \frac{₹18.00}{60} = ₹0.3$$

$$\text{Rate per unit} = ₹0.3 \times 25 = ₹7.5$$

**(c) Halsey Premium Bonus Plan:**

$$E = T \times R + \frac{1}{2} (S - T) \times R$$

$$= 48 \times 18.00 + \frac{1}{2} (75 - 48) \times 18.00$$

$$= 864.00 + 243 = ₹1,107.00$$

Standard time:

One unit takes 25 minutes

180 units should take  $180 \times 25 = 4,500$  minutes

$$\text{or } \frac{4,500}{60} = 75 \text{ hours}$$

**(d) Rowan Premium Bonus Plan:**

$$E = T \times R + \frac{S - T}{S} \times T \times R$$

$$= 48 \times ₹18.00 + \frac{27}{75} \times 48 \times ₹18.00$$

$$= ₹864.00 + ₹311.00 = ₹1175.00$$

**Illustration 9**

A worker under the Halsey Plan of remuneration has a day rate of ₹1,200 per week of 48 hours, plus a cost of living bonus of ₹10 per hour worked. He is given an 8-hour task to perform, which he accomplishes in 6 hours. He is allowed 30% of the time saved as premium bonus. What would be his total hourly rate of earnings, and what difference would it make if he were paid under the Rowan Plan?

**Solution:**

Standard Time	: 8 hours
Time taken	: 6 hours

**Standard Wages :**

Day rate	= ₹1200 for 48 hours = ₹25 per hour
Cost of living bonus	= ₹10 per hour
Premium bonus	= 30% of time saved

**Under Halsey Method :**

Wages for 6 hours @ ₹25 per hour	₹150
Cost of living bonus for 6 hours @ ₹10 per hour	₹ 60
Bonus : (Time saved x Rate x 30%) = 2 x ₹25 x 30%	₹15
Earnings for 6 hours	₹225
Hourly rate = ₹225/6 = ₹37.5	

**Under Rowan Method:**

Wages for 6 hours @ ₹25 per hour	₹150.00
Cost of living bonus for 6 hours @ ₹10 per hour	₹ 60.00
Bonus : (Time saved/Standard Time ) x Time taken Hourly Rate = (2 /8) x 6 x 25 = ₹37.50	
Earnings for 6 hours	₹247.50
Hourly rate = ₹247.5/6 = ₹41.25	

Under Rowan plan the worker would get ₹3.75 more per hour.

**Illustration 10**

Calculate total monthly remuneration of three workers X, Y and Z from the following data:

- Standard production per month per worker - 1,000 units.  
Actual production during the month  
X - 850 units, Y - 750 units and Z - 950 units.
- Piece work rate ₹ 1.00 per unit (actual production).
- Additional production bonus is ₹50 for each percentage of actual production exceeding 80% over standard (e.g., 79% nil, 80% nil, 81% - ₹50, 82% - ₹100 and so on).
- Dearness pay fixed ₹200 per month.

**Solution:**

Standard production	1,000 units
X's actual production	= 850 units
X's production efficiency	= $\left(\frac{850}{1000}\right) 100 = 85\%$
Y's actual production	= 750 units
Y's production efficiency	= $\left(\frac{750}{1000}\right) 100 = 75\%$

Z's actual production = 950 units

Z's production efficiency =  $\left(\frac{950}{1000}\right) 100 = 95\%$

X will be entitled to a bonus of ₹50 x 5 = ₹250

Z will be entitled to a bonus of ₹50 x 15 = ₹750

Y will get no bonus as his production efficiency is below 80%.

The earnings of the workers will be as follows:

	X ₹	Y ₹	Z ₹
Piece wage	(850x₹1.00) =850	(750x₹1.00) =750	(950x₹1.00) =950
Bonus	250	—	750
Dearness Allowance	<u>200</u>	<u>200</u>	<u>200</u>
	<u>1,300</u>	<u>950</u>	<u>1,900</u>

### Illustration 11

A manufacturer introduces new machinery into his factory with the result that production per worker is increased. The workers are paid by results, and it is agreed that for every 2% increase in average individual output, an increase of 1% on the rate of wages will be paid. At the time the machinery is installed, the selling price of the products falls by 8-1/3%.

Show the net saving in production costs which would be required to offset the losses expected from reduced turnover and bonus paid to workers.

	1st period	2nd period
Number of workers	175	125
Number of articles produced	8,400	7,000
Wages paid	₹16,800	
Total Sales	₹37,800	

### Solution:

Sales value of 8,400 articles	= 37,800
Sales value of 7,000 articles	= $\frac{37,800}{8,400} \times 7,000$
	= ₹31,500
Fall in sales value = $31,500 \times \left(\frac{25}{3} \times \frac{1}{100}\right)$	= ₹2,625
175 workers produce	= 8,400 units
125 workers will produce	= $\frac{₹8400}{175} \times 125$
But the actual production is 7,000 units	= 6,000 units
Increase in labour efficiency	= $\frac{1,000}{6,000} \times 100$
	= 16.667%

$$\begin{aligned}
 \text{Increase in wage rate will be } 16.667\% \div 2 &= 8.33\% \\
 \text{Wages for 175 workers} &= ₹16,800 \\
 \text{Wages for 125 workers} &= \frac{16,800}{175} \times 125 \\
 &= ₹12,000 \\
 \text{Increase in wages} &= ₹12,000 \times \frac{25}{3} \times \frac{1}{100} \\
 &= ₹1,000
 \end{aligned}$$

Hence, total consists of:	₹
(a) Fall in sales values	2,625
(b) Increase in wages	<u>1,000</u>
	<b><u>3,625</u></b>

Therefore, net saving in production costs will have to be ₹3,625.

### Illustration 12

From the following comparative statements of the years 2012 and 2013:

- Find out whether the year 2013 showed an overall better performance or otherwise:
- Possible causes of difference:

	2012	2013
Wages incurred	₹2,80,000	₹5,10,000
Units produced	16,000	25,000
Average number of workers	225	400

(Assume production of only one quality and same machinery conditions in both years).

### Solution:

(Better performance implies increase in labour productivity, which can be expressed as output per man).

	2012	2013	% change
Average wage per man	₹1,244	₹1,275	(+) 2.5
Annual output per man (units)	71.2	62.5	(-) 12.09
Labour cost per unit	₹17.5	₹20.40	(+) 16.57

Output per man decreased by 12.09%, labour cost per unit increased by 16.57%, which may be due to general rise in wages which has gone up by 2.5%.

### Illustration 13

A factory undertakes production to customers' specifications. Worker 'A' was entrusted with the production of 100 units of product "X" in 50 hrs. and worker 'B' was asked to produce 50 units of produce "Y" in 100 hrs. The ruling rate of wages is ₹2.50 per hour which is guaranteed irrespective of standard of efficiency. If the work given is finished within the time allotted the workers get ₹3 per hour for time taken. Time saved is rewarded by an incentive bonus at 50% of wages earned per hour. A completes the job in 40 hrs. and B in 60 hrs.

Assuming that the prevailing overhead rate is ₹5 per labour hour, indicate the impact of the system of wages coupled with the incentive scheme on the profits of the company as compared to a straight piece rate at ₹3

per hour.

The fixation of hourly rates is understood to provide for a saving of 20% of the time fixed when the work is carried out by an efficient worker under normal conditions.

Have you any comments to make on the basis of the rate fixation in these circumstances?

**Solution:**

**Cost of Conversion of Products X and Y**

**I. Straight Piece Rate**

	<i>Product X</i> (100 units)	<i>Product Y</i> (50 units)
Time allowed	50 hrs.	100 hrs.
Wages @ ₹3 per hour	₹150	₹300
Overhead @ ₹5 per hour on 40 hours and 80 hours respectively (on the assumption that there will be a saving of 20% in the time allowed for the jobs)	<u>₹200</u>	<u>₹400</u>
	<u>₹350</u>	<u>₹700</u>

**II. Incentive Bonus System if adopted by the Company**

	₹	₹
Wages for time taken @ ₹3 per hour	120	180
Incentive bonus @ ₹1.50 per hour of time saved	<u>15</u>	<u>60</u>
Total wages	135	240
Overhead @ ₹5 per hour of time taken	<u>200</u>	<u>300</u>
Cost of conversion	<u>335</u>	<u>540</u>
Saving	<u>15</u>	<u>160</u>

The company will save in terms of costs if Incentive Bonus System is introduced.

**(i) When there is no incentive system**

	<i>Product X</i> (100 units)	<i>Product Y</i> (50 units)
Time allowed	50 hrs.	100 hrs.
Labour @ ₹3 per hour	₹150	₹300
Overhead for time allowed @ ₹5 per hour	₹250	₹500
Labour and overhead cost at normal hours at straight piece rate	<u>₹400</u>	<u>₹800</u>

**(ii) When there is incentive system**

Time allowed	40 hrs.	60 hrs.
Wages @ ₹3 per hour	₹120	₹ 180
Bonus	<u>₹ 15</u>	<u>₹ 60</u>
Total Wages	₹135	₹ 240
Overhead @ ₹5 per labour hour taken	<u>₹ 200</u>	<u>₹ 300</u>
Total Cost	<u>₹ 335</u>	<u>₹ 540</u>

**Illustration 14**

The following particulars of Soni & Co. relate to the year ending 31st March, 2013 for 30 workers:

	₹
Basic wages	50,000
Dearness allowance	25,000
Night shift allowance	9,600
Overtime allowance	7,000
PF deposit	12,000
ESI contribution	2,808
Recovery towards house rent	10,200
Recoveries against supply of goods	16,000
Expenditure for employees' amenities	4,730

PF is paid in equal share by the employer and employee. Contribution to ESI is in proportion of 7:5 by the employer and employee respectively. The workers are entitled to 5% of the total days worked as leave on full pay. The number of days worked in a year is 300. Normal idle time is 5%. Assuming that all the items are evenly spread over all the days in a year find out total wages, total cash payment to workers and per hour per labour wages. The daily working hours are 8.

**Solution:****Calculation of Total Cash Payment**

	₹
Total wages paid to 30 workers in 2012-13	₹
Wages	50,000
D.A.	25,000
Night shift allowance	9,600
Over time allowance	<u>7,000</u>
	91,600
<b>Less : Deduction :</b>	
P.F.	6,000
ESI	1,170
Rent Recovery	10,200
Recovery of provisions	<u>16,000</u>
Total Cash Payment	<u>58,230</u>
<b>Total Wages :</b>	
Base Wages, DA, etc.	91,600
PF contribution (Employer's share)	6,000
ESI Contribution (Employer's share)	1,638
Expenditure on amenities	<u>4,730</u>
Total Wages	<u>1,03,968</u>
Cost per man-hour	
No. of hours worked during the year: 300 x 8 x 30	72,000
Less : 5% leave with pay :	<u>3,600</u>
5% for idle hours (5% of 72,000-3,600)	<u>3,420</u>
	<u>7,020</u>
	64,980
Cost per man-hour = 1,03,968 ÷ 64,980 = ₹1.60	

## MISCELLANEOUS TOPICS

### Holiday Pay

Employees are entitled to certain holi days. Certain compulsory holidays are declared by the Government while others are decided by agreement between the management and the workers.

Though these costs are unproductive, they are treated as part of production costs. The two methods of charging these overheads are:

- (a) They can be treated as overheads and charged to the output for the year.
- (b) The direct labour cost can be inflated to cover this cost.

### Night Shift Allowance

Workers are sometimes asked to work at night to clear the heavy work load. Additional payment is made for night shifts and this extra cost is charged to general works overhead. When night shift is worked at the specific request of the customers, such extra cost is charged to that job and the selling price is suitably inflated.

### Fringe Benefits

According to Hoge “a fringe is a labour cost which is in addition to the regular wage, salary for the time worked. A fringe may accrue from company policy, a bilateral agreement or legal requirements. It may take the form of monetary payments, services, privileges, benefits or awards. It represents pay for hours not worked or extra pay for hours worked. It is a labour cost for which no tangible return may be apparent to the employer but which in turn provides the employee with extra pay, added security or more desirable working conditions.” Examples are insurance facilities, pension facilities, medical benefits, etc.

The treatment can be as follows:

- (i) Recover fringe benefits as direct charge by using inflated or supplementary labour cost rate.
- (ii) If it can be identified with departments, treat it as departmental overhead.
- (iii) If identification is not possible, treat it as general overhead.

### Leave with Pay

Leave with pay benefit is given to workers, e.g., casual leave, earned leave or privilege leave, sick leave, etc. These can be availed when necessary. They can also be accumulated for some years or encashed. It is treated in the same way as holiday pay.

### Learner's Wages

Learner's wages can be treated as direct labour if it can be identified with the jobs/product. Most of the firms prefer to treat them as overheads as learners take more time than a trained worker and the jobs will be unnecessarily loaded if treated as direct labour.

### Training Cost

Training schemes are available in almost all manufacturing organisations. This cost includes salaries of teaching staff, trainees, cost of tools, materials, etc., The total cost of the training section can be apportioned to various production departments on the basis of trainees in each department.



The training section can be credited with any productive work done by the trainees and the corresponding amount is debited to the concerned production order.

### Casual Workers

A casual worker is one who is not a regular employee of the concern. This situation arises when there is an emergency or somebody is on leave. The quality of work done may not be upto the requisite standard due to lack of training. Hence, a person engaged once should be engaged again if he works satisfactorily. Work done by them should be duly certified.

Time sheets can also be maintained and their work properly checked. This cost is treated as an overhead cost.

The steps to be followed while appointing casual workers are:

- (a) Records of appointments and discharge should be maintained.
- (b) Such workers should be appointed only after the relevant executive has approved it.
- (c) The Time Keeping Department and Wages Department should be sent a copy of the appointment letters to record attendance and facilitate wage payment.
- (d) The time to do jobs should be matched with attendance time.
- (e) The time keeping department and wages department should be intimated in case of dismissal or termination of service of the casual workers.

### Out Workers

Sometimes workers perform their duties outside the company's premises on behalf of the organisation. Hence, the work done and payment made has to be controlled.

Workers may work at their homes either with their tools or with the tools provided by the company. Control can be exercised in the following ways:

- (i) The delivery of work should be within the stipulated time.
- (ii) Issue or return of material should be properly controlled.
- (iii) Finished product should be carefully inspected and defective or sub-standard work should be rejected.

Workers can be sent to site to perform their work. They are known as site workers. Examples are workers employed in construction work, gas and electricity concerns, etc. When a large number of employees are engaged in site work, strict control should be exercised on attendance and wage payment. Time recorded can be checked at the gate and the daily record of attendance can be sent to the accounting department showing the number of workers employed. The period of employment and rates of wages should be determined in advance. These should not be increased or altered without the sanction of the head office. Wages should be calculated in the head office and the head office staff should make the payment. Issue of identity card facilitates identification and avoids the inclusion of dummy workers. Works manager must pay surprise visits to the site to check the attendance.

The site labour can also be controlled by estimating the total labour cost and the time required for each job and comparing the total expenditure from period to period.

## LESSON ROUND UP

- Direct labour cost is that portion of wages or salaries which can be identified with and charged to a single cost unit.
- Indirect labour costs are costs which are not identifiable with particular units of costs.
- The term remuneration is used to cover the total monetary earnings of employees which includes wages according to time or piece basis and other financial incentives.
- Under time rate system of wage payment workers are paid according to time for which they work.
- Under piece rate system wages are paid according to quantity of work done.
- Incentive wage plans is a compromise between time rate and piece rate systems and incentives are provided to workers to work hard. The employer as well as the workers share the benefit of time saved and both labour and overhead costs are reduced.
- Labour turnover is the rate of change in the composition of the labour force in an organization.
- Idle time represents the time lost by workers who are paid on time basis.
- The payroll is a record which shows details of the gross wages earned by each worker in a particular period, the deductions made and the net wages payable. The payroll can be prepared at weekly, fortnightly or monthly periods. It can be prepared department wise or shift wise.

## SELF TEST QUESTIONS

1. Define labour. What is direct labour? What is indirect labour? Give examples. Explain how they are treated in cost accounts.
2. Explain the different methods of time recording for workers.
3. What are the factors that you will take into account before adopting a particular system of wage payment?
4. Explain the term "efficiency of labour".
5. Discuss the various incentive schemes, their merits and demerits.
6. Discuss the various bonus systems.
7. What is profit sharing? How is it different from co-partnership?
8. What is idle time? Give its treatment in cost accounts.
9. Write short notes on:
  - (a) Labour turnover
  - (b) Idle time
  - (c) Overtime
  - (d) Casual workers
  - (e) Site workers.
10. Describe the preparation of payroll in a factory. What precautions will you take at the time of paying wages?

11. Standard output in 10 hours is 240 units; actual output in 10 hours is 264 units. Wages rate is ₹10 per hour. Calculate the amount of bonus and total wages under Emerson Plan.
12. X, the proprietor of a small engineering workshop producing speciality product by employing 5 skilled workers is considering the introduction of some incentive scheme-either Halsey scheme or Rowan scheme-of wage payment for increasing the labour productivity to cope with the increased demand for the product by about 25%. He feels that if the proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers, it would act as a sufficient incentive for them to produce more and he has accordingly given this assurance to the workers.

As a result of this assurance, an increase in productivity has been observed as revealed from the following figures for the current month:

Hourly rate of wages (guaranteed)	₹5.00
Average time for producing 1 piece by one worker as per the previous performance (X desires that this time be considered as time allowed for the purpose of incentive scheme)	2 hours
No. of working days in the month	25
No. of working hours per day for each worker	8
Actual production during the month	625 pieces

You are required to:

- (a) Calculate effective rate of earnings per hour under Halsey scheme and Rowan scheme.
- (b) Calculate the savings to X in terms of direct labour cost per piece under the above schemes.
- (c) Advise X about the selection of the scheme to fulfill his assurance.
13. Calculate the normal and overtime wages payable to a workman from the following data:

<b>Days</b>	<b>Hours worked</b>
Monday	8 hrs.
Tuesday	10 hrs.
Wednesday	9 hrs.
Thursday	11 hrs.
Friday	9 hrs.
Saturday	4 hrs.

Normal rate - ₹ 5.00 per hour

Normal working hours - 8 hours per day.

Overtime rate - Upto 9 hours in a day at single rate and over 9 hours in a day at double rate;

OR

Upto 48 hours in a week at single rate and over 48 hours at double rate, whichever is more beneficial to the workmen.

14. An employee working under a bonus scheme saves 4 hours in a job for which the standard time is 32 hours. Calculate the rate per hour worked and wages payable for the time taken under the following alternative scheme (award rate is ₹ 10 per hour).



# Lesson 4

## DIRECT EXPENSES AND OVERHEADS

### LESSON OUTLINE

- Meaning and Nature of Direct Expenses
- Accounting treatment and control of Direct Expenses
- Meaning and Nature of Indirect Expenses
- Accounting Treatment of Indirect Expenses
- Meaning, Collection and Classification of Overheads
- **Functional Analysis:**
  - Factory Overheads
  - Administration Overheads
  - Selling & Distribution Overheads
  - Research & Development Overheads
- **Behavioural Analysis:**
  - Fixed Overheads
  - Variable Overheads
  - Semi variable Overheads/ Step Cost
- Methods of segregating semi-variable costs into fixed and variable costs
- Advantages of classification of overheads into fixed and variable
- Procedure For accounting and control of overheads
- Allocation of Overheads
- **Apportionment of Overheads**
  - Primary distribution
  - Secondary Distribution
- Methods of Re-apportionment or Re-distribution
- Absorption of Overheads
- Methods Of Absorbing Production Overheads
- Over Or Under Absorption Of Overheads
- Treatment of factory overheads, Administrative & Selling & distribution overheads
- Control of Overheads
- Preparation of Cost Sheet
- Lesson Round Up
- Self-Test Questions

### LEARNING OBJECTIVES

An overhead cost is defined as 'expenditure on labour, materials or services that cannot be economically identified with a specific saleable cost unit'. Overhead cost comprises indirect material, indirect labour and indirect expenses. The indirect nature of overheads means that they need to be 'shared out' among the cost units as fairly and as accurately as possible.

The first stage in the analysis of overheads is the selection of approximate cost centres. The selection will depend on a number of factors including the level of control required and the availability of information. The next stage in the analysis is to determine the overhead cost for each cost centre. This is achieved through the process of allocation and apportionment. Cost allocation is possible when we can identify a cost as specifically attributable to a particular cost centre. Cost apportionment is necessary when it is not possible to allocate a cost to a specific cost centre. In this case the cost is shared out over two or more cost centres according to the estimated benefit received by each cost centre.

After completing this chapter, one should be able to :

1. Prepare cost estimates for allocation and apportionment of overheads, including between reciprocal service departments.
2. Calculate direct, variable and full costs of products, services and activities using overhead absorption rates to trace indirect costs to cost units.
3. Explain the use of cost information in pricing decisions, including marginal cost pricing and the calculation of 'full cost' based prices to generate a specified return on sales or investment.

## DIRECT EXPENSES

Expenses may be defined as **“the costs of services provided to an undertaking and the notional costs of the use of owned assets”**.

Direct expenses are those expenses which are directly chargeable to a job account. Direct expenses may be defined as those expenses which are easily identifiable and attributable to the individual units or jobs. All expenses other than the direct material or direct labour which are incurred for a particular product or process are termed as direct expenses. Expenses which can be identified with a territory, a customer or product can be considered as direct expenses. Expenses in relation to a department may be direct but are indirect in relation to the product.

\*Direct expenses are defined as “costs, other than materials or wages, which are incurred for a specific product or salable service.”\*

There is no hard and fast rule regarding classification of expenses into direct and indirect. Direct expenses are specific charges directly attributable while the indirect expenses are apportioned on suitable basis. Some items by nature are direct but treated as indirect because the amounts chargeable are either of small or negligible value. It is difficult and costly to analyse them and hence treated as indirect expenses, e.g. nuts, screws, thread, glue, etc.

### Nature of Direct Expenses

Direct expenses is directly attributed to cost unit/cost center. It includes all direct cost except the direct material and direct labour.

Types of Direct Expenses are as under:

- (i) Royalties if it is charged as a rate per unit.
- (ii) Hire charges of plant if used for a specific job.
- (iii) Sub-contract or outside work, if jobs are sent out for special processing.
- (iv) Salesman’s commission if it is based on the value of units sold.
- (v) Freight, if the goods are handled by an outside carrier whose charges can be related to individual units.
- (vi) Travelling, hotel and other incidental expenses incurred on a particular contract.
- (vii) Cost of making a design, pattern for a specific job.
- (viii) Cost of any special process not forming part of the normal manufacture like water proofing for canvas cloth.

### Accounting Treatment of Direct Expenses

Direct expenses are chargeable expenses and are debited to Direct Expenses Account in financial books.

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\* The term ‘direct expenses’ has been excluded from prime cost as per latest CIMA terminology, i.e. according to CIMA, prime cost is “the total cost of direct material and direct labour”.

Accounts are prepared in columnar form so that the analysis can be made and the expenses can be related to the specific job/contract.

In cost accounting records, the direct expenses account is credited and the concerned account is debited. The cost department should verify from the accounts department that the expenses are properly booked. These expenses should not be mixed up with overheads.

### Control of Direct Expenses

Items under this head are few. They form a small part of the total cost. Such costs are controlled by fixing standards. The actual should be compared with the standard. The causes of variations, if any, should be ascertained and necessary corrective action should be taken.

### INDIRECT EXPENSES

Indirect expenses are expenses other than direct expenses. These refer to those expenses which cannot be directly, conveniently and wholly allocated to cost centres or cost units. E.g. factory rent & insurance, power, general repairs etc.

### Nature of Indirect Expenses

Indirect costs are “those which are incurred for common or joint objectives and therefore cannot be identified readily and specifically with a particular cost unit/cost centre.

A few examples of such expenses are as follows:

- (i) Rent, rates and insurance of factory and office.
- (ii) Depreciation, repairs and maintenance of plants, machinery, furniture, building etc.
- (iii) Power, fuel, lighting, heating of factory and office.
- (iv) Advertising, legal charges, audit fees, bad debts, etc.

### Expenses excluded from costs

The following types of items are not included in cost of production or sales:

- (a) Matters of pure finance including interest paid and received, dividend received on investments, rent received, profit or loss on sale of investments or company's property, transfer fees received etc.
- (b) Appropriation of profits including income-tax paid, dividends paid, transfer to sinking fund, general reserve, excessive depreciation, goodwill or other fictitious assets written off, etc.

### Notional Expenses

Expenses that are usually incurred should be included in costs even if a particular firm is not required to pay for such expenses. Rent for own premises is an example. If a firm occupies its own buildings, it does not pay any rent for this, but for costing purposes, an appropriate amount of rent should be included in costs.

### Accounting Treatment of Indirect Expenses

Indirect expenses may or may not be allocated. For example, office administrative costs are indirect expenses, but are rarely allocated to anything, unless it is corporate overhead and is being allocated to subsidiaries. These types of indirect expenses are charged to expense in the period incurred. Indirect expenses that are factory overhead will be allocated to those units produced in the factory during the same period that the indirect expenses were incurred, and so will eventually be charged to expense when the products to which they were allocated are sold.

## REVIEW QUESTIONS



Re-write the following sentence after filling-in the blank spaces with appropriate word:

Royalties payable on use of Patents, Copyrights etc. is an example of \_\_\_\_\_

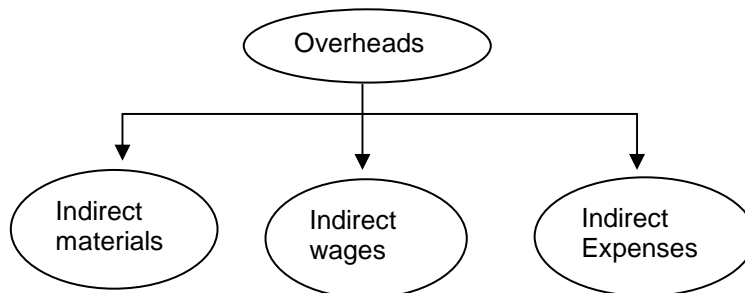
**Correct answer:** *Direct (chargeable) Expenses*

## OVERHEADS

Overhead may be defined as the cost of indirect material, indirect labour and such other expenses, including services, as cannot be conveniently charged direct to specific cost centres or cost units. It should be noted that direct costs (materials, labour, etc.) are associated with individual jobs or products. Indirect expenses or overheads are not associated with individual jobs or products; they represent the cost of the facilities required for carrying on the operations.

CIMA, London defines overhead as “**Expenditure on labour, materials or services which can not be economically identified with a specific saleable cost unit**”.

In modern industrial undertakings, overheads are a very large proportion of the total cost and, therefore, good deal of attention has to be paid to them. It will be a big mistake to pay attention only to direct cost. The problem in respect of overheads arises from the facts that the amount of overheads has to be estimated and that too before the concerned period begins (since it is only continuous costing that is found useful) and that, the amount has to be distributed over the various cost units, again on an estimated basis.



## COLLECTION OF OVERHEADS

When classification of overheads on some scientific and consistent basis is complete, overheads are regularly collected i.e. estimated under standing order code numbers allotted to them. For the collection of overhead expenses the following are some of the primary documents used:-

- (i) Stores requisitions
- (ii) Job cards or tickets



- (iii) Invoices or purchase voucher
- (iv) Salary or pay bills
- (v) Cash book
- (vi) Subsidiary records.

Indirect materials originate in store requisitions. Each stores requisitions note specifies the standing order number and the department for which the stores are drawn. The departmentalisation is done at sources. A material issue analysis sheet is prepared from store requisitions. At the end of each month, the total of these items is charged or debited to Factory Overhead Control Account and credited to Stores Ledger Control Account.

Indirect labour is obtained in the first place, from the time cards and pay rolls. Wages paid to workers against each standing order number can be obtained from the time tickets or job cards. From the time tickets, the wages analysis sheet is prepared each month and at the end of the month, the total is debited to Factory Overhead Control Account and credited to the Wages account.

Indirect expense can come from several sources such as cash book, factory journals or vouchers. In the case of cash outlays, the entry may come from the cash book. Expenses such as depreciation and other adjustment items which do not result from cash outlays are taken from subsidiary records. At the end of the period, the total of factory overheads would be debited to Factory Overhead Control Account and credited to the Cost Ledger Control Account.

Some expenses such as power, lighting, heating, rent, etc. may not be solely applicable to factory overheads, but should be apportioned between Factory expenses, Selling expenses and Administration expenses.

Each item of overheads may be seen and proper estimate of the amount for the coming period may be prepared. Another way, more expeditious, is to analyse the total overheads into fixed and variable and then arrive at the estimate by adjusting the variable amount by the expected change in output and the fixed amount by such changes as employment of more people, increments, etc.

## CLASSIFICATION OF OVERHEADS

The process of classification of overheads involves:

- (a) the determination of the classes or groups in which the costs are sub-divided; and
- (b) the actual process of classification of the various items of expenses into one or another of the groups.

The classification of overheads expenditure depends upon the type and size of a business and the nature of the product or service rendered.

Generally overheads are classified on the following basis:

- (1) Functional analysis
- (2) Behavioural analysis

### 1. Functional Analysis

Overheads can be divided into the following categories on functional basis:

- (a) Manufacturing or production or factory overheads:** Manufacturing overheads includes all

indirect costs (indirect material, indirect labour and indirect expenses) incurred for operation of manufacturing or production division in a factory. It is also known as, factory overheads, works overheads, factory cost or works cost etc.

- (b) Administration overheads:** It is the sum of those costs of general management, secretarial, accounting and administrative services, which cannot be directly related to the production, marketing, research or development functions of the enterprise. Administration overheads include the cost of formulating the policy, directing the organisation and controlling the operations of an undertaking which is not related directly to production, selling, distribution, research or development activity or function.
- (c) Selling and distribution overheads:** Selling overheads is the cost of seeking to create and stimulate demand and of securing orders. It comprises the cost to products of distributors for soliciting and recurring orders for the articles or commodities dealt in and of efforts to find and retain customers. Distribution overhead is the expenditure incurred in the process which begins with making the packed product available for dispatch and ends with the making the reconditioned returned empty package, if any, available for re-use. It includes expenditure incurred in transporting articles to central or local storage. It also comprises expenditure incurred in moving articles to and from prospective customer as in the case of goods on sale or return basis. In case of gas, electricity and water industries distribution means pipes, mains and services which may be regarded as equivalent to packing and transportation.
- (d) Research and development overheads:** Research overhead is incurred for the new product, new process of manufacturing any product. The development overhead is incurred for putting research result on commercial basis.

#### Examples of different types of overheads

	<i>Production</i>	<i>Administration</i>	<i>Selling and Distribution</i>	<i>Research and Development</i>
	(1)	(2)	(3)	(4)
(a) <b>Indirect materials:</b>	<b>Indirect materials:</b>	<b>Indirect materials:</b>	<b>Indirect materials:</b>	<b>Indirect materials:</b>
Lubricants, cotton waste, stationery, repair materials, etc.	Office stationery and printing	(i) Stationery and printing (ii) Catalogues (iii) Price list etc.	(i) Stationery and printing (ii) Cost of raw material used in research	(i) Stationery and printing (ii) Cost of raw material used in research
(b) <b>Indirect labour, salaries and wages of:</b>	<b>Indirect labour, salaries of:</b>	<b>Indirect labour, salaries and commission of:</b>	<b>Indirect labour, salaries and commission of:</b>	<b>Indirect labour, salaries and commission of:</b>
(i) Supervisors, foremen and chargehands (ii) Inspectors (iii) Storekeepers (iv) Maintenance	(i) Office clerks (ii) Secretaries (iii) Accountants (iv) Executives (v) Managers and General Manager	(i) Salesmen (ii) Travellers (iii) Agents (iv) Demonstrators and technical advisors to customers	(i) Staff engaged in research and development	(i) Staff engaged in research and development

- labours
- (v) Tool room
- (vi) Operators
- (vi) Employees of drawing office
- (vii) Watch and ward staff
- (viii) Welfare staff
- (ix) Works clerical staff
- (x) Works executives including works managers, etc.
- (vi) Directors, etc.
- (v) Sales manager

<b>(c) Indirect Expenses:</b>	<b>Indirect Expenses:</b>	<b>Indirect Expenses:</b>	<b>Indirect Expenses:</b>
(i) Rent, rates and insurance of factory	(i) Rent, rates and insurance of office	(i) Rent, rates and insurance of showroom, sales office, finished goods, godown, etc.	(i) Rent, rates and insurance of research center
(ii) Power, lighting and heating of factory	(ii) lighting, heating and cleaning of office	(ii) Advertising expenses	(ii) Subscription to research associations
(iii) Depreciation, repairs and maintenance of plant, machinery, factory furniture and fixture and factory buildings	(iii) Depreciation, repairs and maintenance of office, furniture, equipment and buildings	(iii) Expenses on consumers service, after sales service etc.	(iii) Depreciation, repairs and maintenance of building and research equipment, plant etc.
(iv) Welfare expenses like canteen, medical, recreation service etc.	(iv) Sundry expenses like legal charges audit fees etc.	(iv) Sundry expenses like discount, bad debts etc.	(iv) Patent fees

## 2. Behavioural Classification

Based on the behavioural patterns, overheads can be classified into the following categories:

- (i) Fixed overheads
- (ii) Variable overheads
- (iii) Semi-variable overheads.

**Fixed Overheads:**

Fixed overheads expenses are those which remain fixed in total amount with increases or decreases in volume of output or productive activity for a particular period of time, e.g. managerial remuneration, rent of building, insurance of building, plant etc. Fixed overhead costs remain the same from one period to another except when they are deliberately changed, e.g. increments granted to staff. The incidence of fixed overhead on unit cost decreases as production increases and vice versa.

Fixed overheads are stated to be uncontrollable in the sense that they are not influenced by managerial action. However, it should be noted that an expenditure is fixed within specified limit relating to time or activity. In a hypothetical organisation no expenditure remains unchanged for all time. Therefore, it is true to state that “fixed overhead is fixed within specified limit relating to time and activity”.

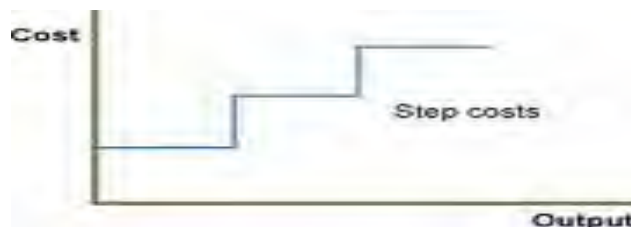
**Variable Overheads:**

Variable overhead costs are those costs which vary in total in direct proportion to the volume of output. For instance, if the output increases by 5%, the variable expenses also increase by 5%. Correspondingly, on a decline of the output it will also decline proportionately. Examples are indirect material and indirect labour. Variable overhead changes in total but its incidence on unit cost remains constant.

**Semi-variable Overheads/ Step Cost:**

These overhead costs are partly fixed and partly variable. They are known as semi-variable overheads because they contain both fixed and variable element. Semi-variable overheads do not fluctuate in direct proportion to volume. They are also called Step Costs. It may remain fixed within a certain activity level, but once that level is exceeded, they vary without having direct relationship with volume changes. Examples are depreciation, telephone charges, repair and maintenance of buildings, machines and equipment etc.

Semi-variable expenses usually have two parts—one fixed and other variable. For instance depreciation usually depends on two factors—one time (fixed) and other wear and tear (variable). The two together make depreciation (as a whole) semi-variable. An analytical study thus can make it possible for all semi-variable expenses to be split up into two parts. Fundamentally, therefore, there are only two types of expenses—fixed and variable.

**Methods of segregating semi-variable costs into fixed and variable costs**

Separation of semi-variable cost into fixed and variable can be done by applying any of the following methods:

**(i) Graphical Presentation Method:** Under this method, a good number of observations in respect of the total costs at different levels of activity or output are plotted on a graph with the output on the X-axis and their corresponding costs on the Y-axis. Then by judgment a line of 'best fit' which passes through all or most of

the points is drawn. Points falling far behind the line are erratic and are not considered for this purpose. The point at which the cost line touches the Y-axis is taken to be the fixed element of cost. From this point a line parallel to X-axis is drawn to represent fixed cost line. The variable cost, at any level of output, is derived by deducting this fixed cost element from the total cost.

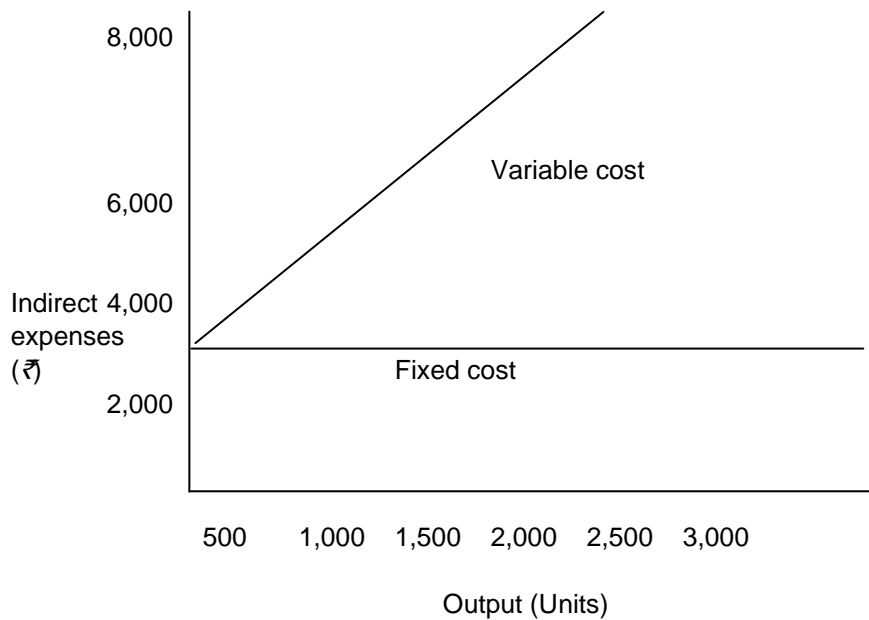
### Illustration 1

You are given the following information:

Month	Output Units	Indirect Expenses (₹)
April	1,500	6,000
May	1,800	6,600
June	2,100	7,200
July	2,820	8,640
August	2,220	7,440

Plot the above information on the graph to draw a 'line of best fit'.

### Solution:



**(ii) Least square method:** In this method 'line of best fit' is drawn for a number of observations with the help of statistical method. This method uses the linear equation  $y=mx+c$ , where 'm' represents the variable

element of cost per unit, 'c' represents the total fixed cost, 'y' represents the total cost and 'x' represents the volume of output. The relationship between fixed and variable cost can be illustrated on the basis of the above example.

Month	Units of Output	Indirect Expenses (₹)	Deviation of output from the mean (2088)x	Deviation of expenses from the mean (7176)y	x <sup>2</sup>	xy
April	1,500	6,000	- 588	- 1176	3,45,744	6,91,488
May	1,800	6,600	- 288	- 576	82,944	1,65,888
June	2,100	7,200	+ 12	+ 24	144	288
July	2,820	8,640	+732	+1464	5,35,824	10,71,648
August	2,220	7,440	+132	+ 264	17,424	34,848
					∑x <sup>2</sup> = 9,82,080	∑xy = 19,64,160

Variable charges:

$$\frac{\sum xy}{\sum x^2} = \frac{19,64,160}{9,82,080} = ₹2$$

$$\begin{aligned} \text{Fixed expenses} &= \text{Mean expenses} - (\text{Mean output} \times \text{Variable charges per unit}) \\ &= ₹7,176 - (2,088 \times ₹2) \\ &= ₹7,176 - 4,176 \\ &= ₹3,000 \end{aligned}$$

The line on the graph will, therefore, be represented by:

$$y = mx + c$$

$$y = 2x + 3,000 \text{ where,}$$

$$y = \text{total cost, } x = \text{number of units.}$$

**(iii) High and low points method:** Under this method the output at two different levels i.e. high or low point is compared with the amount of expenses incurred at these different periods. The example above can be worked out as follows:

	Output	Indirect Expenses ₹
Highest	2,820	8,640
Lowest	<u>1,500</u>	<u>6,000</u>
Difference	<u>1,320</u>	<u>2,640</u>

$$\text{Variable cost per unit} = \frac{₹2,640}{1,320} = ₹2 \text{ per unit.}$$

**(iv) Analytical method:** Under this method, the degree of variability is estimated for each item of semi-variable expenses. For instance, some semi-variable expenses may have 20% variability while others may vary to the extent of 70%.

**(v) Comparison by period or level of activity method:** Under this method output and expenses at two levels are compared. Fixed overhead remain fixed and variable overhead can be obtained by the following formula:

$$\frac{\text{Change in the amount of expenses}}{\text{Change in activity or quantity}}$$

**Advantages of classification of overheads into fixed and variable**

**(i) Effective cost control:** The classification of expenses into fixed and variable helps in controlling expenses. Fixed expenses are incurred by management decisions and are incurred irrespective of the output, hence it is more or less uncontrollable. Variable expenses vary with the volume of activity and the responsibility for incurring this expenditure is determined in relation to output.

**(ii) Preparation of budget estimates:** Unless a distinction between fixed and variable expenses is made, it would not possible to prepare a flexible budget in a given period on the basis of different levels of activity. For instance in March 2013, the output of the factory is 2,000 units and the expenses are as follows:

Fixed	10,000
Variable	8,000
Semi-variable (40% fixed)	<u>9,000</u>
	<u>27,000</u>

In April 2013, the output is likely to increase by 500 units. In this case the budget or estimate expenses will be as follows:

	₹	
Fixed		10,000
Variable	$\frac{₹ 8,000}{2,000} \times 2,500$	10,000
Fixed (40% of ₹ 9,000)		3,600
Variable	$\frac{₹ 9,000 - ₹ 3,600}{2,000} \times 2,500$	<u>6,750</u>
		<u>30,350</u>

**(iii) Ascertaining Marginal Cost:** Decision Making: A number of decisions of management depend upon a comparison of (a) the extra amount that would have to be spent if an additional activity is undertaken or an alternative course is adopted, and (b) measurement of the benefits resulting therefrom. The extra amount that will have to be spent will only be the variable costs (including materials, labour and variable expenses) and not fixed expenses. Therefore, a distinction between fixed and variable expenses is essential. Marginal costs (or variable costs) afford a number of advantages, in fixing prices in a special market, for a special customer and during a slump or a period of depression, decision on make or buy, shut down or continue etc. The main principle is that if the price available is above the variable or marginal cost, profits would increase or losses would decrease because of additional units sold. This is because fixed expenses would not increase.

Suppose, a factory having a capacity of 10,000 units per month produces and sells 8,000 units @ ₹20 each, the total costs being:

	₹
Variable	1,00,000
Fixed	<u>40,000</u>
	<u>1,40,000</u>

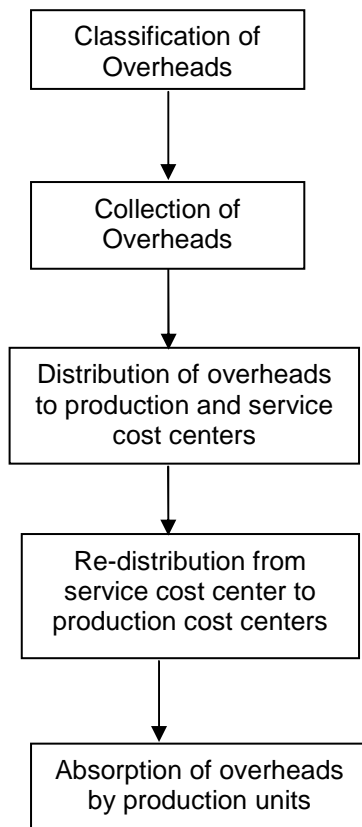
On a sale of 8,000 units @ ₹20 (total sales ₹1,60,000), there would be a profit of ₹20,000. If another 2,000 units can be sold @ ₹15, say to the Government, the profit would increase to ₹25,000. Thus:

	₹
Variable Costs $\frac{1,00,000}{8,000} \times 10,000$	1,25,000
Fixed Costs	<u>40,000</u>
	1,65,000
Sales: 8,000 units @ ₹20	1,60,000
2,000 units @ ₹15	<u>30,000</u>
Profit	<u>1,90,000</u>
	<u>25,000</u>

Profit maximisation is possible only if marginal and fixed costs are distinguished. The advantages of marginal costs will be discussed in a later study.

**PROCEDURE FOR ACCOUNTING AND CONTROL OF OVERHEADS**

The procedure for accounting and control of overheads involves the some steps which is described as under:



**An overview of the overhead apportionment rate**



## ALLOCATION AND APPORTIONMENT OF OVERHEADS (DEPARTMENTALISATION OF OVERHEADS)

Most of the manufacturing process functionally are different and performed by different departments in a factory. Where such a division of functions has been made, some of the departments would be engaged in actual production of goods while others in providing services ancillary thereto.

For the efficient working, a factory is divided into a number of sub-divisions. Such sub-divisions are referred to as departments. In other words, departmentalisation of overhead means dividing the factory into several segments called departments or cost centres to which expenses are charged. This sub-division is done in such a manner so that each department represents a division of activity of the organisation such as repairs department, power department, tools department, stores department, cost department, cash department, etc. The following factors are taken care of while dividing an organisation into number of departments:

- (i) Every manufacturing process is divided into its natural divisions in order to maintain natural flow of raw materials from the time of its purchase till its conversion into finished goods and sale.
- (ii) The sequence of operations are taken into consideration while determining the location of various departments.
- (iii) Division of responsibility as far as possible should be clear, without ambiguity and dual control.

The departments in a factory can be broadly categorised into the following types:

- (i) **Producing or manufacturing departments:** A manufacturing or producing department is one in which manual/machine operations and other process of production of articles or commodities take place. The number of such departments will depend upon the nature of industry, type of work performed and the size of the factory.
- (ii) **Service departments:** These departments are not directly engaged in production but they render special type of service for the benefit of other departments.
- (iii) **Partly producing departments:** In every organisation a few departments such that it is not possible to place these departments into a particular category, since they fall within the purview of both categories, i.e. producing and service departments. For example, if a toolroom manufactures some special tools for utilisation in the main job orders, it is acting as a productive department though it is a service department.

### Advantages of Departmentalisation:

- (i) It segregates factory overhead costs and computes the total cost of each service departments.
- (ii) It makes possible the establishments of control to keep costs at a minimum.
- (iii) Ascertainment of cost of different departments helps in computing the cost of different jobs or products which pass through these departments.

## ALLOCATION OF OVERHEADS

After having collected the overheads under proper standing order numbers the next step is to arrive at the amount for each department or cost centre. This may be through allocation or absorption. According to the Chartered Institute of Management Accountants, London, cost allocation is “that part of cost attribution which charges a specific cost to a cost centre or cost unit”. Thus, the wages paid to maintenance workers as obtained from wages analysis book can be allocated directly to maintenance service cost centre. Similarly indirect material cost can also be allocated to different cost centres according to use by pricing stores requisitions.

## APPORTIONMENT OF OVERHEADS

Apportionment refers to the distribution of overheads among departments or cost centres on an equitable basis. In other words, apportionment involves charging a share of the overheads to a cost centre or cost unit. CIMA, London has defined it as “that part of cost attribution which shares costs among two or more cost centres or cost units in proportion to the estimated benefit received, using a proxy”. Apportionment is done in case of those overhead items which cannot be wholly allocated to a particular department. For example, the salary paid to the works manager of the factory, factory rent, general manager’s salary etc. cannot be charged wholly to a particular department or cost centre, but will have to be charged to all departments or cost centres on an equitable basis.

### 1. Primary distribution of overheads

Primary distribution of overhead involves allocation or apportionment of different items of overhead to all departments of a factory. This is also known as departmentalisation of overheads. While making primary distribution the distinction between production departments and service departments disregarded since it is of little use. The distribution of different items of overhead in different departments is attempted on some logical and reasonable basis.

Basis of apportioning overhead expenses: It is stated that the total overhead expenses of a department comprises direct overhead expenses incurred in the departments itself as well as the apportioned overhead expenses of other service departments. Expenses directly incurred in the departments which are jointly incurred for several departments have also to be apportioned e.g. expenses on rent, power, lighting, insurance etc. In other words, common expenses have to be apportioned or distributed over the departments on some equitable basis. The following basis are most commonly used for apportioning items of overhead expenses among production and service departments.

<i>Basis</i>	<i>Items of Overheads</i>
1. Floor area	Rent, rates and taxes paid for the building, air conditioning, etc.
2. No. of employees or wages of each department	Group insurance, canteen expenses, E.S.I. contribution, general welfare expenses, compensation and other fringe benefits, supervisions etc.
3. Capital values	Insurance and depreciation of plants, machinery and equipments.
4. Direct labour hours	Works manager’s remuneration, general overtime expenses, cost of inter-department transfers etc.
5. No. of light points	Electric light
6. Horse power of machines or machine hours	Electric power
7. Audit fee	Sales or total cost
8. Value or weight of direct material	Stores overheads
9. Weight, volume, tonne, mile.	Delivery expenses

## 2. Re-apportionment of service department overheads (Secondary Distribution)

Normally products do not pass through service departments, but service departments do benefit the manufacture of products. Therefore, it is logical that product cost should bear an equitable share of the cost of service departments. The process of redistribution of the cost of service departments among the production departments is known as secondary distribution.

### Criteria for secondary distribution

- (i) **Service or use method:** Under this method overheads are distributed over various production departments on the basis of service received. The greater is the amount of service received by a production department, the greater should be the share to be apportioned to that department. This criterion has greatest applicability in cases where overhead costs can be easily and directly traced to departments receiving the benefits. Since this method is based upon the extent of the benefit received by a department, the expenses are equitably apportioned. This method is considered to be fair as it takes into account the time element and consistent results.
- (ii) **Analysis or survey:** In certain cases it may not be possible to measure exactly the extent of benefit which the various departments receive as this may vary from period to period. Therefore, overheads are apportioned on the basis of analysis and survey of existing conditions. This basis of apportionment includes arbitrary elements.
- (iii) **Ability to pay:** This method presumes that higher the revenue of a production department, higher should be the proportionate charge for services. This method is simple to apply but it is generally considered inequitable because it penalises the efficient and profitable units of a business to the advantage of the inefficient ones.
- (iv) **Efficiency or incentive method:** This basis facilitates scientific distribution of service department cost to production departments. Under this method the apportionment of expenses is made on the basis of production targets. If the target is exceeded the unit cost reduces indicating a more than average efficiency. Opposite is the effect if the assumed levels are not reached. Thus, the department whose sales are increasing is able to show a greater profit and thereby is able to earn greater goodwill and appreciation of the management.
- (v) **General use of indices:** If data relating to actual services rendered can not be obtained in some situations this method is adopted. The index selected is closely related to assured flow of service department cost to production departments. For instance, the service of cost accounting department can be apportioned to production departments on the basis of number of employees in each department.

Following is a list of basis, which are frequently used for apportionment of cost of service departments among production departments:

	<b>Service department costs</b>	<b>Basis of apportionment</b>
1.	Maintenance department	Hours worked for each department.
2.	Employment/personnel department	Rate of labour turnover or number of employees in each department.
3.	Payroll or time department	Direct labour hours, machine hours number of employees.
4.	Stores keeping department	No. of requisitions, quantity or value of materials.

5.	Welfare department	No. of employees in each department.
6.	Internal transport service	Truck hours, truck mileage or tonnage.
7.	Building service department	Relative area of each department.
8.	Power house	Floor area, cubic contents.

### Methods of Re-apportionment or Re-distribution

At first expenses of all departments are compiled without making a distinction between production and service departments but, then, the expenses of the service departments are apportioned among the production departments on a suitable basis. It is also possible that expenses of one service department may also be apportioned in part to another service department to arrive at the total expenses incurred on the latter department, which will then be distributed among production department.

Following are the methods of re-distribution of service department costs to production departments:

- (i) **Direct distribution method:** Under this method, the cost of service department are directly apportioned to production departments, without taking into consideration any service from one service departments to another service department.
- (ii) **Step method:** In this method the cost of most serviceable department is first, apportioned to other service departments and production departments. The next service department is taken up and its cost is apportioned and this process is going on till the cost of last service department is apportioned. The cost of last service department is apportioned among production departments only.
- (iii) **Reciprocal service method:** This method gives cognizance to the fact that where there are two or more service departments, they may render service to each other and therefore these inter-departmental services are to be given due weight in distributing the expenses of service departments. There are three methods available for dealing with inter service department transfer :
  - (a) **Simultaneous equation method:** Under this method, the true cost of service departments are ascertained first with the help of simultaneous equations. These are then distributed among the production departments on the basis of given percentages.
  - (b) **Repeated distribution method:** According to this method service department costs are apportioned over other departments, production as well as service according to the agreed percentages and this process is repeated until the total costs of the service departments are exhausted or the figures become to small to be considered for further apportionment.
  - (c) **Trial and error method:** In this method the cost of one service department is apportioned to another service department. The cost of another service department plus the share received from the first service department is again apportioned to first service department and this process is continued until the balancing figure becomes nil. For instance, suppose there are two service departments x and y. These service departments render service to each other. Cost of service department x will be distributed to service department y. Again cost of service department y plus the share from service department x will be apportioned to x. The amount so apportioned to x will continue to be repeated till amount involved becomes negligible.

**Illustration 2**

A company's production for the year ending 30.3.2013 is given below:

Items	Production Departments			Office	Stores	Workshop	Total
	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>				
Direct Wages	₹ 20,000	25,000	30,000	-	-	-	75,000
Direct Materials	₹ 30,000	35,000	45,000	-	-	-	1,10,000
Indirect Materials	₹ 2,000	3,000	3,000	1,000	2,000	2,000	13,000
Indirect Wages	₹ 3,000	3,000	4,000	10,000	10,000	5,000	35,000
Area in Square Metres	200	250	300	150	100	250	1,250
Book value of Machinery	₹ 30,000	35,000	25,000	-	-	15,000	1,05,000
Total H.P. of Machinery	15	20	25	-	-	5	65
Machine Hours Worked	10,000	20,000	15,000	-	-	5,000	50,000

General Expenses:

- (i) Rent ₹12,500
- (ii) Insurance ₹1,050
- (iii) Depreciation 15% of value of machinery
- (iv) Power ₹3,800
- (v) Light ₹1,250

You are required to prepare an overhead analysis sheet for the departments showing clearly the basis of apportionment when necessary.

**Solution:****Overhead Analysis Sheet**

Items	Basis of Apportionment	Production Departments			Service Departments			Total
		P1	P2	P3	Office	Stores	Workshop	
		₹	₹	₹	₹	₹	₹	
Direct Materials	Actual	2,000	3,000	3,000	1,000	2,000	2,000	13,000
Direct Wages	Actual	3,000	3,000	4,000	10,000	10,000	5,000	35,000
Rent	Area	2,000	2,500	3,000	1,500	1,000	2,500	12,500
Insurance	Value of Machinery	300	350	250	-	-	150	1,050
Depreciation	-do-	4,500	5,250	3,750	-	-	2,250	15,750
Power	H.P. machine	877	1,169	1,462	-	-	292	3,800
Light	Area	200	250	300	150	100	250	1,250
		12,877	15,519	15,762	12,650	13,100	12,442	82,350
Apportionment of workshop O.H.	Machine hour	2,765	5,530	4,147	-	-	(-)12,442	-
Apportionment of Stores O.H.	Direct material	3,573	4,168	5,359	-	(-)13,100	-	-
Apportionment of Office O.H.	Direct wages	3,373	4,217	5,060	(-)	12,650	-	-
		22,588	29,434	30,328	-	-	-	82,350

**Illustration 3**

A factory has two service departments P and Q and three production departments A, B, and C. You are supplied with the following information:

Particulars	Total	Production Departments			Service departments	
		A	B	C	P	Q
	₹	₹	₹	₹	₹	₹
Rent	12,000	2,400	4,800	2,000	2,000	800
Electricity	4,000	800	2,000	500	400	300
Indirect labour	6,000	1,200	2,000	1,000	800	1,000
Depreciation of machinery	5,000	2,500	1,600	200	500	200
Sundries	4,500	910	2,143	847	300	300
Estimated working hours		1,000	2,000	1,400	4,000	2600

Expenses of Service Departments P and Q are apportioned as under:

	<i>A</i>	<i>B</i>	<i>C</i>	<i>P</i>	<i>Q</i>
P	30%	40%	20%	—	10%
Q	10%	20%	50%	20%	—

You are required to show the apportionment of overheads under different methods of apportioning inter-service departments overheads and also to work-out the production hour rate recovery of overheads in departments A, B and C.

**Solution:****Department distribution summary**

Item	Total	Production Departments			Service Departments	
		A	B	C	P	Q
	₹	₹	₹	₹	₹	₹
Rent	12,000	2,400	4,800	2,000	2,000	800
Electricity	4,000	800	2,000	500	400	300
Indirect labour	6,000	1,200	2,000	1,000	800	1,000
Depreciation of machinery	5,000	2,500	1,600	200	500	200
Sundries	4,500	910	2,143	847	300	300
	31,500	7,810	12,543	4,547	4,000	2,600

**(i) Simultaneous equation method:**

$p$  = total overhead of Deptt. P

$q$  = total overhead of Deptt. Q

$$p = 4,000 + \frac{20}{100} q \quad \dots(i)$$

$$q = 2,600 + \frac{10}{100} p \quad \dots(ii)$$

$$\text{So, } 10p = 40,000 + 2q \quad \dots(iii)$$

$$10q = 26,000 + p \quad \dots(iv)$$

By rearranging

$$10p - 2q = 40,000 \quad \dots(v)$$

$$-p + 10q = 26,000 \quad \dots(vi)$$

Multiplying (vi) by 10

$$10p - 2q = 40,000 \quad \dots(vii)$$

$$\underline{-10p + 100q = 2,60,000}$$

$$\underline{\quad\quad\quad 98q = 3,00,000}$$

$$q = 3,061$$

$$\text{and, } p = 4,000 + \frac{1}{5} (3,061)$$

$$= 4,000 + 612 = 4,612.$$

**Overhead distribution summary**

<i>Particulars</i>	<i>A</i> (₹)	<i>B</i> (₹)	<i>C</i> (₹)
As per distribution summary	7,810	12,543	4,547
Service department P (90% of ₹4,612)	1,384	1,845	922
Service department Q (80% of ₹3,061)	306	612	1,531
	<u>9,500</u>	<u>15,000</u>	<u>7,000</u>
No. of working hours	1,000	2,500	1,400
Rate per hour	9.50	6.0	5.0

**(ii) Repeated distribution method:**

**Secondary distribution summary**

<i>Particulars</i>	<i>A</i> (₹)	<i>B</i> (₹)	<i>C</i> (₹)	<i>P</i> (₹)	<i>Q</i> (₹)
As per summary	7,810	12,543	4,547	4,000	2,600
Service department P	1,200	1,600	800	- 4,000	400
Service department Q	300	600	1,500	600	- 3,000
Service department P	180	240	120	- 600	60
Service department Q	6	12	30	12	- 60
Service department P	4	5	3	- 12	
Total	<u>9,500</u>	<u>15,000</u>	<u>7,000</u>		
Working hours	1,000	2,500	1,400		
Rate per hour	9.50	6.00	5.00		

**(iii) Trial and error method:**

	<i>Dept. P (₹)</i>	<i>Dept. Q (₹)</i>	
As per summary	4,000	2,600	
		400	(10% of 4,000 of P)
(20% 3,000 of Q)	600		
		60	(10% of 600 of P)
(20% 60 of Q)	12		
		1	(10% of 12 of P)
	<u>(4,612)</u>	<u>(3,061)</u>	

The total cost of service department of P and Q shall subsequently be apportioned to production department A, B and C.

### ABSORPTION OF OVERHEADS

Absorption of overheads refers to charging of overheads to individual products or jobs. The overhead expenses pertaining to a cost centre are ultimately to be charged to the products, jobs etc. which pass through that cost centre. For the purpose of absorption of overhead to individual jobs, processes or products, overheads absorption rates are applied. The overhead rate of expenses for absorbing them to production may be estimated on the following three basis.

- (i) The figure of the previous year or period may be adopted as the overhead rate to be charged on production in the current year.
- (ii) The overhead rate for the year may be determined on the basis of the estimated expenses and anticipated volume of production or activity.
- (iii) The overhead rate for the year may be determined on the basis of normal volume of output or capacity of the business.

Actual and pre-determined overhead rate: The overhead absorption rate may be computed either based on actual cost or on the basis of estimated cost:

#### Actual Overhead Rate

This is also known as historical overhead rate. This rate is obtained by dividing the overhead expenses incurred during the accounting period by the actual quantum (quantity/value) of the base selected. This rate is determined as follows:

$$\text{Actual overhead rate} = \frac{\text{Actual overhead for the period}}{\text{Actual quantity or value of the base for the period}}$$

**This method suffers from the following limitations:**

- (i) Actual overhead rate cannot be determined until the end of the period.
- (ii) Seasonal or cyclical influences cause wide fluctuations in the actual overhead cost and actual volume of activity.
- (iii) Actual cost is generally used for comparison with the predetermined figures for the purpose of control. Thus, it is useful only when compared with the established norms or standards.

#### Pre-determined Overhead Rate

Pre-determined overhead rate is determined in advance of the actual production and is computed by dividing the budgeted overhead expenses for the accounting period by the budgeted base for the period i.e.

$$\text{Pre-determined overhead rate} = \frac{\text{Budgeted overhead for the period}}{\text{Budgeted base for the period}}$$

This computation of a pre-determined overhead rate is more practical and has the following advantages:

- (i) Pre-determined overhead rate facilitates product cost determination immediately after production is completed.



- (ii) In those concerns where the budgetary control system is in operation, all the data for the purpose of calculation of pre-determined overhead rate is available without any extra clerical cost.
- (iii) It is useful when cost plus contracts are undertaken.
- (iv) Cost estimating and competitive pricing offer ideal situations for use of pre-determined overhead rates.

### Blanket and Multiple Overhead Rates

Blanket overhead rate refers to the use of one single or general overhead rate for the whole factory.

The blanket rate is used in those factories :

- (a) Where only one major product in continuous process is being produced.
- (b) Where several products are produced it can be applied only if:
  - (i) all products pass through all departments; and
  - (ii) all products are processed for the same length of time in each department.

This rate is calculated as follows:

$$\text{Blanket overhead rate} = \frac{\text{Overhead Cost for the entire factory}}{\text{Base for the period}}$$

When different rates are computed for each producing department, service department, cost centre, each product or product line, each production factor, and for fixed overhead and variable overhead, then they are known as multiple rates. It is calculated as under:

$$\text{Overhead rate} = \frac{\text{Overhead cost allocated and apportioned to each cost centre}}{\text{Corresponding base}}$$

### METHODS OF ABSORBING PRODUCTION OVERHEADS

Before we describe the various methods, it would be better to know how to judge whether a method will give good results or not. The method selected for charging overheads to jobs or products should be such as will ensure:

- (i) that the total amount charged (or recovered) in a period does not differ materially from the actual expenses incurred in that period. In other words, there should not be any material over or under-recovery of overheads; and
- (ii) that the amount charged to individual jobs or products is equitable. In case of factory overheads, this means—
  - (a) that the time spent on completion of each job should be taken into consideration;
  - (b) that a distinction should be made between jobs done by skilled workers and those done by unskilled workers. Usually, the latter class of workers need more supervision, as they cause greater wear and tear of machines and tools and waste a larger quantity of materials. Hence jobs done by such workers should bear a correspondingly higher burden for overheads; and
  - (c) that jobs done by manual labour and those done by machines should be distinguished. It stands to reasons that no machine expenses should be charged to jobs done by manual labour.

In addition, the method should :

- (i) be capable of being used conveniently; and
- (ii) yield uniform results from period to period as far as possible any change that is apparent should reflect a change in the underlying situation, such as substitution of human labour by machines.

Several methods are commonly employed for computing the appropriate overhead rate to be employed. The common methods are as under:

- (1) Percentage of direct materials cost.
- (2) Percentage of prime cost.
- (3) Percentage of direct labour cost.
- (4) Direct labour hour rate.
- (5) Machine hour rate.
- (6) Combined machine hour and labour hour rate.
- (7) Rate per unit of production.

### 1. Percentage of direct material cost

In this method the cost of direct materials used in the manufacture of a product is used as the base in absorption of factory overheads. The overhead rate is calculated on the basis of the following formula:

$$\text{Overhead rate} = \frac{\text{Factory overheads}}{\text{Direct material cost}} \times 100$$

This method gives satisfactory results in the following circumstances:

- (i) Where the proportion of overheads to the total cost is significant.
- (ii) Where the prices of materials are stable.
- (iii) Where the output is uniform i.e. only one kind of article is produced.

#### Advantages:

- (i) The calculation of overhead rate is simple as the cost of direct material is easily available.
- (ii) This method is more suitable when prices of materials are fairly stable.
- (iii) Overhead cost pertaining to upkeep and handling of materials can be absorbed equitably by this method.

### 2. Percentage on prime cost

An actual or pre-determined rate of overhead absorption is calculated by dividing the overheads to be absorbed by the prime cost incurred or expected to be incurred and expressing the result as a percentage. This is calculated as follows:

$$\text{Prime cost percentage rate} = \frac{\text{Amount of factory overheads}}{\text{Prime cost}} \times 100$$

This method has the advantage of simplicity and is applied because it considers both material and labour which gives rise to overhead expenses.

These two methods are generally considered to be unsuitable on account of the following reasons.

- (1) Manufacturing overhead expenses are firstly a function of time, i.e., time is the determining factor for the incurrence and application of manufacturing overhead expenses. The overhead expenses, specially manufacturing expenses, can in the ultimate analysis be regarded as expenditure incurred in providing the necessary facilities and services to workers employed in the productive processes. The question of facilities and services made available to workers naturally is dependent on the length of the time during which the workers make use of these facilities. It may, therefore, be said that the job or product on which more time has been spent would entail larger manufacturing expenses than the job requiring lesser time. This factor is altogether ignored by the first method.
- (2) When the overhead cost is allocated as a percentage of direct materials or prime cost, the same is the determining factor. As a result, when there are two jobs, otherwise absolutely similar and requiring same operational time but using materials having varying prices, their manufacturing overhead cost would be different; these should not normally vary if time taken is the same.

The method of apportioning overhead costs on the basis of prime cost also does not take into consideration the time factor. The fact that the amount includes labour cost over and above materials cost, does not render the prime cost any more suitable; in fact, the results are liable to be more misleading because of the cumulative error of using both the labour and materials cost as the basis of allocation of overhead expenses, on neither of which they are dependent.

- (3) There is no close or direct connection between the manufacturing expenses and the direct materials cost or prime cost of jobs produced.
- (4) Since material prices are prone to frequent and wide fluctuations, the amount of manufacturing overheads recovered, if based on material cost or prime cost, also would fluctuate violently from job to job and from period to period.
- (5) The skill of the workers involved and whether machines were used or not, are ignored.

### 3. Percentage of direct labour cost

According to this method, the manufacturing overhead expenses are charged as a percentage of the direct wages incurred on jobs. The formula for computing the percentage rate for a period is as follows:

$$\frac{\text{Manufacturing overhead expenses}}{\text{Direct wages or labour cost}} \times 100$$

The numerator for overhead expenses and the denominator for direct wages may be either an estimated sum, actual amount or normal amount. As has been stated earlier, overhead rates are usually predetermined and the use of actual figures is not very common.

This method also fails to give due recognition to the element of time which is of prime importance in the accounting for and treatment of manufacturing overhead expenses except in so far as the amount of wages is a product of the rate factor multiplied by the time factor. Thus, the time factor is taken to consideration only indirectly or partially in the computation of the overhead percentage rate. This method, therefore, cannot be depended upon to produce very accurate results where the same type of work is performed at the same time by different type of workers, skilled and unskilled, with varying rates of pay. Also no distinction is made between jobs done by manual labour and those done by machines.

In spite of the inaccuracies which may arise under this method, it is widely used in actual practice, because it is simple and does not involve much calculations; for in costing any job, the labour cost has to be

ascertained anyhow. If, on the other hand, a more scientific method is employed, e.g., the labour hour or the machine hour rate, which gives proper allowance to the time element, these would introduce more complexities in the overhead accounting procedure. Thus, the advantage of elimination of a small error in practice may be a heavy price to pay on account of introduction of complexities aforementioned. Also, under this method, there is no large over or under recovery of overheads.

#### **Advantages of Percentage of Direct Labour Cost**

- (i) The method is simple and economical to apply;
- (ii) The time factor is given fair recognition;
- (iii) Total expenses recovered will not differ much from the estimated figure since total wages paid are not likely to fluctuate much.

#### **Disadvantages of Percentage of Direct Labour Cost**

- (i) It gives rise to certain inaccuracies as the time factor is not being given adequate importance;
- (ii) Where machinery is used to some extent in the process of manufacture, an allowance for such a factor is not made; and
- (iii) It does not provide for varying skills of workers.

It is possible to consider the time factor fully by ascertaining the factory overheads per productive labour hour. Suppose the total of direct productive labour hours is 1,50,000 and the factory overheads total ₹3,00,000, then the productive labour hour rate is ₹2.

#### **4. Direct labour hour rate**

This method is a distinct improvement on the percentage of direct wages basis, as it fully recognises the significance of the element of time in the incurring and application of manufacturing overhead expenses. This method is admirably suited to operations which do not involve any large use of machinery. A direct labour hour rate is calculated for each category of workers. The expenses incurred, other than wages paid to workers, on each category of workers are listed and totalled for a period. The figure is divided by the number of hours to be put in by that category of workers. Thus, full attention will be paid to the skill of the workers for charging overheads. Productive labour hour rate is a variation of this method. It is computed by dividing the total factory expenses for a period by the total number of hours put in by all the direct workers during that period. Thus, this method, though making no allowance for the skill of workers, gives full recognition to the time factor.

#### **5. Machine hour rate**

By the machine hour rate method, manufacturing overhead expenses are charged to production on the basis of a number of hours a machine or machines are used on jobs or work orders. There is a basic similarity between the machine hour and the direct labour hour rate methods, in so far as both are based on the time factor. The choice of one or the other method is conditioned by the actual circumstances of the individual case. In respect of departments or operations, in which machines predominate and the operators perform relatively a passive part, the machine hour rate is more appropriate. This is generally the case for operations or processes performed by costly machines, which are automatic or semiautomatic and where operators are needed merely for feeding and tending them rather than for regulating the quality or quantity of their output. In such cases, the machine hour rate method alone can be depended on to correctly apportion the manufacturing overhead expenses to different items of production. What is needed for computing the machine hour rate is to divide overhead expenses for a specific machine or group of machines for a period

by the operating hours of the machine or the group of machines for the period. It is calculated as follows:

$$\text{Machine hour rate} = \frac{\text{Amount of overheads}}{\text{Machine hours during a given period}}$$

Usually, the computation is made on the basis of the estimated expense or the normal expense for the coming period. Thus, the machine hour rate usually is a predetermined rate. Rate for each individual machine may be worked out or, where a number of similar machines are working in a group, there may be a single rate for the whole group.

### STEPS FOR CALCULATION OF MACHINE HOUR RATE

The following steps are required to be taken for the calculation of machine hour rate:

- (i) Each machine or group of machine should be treated as a cost centre.
- (ii) The estimated overhead expenses for the period should be determined for each machine or group of machines.
- (iii) Overheads relating to a machine are divided into two parts i.e. fixed or standing charges and variable or machine expenses.
- (iv) Standing charges are estimated for a period for every machine and the amount so estimated is divided by the total number of normal working hours of the machine during that period in order to calculate an hourly rate for fixed charges. For machine expenses, an hourly rate is calculated for each item of expenses separately by dividing the expenses by the normal working hours.
- (v) Total of standing charges and machine expenses rates will give the ordinary machine hour rate.

There are two ways of computing the machine hour rate. According to the **first method**, only indirect expenses directly or immediately connected with the operation of the machine are taken into account, e.g., power, depreciation, repairs and maintenance, insurance, etc. **The rate is calculated by dividing the estimated total of these expenses for a period by the estimated number of operating hours of the machines during the period.**

It will be obvious, however, that in addition to the expenses stated above there may still be other manufacturing expenses such as supervision charges, shop cleaning and lighting, consumable stores and shop supplies, shop general labour, rent and rates, etc., incurred for the department as a whole and, hence, not charged to any particular machine or group of machines. In order to see that such expenses are not left out of production costs, one should include a proportionate amount of such expenses, in the expenses of machines, before proceeding to compute the machine hour rate. Some people even prefer to add the wages paid to the machine operator in order to get a comprehensive rate for working a machine for one hour. But it is preferable to include the machine operator's wages in direct wages.

Generally, all expenses are not allocated to machines; it will be, therefore, necessary to calculate another rate for charging the general departmental expenses to production. **This second rate** will be calculated on the basis of direct labour hours or wages. In effect, therefore, both the machine hour and the labour hour rates will be applied, though separately.

As regards the superiority of one method over the other, it may be considered that the recovery of the direct machine expenses without the proportion of the departmental expenses is likely to be more accurate than when these are made part thereof, because the general departmental expenses are not connected with the actual operation of the machines except remotely. Therefore, when merged with the direct machine

expenses for the purpose of computing the machine hour rate, the resultant rate may not be as accurate or as it would be otherwise. But the second method has the advantage of simplifying the routine and procedure of applying manufacturing overheads in as much as only the machine hour rate has to be applied for charging the general departmental overhead.

### Advantages of Machine Hour Rate

- (1) Where machinery is the main factor in production, it is usually the best method of charging machine operating expenses to production.
- (2) The under-absorption of machine overheads would indicate the extent the machines have been idle.
- (3) It is particularly advantageous where one operator uses several machines (e.g., automatic screw manufacturing machines) or where several operators are engaged in one machine (e.g., the belt press used in making conveyor belts).
- (4) It is a logical method and takes into consideration the time factor completely.

### Disadvantages of Machine Hour Rate

- (1) Additional data concerning the operating time of machines, not otherwise necessary, must be recorded and maintained.
- (2) As general data concerning rates for all the machines in a department may be suitable, the computation of a separate machine hour rate for each machine or group of machines would mean additional work.
- (3) It gives inaccurate result if hand labour is equally important.

If production is carried on in different departments having different degrees of mechanisation, the best method would be the machine hour rate. The machine may be treated as a small department or cost centre and the total cost for, say, a month may be divided by the effective hours for which the machine is usually used. Suppose the total cost of running a machine, including, expenses on rent, lighting, insurance, supervision, depreciation, power, etc. for a month is ₹12,600 and the total number of hours is 200 including 20 for maintenance, the machine hour rate is ₹70 i.e.  $\frac{12,600}{180}$ . If the machine is used on job for 5 hours, the job should be charged with ₹350 i.e. ₹70 x 5 as production overheads.

[In small firms however, quite good results are obtained by working out the percentage of factory overheads to direct wages or by dividing the total factory overheads by the total number of direct labour hours (productive labour hour rate); production overheads may then be charged to jobs or products using one of these methods. Office expenses are usually charged as a percentage of works cost].

### Illustration 4

Following information is made available from the costing records of a factory:

- |   |   |                    |
|---|---|--------------------|
| (i) The original cost of the machine  | : | ₹ 1,00,000         |
| Estimated life  | : | 10 years           |
| Residual Value  | : | ₹ 5,000            |
| Factory operates for 48 hours per week  | : | 52 weeks in a year |
| Allow 15% towards machine maintenance down time.  |   |                    |
| 5% (of productive time assuming unproductive) may be allowed as setting up time.              |   |                    |
| <br>(ii) Electricity used by the machine is 10 units per hour at a cost of 50 paise per unit. |   |                    |

- (iii) Repair and maintenance cost is ₹ 500 per month.
- (iv) Two operators attend the machine during operations alongwith two other machines. Their total wages including fringe benefits, amounting to ₹ 5,000 per month is paid.
- (v) Othe overheads attributable to the machine are ₹10,431 per year.

Using above data, calculate machine hour rate.

**Solution**

**Computation of Machine Hour Rate:**

Particulars	Per Year ₹	Per Year ₹
Standing Charges		
Wages for Operator (₹ 5,000 × 12)/3	20,000	
Other Overheads	10,431	
Standing charges per hour (30,431/2,015)		15.10
Machine Exoences		
[(1,00,000 – 5,000)/10]/2015		4.71
Repair and maintenance (5.00 × 12/2,015)		2.98
Electricity (10 units @ 50 paise)		<u>5.00</u>
<b>Machine Hour Rate</b>		<b>27.79</b>

**Working Note:**

**Calculation of effective machine hours:**

Total working hours per year (4 × 52)	2,496
Less: 15% maintenance time	<u>375</u>
	2,121
Less: 5% for setting up time	<u>108</u>
Effective time	<u>2,015</u>

**Illustration 5**

The following information has been collected from the cost records of a small company for the year ended 31st March, 2013:

	₹
Direct Materials	2,50,000
Direct Labour	2,00,000
Direct Expenses	20,000
Works Overheads	1,60,000
Office Expenses	94,500

The total number of direct labour hours were 1,00,000 involving 40,000 machine hours. What should be the price quoted for a job involving 2,000 labour hours @ ₹3 per hour, 1,000 machine hours and ₹10,000 in direct materials if the profit desired is 20% on the selling price?

**Solution:**

It should be realised that three methods for apportioning production overheads are possible in the problem. These are:

- (i) Percentage on Direct Wages: 80%, i.e.,  $\frac{1,60,000}{2,00,000} \times 100$
- (ii) Productive Labour Hour Rate: ₹1.60, i.e.  $\frac{₹1,60,000}{1,00,000}$
- (iii) Machine Hours Rate: ₹4.00, i.e.  $\frac{₹1,60,000}{40,000}$ .

The total work cost comes to ₹6,30,000; office expenses are ₹94,500. The percentage of office expenses to works cost is 15%, i.e.,  $\frac{₹94,500}{₹6,30,000} \times 100$ .

**Statement of Cost of Job No.....**

	<i>Percentage on Direct wages</i> ₹	<i>Productive Labour Hour rate</i> ₹	<i>Machine Hour rate</i> ₹
Direct Materials	10,000	10,000	10,000
Direct Labour	<u>6,000</u>	<u>6,000</u>	<u>6,000</u>
Prime Cost	16,000	16,000	16,000
Works Overhead*	<u>4,800</u>	<u>3,200</u>	<u>4,000</u>
Works Cost	20,800	19,200	20,000
Office Expenses (15% of Works Cost)	<u>3,120</u>	<u>2,880</u>	<u>3,000</u>
	23,920	22,080	23,000
Profit (25% on cost, or at 20% on selling price)	<u>5,980</u>	<u>5,520</u>	<u>5,750</u>
Price	<u>29,900</u>	<u>27,600</u>	<u>28,750</u>

One should note that by using a different method a different figure is obtained.

**Illustration 6**

Calculate the machine hour rate from the following:

	₹
Cost of machine	18,000
Cost of installation	2,000
Scrap value after 10 years	2,000
Rates and rent for a quarter for the shop	600
General lighting	200 p.m.
Shop supervisor's salary	₹6,000 per quarter
Insurance premium for a machine	120 p.a.
Estimated repair	200 p.a.
Power 2 units per hour @ ₹150 per 100 units	
Estimated working hours p.a. 2,000	

\* Respectively 80% of ₹6,000; ₹1.60 on 2,000 hours and ₹4.00 on 1,000 hours.



The machine occupies 1/4th of the total area of the shop. The supervisor is expected to devote 1/6th of his time for supervising the machine. General lighting expenses are to be apportioned on the basis of floor area.

**Solution:**

**Computation of Machine Hour Rate**

Machine No.:

	<i>Per year</i>	<i>Per hour</i>
	₹	₹
<b><u>Standing Charges:</u></b>		
Rent and Rates - 1/4th	600	
General lighting as per floor area - (200x12)/4	600	
Supervisor's Salary (6,000x4)/6	4,000	
Insurance premium	<u>120</u>	
Total yearly standing charges	5,320	
Hourly rate (5,320 ÷ 2,000)		2.66
<b><u>Machine Expenses:</u></b>		
Depreciation Cost	18,000	
Installation	<u>2,000</u>	
Total	20,000	
Less: Scrap value	<u>2,000</u>	
Amount to be written off	18,000	0.90
Repairs etc. — ₹ 200/2,000 hours		0.10
Power 2 units @ ₹1.5 per unit		<u>3.00</u>
<b>Machine Hour Rate</b>		<b><u>6.66</u></b>

**6. Combined machine hour and direct labour hour rate**

Where the work is done partly by machines and partly by manual labour, a combination of Machine Hour and Direct Labour Hour Method is used for the purpose of absorbing works expenses. Such expenses as are inseparable from the running of the machine, are allocated on the basis of the Machine Hour Rate and the other expenses which are not directly attached to the machines are allocated on the basis of the direct labour hour basis. In fact, because of inconvenience, it may not be possible to cover all the items included in factory overheads while computing machine hour and direct labour hour rates. For example, it is likely that such overhead items as salary of the works manager or the factory clerical staff, stationery, etc. are left out. To cover such items also there will be need to apply the method of the percentage of wages to overhead (remaining items only). Suppose the various rates worked out are the following:

Machine A	₹35 per hour
Machine B	₹45 per hour
Skilled workers:	
Category 1	₹3.00 per hour
Category 2	₹2.50 per hour

The total wages (direct) for a month come to ₹1,50,000 and the items of overheads not covered while computing the rates mentioned above totalled ₹22,500 per month. For a job undertaken during the month, the following information is available:

Time spent: Machine A	10 hours
Machine B	5 hours

Skilled workers:

Category 1 25 hours  
Category 2 20 hours

Total of direct wages ₹600

The overheads to be applied to the job will be ₹790 i.e.

₹		
Machine A	10 hours @ ₹35	350
Machine B	5 hours @ ₹45	225
Workers		
Category 1	25 hours @ ₹3.00	75
Category 2	20 hours @ ₹2.50	50
"Remaining" overheads (15% on ₹600)		<u>90</u>
		<u>790</u>

## 7. Rate per unit of production

This is also known as unit cost method. Under this method, actual or pre-determined overhead rate is calculated by dividing the overheads to be absorbed by number of units produced or expected to be produced. The rate is calculated as under:

$$\text{Overhead rate} = \frac{\text{Overhead expenses}}{\text{No. of units produced}}$$

This method is very simple. The main limitation of this method is that it is restricted to those concerns which produce only one item of product or a few sizes, quantities or grades of the same product.

## OVER OR UNDER ABSORPTION OF OVERHEADS

Overhead expenses are usually applied to production on the basis of predetermined rates. The predetermined rates may represent estimated, actual or normal costs. In either case, the amount of expenses actually incurred and the amount of overheads applied to production will seldom be the same. Some difference is inevitable. If the actual expenses fall short of the amount applied, there is said to be an over-absorption of overheads, and, conversely, if the actual expenses exceed the amount applied to production, it is a case of under-absorption. Such over or under-absorption may also be termed as overhead variance, the amount of over-absorption being represented by the credit balance on the variance account, and, conversely, the amount of under-absorption by a debit balance.

## Treatment of under-absorption and over-absorption of overheads

The treatment will depend on the causes that led to under or over-absorption. The amount ascribable to abnormal factors should be charged off to costing profit and loss account, otherwise costs previously arrived at should be adjusted. The following are the main methods of disposal of under or over-absorption of overheads.

## Use of supplementary rates

Where the amount of under or over-absorption is considerable, the cost of jobs or products is adjusted by means of a supplementary rate. This rate is determined by dividing the amount of under or over-absorption by the base that was adopted for absorption. This rate may be positive or negative. The amount of under-absorption is set right by a positive rate while a negative rate is determined for adjusting over-absorption.

The amount of under/over-absorption at the end of accounting period is adjusted in work-in-progress, finished stock and cost of sales in proportion to direct labour hours, or machine hours or the value of the balances in each of these accounts by use of supplementary rate. Subsidiary records or individual items are not corrected. The amount so adjusted will be shown in the balance sheet as deductions from the work-in-progress and finished stock.

### Writing of to costing profit and loss account

Where the difference between actual or absorbed overheads is not large, the simple method is to write it off to the costing profit and loss account. When there is under absorption due to idle facility, the concerned amount is also written off in this manner, likewise, when there was wasteful expenditure due to lack of control also.

### Carrying of overheads

The balance of under/over-absorbed overheads at the end of the year is transferred to an overhead reserve or suspense account and is carried forward to the next year account for absorption. This method is preferably applied when the normal business cycle is more than one year and in the case of new projects and schemes when the output is low in the initial stages of production and can not bear the entire share of overhead.

## REVIEW QUESTIONS



**Re-write the following sentence after filling-in the blank spaces with appropriate word:**

When the under or over absorbed overheads amount is significant, it should be disposed off by\_\_\_\_\_

**Correct answer:** Using a supplementary rate

## TREATMENT OF FACTORY OVERHEADS

Generally factory overheads form a substantial portion of the total overheads. It is very important therefore, that such overheads are properly absorbed over the cost of production.

The following are the steps involved in accounting of overheads :

- (i) The overhead expenses incurred by various departments are collected and accumulated under appropriate standing order numbers in the overhead expenses ledger.
- (ii) Allocation of overheads to production and service departments.
- (iii) Apportionment of such overheads which can not be allocated.
- (iv) Re-appointment of service department expenses to production departments.
- (v) The total overhead expenses incurred by steps (i) to (iv) above represents the total overhead cost of production departments.
- (vi) An overhead rate is to be computed for each department on the basis of estimated, actual or normal expenses and normal rate of working.

- (vii) The departmental overheads are applied or charged to the cost of products manufactured by different departments at a rate determined in the foregoing manner.
- (viii) Periodical comparison of actuals with absorbed expenses to find out under or over absorption of overheads.

### **TREATMENT OF ADMINISTRATIVE OVERHEADS**

As a class, administrative expenses bear only a remote relationship either to the manufacturing or to the selling functions. The administrative divisions being responsible only for laying down general policies of the company, its benefits, by and large, are intangible and hence difficult to measure. Also, administrative expenses are generally period costs are constant; they are not affected by any fluctuations in the volume of production or sales activity. A careful watch over the variable administrative expenses, e.g., postage, stationery, office maintenance and upkeep, office transport, repairs, etc., is nevertheless necessary since top executives may sometimes overlook the need for exercising strict economy in expenses with which they themselves are concerned.

There are three distinct methods of accounting for administrative overheads.

#### **Apportioning between production and sales departments**

This method recognises only two basic functions of a manufacturing concern, i.e. manufacturing and selling and distribution. Thus, administrative overheads are apportioned over production and sales departments. Therefore, each of the department should be charged with the proportionate share of them. When this method is adopted, administrative overheads lose their identity and get merged with production and selling and distribution overheads.

#### **Transfer to profit and loss account**

As per this method, administrative overheads are concerned with the formulation of policies and thus are not directly concerned with either the production or the selling and distribution functions. Further administrative overheads are mainly of fixed costs. Lastly, there appears to be no equitable base to charge administration overheads to other functions or the products. In view of these arguments, the administrative overheads are charged to profit and loss account.

#### **Treating administrative overheads as a separate addition to the cost of jobs or products**

This method considers administration as a separate function like production and sales and, as such costs relating to formulating the policy, directing the organisation and controlling the operations are taken as a separate charge to cost of the jobs or a product, sold along with the cost of other functions. The following bases may be adopted for such absorption:

- (i) Works cost
- (ii) Sales value/quantity
- (iii) Gross profit on sales
- (iv) Units manufactured
- (v) Conversion cost.

### **Illustration 7**

The following information has been gathered for a company doing jobbing work only for 2012:

	₹
Materials Consumed	4,00,000
Direct Labour	3,00,000
Factory Overheads	2,40,000
Office and Administrative Expenses	94,000
Sales	12,40,800

The company has to quote for a job to be undertaken in February, 2013. It is estimated that the job will require materials costing ₹30,000 and direct wages for it will be ₹45,000. What should be the quotation?

**Solution:**

**Cost Sheet for 2012**

	₹
Materials Consumed	4,00,000
Direct Labour	<u>3,00,000</u>
Prime Cost	7,00,000
Factory Overheads	<u>2,40,000</u>
Works Cost	9,40,000
Administration Expenses	<u>94,000</u>
Total Cost	10,34,000
Profit (Balancing Figure)	<u>2,06,800</u>
Sales	<u>12,40,800</u>

*Some relevant percentages:*

(i) Factory overheads to direct labour =  $\frac{₹2,40,000}{₹3,00,000} \times 100 = 80\%$

(ii) Administration Expenses to Works Cost =  $\frac{₹94,000}{₹9,40,000} \times 100 = 10\%$

(iii) Profit to total cost =  $\frac{₹2,06,800}{₹10,34,000} \times 100 = 20\%$ .

**Quotation for Job:**

	₹
Materials	30,000
Direct Wages	<u>45,000</u>
<b>Prime Cost</b>	75,000
Factory Overheads, 80% of ₹45,000	<u>36,000</u>
<b>Works Cost</b>	
1,11,000	
Administration Expenses 10% of ₹1,11,000	<u>11,100</u>
<b>Total Cost</b>	1,22,100
Profit @ 20% of total cost	<u>24,420</u>
Price (to be quoted)	<u>1,46,520</u>

## TREATMENT OF SELLING AND DISTRIBUTION OVERHEADS

Selling costs or overhead expenses are those incurred for the purpose of promoting the marketing and sales of different products. Distribution expenses, on the other hand, are expenses relating to delivery and dispatch of goods sold. Examples of selling and of distribution expenses have been considered earlier in this Study Lesson. From the above, it is clear that the two types of expenses represent two distinct types of functions. However, it is usual to group together these into one composite class, namely, selling and distribution overhead, for the purpose of cost accounting. Such a course has the merit of simplicity.

### Absorption of selling and distribution expenses

If selling and distribution expenses are small, they may be included in office expenses. If these expenses are considerable, one of the following magnitudes may be followed:

#### Percentage of works cost

In this method, on the basis of past year's experience the percentage of selling expenses to works cost is ascertained and used for finding out the selling and distribution expenses to be charged to each job or product. This method can be followed successfully if one product is produced or where selling expenses are small though various articles are produced. The method will not take into consideration different efforts involved in selling unless the effort is in the same proportion as the cost of production.

#### A percentage on the selling price

From an analysis of past year's accounts one can determine the percentage which normal selling and distribution expenses bear to the normal turnover. Suppose, on the basis of the previous year's experience it is ascertained that selling expenses are 10% of the turnover, and the cost of production is 9,000, then  $\frac{10}{100 - 10}$  i.e.  $\frac{10}{90}$  or  $\frac{1}{9}$  of the cost of production will be charged as selling and distribution expenses. This method can be followed in those cases, where the products are sold at fixed prices and the selling price of each article is known. If prices fluctuate, the method will not give good results.

#### An estimated rate per unit

If there is only one product, the total estimated selling expenses can be divided by the total estimated number of unit to be sold to give the selling on cost per unit. It would be better if constant and variable expenses are separately treated, if there are more than one product.

## REVIEW QUESTIONS



**State whether the following statement is “True” or “False”**

Administration overheads are recovered as a percentage of works cost:

- True
- False

**Correct answer:** *True*

**Illustration 8**

In a certain department of a factory there are two shops. Total departmental overheads for a year are ₹1,20,000 and the estimated number of direct labour hour is 24,000 (10 men employed for 48 hours per week during 50 weeks in the year).

From the particulars given below calculate the prime cost and works cost of a work order No. 54 which passes through both shops:

- (1) Material consumed ₹1,000.
- (2) Direct labour hours :   Shop A — 8 hours @ ₹6.00 per hr.  
  Shop B — 5 hours @ ₹7.50 per hr.
- (3) Works overheads are to be levied by means of a direct hour rate.

**Solution:***Calculation of Direct Labour Hour Rate*

$$\text{Direct Labour Hour Rate} = \frac{\text{₹1,20,000}}{24,000} = \text{₹5.00}$$

**Statement of Cost of Work Order No. 54**

	₹	₹
Material consumed		1,000.00
Direct Labour:		
Shop A (8 hours @ ₹6.00 per hour)	48.00	
Shop B (5 hours @ ₹7.50 per hour)	37.50	<u>85.50</u>
Prime Cost		1,085.50
Works Overheads:		
Shop A (8 hours @ ₹5.00 per hour)	40.00	
Shop B (5 hours @ ₹5.00 per hour)	25.00	<u>65.00</u>
Works Cost		<u>1,150.50</u>

**Illustration 9**

The following information is obtained from the records of a factory regarding the execution of two orders for the same quantity of a commodity:

	<i>Materials</i>	<i>Wages</i>	<i>Sale Price</i>	<i>Percentage of Profit on Cost of Production</i>
	₹	₹	₹	%
First order	25,000	20,000	85,800	10
Second order	36,000	28,000	1,23,760	12

Find out the percentage of Factory Overheads and Office Overheads.

**Solution:**

The cost of production of the First Order = ₹78,000 being 100/110 of ₹85,800.

The cost of production of the Second Order = ₹1,10,500 being 100/112 of ₹1,23,760.

Let factory overhead be x% on wages and office overhead be y% on factory cost.

Then,

$$78,000 = 25,000 + 20,000 + \left(20,000 \frac{x}{100}\right) + \left[\frac{y}{100}(45,000 + 200x)\right]$$

$$1,10,500 = 36,000 + 28,000 + \left(28,000 \frac{x}{100}\right) + \left[\frac{y}{100}(64,000 + 280x)\right]$$

$$33,000 = 200x + 450y + 2xy \quad \dots(i)$$

$$46,500 = 280x + 640y + 2.8xy \quad \dots(ii)$$

Multiplying equation (i) by 28 and equation (ii) by 20, we get

$$9,24,000 = 5,600x + 12,600y + 56xy$$

$$9,30,000 = 5,600x + 12,800y + 56xy$$

$$\text{or} \quad -6,000 = -200y$$

$$\text{or} \quad y = 30$$

By substituting the value of y in equation (i), we get

$$33,000 = 200x + 13,500 + 60x$$

$$\text{or} \quad x = 75.$$

Therefore, the factory overheads are 75% of wages and office overheads are 30% of factory cost.

**Illustration 10**

Hind Private Ltd. manufactures four sizes of the product 'Modern Model' called A, B, C, and D in the Department. The workers are paid the piece rate of Re. 1.00, ₹1.50, ₹2.00, ₹3.00 per unit of the product sizes A, B, C and D respectively. Dearness allowance paid to the workers is ₹4.00 per day. Miscellaneous payments are 20% of the basic wages.

From the following information for the month of January, you are required to find the total cost per unit of each size of the product 'Modern Model':

	<i>Product</i>			
	<i>Size A</i>	<i>Size B</i>	<i>Size C</i>	<i>Size D</i>
Direct Labour (Days)	104	78	52	52
Production (Units)	320	150	70	55
Direct Material (₹)	250	150	100	125
Overhead Expenses:				
	₹			
Indirect Material	500			
Indirect Labour	572			
Indirect Expenses	429			



**Solution:**

**Statement of total cost per unit of each size**

	<i>Products</i>				<i>Remarks</i>
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	
Units Produced	320	150	70	55	
Direct Material (a)	<u>0.78</u>	<u>1.00</u>	<u>1.43</u>	<u>2.27</u>	
Direct Labour:					
Piece rate wages	1.00	1.50	2.00	3.00	
*Dearness allowance	1.30	2.08	2.97	3.78	
Misc. payment	<u>0.20</u>	<u>0.30</u>	<u>0.40</u>	<u>0.60</u>	
Total Direct Labour: (b)	<u>2.50</u>	<u>3.88</u>	<u>5.37</u>	<u>7.38</u>	
Prime Cost (a+b)	<u>3.28</u>	<u>4.88</u>	<u>6.80</u>	<u>9.65</u>	
Overhead Expenses:					Basis of
Indirect Material	0.62	0.80	1.14	1.82	Apportionment
Indirect Labour	0.65	1.04	1.49	1.89	Material Value
Indirect Expenses	0.49	0.78	1.11	1.42	Direct Labour
					Days
					Direct Labour
					Days
Total Overhead (c)	<u>1.76</u>	<u>2.62</u>	<u>3.74</u>	<u>5.13</u>	
Total Cost (a+b+c)	<u>5.04</u>	<u>7.50</u>	<u>10.54</u>	<u>14.78</u>	

**CONTROL OF OVERHEADS**

**1. Manufacturing Overheads**

Control of manufacturing overhead cost can be best achieved by means of the flexible budget. It provides a base for comparing the actual overhead with the budgeted overhead adjusted to the level of activity attained. Fixed budgets may be used for planning purposes. No adjustment is made for actual level of activity attained. Flexible budgets may be prepared by the following two methods.

- (a) Range of activity method of setting flexible budget.
- (b) Fixed plus variable rate method of setting flexible budget.

An item wise budget of overhead expenses can be prepared quarterly or monthly to control overheads. The budget should be based on anticipated production capacity and the past expenses. The fixed and variable expenses should be segregated. The actual expenses should be ascertained and controlled.

If the budgets are prepared department wise, controlling cost and fixing responsibility is facilitated.

Departmental overhead cost reports should be designed to emphasise the items which can be controlled by the departmental managers and exclude those items which are non-controllable either directly or indirectly. Variances in non-controllable items is generally due to a poor system of cost allocation or due to decisions made by the management. Large non-controllable variances tend to obscure effectiveness of the departmental managers effort to control cost. Moreover, if there are large number of non-controllable items it make the report useless: Hence non-controllable items should be excluded.

Approved departures from budget should also be indicated in the performance reports and allowances for such approved departures should be introduced in variance analysis. In other words, "management by exception" should be applied for effective control of overhead cost.

### Difficulties in controlling overhead costs

A certain amount of authority is usually delegated to lower level of management for controlling certain costs within their jurisdiction. However, the following difficulties are faced while controlling overheads:

- (i) Few overheads are controllable when authority is delegated, as lower levels of management cannot control all expenses.
- (ii) Several causes are jointly controllable by different departments.
- (iii) Controllable costs vary with activity level. They tend to be fixed or semi-fixed and indirect with respect to either the product or departments and non-controllable by lower levels of management.
- (iv) The decisions made do not alter the amount of fixed costs as they are long-term costs.

The following steps should be taken to control manufacturing overheads:

- (a) Overheads should be properly classified as fixed, variable and semi-fixed.
- (b) The overhead cost should be budgeted by each classification and each department.
- (c) Actuals and budgeted figures should be compared and necessary action initiated.
- (d) Standard costing system should be introduced.

## 2. Control of Administration Overheads

A major portion of administrative overhead costs is fixed in nature and are incurred due to management policy. Administration overhead can be classified to two parts, namely, the expenses that varies with volume of office work and fixed expenses. Fixed overheads e.g. depreciation cannot be controlled at lower levels of management and can be incorporated in a fixed cost budget for informing the top management.

They are usually non-controllable. Though it is difficult to control such costs, the following methods can be used to control administration overheads :

- (a) Preparing control reports and comparing the results with the past.
- (b) Flexible Budget: Budgets are fixed for each items of administration overhead so that periodical comparisons can be made and responsibility can be fixed and to ensure that the actuals do not exceed the budgets.
- (c) Standard Cost Accounting: The most important problem connected with the administrative overhead cost is its costing treatment rather than its control because a major portion of the overhead is not controllable.

## 3. Control of Selling and Distribution Overheads

It is not easy to identify or link selling and distribution costs with units of production because the costs are normally incurred after production has been completed.

The incidence of these costs depends upon several factors such as the distance of market, terms of sale, extent of competition etc.

It is difficult to control such cost because of the following reasons:

- (a) capacity of sales organisation cannot be properly defined,
- (b) it is difficult to exercise control over customers and competitors,

- (c) strict control cannot be exercised by sales representatives and other field workers,
- (d) price fluctuations are determined by many factors besides cost factors,
- (e) market potentials and capacity cannot be properly estimated,
- (f) the difference between selling and not selling is sometimes not clear.

Such cost can be controlled and reduced by the following :

- (i) preparing selling and distribution control reports and cost control reports.
- (ii) preparing flexible budgets: The budget should be drafted keeping in mind the potential and anticipated sales of each product in every region. Many of the selling and distribution expenses can be budgeted on this basis. Top management estimates and plans certain expenses like advertisement, credit facilities, sales promotion etc. which cannot be directly linked with sales. Periodical statements can be prepared. Actuals should be compared with budgeted figures and any variations should be corrected.
- (iii) standard costing.
- (iv) comparison with past performance: The expenses incurred in a period can be compared with the corresponding expenditure incurred earlier. Difference in amounts and percentages to sales can be verified and corrective action initiated.

**PREPARATION OF COST SHEET**

Cost sheet is one of the method of unit costing. Detail of cost sheet we will discuss in lesson 7. The format of cost sheet is as under:-

**Cost Sheet for the Period \_\_\_\_\_**  
**Production \_\_\_\_\_ Units**

Particulars	Amount	Amount
Opening Stock of Raw Material	***	
Add: Purchase of Raw materials	***	
Add: Purchase Expenses	***	
Less: Closing stock of Raw Materials	***	
Raw Materials Consumed	***	
Direct Wages (Labour)	***	
Direct Charges	***	
<b>Prime cost (1)</b>		***
Add :- Factory Over Heads:		
Factory Rent	***	
Factory Power	***	
Indirect Material	***	
Indirect Wages Supervisor Salary	***	
Drawing Office Salary	***	
Factory Insurance	***	
Factory Asset Depreciation	***	
Works cost Incurred		***
Add: Opening Stock of WIP	***	

Less: Closing Stock of WIP	***	
<b>Works cost (2)</b>		***
Add:- Administration Over Heads:-		
Office Rent	***	
Asset Depreciation	***	
General Charges	***	
Audit Fees	***	
Bank Charges	***	
Counting house Salary	***	
Other Office Expenses	***	
<b>Cost of Production (3)</b>		***
Add: Opening stock of Finished Goods	***	
Less: Closing stock of Finished Goods	***	
<b>Cost of Goods Sold</b>		***
Add:- Selling and Distribution OH:-		
Sales man Commission	***	
Sales man salary	***	
Traveling Expenses	***	
Advertisement	***	
Delivery man expenses	***	
Sales Tax	***	
Bad Debts	***	
<b>Cost of Sales (5)</b>		***
<b>Profit (balancing figure)</b>		***
<b>Sales</b>		***

**Notes:-**

- (1) Factory Over Heads are recovered as a percentage of direct wages
- (2) Administration Over Heads, Selling and Distribution Overheads are recovered as a percentage of works cost.

**LESSON ROUND-UP**

- Direct expenses are costs other than materials or wages which are incurred for a specific product or saleable service.
- Overhead is the expenditure on labour, materials or services which can not be economically identified with a specific saleable cost unit.
- Standing order number is a code number given to a factory overhead item.
- Allocation of overheads is the process of charging the full amount of overhead costs to a particular cost centre.
- Apportionment of overheads refers to the allotment of proportions of items of cost to cost centers or cost units.
- Primary distribution of overhead involves allocation or apportionment of different items of overhead to all departments of a factory. This is also known as departmentalization of overheads.
- Secondary distribution of overheads is the process of apportionment of service department overheads among the production departments.

- Absorption of overheads refers to allotment of overheads to cost units.
- Pre-determined overhead rate is the rate calculated by dividing the budgeted overheads for an accounting period by the budgeted base for the period.
- Machine hour rate is the overhead cost for operating the machine for one hour.
- Unabsorbed of overheads means the amount by which the overhead actually incurred exceeds the overhead absorbed by the application of a predetermined rate.

### SELF-TEST QUESTIONS

1. State the distinction between the two terms in each of the following, giving examples:
  - (a) Cost allocation and cost apportionment.
  - (b) Direct cost and indirect cost.
  - (c) Fixed cost and variable cost.
  - (d) Indirect expenses and overheads.
2. Distinguish clearly between direct and indirect materials. Under what circumstances may direct materials be charged indirectly to the product?
3. Distinguish between direct labour and indirect labour. Give four examples of indirect labour that may arise in a factory.
4. Is it necessary to classify costs as “fixed” and “variable”? Describe briefly how this classification would be of help in costing?
5. Describe the different components of total cost.
6. What are overheads? How should overheads be classified? To what extent will you include overhead charges in your valuation of (a) work-in-progress, and (b) finished goods?
7. Distinguish between allocation, apportionment and absorption in connection with factory overhead expenses.
8. Discuss the reasons for overheads being analysed into fixed and variable components.
9. What are different stages by which overhead expenses are analysed, collected and charged to product?
10. State the main sources from which overhead expenses are collected in the Cost Accounts.
11. What are the general considerations that should decide your choice of basis for distribution of overhead costs to departments?
12. What is meant by absorption of overheads? What factors should be considered in obtaining a rate for absorption of overheads?
13. What are meant by ‘actual overheads’ and ‘recovered overheads’? Under what circumstances overheads stand under-absorbed or over absorbed? How will you account for the under/over absorption of overheads?
14. Works overhead expenditure is frequently charged out as a percentage on direct labour. Give two specific examples (with figures) where this method yields misleading results.
15. What are the principal factors to be considered when fixing a machine hour rate? Give a specimen computation.
16. In a factory where machine hour rates are used for recovering overhead expenses, state what information would be necessary to compute these rates?
17. Some of the major problems of cost accounting are associated with the allocation of indirect

expenditure. Why is this so ? Give a brief account of the several methods of allocation known to you and indicate the circumstances which would lead you to regard each of them in turn as appropriate.

18. A company is having three production departments X, Y and Z and two service departments - boiler-house and pump-room. The boiler-house has to depend upon the pump-room for supply of water and pump-room in its turn is dependent on the boiler-house for supply of steam-power for driving the pump. The expenses incurred by the production departments are: X - ₹6,00,000; Y - ₹5,25,000; and Z - ₹3,75,000. The expenses for boiler-house are ₹1,75,500 and pump-room are ₹2,25,000.

The expenses of the boiler-house and pump-room are apportioned to the production departments on following basis:

	DEPARTMENT			Boiler House	Pump Room
	X	Y	Z		
Expenses of boiler-house	20%	40%	30%	—	10%
Expenses of pump-room	40%	20%	20%	20%	—

Show clearly as to how the expenses of boiler-house and pump-room would be apportioned to X, Y and Z departments?

19. The budgeted working conditions of a cost centre are as follows:

Normal working per week	42 hours
No. of machines	14
Normal weekly loss of hours on maintenance etc.	5 hours per machine
No. of weeks worked per year	48
Estimated annual overheads	₹2,48,640
Estimated direct wage rate	₹8 per hour
Actual results in respect of a week period are:	
Wages incurred	₹18,000
Overheads incurred	₹20,400
Machine hours produced	2,000

You are required to calculate:

- (i) The overhead rate per machine hour; and
  - (ii) The amount of under or overabsorption of wages and overheads.
20. Explain any two methods of secondary distribution of Overheads.

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# Lesson 5

## ACTIVITY BASED COSTING (ABC)

### LESSON OUTLINE

- Introduction
- Meaning of Activity Based Costing
- Basic of Activity Based Costing
- Evolution of Activity Based Costing System
- Distinction Between Traditional Absorption Costing & Activity Based Costing
- Objectives of Activity Based Costing
- Terminology of Activity Based Costing
- Stages in developing Activity Based Costing system
- Importance of Activity Based Costing
- Uses of Activity Based Costing
- Limitation of Activity Based Costing
- Lesson Round Up
- Self Test Question

### LEARNING OBJECTIVES

Wrong cost analysis leads to wrong decision making. Traditional cost accounting can be used appropriately where the organisation has only few products but when organisation expand their products offering and these products use different amount of resources , it become difficult to determine accurate cost of products by using Traditional Absorption Costing and use of Activity Based Costing (ABC) is inevitable in such situations.

Activity-based cost-management systems trace indirect and support expenses accurately to individual products, services and customers. ABC systems use a simple two-stage approach similar to traditional cost systems. However, instead of using cost centers for accumulating costs, it uses activities.

After going through this lesson, one should be able to–

1. Understand about basic concepts of Activity Based Costing (ABC) and its evolution its objectives.
2. Know about difference between Traditional Absorption Costing and Activity Based Costing.
3. Understand about Cost drivers, its types.
4. Understand about practical uses of Activity Based costing.

Activity based costing is a modern approach which aims at rectifying the inaccurate cost information.

## ACTIVITY-BASED COSTING

### INTRODUCTION

The Activity-Based Costing (ABC) is a costing system, which focuses on activities performed to produce products. ABC is that costing in which costs are first traced to activities and then to products. This costing system assumes that activities are responsible for the incurrence of costs and create the demands for activities. E.g. an accounting firm prepares tax returns; a University teaches students. Costs are charged to products based on individual product's use of each activity. In traditional absorption costing system, costs are first traced not to activities but to an organizational unit, such as department or plant and then to products. It means under both, ABC and traditional absorption costing system the second and final stage consists of tracing costs to the product.

ABC aims at identifying as many costs possible to be subsequently accounted as direct costs of production. Any cost that is traced to a particular product via its consumption of activity becomes direct cost of the product. For instance, in conventional costing system, cost of setup and adjustment time is considered as factory overhead and subsequently assigned to different products on the basis of direct labour hours. But in ABC, setup and adjustment time is determined for each product and its costs are directly charged to each product. ABC is generally used as a tool for understanding product and customer cost and profitability.

As global competition intensifies, companies are producing an increasing variety of products and services. They are finding that producing different products and services places varying demands on their resources. The need to measure more accurately how different products and services use resources has led companies such as American Express, Boeing, General Motors, and Exxon Mobil to refine their costing systems. One of the main ways companies around the globe have refined their costing systems is through activity based costing.

### MEANING OF ACTIVITY BASED COSTING (ABC)

**CIMA** defines Activity Based Costing as,

**'cost attribution to cost units on the basis of benefit received from indirect activities e.g. ordering, setting up, assuring quality.'**

ABC has also been defined by **CAM-1 organisation of Arlinton Texas as**

**"the collection of financial and operation performance information tracing the significant activities of the firm to product Costs".**

The features of ABC are as under:

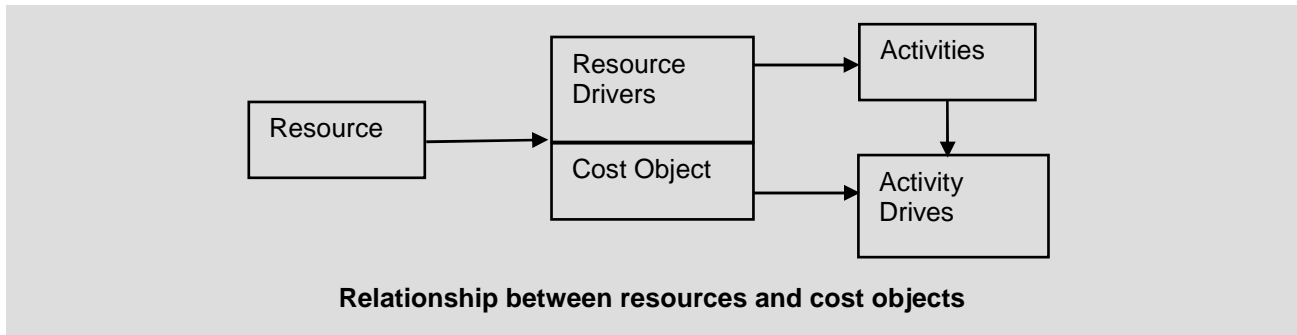
- Activity-based costing (ABC) is a two-stage product costing method that first assigns costs to activities and then allocates them to products based on the each product's consumption of activities.
- The cost pools in the two-stage approach now accumulate activity-related costs.
- An activity is any discrete task that an organization undertakes to make or deliver a product or service.
- Activity-based costing is based on the concept that products consume activities and activities consume resources.
- Activity-based costing can be used by any organization that wants a better understanding of the costs of the goods and services it provides, including manufacturing, service, and even non-profit organizations.



## BASICS OF A B C

ABC assigns costs to products by tracing expenses to “activities”. Each Product is charged based on the extent to which it used an activity. The primary objective of ABC is to assign costs that reflect/mirror the physical dynamics of the business provides ways of assigning the costs of indirect support resources to activities, business processes, customers, products. It recognises that many organisational resources are required not for physical production of units of product but to provide a broad array of support activities.

Cost of a product is the sum of the costs of all activities required to manufacture and deliver the product. Products do not consume costs directly. Money is spent on activities which are consumed by product/ services.



## EVOLUTION OF ACTIVITY BASED COSTING SYSTEM

The concepts of ABC were developed in the manufacturing sector of the United States during the 1970's and 1980's. During this time, the consortium for advanced manufacturing – International , now known simply as CAM-I , provided a formative role for studying and formalizing the principles that have become more formally known as Activity Based Costing.

ABC is developed due to many deficiencies of Traditional Cost systems, which lead to the discovery of the ABC System. Which are as under:

- (i) The present costing system has developed convenient overhead recovery basis and blanket overhead recovery are acceptable when valuing stocks for financial reporting, but they are inappropriate when used for decision-making and typical product strategy decisions. Such decisions have implications. Over 3-5 years and over this period many fixed costs become variable.
- (ii) It's easy to determine accurate costs of products or services when a company has only a few products. When companies expand their product offerings and these products use different amount of resources such as supervision, quality control it is more difficult to determine accurate costs of products. This situation is a main reason why companies use ABC.
- (iii) Traditional costing fails to capture cause and effect relationships. If focused on the cost incurred.
- (iv) Traditional accounting was confined merely to furnish information at product level. The new manufacturing technology demands the feedback of performance while production is still in progress rather than history.

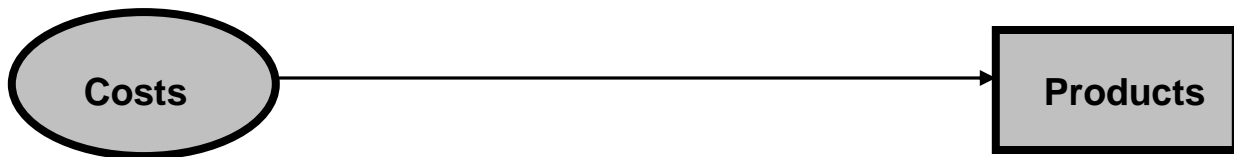
Therefore, in order to overcome the inadequacies of traditional methods of overhead absorption, Activity Based Costing has been devised.

**DISTINCTION BETWEEN TRADITIONAL ABSORPTION COSTING AND ACTIVITY BASED COSTING**

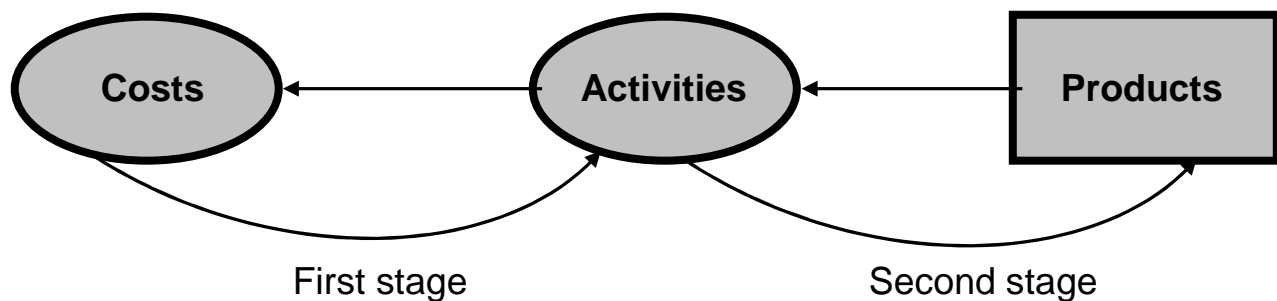
Traditional Absorption Costing	Activity Based Costing
Overheads are first related to departments cost centres (Production and Service Cost Centres)	Overheads are first related to activities or grouped into Cost Pools.
Only two types of activities viz. Unit Level Activities and Facility Level Activities are identified.	All levels of activities in the manufacturing cost hierarchy viz. Unit Level, Batch Level, Product Level and Facility Level are identified.
This method relates overheads to cost centres i.e. locations. It is not realistic of the behaviour of costs.	This method relates overheads to the causal factor i.e. driver. Thus, it is more realistic of cost behaviour.
Overhead Rates can be used to ascertain cost of products only.	Activity Cost Driver Rates can be used to ascertain cost of products and also cost of other cost objects such as customer segments, distribution channels. etc.

We can summarise the main difference between ABC and traditional costing by following picture:

• **Traditional allocation method**



□ **Activity-based allocation method**



**OBJECTIVES OF ACTIVITY BASED COSTING**

The objectives of Activity Based Costing are as under:

1. To improve product costing
2. To identify non-value adding activities in the production process which might be a suitable focus for attention or elimination
3. To provide required information for decision making
4. To reduce the frivolous (nonessential) use of common resources

5. To encourage managers to evaluate the efficiency of internally provided services
6. To calculate the full cost of products for financial reporting purposes and for determining cost-based prices.

### TERMINOLOGY OF ACTIVITY BASED COSTING

1. **A Cost Object:** It is an item for which cost measurement is required e.g. Product, job or a customer.
2. **A Cost Driver:** In an ABC system, the allocation basis that are used for applying costs to services or procedures are called cost drivers. It is a factor that causes a change in the cost of an activity. Few examples of cost driver as under:

Function	Cost Drivers
Research and Development	<ul style="list-style-type: none"> <li>• Number of research projects</li> <li>• Personnel hours on a project</li> <li>• Technical complexities of projects</li> </ul>
Customer Service	<ul style="list-style-type: none"> <li>• Number of service calls</li> <li>• Number of products serviced</li> <li>• Hours spent on servicing products</li> </ul>

3. **Unit level cost:** Traditionally, cost drivers were viewed only at the unit level. These drivers create unit-level costs meaning that they are caused by the production or acquisition of a single unit of product or the delivery of a single unit or service.
4. **Batch level cost:** Costs are caused by a group of things being made, handled or processed at a single time are referred to as batch level costs.
5. **Product-level cost:** A cost caused by the development, production or acquisition of different items is called a product level or process level cost. These include engineering change orders, equipment maintenance, product development and scrap, if related to product design.
6. **Facility-level cost:** Some costs cannot be related to a particular product line. These are instead related to providing a facility. For e.g. Cost of maintaining a building or plant security or advertisement promoting the organization.
7. **Organizational-level cost:** Certain costs are incurred at organizational level for the single purpose of supporting continuing facility operations. These organizational level costs common to many different activities and products and services can be prorated among services and products on an arbitrary basis only. These costs are not product related .thus they should be subtracted from net product revenues instead of an arbitrary and illogical apportionment.
8. **Cost Pool:** Costs are grouped into pools according to the activities, which drive them. In this all costs associated with procurement i.e. ordering, inspection, storing etc would be included in this cost pool and cost driver identified.

The technique of ABC lays importance on different costs for different costs, which are relevant to a particular decision.

### STAGES IN DEVELOPING ACTIVITY BASED COSTING SYSTEM

#### Step 1. IDENTIFY RESOURCES

Resources represent the expenditure of an organization. These are the same costs that are represented in a traditional accounting, ABC links these cost to products, customers or services.

**Step2. IDENTIFY ACTIVITIES**

Activities represent the work performed in an organization. ABC accounts for the costs based on what activities caused them to occur. By determining the actual activities that occur in various departments it is then possible to more accurately relate these costs to customers, products and services.

**Step 3. IDENTIFY COST OBJECTS**

ABC provides profitability by one or more cost object. Cost object profitability is utilized to identify money-losing customers to validate separate divisions or business units. Defining outputs to be reviewed is an important step in a successful ABC implement action.

**Step 4. DETERMINE RESOURCE DRIVERS**

Resource drivers provide the link between the expenditure of an Organisation and activities performed within the Organisation.

**Step 5. DETERMINE COST (ACTIVITY) DRIVERS**

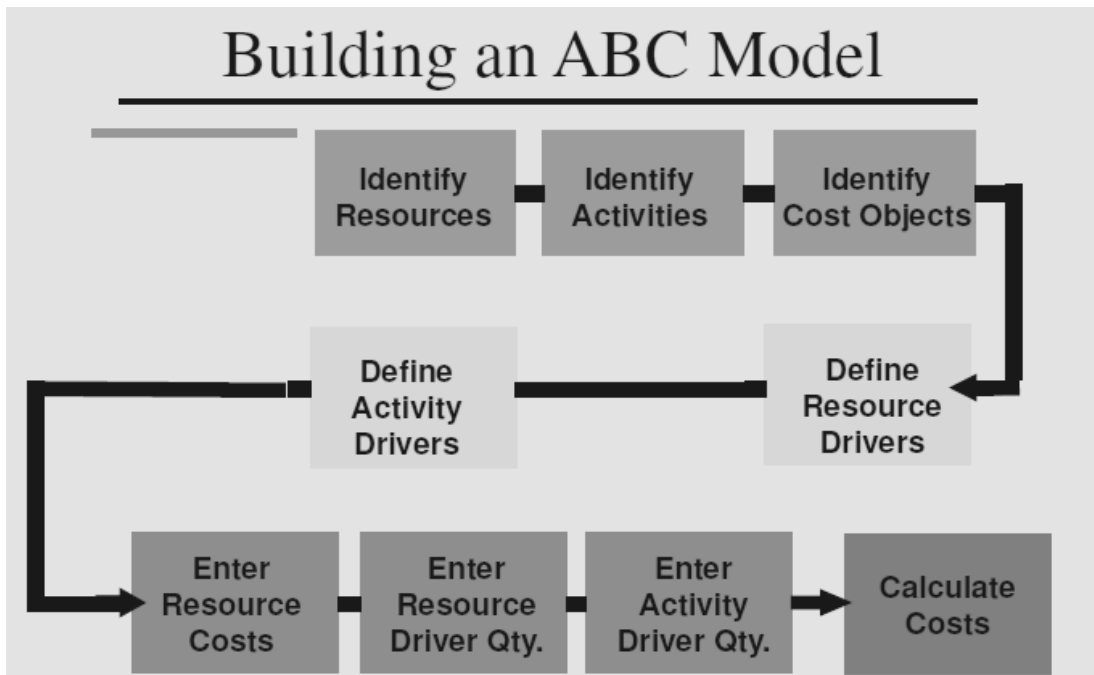
Determination of cost drivers completes the last stage of the model. Cost drivers trace or links the cost of performing certain activities to cost objects.

$$\text{Activity Cost Driver Rate} = \frac{\text{Toatal Cost of Activity(Cost pool)}}{\text{Activity Cost Driver}}$$

**Step 6. ASSIGN COSTS TO THE COST OBJECTS**

We can use following formula for assigning costs to the cost objects

$$\text{Costs} = \text{Resources Consumed} \times \text{Activity Cost Driver Rate}$$



## DIFFERENT TYPES OF ACTIVITIES

### Identification of activities for ABC

**Meaning of Activities:** Activities comprise of units of work or tasks. For example, purchase of materials is an activity consisting a series of tasks like purchase requisition, advertisement inviting quotations, identification of suppliers, placement of purchase order, follow-up etc.

**Types of Activities:** Activities basically fall into four different categories, known as the manufacturing cost hierarchy. These categories were first identified by Cooper in 1990 and help to determine the type of activity cost driver required. The categories are:

Type of Activity	Examples
<b>Unit level activities:</b> These are activities for which the consumption of resources can be identified with the number of units produced. It is performed each time a unit is produced.	Use of indirect materials/consumables.
<b>Batch level activities:</b> The costs of some activities are driven by the number of batches of units produced. These are activities related to setting up of a batch or a production run. It is performed each time a batch is processed.	Material ordering, Inspection of Products.
<b>Product level activities:</b> The cost of some activities are driven by the creation of a new product line and its maintenance.	Designing the product, Producing parts specifications and keeping technical drawings of products.
<b>Facility Level Activities:</b> It must be carried out regardless of which products are produced. These are activities necessary for sustaining the manufacturing process and cannot be directly attributed to individual products	Plant Security, Production Manager's Salary and Maintenance of buildings.

## REVIEW QUESTIONS



State whether the following statement is "True" or "False":

1. Activity-based costing is more expensive to implement than traditional costing
2. Processing units on machines is a unit-level activity.
3. ABC improves control over overhead costs.
4. Setting up equipment is a batch-level activity.
5. In an ABC each cost pool has its own predetermined overhead rate.

(Answer : All true)

## IMPORTANCE OF ACTIVITY BASED COSTING (ABC)

ABC provides information for decision making about product costs and product-line profitability. Implementation of ABC will emphasis on more precise profit analysis, more accurate costing, better

allocation of overhead, improved cost control and cost management. It supports the manager in operating decisions, such as performance measurement, product design and process improvement. It is also used to advocate for strategic decisions, such as customer profitability and pricing and product mix. Due to the increasing accuracy of output costs, ABC information enables managers to make better decisions on product, product design, process improvement, market segments and customer mix. . It can lead product designers to decisions on tradeoffs between minimizing cost and desired performance and it provides the cost information of diverse designs that product designers can compare moreover, using product costing techniques at the design stage can be combined with target costing since product costs can determine the mix of products to manufacture and to sell and can evaluate profitability by product group or customer type.

We can summarise the importance of ABC as under:

1. To link the cost to its causal factor – i.e. the Cost Driver
2. To identify costs of activities rather than cost centres
3. To ascertain product costs with greater accuracy by relating overheads to activities
4. To overcome the inherent limitations of traditional absorption costing and use of blanket overhead rates
5. To assist managers in budgeting and performance measurement
6. To provide the links between the activities, the organizational acts and the resources consumed, and illustrate the differences between resource consumption and resource provision
7. To help in cost control and cost reduction, as well as improved profitability.
8. To provide valuable economic information to support a company's operational improvement and customer satisfaction programs.
9. To furnish many significant benefits over traditional costing techniques
  - (a) most accurate data about product cost;
  - (b) more comprehensive cost information for performance measurement;
  - (c) relevant data for management's decision-making;
  - (d) more potential for sensitivity analysis;
  - (e) providing a model prospect on value-adding organizational transactions and activities

## USES OF ACTIVITY BASED COSTING

The areas in which activity based information is used for decision making are as under: -

1. **Activity costs:** ABC is designed to track the cost of activities, so we can use it to see if activity costs are in line with industry standards. If not, ABC is an excellent feedback tool for measuring the ongoing cost of specific services as management focuses on cost reduction.
2. **Customer profitability:** Though most of the costs incurred for individual customers are simply product costs, there is also an overhead component, such as unusually high customer service levels, product return handling, and cooperative marketing agreements. An ABC system can sort through these additional overhead costs and determine which customers are actually providing a reasonable profit. This analysis may result in some unprofitable customers being turned away, or more emphasis being placed on those customers who are contributing more in profits.

3. **Distribution cost:** Organisation uses a variety of distribution channels to sell its products, such as retail, Internet, distributors, and mail order catalogs. Most of the structural cost of maintaining a distribution channel is overhead, so if we can make a reasonable determination of which distribution channels are using overhead, we can make decisions to alter how distribution channels are used, or even to drop unprofitable channels.
4. **Make or buy:** ABC enables the manager to decide whether he should get the activity done within the firm or outsource the same. Outsourcing may be done if the firm is incurring higher overhead costs as compared to the outsourcer or vice-versa.
5. **Margins:** With proper overhead allocation from an ABC system, we can determine the margins of various products, product lines, and entire subsidiaries. This can be quite useful for determining where to position company resources to earn the largest margins.
6. **Minimum price:** Product pricing is really based on the price that the market will bear, but the marketing manager should know what the cost of the product is, in order to avoid selling a product that will lose a company money on every sale. ABC is very good for determining which overhead costs should be included in this minimum cost, depending upon the circumstances under which products are being sold.
7. **Production facility cost:** It is usually quite easy to segregate overhead costs at the plant-wide level, so we can compare the costs of production between different facilities.

### LIMITATIONS OF ACTIVITY BASED COSTING

Activity based costing help managers in decision making. However activity based costing has certain limitations or disadvantages which as are under:

1. Implementing an ABC system requires substantial resources, which is costly to maintain.
2. Activity Based Costing is a complex system which need lot of record for calculations.
3. In small organisation mangers are accustomed to use traditional costing systems to run theirs operations and traditional costing systems are often used in performance evaluations.
4. Activity based costing data can be easily misinterpreted and must be used with care when used in decision making. Managers must identify which costs are really relevant for the decisions at hand.
5. Reports generated by this systems do not conform to generally accepted accounting principles (GAAP). Consequently, an organization involved in activity based costing should have two cost systems - one for internal use and one for preparing external reports.

### REVIEW QUESTIONS



**Re-write the following sentence after filling-in the blank spaces with appropriate word:**

- (i) \_\_\_\_\_ uses multiple activity rates.
- (ii) Performing periodic maintenance on general use equipment is an example of a \_\_\_\_\_.

**Correct answer:** (i) Activity-based costing (ii) Facility-level activity

**Illustration 1**

Autolite Private Ltd. an auto repair business, uses activity based costing and accumulates overhead costs in the following cost pools:

- Human Resources
- Parts management
- Purchasing
- Quality Control
- Equipment set-up
- Training employees
- Assembly department
- Receiving department

You are to find out for each cost pool whether the cost pool would be unit-level, batch-level, product-level or facility level.

**Solution:**

<b>ACTIVITY COST POOL</b>	<b>HIERARCHY</b>
Human Resources	Facility-level
Parts management	Product-level
Purchasing	Batch-level
Quality Control	Unit-level
Equipment set-up	Unit-level
Training employees	Facility-level
Assembly department	Unit-level
Receiving department	Batch-level

**Illustration 2**

Explain briefly each of the following categories in Activity based Costing by giving at least three examples:

- (i) Batch level activities
- (ii) Product level activities
- (iii) Facility level activities.

**Solution**

**(i) Batch level activities** – The cost of some activities (mainly manufacturing support activities) are driven by the number of batches of units produced. These activities are known as Batch level activities. Examples are:

- (I) Material ordering.



- (II) Machine set up cost.
- (III) Inspection of products - like first item of every batch.

**(ii) Product level activities** – The cost of some activities are driven by the creation of a new product line and its maintenance. These activities are known as Product level activities. Examples are:

- (I) Designing the product.
- (II) Producing parts to a certain specified limit.
- (III) Advertising cost, if advertisement is for individual products.

**(iii) Facility level activities** – The cost of some activities cannot be related to a particular product line, instead they are related to maintaining the building and facilities. These activities are known as Facility level activities. Examples are:

- (I) Maintenance of buildings.
- (II) Plant security.
- (III) Production manager's salary.
- (IV) Advertising campaigns promoting the company.

### Illustration 3

The cost accountant of ABC Manufacturing attended a workshop on activity-based costing and was impressed by the results. After consulting with the production personnel, he prepared the following information on cost drivers and the estimated volume for each driver.

	<i>Products</i>			<i>Total</i>
	<i>A</i>	<i>B</i>	<i>C</i>	
Units produced	25,000	15,000	5,000	45,000
Direct materials Cost Per Unit in ₹	40.0	30.0	55.0	
Direct labour in ₹	15.0	15.0	15.0	

<i>Cost driver</i>	<i>Cost driver volume</i>			<i>Total</i>
	<i>A</i>	<i>B</i>	<i>C</i>	
Number of setups	125	75	50	250
Machine Hours	2,500	1,500	2,000	6,000
Direct labour hours	25,000	15,000	5,000	45,000
Number of Inspection	50	25	25	100

The cost accountant also determined how much overhead costs were incurred in each of the four activities as follows:

<i>Activity</i>	<i>Overhead costs in ₹</i>
<b>Machining</b>	
Setup	1,50,000
Machining	<u>7,50,000</u>
Total of Machining Overhead Cost	<u>9,00,000</u>
<b>Assembly</b>	
Assembly	360,000
Inspection	<u>90,000</u>
Total of Assembly Overhead Cost	<u>4,50,000</u>
<b>Total Overhead Cost</b>	<b><u>13,50,000</u></b>

**Required:**

1. Determine the cost driver rate for each activity cost pool.
2. Use the activity-based costing method to determine the unit cost for each product.

**Solution:****Activity Cost drive rate****Machining**

Setup ₹ 600 per setup ( = ₹150,000 ÷ 250 setups)

Machining ₹125 per machine hour ( = ₹750,000 ÷ 6,000 machine hours)

**Assembly**

Assembly ₹8 per direct labor hour ( = ₹360,000 ÷ 45,000 direct labor hours)

Inspection ₹900 per inspection ( = ₹90,000 ÷ 100 inspections)

In the following table, the total costs are divided by the number of units to arrive at the unit cost for each product.

		A	B	C
Direct Materials in ₹		10,00,000	4,50,000	2,75,000
Direct Labour in ₹		3,75,000	2,25,000	75,000
<b>Applied Overhead</b>				
Set Up cost in ₹	600 per setup	75,000	45,000	30,000
Machining cost in ₹	125 per Machine Hours	3,12,500	1,87,500	2,50,000
Assembly cost in ₹	8 per Labour Hour	2,00,000	1,20,000	40,000
Inspection cost in ₹	900 per inspection	45,000	22,500	22,500
Total Overhead Cost in ₹		6,32,500	3,75,000	3,42,500
Total Cost in ₹		20,07,500	10,50,000	6,92,500
Number of Units		25,000	15,000	5,000
Unit Cost in ₹		80.3	70	138.5

**Illustration 4**

The Indiana Company produces only two products: a major computer part and cell phones. The company uses a normal cost system and overhead costs are currently allocated using a plant-wide overhead rate based on direct labor hours. Outside cost consultants have recommended, however, that the company use activity-based costing to charge overhead to products.

The company expects to produce 4,000 computer parts and 2,000 cell phones in 2013. Each computer part requires two direct labor hours to produce and each cell phone requires one-half hour to produce. The direct material and direct labor costs included in the two products are as follows:

<i>Item</i>	<i>Computer Part</i>	<i>Cell Phone</i>
Direct Material (per unit) in ₹	30	17
Direct labour cost per unit in ₹	16	4

Budgeted (Estimated) Total Factory Overhead Data For 2013:

<i>Activity</i>	<i>Budgeted Overhead in ₹</i>	<i>Estimated Volume Level</i>
Production Setups	80,000	20 setups
Material Handling	70,000	5,000 lbs.
Packaging and Shipping	120,000	6,000 boxes
Total Factory Overhead	270,000	

Based on an analysis of the three overhead activities, it was estimated that the two products would require these activities as follows in 2013

<i>Activity</i>	<i>Computer Part</i>	<i>Cell Phone</i>	<i>Total</i>
Production Setups	5	15	20
Material handling (lbs)	1000	4000	5000
Packaging and Shipping (boxes)	4000	2000	6000

**Required:**

1. Calculate the cost of each product using a plant-wide rate based on direct labor hours.
2. Calculate the activity cost rates for (a) setups, (b) material handling and (c) packaging and shipping.
3. Cost out the two products using an activity-based costing system.

**Solution****Calculation of Labour Cost per Direct labour Hours (D.L.H)**

<i>Item</i>	<i>Computer Part</i>	<i>Cell Phone</i>
Direct labour cost per unit in ₹	16	4
Number of Direct Labour Hour per unit	2	0.5
Direct Labour Cost per hour	8	8

**1. The Cost of Each Product Using a Plant-Wide Rate Based on Direct Labour Hours:**

Step 1: Calculation of plant-wide overhead rate:

Total budgeted DLH =

4,000 computer parts x 2 DLH per part + 2,000 cell phones x 0.5 DLH per phone = 9,000 DLH

Over head Rate = Total Budgeted Overhead Dollars/Total Budgeted Direct Labor Hours  
 = ₹270,000/ 9,000 DLH  
 = ₹30 per DLH

Step 2: Calculation of each product's cost using a plant-wide rate:

<i>Item</i>	<i>Computer Part</i>	<i>Cell Phone</i>
Direct Material (per unit) in ₹	30	17
Direct labour cost per unit in ₹	16	4
Manufacturing overhead @ ₹30 per labour hour	60	15
Total	106	36

**2. The Activity Cost Rates for (1) Setups, (2) Material Handling and (3) Packaging and Shipping:**

<i>Activity</i>	<i>Budgeted Overhead in ₹</i>	<i>Estimated Volume Levels</i>	<i>Activity cost rates</i>
Production Setups	80,000	20	4000 per setup
Material handling (lbs)	70,000	5000	14 per lbs
Packaging and Shipping (boxes)	1,20,000	6000	20 per box

**3. Cost of the Two Products Using an Activity-Based Costing System:**

<i>Item</i>	<i>Computer Part</i>	<i>Cell Phone</i>
No of item	4,000	2,000
Direct Material cost in ₹	1,20,000	34,000
Direct labour cost in ₹	64,000	8,000
Production set up cost in ₹	20,000	60,000
Material handling cost in ₹	14,000	56,000
Packaging and Shipping ₹	80,000	40,000
Total Manufacturing Cost For All Units in ₹	298,000	198,000
Total Units Produced	4,000 parts	2,000 phones
Total Cost Per Unit in ₹	74.50	99

## LESSON ROUND-UP

- The Activity-Based Costing (ABC) is a costing system, which focuses on activities performed to produce products. ABC is that costing in which costs are first traced to activities and then to products.
- ABC is developed due to many deficiencies of Traditional Cost systems.
- In traditional product costing system, costs are first traced not to activities but to an organizational unit, such as department or plant and then to products.
- Cost driver is an activity which generate cost. Costs are grouped according to what drives them or causes them to be incurred.
- A Cost Object: It is an item for which cost measurement is required e.g. Product , job or a customer.
- Cost drivers type of Pure Volume, Weighted Volume, Situational, Motivational.
- Cost pool is created for each activity and such activities are related with each type of product to determine the cost of such product.
- Stages in developed ABC system as under:
  - Identify resources
  - Identify activities
  - Identify cost objects
  - Determine resource drivers
  - Determine cost (activity) drivers
  - Assign costs to the cost objects

## SELF-TEST QUESTIONS

1. What is Activity Based Costing? Why is it needed?
2. What is a 'Cost Driver'? What is the role of cost driver in tracing cost to products?
3. Discuss the steps in applying Activity Based Costing?
4. How are activities grouped in a manufacturing company?
5. Distinguish between traditional costing system and activity based costing.
6. What are the benefits of activity based costing?
7. Write the most appropriate answer from the given options in respect of the following :
  - (i) Company X uses activity-based costing for its two products: Product B and Product D. One of the activity cost pools is parts administration. The total estimated overhead cost for that pool was ₹ 550,000 and the expected activity was 2000 part types. If Product D requires 1200 part types, the amount of overhead allocated to it would be:
    - (a) ₹ 275,000
    - (b) ₹ 300,000
    - (c) ₹ 330,000
    - (d) ₹ 345,000
  - (ii) Company B uses activity-based costing and has the following activity cost pools and estimated overhead cost for each pool:

Machine related ₹ 350,000  
 Handling material ₹ 240,000  
 Processing purchase orders ₹ 720,000  
 General factory ₹ 500,000

The amount of total estimated overhead is:

- (a) ₹ 1,310,000  
 (b) ₹ 1,090,000  
 (c) ₹ 850,000  
 (d) ₹ 1,810,000

[ (i) a, (ii) d ]

8. ABC electronics makes audio player model 'AB 100'. It has 80 components. ABC sells 10,000 units each month at ₹3,000 per unit. The cost of manufacturing is ₹2,000 per unit or ₹200 lakhs per month for the production of 10,000 units. Monthly manufacturing costs incurred are as follows:

	(₹ Lakhs)
Direct material costs	100.00
Direct manufacturing labour costs	20.00
Machining costs	20.00
Testing costs	25.00
Rework costs	15.00
Ordering costs	0.20
Engineering costs	<u>19.80</u>
	<u>200.00</u>

Labour is paid on piece rate basis. Therefore, ABC considers direct manufacturing labour cost as variable cost.

The following additional information is available for 'AB 100'

- (i) Testing and inspection time per unit is 2 hours.  
 (ii) 10 per cent of 'AB 100' manufactured are reworked.  
 (iii) It currently takes 1 hour to manufacture each unit of 'AB 100'  
 (iv) ABC places two orders per month for each component. A different supplier supplies each component.

ABC has identified activity cost pools and cost drivers for each activity. The cost per unit of the cost driver for each activity cost pool is follows:

<b>Manufacturing Activity</b>	<b>Description of activity</b>	<b>Cost driver</b>	<b>Cost per unit of cost driver</b>
1. Machine costs	Machining components	Machine hours of capacity	₹200
2. Testing costs	Testing components and finished products. (Each unit of 'AB 100' is tested individually)	Testing hours	₹125

3. Rework costs	Correcting and fixing errors and defects	Units of 'AB 100' reworked	₹1,500 per unit
4. Ordering costs	Ordering of components	Number of orders	₹125 per order
5. Engineering costs	Designing and managing of products and processes	Engineering hours	₹1,980 per engineering hour

Over a long-run horizon, each of the overhead costs described above vary with chosen cost drivers. In response to competitive pressure ABC must reduce the price of its product to ₹600 and to reduce the cost by at least ₹400 per unit. ABC does not anticipate increase in sales due to price reduction. However, if it does not reduce price it will not be able to maintain the current sales level.

Cost reduction on the existing model is almost impossible. Therefore, ABC has decided to replace 'AB 100' by a new model 'AB 200', which is a modified versions of 'AB 100'. The expected effect of design modifications are as follows:

- (i) The member of components will be reduced to 50.
- (ii) Direct material costs to be lower by ₹200 per unit.
- (iii) Direct manufacturing labour costs to be lower by ₹20 per unit.
- (iv) Machining time required to be lower by 20 per unit.
- (v) Testing time required to be lower by 20 per cent.
- (vi) Rework to decline to 5 per cent.
- (vii) Machining capacity and engineering hours capacity to remain the same.

ABC currently out sources the rework on defective units.

Required:

- (i) Compare the manufacturing cost per unit of 'AB 100' and 'AB 200'.
- (ii) Determine the immediate effect of design change and pricing decision on the operating to apply to 'AB 200'.

Ignore income tax, Assume that the cost per unit of each cost driver for 'AB 100' continues to apply to 'AB 200'.

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# Lesson 6

## COST RECORDS

### LESSON OUTLINE

- Introduction
- Non-integrated accounting system
  - Principal ledgers
  - Control accounts
  - Entries to record transactions
- Advantages of non-integrated accounting
- Limitations of non-integrated accounting
- Integrated (integral) accounting system
- Benefits of integrated accounting system
- Pre-requisites for an integral accounting system
- Essential features of integral accounting
- Reconciliation of cost and financial accounts
- Need for reconciliation
- Causes of differences
- Reconciliation statement
- Memorandum reconciliation account
- Lesson Round Up
- Self Test Questions

### LEARNING OBJECTIVES

Cost Records have a very important role in the accounting of a manufacturing organisation. Cost records provide the details about components of cost of a product or services i.e. material, labour and overhead. There are two system used in maintenance of cost records i.e. integrated records and non- integrated records.

Under non-integrated accounting systems, Financial Accounting and Inventory/Cost Accounting books/ ledgers are separately maintained.

An Integrated Accounting System would be one where only a single set of books would contain all the information of Financial Accounting as well as Inventory/ Cost Accounting.

Integrated system would be difficult to maintain if accounts are maintained manually but most available Computerized Accounting Systems are Integrated Systems. In integrated system, the problem of reconciliation of financial accounts and cost accounts does not arise.

The objective of this lesson is to enable the student to understand

1. The meaning of Integrated and non integrated system.
2. Difference between integrated and non integrated systems.
3. Accounting of cost records under integrated and non integrated system.
4. Reconciliation of records under non integrated environment.

“Integrated accounts indicate a set of accounting records which provides financial and cost accounts using a common input of data for all accounting purpose.”

—CIMA, London

## INTRODUCTION

Financial accounting system prepares accounts for only the monetary aspects of every business transaction with keeping certain objectives in mind. Whereas cost accounting system is maintained with a view to achieve its objectives. All transactions are collected from the same invoices vouchers or receipts which are also common for financial account. Costs are then classified according to functions, departments, or products. Though real accounts and nominal accounts are of direct relevance in ascertaining the cost of products. Personal accounts and cash or bank account are not directly related to cost ascertainment. When cost accounting system is maintained it involves maintenance of certain bulks for recording day to day transactions. It is not necessary to maintain cost account under double entry system. In cost accounting, the cost books are basically maintained under the two systems. I] Non-integral or non- integrated cost accounting and II] Integral or integrated cost accounting. Where cost and financial accounts are maintained in a combined way, the system is called as integrated while if the records are maintained separately, the system is called as non-integrated system of maintaining accounts.

## NON-INTEGRATED ACCOUNTING SYSTEM

It is a system of accounting under which separate ledgers are maintained for cost and financial accounts by Accountants. Under such a system the cost accounts restricts itself to recording only those transactions which relate to the product or service being provided. Hence items of expenses which have a bearing with sales or, production or for that matter any other items which are under the factory management are the ones dealt with in such accounts.

A special feature of the non-integrated system of accounts is its ability to deal with notional expenses like rent or interest on capital tied up in the stock. The accounting of notional rent facilitates comparisons amongst factories (some owned and some rented). Similarly, recognition of interest on capital tied up in stock could help make the stores and works managers aware of the money being blocked because of holding stock.

Non Integrated Accounting Systems contain fewer accounts when compared with financial accounting because of the exclusion of purchases, expenses and also Balance Sheet items like fixed assets, debtors and creditors. Items of accounts which are excluded are represented by an account known as cost ledger control account.

## Principal Ledgers

### Subsidiary books maintained under non-integrated system of accounting

The following are some of the subsidiary books maintained under interlocking system of accounting

- (1) **Stores ledger:** It is used to record both the quantity and amount of receipts, issues and balance of materials and supplies. It consists all store accounts.
- (2) **Payroll and wage analysis book:** It is used to record the wages. The basis for recording the transactions are (a) clock cards,(b) time tickets, and (c)piece work tickets.
- (3) **Job ledger:** It is used to record the material cost, wages, and overheads incurred in respect of a job.

- (4) **Finished goods stock ledger:** It is used to record the receipt of finished goods from production department, the sale and stock of finished goods both in terms of quantity and value.
- (5) **Standing order ledger:** It is used to record overheads incurred.
- (6) **Debtors' Ledger:** It contains personal accounts of all trade debtors.
- (7) **Creditors' Ledger:** It contains personal accounts of all trade creditors.

### Control Accounts

The following important accounts are maintained under non-integrated accounting system:

- (1) **General ledger adjustment account:** It is also known as cost ledger control account or nominal ledger control account. In this accounts transactions with only one entry is recorded and contra appears in financial book. All transactions of income and expenditure which originate in the financial Accounts must be entered in the ledger for eventual transfer to Cost Accounts and total of this account will be equal to total of all the balance of the impersonal accounts.

On the credit side of this account are recorded

- (a) Opening Balance of materials, work in progress and finished stock,
  - (b) Expenses of material, wages and overheads on the credit side,
  - (c) On the debit side returns of materials to the supplier,
  - (d) Sales income and
  - (e) on the debit side balancing entries of P&L account and closing stock.
- (2) **Stores ledger control account:** It is debited with purchase of materials for the stores and credited with issues of material.
  - (3) **Wages control account:** In this account the wages accrued and paid and allocation of wages in this account are recorded.
  - (4) **Work in progress control account:** It includes of all direct materials, direct wages, direct expenses, special purchases and expenses.
  - (5) **Finished goods stock ledger control account:** This account represents finished goods stock ledger transactions in total form.
  - (6) **Selling, distribution, and administration overhead control account:** This account represents selling, distribution and administration overheads.

### Entries to Record Transactions under Non-Integrated System

#### (1) Materials purchased

Stores Ledger Control account	Dr
To General Ledger Adjustment a/c	

#### (2) Material purchased for a special job

Work in Progress Control a/c	Dr.
To General Ledger Adjustment a/c	

**(3) For issue of direct materials to production department**

Work in Progress Control a/c Dr  
To Stores Ledger Control account

**(4) For issue of indirect materials to production departments**

Overhead Control a/c Dr.  
To Stores Ledger Control a/c

**(5) For returning materials to supplier**

General Ledger Adjustment a/c Dr  
To Stores Ledger Control a/c

**(6) For materials returned from production department**

Stores Ledger Control a/c Dr  
To Work in Progress Control a/c

**(7) For materials transferred from job to job**

No entry is passed in control account.  
In work in progress ledger the following Entry is passed  
Transferee Job a/c Dr  
To Transferor Job a/c

**(8) For total salary and wages paid**

Wages Control a/c Dr.  
To General Ledger Adjustment a/c

**(9) For allocation of direct and indirect labour**

Work in Progress Control a/c Dr.  
Overhead Control a/c Dr.  
To Wages Control a/c

**(10) For recording direct expenses**

Work in Progress Control a/c Dr.  
To General Ledger Adjustment a/c

**(11) For recording overhead incurred and accrued**

Overhead Control a/c Dr.  
To General Ledger Adjustment a/c

**(12) For adjusting under or over absorption overheads**

The overhead control account is closed by transferring to overhead suspense account.

**(13) For recording finished stock produced**

Finished Goods Stock Ledger Control a/c	Dr.
To Work in Progress Control a/c	

**(14) When finished goods are sold at cost**

Cost of Sales a/c	Dr
To Finished Goods Stock Ledger Control a/c	

**(15) When finished goods are sold at total sales value**

General Ledger Adjustment a/c	Dr.
To Costing Profit and Loss a/c	

**(16) For recording sales returns**

Costing Profit and Loss a/c	Dr.
To General Ledger Adjustment a/c	

**(17) For recording total cost to make and sell**

Cost of Sales a/c	Dr.
To Costing Profit and Loss a/c	

**(18) For recording under absorption of overheads which is not yet adjusted**

Costing Profit and Loss a/c	Dr.
To Overhead Suspense a/c	

**(19) For recording over absorption of overheads which is not yet adjusted**

Overhead Suspense a/c	Dr.
To Costing Profit and Loss a/c	

**(20) For recording profit**

Costing Profit and Loss a/c	Dr.
To General Ledger Adjustment a/c	

## ADVANTAGES OF NON-INTEGRATED ACCOUNTING

The following are the main advantages of integral accounting:

1. This system tends to coordinate the functions of different selections of the accounts department since all efforts are integrated and directed towards achievement of one aim that is providing a high level of efficiency.
2. The accounting procedures can be simplified and the system can be centralised with the object of achieving a greater control over the organization.
3. The system creates conditions which are eminently suitable for the introduction of mechanized accounting.
4. There is no possibility of overlooking any expense under the system.

5. As cost accounts are posted straight from the books of original entry, there is no delay in obtaining the data.
6. There is automatic check on the correctness of the cost data. It ensures that all legitimate expenditure is included in Cost accounts and reliable and proved data is provided to the management for its decisions'.
7. Integrated accounting widens the outlook of the accountant.
8. It can be maintained according to convenience as it need not be statutorily maintained.

### **LIMITATIONS OF NON-INTEGRATED ACCOUNTING**

The following are some of the limitations of this accounting system:

1. The Financial transactions other than cost incurred are not recorded in the system.
2. Transactions involving payment other than that of cost are not included in the system E.g: loss on fixed assets.
3. There is always a diff between the profits reported as per the cost accounting system and the Financial Accounting System.

### **INTEGRATED (INTEGRAL) ACCOUNTING SYSTEM**

Integrated Accounting is a system in which the accounts are integrated and only a single set of accounts are maintained for Cost & Financial records. It avoids maintenance of Accounts under cost accounting & financial accounting. This enables a firm to eliminate separate Profit & Loss Accounts under financial accounting and cost accounting systems & only one Profit & Loss Accounts are prepared. It provides entire information for the ascertainment of cost of each unit as well as preparation of a balance sheet as per the legal requirement of the organisation. It also provides necessary information as required by the costing and finance department. There is no General Ledger Control A/c is prepared in this system.

### **BENEFITS OF INTEGRATED ACCOUNTING SYSTEM**

The benefits of Integrated Accounting System are as follows:

1. No need for reconciliation as it maintains single set of accounting records.
2. Easy method to maintain accounts and avoid unnecessary complications.
3. There is no possibility of different profit figures being reported in integrated accounting system.
4. There is economy of scale due to the savings in the maintenance of books and general accounting
5. There is saving of time, because two different sets of books need not be maintained

### **PRE-REQUISITES FOR AN INTEGRAL ACCOUNTING SYSTEM**

The following principles shall be taken into consideration while designing such a system:

1. The degree of integration must be determined. Some undertakings find it satisfactory merely to integrate upto the stage of prime cost or factory cost while other concerns integrate the whole of the records in which cost and financial accounts cannot be distinguished.
2. The degree of integration will determine the classification of expenditure. The expenditure classified

here according to function as office expenses, selling expenses etc., and not according to nature. However, control accounts are maintained for each element of cost. A suitable coding system should be available to serve the accounting purposes of financial and cost accounts.

3. Full details of items posted to the control accounts are supplied to the cost office at convenient intervals. This information is then dealt with by the cost office in accordance with the system of costing in force.
4. The amount of detail recorded in the ledger is usually kept to a minimum. Full information regard in each department or process being contained in tabulators prepared by the cost office. These tabulations are sometimes referred to as third entries to emphasize that they are not part of double entry system.
5. For preparation of interim accounts there must be an agreed routine for treatment after accruals, prepaid expenses and other necessary adjustments.
6. There should be perfect coordination between the staff responsible for the financial and cost aspects to ensure an efficient processing of accounting documents.

### ESSENTIAL FEATURES OF INTEGRAL ACCOUNTING

The following are the essential features of an integral an accounting system:

1. It records financial transitions not normally required for cost accounting be sided recording internal costing transaction prepayments and accruals are opened.
2. Stores transactions are recorded in the stores control account. This account is debited with the cost of stores purchased corresponding credit being given to cash or sundry creditors depending whether the purchase is made for cash or on credit.
3. Wages control account is debited with the wages paid, contra credit is taken in cash or bank account.
4. Overhead expenses are debited to the overhead control account, corresponding credit being given to cash or band account or the sundry creditors.
5. Transactions relating to material, labour cost overheads are posted in the stores wages and overhead control account after making suitable cost analysis and tat the end of the period transfer of the totals is made to the wok in progress accounts by crediting various control accounts. The day to day cost analysis made for this purpose is known as making third etc. These entries do not mean entries in the same sense a entry of transaction in the ledger but such entries are simply a sort of cash analysis.
6. All advance payments are credited and accruals debited to the respective control account by contra entries in the prepayments and accrual accounts.
7. Capital asset account is debited and respective control accounts are credited in the process of cost analysis of capital expenditure.

It is also important to note that integrated accounts are like a hybrid between non-integrated and the financial system of accounting as in case of the non-integrated system, No personal or real accounts are prepared and all entries are passed through the general ledger adjustment account. In the financial accounting system, there is no base of the cost accounting. In the integrated system of accounting, personal and real accounts are prepared but there exists a base of the cost accounting system

For Example, The same entry when passed through the three systems of accounting look like:

<i>Particulars</i>	<i>Financial</i>		<i>Integrated</i>		<i>Non-Integrated</i>	
Material Purchased	Purchase A/c...	Dr.	Stores Ledger Control A/c...	Dr.	Stores Ledger Control A/c...	Dr.
	To Sundry Cr/Bank A/c		To Sundry Cr/Bank A/c		To General Ledger Adjustment A/c	
Payment of Wages	Wages A/c	Dr.	Wages Control A/c...	Dr.	Wages Control A/c...	Dr.
	To Cash/Bank A/c		To Cash/Bank A/c		To General Ledger A/c	

While passing entries in any system of accounting, follow the steps:

1. Visualise the accounting entry in the financial system of accounting;
2. Then replace the cost head, by the head in the costing system of accounting;
3. In case of the non-integrated system, an additional step is replacing any personal or real A/c by the General Ledger Adjustment A/c.

### Illustration 1

Pass Journal Entries in the Cost Books [non-integrated systems] for the following transactions.

- (a) Materials worth ₹50,000 returned to stores from job
- (b) Gross total wages paid ₹96,000.
- (c) Employer's contribution to PF and State Insurance amount to ₹4000.
- (d) Wages analysis book detailed ₹40,000 direct labour,
- (e) ₹24,000 towards indirect factory labour
- (f) ₹20, 000 towards salaries to office staff and ₹16,000 for salaries to selling and distribution staff.

### Solution:

#### COST JOURNAL

<i>Particulars</i>		<i>Dr.</i> <i>(Amount in ₹)</i>	<i>Cr.</i> <i>(Amount in ₹)</i>
Stores Ledger Control A/c	Dr	50,000	
To Work-in-progress Control A/c			50,000
[Being material returned from stores]			
Wages Control A/c	Dr	1,00,000	
To General Ledger Adjustment A/c			96,000
To Provident Funds and Employees State Insurance A/c			4,000
[Being gross total wages paid]			
Work-in-progress Control A/c	Dr	40,000	
Factory Overheads Control A/c	Dr	24,000	
Office Overheads Control A/c	Dr	20,000	
Selling Overheads Control A/c	Dr	16,000	
To Wages Control A/c			1,00,000
[Being wages allocated]			



**Illustration 2**

The following figures have been ascertained from the costing records. You are required to pass the necessary entries in the cost journal. Assume that a system of maintaining control accounts prevails in the organisation.

	₹
(1) Purchases	3,90,000
(2) Carriage inwards	5,850
(3) Stores issued	3,58,800
(4) Productive wages	3,46,320
(5) Unproductive wages	1,21,680
(6) Works on cost	3,48,400
(7) Materials used in repairs	3,120
(8) Cost of completed jobs	12,80,630

**Solution:****COST JOURNAL**

Particulars	Dr. (Amount in ₹)	Cr. (Amount in ₹)
Stores ledger control a/c To General Ledger Adjustment a/c (Being the entry for purchase of materials)	Dr. 3,90,000	3,90,000
Stores Ledger Control a/c To General Ledger Adjustment a/c (Being carriage inward treated as part of the cost of materials purchased)	Dr. 5,850	5,850
Work-in-progress Ledger Control a/c To Stores Ledger Control a/c (Being stores issued to production)	Dr. 3,58,800	3,58,800
Wages Control a/c To General Ledger Adjustment a/c (Being Payment of Wages)	Dr. 3,46,320	3,46,320
Factory Overhead Control a/c To Cost Ledger Control a/c (Being indirect wages incurred)	Dr. 1,21,680	1,21,680
Factory Overhead Control a/c To Cost Ledger Control a/c (Being works overhead other than indirect wages)	Dr. 3,48,400	3,48,400
Factory Overhead Control a/c To Stores Ledger Control a/c (Being materials used in repairs)	Dr. 3,120	3,120
Finished Stock Ledger Control a/c To Work-in-progress Ledger Control a/c (Being completed production transferred to finished stock)	Dr. 12,80,630	12,80,630

**Illustration 3**

As at 31st March 2013, the following balances existed in a company's cost ledger

	<i>Dr.</i>	<i>Cr.</i>
Stores Ledger Control a/c	6,02,870	
Work-in-progress Ledger Control a/c	2,44,730	
Finished Stock Ledger Control a/c	5,03,890	
Manufacturing Overhead Control a/c		21,050
Cost Ledger Control a/c	_____	<u>13,30,440</u>
	<u>13,51,490</u>	<u>13,51,490</u>

During the next three months the following items arose

	₹
(1) Raw materials purchased	2,46,000
(2) Materials returned to suppliers	5,800
(3) Materials issued to production	2,54,630
(4) Factory wages	1,01,060
(5) Manufacturing overhead incurred	1,83,020
(6) Indirect labour	43,330
(7) Manufacturing overhead charged to production	1,54,400
(8) Cost of sales	3,71,780
(9) Sales returns at cost	10,760
(10) Finished product at cost	4,21,670

Pass the necessary entries, open ledger accounts and prepare trial balance.

**Solution:****JOURNAL ENTRIES**

<i>Particulars</i>		<i>Dr. (Amount in ₹)</i>	<i>Cr. (Amount in ₹)</i>
Stores Ledger Control a/c	Dr.	2,46,000	
To General Ledger Adjustment a/c			2,46,000
(Being materials purchased)			
General ledger Adjustment a/c	Dr.	5,800	
To Stores Ledger Control a/c			5,800
(Entry for materials returned to suppliers)			
Work-in-progress Ledger Control a/c	Dr.	2,54,630	
To Stores Ledger Control a/c			2,54,630
(Entry for issue of materials to production)			
Wages Control a/c	Dr.	1,01,060	
To General Ledger Adjustment a/c			1,01,060
(Entry for direct wages incurred)			

Work-in-progress Ledger Control a/c To Wages Control a/c (Entry for direct wages charged to production)	Dr.	1,01,060	1,01,060
Works Overhead Control a/c To General Ledger Adjustment a/c (Entry for works overhead incurred)	Dr.	1,83,020	1,83,020
Works overhead control a/c To General Ledger Adjustment a/c (Entry for indirect wages incurred)	Dr.	43,330	43,330
Work-in-progress Ledger Control a/c To Works Overhead Control a/c (Entry for overhead charged to production)	Dr.	1,54,400	1,54,400
General Ledger Adjustment a/c To Finished Stock Ledger Control a/c (Entry for cost of sales)	Dr.	3,71,780	3,71,780
Finished Stock Ledger Control a/c To General Ledger Adjustment a/c (Entry for sales return)	Dr.	10,760	10,760
Finished Stock Ledger Control a/c To Work-in-progress Ledger Control a/c (Entry for finished goods transferred)	Dr.	4,21,670	4,21,670

**GENERAL LEDGER ADJUSTMENT ACCOUNT**

To Stores Ledger Control a/c	5,800	By balance b/d	13,30,440
To Finished Stock Ledger Control a/c	3,71,780	By Stores Ledger Control a/c	2,46,000
To balance c/d	15,37,030	By Wages Control a/c	1,01,060
		By Works Overhead Control a/c	1,83,020
		By Works Overhead Control a/c	43,330
		By Finished Stock Ledger Control a/c	10,760
	<u>19,14,610</u>		<u>19,14,610</u>

**STORES LEDGER CONTROL ACCOUNT**

To balance b/d	6,02,870	By General Ledger Control	5,800
To General Ledger Adjustment a/c	2,46,000	By Work-in-progress Ledger Control a/c	2,54,630
		By balance c/d	5,88,440
	<u>8,48,870</u>		<u>8,48,870</u>

**WORKS (MANUFACTURING) OVERHEAD CONTROL ACCOUNT**

To General Ledger Control a/c	1,83,020	By balance b/d	21,050
To General Ledger Control a/c	43,330	By Work-in-progress Ledger Control a/c	1,54,400
		By balance c/d	50,900
	<u>2,26,350</u>		<u>2,26,350</u>

**WORK-IN-PROGRESS LEDGER CONTROL ACCOUNT**

To balance b/d	2,44,730	By Finished Stock Ledger Control a/c	4,21,670
To Stores Ledger Control a/c	2,54,630	By balance c/d	3,33,150
To Wages Control a/c	1,01,060		
To Works Overhead Control a/c	<u>1,54,400</u>		
	<b><u>7,54,820</u></b>		<b><u>7,54,820</u></b>

**FINISHED STOCK LEDGER CONTROL ACCOUNT**

To balance b/d	5,03,890	By Cost Ledger Control a/c	3,71,780
To Work-in-progress Ledger Control a/c	4,21,670	By balance c/d	5,64,540
To General Ledger Adjustment a/c	<u>10,760</u>		
	<b><u>9,36,320</u></b>		<b><u>9,36,320</u></b>

**TRIAL BALANCE**

	<i>Dr.</i>	<i>Cr.</i>
Stores Ledger Control a/c	5,88,440	
Work-in-progress Ledger Control a/c	3,33,150	
Finished Stock Ledger Control a/c	5,64,540	
Manufacturing Overhead Control a/c	50,900	
Cost Ledger Control a/c	<u>          </u>	<u>15,37,030</u>
	<b><u>15,37,030</u></b>	<b><u>15,37,030</u></b>

**RECONCILIATION OF COST AND FINANCIAL ACCOUNTS****NEED FOR RECONCILIATION**

The two systems of accounting viz. financial and cost accounts co-exist in the same organisation and they deal with same basic transactions say, purchases, consumption of materials, wages and other expenses. But the difference of purpose calls for a difference in approach in collection, analysis and presentation of data to meet the objective of individual system. Financial accounts are concerned with the ascertainment of profit or loss for the whole operation of the organisation for a relatively long period usually a year, without being too much concerned with cost computation, whereas cost accounts are provided for ascertaining the profit or loss made by manufacturing or product divisions/products for cost comparison and preparation and use of variety of cost statements. The difference in purpose and approach more often than not results in a different profit from what is disclosed by the financial accounts and this establishes the need for a reconciliation of profit between cost accounts and financial accounts.

Thus, reconciliation between the results of the two sets of books is necessary due to the following reasons:

- (i) It finds out the reasons for the difference in the profit or loss in cost and financial accounts.
- (ii) It ensures the mathematical accuracy and reliability of cost accounts in order to have cost ascertainment, cost control and to have a check on the financial accounts.
- (iii) It contributes to the standardisation of policies regarding stock valuation, depreciation and overheads.
- (iv) It facilitates more coordination and promotes better co-operation, between the activities of financial and cost sections of the accounting department.
- (v) Reconciliation places management in better position to acquaint itself with the reasons for the variation in profits paying the way for more effective internal control.

## CAUSES OF DIFFERENCES

The vital differences between the two branches of accounting are manifested in the variation of the profit figure of one from the other through the cumulative impact of the following factors:

### I. ITEMS SHOWN ONLY IN FINANCIAL ACCOUNTS

There are certain items which are included in financial accounts but find no place in cost accounts. These may be items of expenditure or appropriation of profit or items of income. The items may be classified as under:

#### (a) Purely Financial Charges:

- (i) Loss on sale of fixed assets.
- (ii) Loss in investments.
- (iii) Discount on issue of shares.
- (iv) Interest on bank loan, mortgages, debentures etc.
- (v) Expenses of the company's share transfer office.
- (vi) Damages payable.
- (vii) Penalties and fines.
- (viii) Losses due to scrapping of machinery.
- (ix) Remuneration paid to the proprietor in excess of a fair reward for services rendered.

#### (b) Purely Financial Income:

- (i) Rent receivable, (when rent is receivable from subletting part of business premises - then it can also be included in cost accounts).
- (ii) Interest received on bank deposits.
- (iii) Profit made on sale of investments, fixed assets etc.
- (iv) Transfer fees received.
- (v) Interest, dividends etc. received on investments.
- (vi) Brokerage received.
- (vii) Discount, commission etc. received.

#### (c) Appropriation of Profits:

- (i) Donations and charities paid.
- (ii) Taxes on income and profits.
- (iii) Dividend paid.
- (iv) Transfer to reserves and sinking fund.
- (v) Additional provision for depreciation of building, plant etc. and for bad debts.
- (vi) Amounts written off - goodwill, preliminary expenses, underwriting commission, discount on debentures issued, organisation expenses etc.
- (vii) Capital expenditure, specifically charged to revenue.

## II. ITEMS INCLUDED IN COST ACCOUNTS ONLY

There are certain items which are excluded from financial accounts but are included in cost accounts:

- (i) Interest on capital employed in production but upon which no interest is actually paid. It is included in cost books in order to show the nominal (notional) cost of employing the capital rather than investing it outside the business.
- (ii) Charge in lieu of rent where premises are owned.
- (iii) Depreciation on asset even when the book value of the asset is reduced to negligible figure.
- (iv) Salary of the proprietor where he works but does not charge salary.

## III. OVER OR UNDER ABSORPTION OF OVERHEADS

In cost accounts, recovery of overheads is based on an estimate or pre-determined ratio e.g. percentage on prime cost, percentage on sales etc. which may be more or less than the actual amount incurred. In financial accounting the actual expenses of overheads are recorded. If overheads are not fully absorbed i.e. the amount in cost accounts is less than the actual amount, the short fall is called under absorption. On the other hand, if overhead expenses in cost accounts are more than the actual, it is called over-absorption. Thus under or over absorption of overheads leads to difference in two accounts. The under recovery or over recovery of overheads may be carried forward to the next period or may be charged by a supplementary rate (positive or negative) or transferred to costing profit and loss account. In case, the under recovery or over recovery of overheads has been carried forward to the next period, the profit as shown by the cost accounts will be different from the profits as shown by the financial books and adjustments will have to be made on this account. Some cases, selling and distribution expenses are ignored in cost accounts and as such costing profit will be higher and thus requiring reconciliation.

## IV. ADOPTION OF DIFFERENT BASIS OF VALUATION OF STOCK

- (a) **Raw Material:** In financial accounts, stock of raw material is valued at cost or market price whichever is less, while in cost accounts stock can be valued on the basis of FIFO or LIFO or any other method. Thus the value of stock may be different in both the books.
- (b) **Work-in-progress:** Difference may also exist regarding the mode of valuation of work-in-progress. It may be valued at prime cost or factory cost or cost of production. The most appropriate mode of valuing is at factory cost in cost accounts. In financial accounts, work-in-progress may be valued after considering a part of administrative expenses also.
- (c) **Finished Goods:** In financial accounts stock of finished goods is valued at cost or market price whichever is lower. In cost accounts, finished goods are generally valued at total cost of production.

Thus the method of valuation of stock gives rise to different results in the sets of books.

## V. DIFFERENT METHODS OF CHARGING DEPRECIATION

The methods of charging depreciation may be different in cost books as well as in financial books. The method of providing depreciation under financial accounting is totally governed by Companies Act or tax provisions so that diminishing balance method or fixed instalment method is generally followed. However in cost accounts machine hour rate or production hour or unit method may have been followed.

## VI. ABNORMAL GAINS AND LOSSES

Abnormal gains or losses may completely be excluded from cost accounts or may be taken to costing profit and loss account. If it is excluded, costing profit/loss will differ from financial profit/loss and adjustment will be required. In case, if these are transferred to costing profit and loss account, the profit or loss shown by cost accounts will agree with the profit or loss of financial accounts. In such a case no adjustment will be required. Examples of such abnormal gains and losses are, abnormal wastage of materials, e.g. by theft, fire etc., cost of abnormal idle time, cost of abnormal idle facilities, exceptional bad debts, abnormal gain in manufacturing through processes etc.

## PREPARATION OF RECONCILIATION STATEMENT OR MEMORANDUM RECONCILIATION ACCOUNT

A Reconciliation Statement or a Memorandum Reconciliation Account should be drawn up for reconciling profits shown by two set of books. Results shown by any set of books may be taken as the base and necessary adjustments should be made to arrive at the results shown by the other set of books. The technique of preparing a reconciliation statement as well as a memorandum reconciliation account is as under:

### RECONCILIATION STATEMENT

When there is a difference between the profits disclosed by cost accounts and financial accounts, the following steps shall be taken to prepare a Reconciliation Statement:

- I. **Ascertain the various reasons of disagreement (as discussed above) between the profits disclosed by two sets of books of accounts.**
- II. **If profit as per cost accounts (or loss as per financial accounts) is taken as the base.**

#### ADD:

- (i) Items of income included in financial accounts but not in cost accounts.
- (ii) Items of expenditure (as interest on capital, rent on owned premises etc.) included in cost accounts but not in financial accounts.
- (iii) Amounts by which items of expenditure have been shown in excess in cost accounts as compared to the corresponding entries in financial accounts.
- (iv) Amounts by which items of income have been shown in excess in financial accounts as compared to the corresponding entries in cost accounts.
- (v) Over absorption of overheads in cost accounts.
- (vi) The amount by which closing stock of inventory is undervalued in cost accounts.
- (vii) The amount by which the opening stock of inventory is overvalued in cost accounts.

#### DEDUCT:

- (i) Items of income included in cost accounts but not in financial accounts.
- (ii) Items of expenditure included in financial accounts but not in cost accounts.
- (iii) Amounts by which items of income have been shown in excess in cost accounts over the corresponding entries in financial accounts.
- (iv) Amounts by which items of expenditure have been shown in excess in financial accounts over the corresponding entries in cost accounts.

- (v) Under absorption of overhead in cost accounts.
- (vi) The amount by which closing stock of inventory is overvalued in cost accounts.
- (vii) The amount by which the opening stock of inventory is undervalued in cost accounts.

**III. After making all the above additions and deductions, the resulting figure will be profit as per financial accounts.**

*Note:* If profit as per financial accounts (or loss as per cost accounts) is taken as the base, then items added above shall be deducted and items to be deducted shall be added i.e. the procedure discussed above shall be reversed.

### MEMORANDUM RECONCILIATION ACCOUNT

Reconciliation can also be done by preparing a Memorandum Reconciliation Account. This account is a memorandum account only and does not form part of the double entry. A specimen form of Memorandum Reconciliation Account is given below:

#### Memorandum Reconciliation Account

Particulars	₹	Particulars	₹
To Financial Expenses:		By Profit as per Cost Accounts	
Discount		By Financial income	
Fine and penalties		Rent	
Bank Interest		Interest	
Underwriter's Commission		Dividend	
Donations		Profit on sales of assets	
Goodwill written off		By Items charged in cost accounts:	
To Under-charge of depreciation		Interest on own capital	
cost accounts		Rent on own building	
To Under-absorption of overheads		By Over-charge of depreciation	
To Under-valuation of opening stock		in cost accounts	
in cost accounts		By Over-absorption of overheads	
To Over-valuation of closing stock in		By Over-valuation of opening stock	
cost accounts		in cost accounts	
To Profit as per Financial Accounts		By Under-valuation of closing stock	
		in cost accounts	

#### Illustration 4

The following is a summary of the trading and profit and loss account of a manufacturing company for the year ended 31st March, 2013:

			(₹ '000)
Dr.		Cr.	
	₹		₹
To Material consumed	2,740	By Sales (1,20,000 units)	6,000
To Wages	1,510	By Finished stock (4,000 units)	160



To Factory expenses	830	By Work-in-progress:		
To Administration expenses	382	Materials	64	
To Selling and distribution expenses	450	Wages	36	
To Preliminary expenses (written off)	40	Factory expenses	<u>20</u>	120
To Goodwill (written off)	20	By Dividend received		18
To Net profit	<u>326</u>			
	<u>6,298</u>			<u>6,298</u>

In the cost accounts, the following allocations have been made:

- (i) Factory expenses at 20% on prime cost.
- (ii) Administration expenses at ₹ 3 per unit of production.
- (iii) Selling and distribution expenses at ₹ 4 per unit of sales.

You are required to prepare a costing profit and loss account of the company and to reconcile the profit disclosed with that shown in the financial account.

### **Solution:**

#### **Costing Profit and Loss Account on 31.3.2013**

		(₹ '000)
Material consumed		2,740
Wages		<u>1,510</u>
Prime cost		4,250
Factory expenses (20% of prime cost)		<u>850</u>
Total works cost		5,100
Less: Closing work-in-progress		
Materials	64	
Wages	36	
Factory expenses	<u>20</u>	<u>120</u>
Works Cost (Completed units)		4,980
Add: Administration expenses		
@ ₹ 3 (for sales and closing stock)		
i.e. ₹ 3 (1,20,000 + 4,000)		<u>372</u>
Cost of production		5,352
Less: Closing finished stock		
(at proportionate cost of production)		
		<u>173</u>
Cost of goods sold		5,179
Add: Selling and distribution expenses		
(1,20,000 @ ₹ 4 per unit)		<u>480</u>
Cost of Sales		5,659
Net Profit		<u>341</u>
Sales (1,20,000 units @ ₹ 50)		<u>6,000</u>

**Note:** Figures are rounded off to the nearest thousands.

## Reconciliation Statement

(₹ '000)

Profit as per Cost Accounts		341
<i>Add:</i> Over absorption of factory expenses (₹ 850 - ₹ 830)	20	
Over absorption of selling expenses (₹ 480 - ₹ 450)	30	
Dividend received	<u>18</u>	<u>68</u>
		409
<i>Less:</i> Under absorption of administration overheads (₹ 382 - ₹ 372)	10	
Preliminary expenses written off	40	
Goodwill written off	20	
Difference in valuation of finished stock	<u>13</u>	<u>83</u>
<b>Profit as per Financial Accounts</b>		<b><u>326</u></b>

**Illustration 5**

The audited final accounts showed a profit of ₹ 30,500 whereas costing records showed a profit of ₹ 36,700. From the following additional information, reconcile the two accounts.

**Profit and Loss Account  
for the year ended 31st March, 2013**

<i>Dr.</i>	₹	₹	<i>Cr.</i>
To Opening Stock	5,05,000	By Sales	7,10,000
To Purchases	1,75,000	By Closing Stock	1,80,000
To Direct Wages	80,000		
To Factory Overheads	45,000		
To Gross Profit c/d	<u>85,000</u>		
	<b><u>8,90,000</u></b>		<b><u>8,90,000</u></b>
To Administration expenses	20,300	By Gross Profit b/d	85,000
To Selling expenses	24,500	By Interest Received	1,000
To Distribution expenses	11,200	By Dividend Received	500
To Net Profit	<u>30,500</u>		
	<b><u>86,500</u></b>		<b><u>86,500</u></b>

The Cost accounts showed the following:

1. Stock balance of ₹ 1,85,000
2. Direct wages absorbed ₹ 82,500
3. Factory overheads absorbed ₹ 42,000
4. Administration expenses charged @ 3% of sale value
5. Selling expenses charged @ 3% of sales value.

**Solution:****Reconciliation of Profit between Cost and Financial Accounts**

<i>Particulars</i>	₹	₹	₹
Profit as per Financial Accounts			30,500
<i>Add:</i> Difference in valuation of Closing stock	1,85,000		
	<u>1,80,000</u>	5,000	
Factory overheads under absorbed in Cost Accounts	45,000		
	<u>42,000</u>	3,000	
Selling expenses under charged in Cost Accounts (3% on ₹ 7,10,000)	24,500		
	<u>21,300</u>	<u>3,200</u>	<u>11,200</u>
			<u>41,700</u>
<i>Less:</i> Direct wages over absorbed in Cost Accounts	82,500		
	<u>80,000</u>	2,500	
Administration overheads over-absorbed in Cost Accounts (3% of ₹ 7,10,000)	21,300		
	<u>20,300</u>	1,000	
Interest and dividends received - not Included in Cost Accounts		<u>1,500</u>	<u>5,000</u>
<b>Profit as per Cost Accounts</b>			<b><u>36,700</u></b>

**Illustration 6**

M/s Birla Trader have furnished the following information from financial books for the year ended 31st March, 2013:

**Trading and Profit and Loss Account for the year ended 31st March, 2013**

		₹			₹
To Opening stock			By Sales (10,250 units)		7,17,500
(500 units at ₹ 35 each)	17,500		By Closing stock (250 units at ₹ 50 each)		12,500
To Materials consumed	2,60,000				
To Wages	1,50,000				
To Gross Profit	<u>3,02,500</u>				
	<b><u>7,30,000</u></b>				<b><u>7,30,000</u></b>
To Factory overheads	94,700	By Gross profit		3,02,500	
To Office overheads	1,06,000	By Interest		250	
To Selling expenses	55,000	By Rent		10,000	
To Bad debts	4,000				
To Goodwill written off	5,000				
To Net profit	48,050				
	<b><u>3,12,750</u></b>				<b><u>3,12,750</u></b>

The cost sheet shows the following:

- (a) Cost of materials at ₹ 26 per unit and labour cost ₹ 15 per unit produced.
- (b) Factory overheads are absorbed at 60% of labour cost.
- (c) Office overheads are absorbed at 20% of factory cost.
- (d) Selling expenses are charged at ₹6 per unit.
- (e) Opening stock of finished goods is valued at ₹ 45 per unit and closing stock as in financial books.

You are required to prepare:

- (i) a statement showing cost and profit as per cost accounts for the year ended 31st March, 2013, and
- (ii) statement showing the reconciliation of profit disclosed in cost accounts with the profits shown in financial accounts.

### **Solution:**

#### **(i) Cost Statement for the year ending 31st March, 2013**

	₹
Cost of material (10,000 units @ ₹ 26 per unit)	2,60,000
Labour cost (10,000 units @ ₹ 15 per unit)	<u>1,50,000</u>
Prime cost	4,10,000
Factory overhead (60% of labour cost)	<u>90,000</u>
Factory cost	5,00,000
Office overheads (20% of factory cost)	<u>1,00,000</u>
Cost of production	6,00,000
Add: Opening stock: 500 units at ₹ 45 each	<u>22,500</u>
	6,22,500
Less: Closing stock: 250 units at ₹ 50 each	<u>12,500</u>
Cost of goods sold	6,10,000
Selling overhead (₹ 6 unit on 10,250 units)	<u>61,500</u>
Cost of sales	6,71,500
Sales	<u>7,17,500</u>
<b>Profit</b>	<b><u>46,000</u></b>

#### **(ii) Reconciliation Statement**

	₹	₹
Profit as per Cost Accounts		46,000
Add: (i) Income items, i.e. interest and rent not included in cost accounts	10,250	
(ii) Over-valuation of opening stock in cost accounts	5,000	
(iii) Over-recovery of selling overheads in cost accounts	<u>6,500</u>	<u>21,750</u>
		67,750
Less: (i) Loss items i.e. bad debts and goodwill written off not included in cost accounts	9,000	
(ii) Under-recovery of factory overheads in cost accounts	4,700	
(iii) Under-recovery of office overheads in cost accounts	<u>6,000</u>	<u>19,700</u>
<b>Profit as per Financial Accounts</b>		<b><u>48,050</u></b>

**Illustration 7**

During the year ended 31st March, 2013, the profit of a company stood at ₹ 36,450 as per financial records. The cost book, however, showed a profit of ₹51,950 for the same period. You are required to reconcile the profit as shown by two sets of accounts:

	₹
(i) Opening stock overstated in cost accounts	3,500
(ii) Closing stock understated in cost accounts	4,600
(iii) Factory overheads under recovered in cost accounts	2,500
(iv) Administration expenses over recovered in cost accounts	750
(v) Selling and distribution expenses under-recovered in cost accounts	1,650
(vi) Depreciation over-recovered in cost accounts	1,500
(vii) Interest on investment not included cost accounts	5,000
(viii) Obsolescence loss in respect of machineries charged in financial accounts	2,450
(ix) Income-tax provided in financial accounts	25,000
(x) Bank interest credited in financial accounts	1,500
(xi) Stores adjustments (debit in financial book)	750

**Solution:****Reconciliation Statement**

<i>Particulars</i>	<i>Amount</i> ₹	<i>Amount</i> ₹
Net profit as per financial accounts		36,450
<i>Add: Items not debited in cost accounts:</i>		
(i) Obsolescence loss	2,450	
(ii) Income tax provisions	25,000	
(iii) Stores adjustments	<u>750</u>	
	28,200	
Under recover of factory overheads in cost accounts	2,500	
Under recovery of selling and distribution expenses in cost accounts	<u>1,650</u>	<u>32,350</u>
		68,800
<i>Less: Items not credited in cost accounts:</i>		
(i) Interest on investments	5,000	
(ii) bank interest in financial accounts	<u>1,500</u>	
	6,500	
Over recovery of administration expenses	750	
Over recovery of depreciation	<u>1,500</u>	
	8,750	
Difference in value of stock:		
(i) Opening stock overstated in cost accounts	3,500	
(ii) Closing stock understated in cost accounts	<u>4,600</u>	<u>16,850</u>
<b>Net profit as per cost accounts</b>		<b><u>51,950</u></b>

The same solution is presented in memorandum form:

**Memorandum Reconciliation Account**

<i>Dr.</i>			<i>Cr.</i>
<i>Particulars</i>	<i>Amount</i>	<i>Particulars</i>	<i>Amount</i>
	₹		₹
To Interest on investments	5,000	By Net profit as per financial accounts	36,450
To Bank interest	1,500	By Obsolescence loss	2,450
To Over-recovery of Admn. expenses	750	By Income Tax Provision	25,000
To Over-recovery of depreciation	1,500	By Stores Adjustments	750
To Over statement of opening stock	3,500	By Under recovery of factory overheads	2,500
To Under statement of closing stock	4,600	By Under recovery of selling and	
To Net profit as per cost accounts	<u>51,950</u>	distribution expenses	<u>1,650</u>
	<u>68,800</u>		<u>68,800</u>

**Illustration 8**

A manufacturing, trading, profit and loss, and profit and loss appropriation accounts of Tata Limited for the year ending 31st March, 2011 are as follows:

	₹	₹		₹	₹
To Raw Materials:			By Cost of goods manufactured		80,750
Opening Stock	7,100				
Add: Purchases	<u>33,850</u>				
	40,950				
Less: Closing Stock	<u>7,450</u>	33,500			
To Wages		29,000			
To Factory Overhead:					
Indirect wages	3,500				
Rent and Rates	1,500				
Power and fuel	3,000				
Depreciation	5,500				
Other expenses	<u>5,200</u>	<u>18,700</u>			
Works Cost		81,200			
Less: Work in Progress					
Closing Stock	5,350				
Less: Opening Stock	<u>4,900</u>	<u>450</u>			
		<u>80,750</u>			<u>80,750</u>
To Finished Goods:			By Sales		1,20,000
Opening stock	5,200				
Manufactured	<u>80,750</u>				
	85,950				
Less: Closing Stock	<u>5,750</u>	80,200			
To Gross Profit c/d		<u>39,800</u>			
		<u>1,20,000</u>			<u>1,20,000</u>

To Administration Overhead:		By Gross Profit b/d	39,800
Office Salaries	7,750	By Dividend Received	500
Office Expenses	<u>2,000</u>		
	9,750		
To Selling and Distribution Overhead:			
Salesmen's salaries	3,000		
Selling expenses	500		
Distribution expenses	<u>1,500</u>		
	5,000		
To Loss on sale of machinery	400		
To Fines	150		
To Net Profit for the year	<u>25,000</u>		
	<b><u>40,300</u></b>		<b><u>40,300</u></b>
To Income Tax	5,000	By Balance b/d	15,100
To General reserve	2,500	By Net Profit for the year	25,000
To Dividend	6,000		
To Goodwill written off	1,500		
To Balance c/d	<u>25,100</u>		
	<b><u>40,100</u></b>		<b><u>40,100</u></b>

The cost accounts revealed a profit of ₹ 34,787. In preparing this figure stocks have been valued in cost accounts as follows:

	<i>Opening Stock</i>	<i>Closing Stock</i>
Raw materials	7,050	7,475
Work in progress	4,938	5,300

Administration Overhead has been ignored in cost accounts. Prepare a reconciliation statement.

**Solution:**

**Reconciliation Statement**

<i>Particulars</i>	<i>₹</i>	<i>₹</i>
Profits per cost accounts		34,787
<i>Add:</i> Dividend received not credited in cost accounts	500	
Difference in stock:		
Work in progress - opening	38	
Work in progress - closing	<u>50</u>	<u>588</u>
		35,375
<i>Less:</i> Administration overhead not-charged in cost accounts	9,750	
Loss on sale on machinery	400	
Fines	150	
Difference in stocks:		
(a) Raw materials - opening	50	
(b) Raw materials - closing	<u>25</u>	<u>10,375</u>
<b>Profit as per financial accounts</b>		<b><u>25,000</u></b>

## LESSON ROUND UP

- There are basically three cost accounting systems 1. Financial Accounting System 2. Non-Integrated Accounting System 3. Integrated Accounting System
- Non-integral accounting system where separate accounts books are maintained to record financial and cost transactions.
- Non-integral accounting system is also known as 'Cost Control Accounts'.
- Two set of accounts books are kept in non-integral system one for recording cost transaction another for financial transaction.
- Double entry system is adopted for recording the transactions in both accounts books.
- Integral system is a system of accounting under which only one set of books of account is maintained to record the both transactions (cost & financial). It is also known as integrated accounts system. There is no need for cost ledger and cost ledger control account.
- Integrated accounts are like a hybrid between non-integrated and the financial system of accounting.
- In case of the non-integrated system, no personal or real accounts are prepared and all entries are passed through the General Ledger Adjustment account.
- In the financial accounting system, there is no base of the cost accounting.
- In the integrated system of accounting, personal and real accounts are prepared but there exists a base of the cost accounting system.
- In non-integral accounting system shows the two different profits due to two separate books of account.
- Reconciliation statement reconciles the profit as per Cost Accounts with the profit as per Financial Accounts by showing all causes of differences between the two.
- Reconciliation places management in better position to acquaint itself with the reasons for the variation in profits paying the way for more effective internal control.

## SELF TEST QUESTIONS

1. What are the main ledgers have been maintained under non-integral accounting system?
2. Give Journal entries for following transactions under non-integrating accounting system:
  - (a) Material Purchased for stock
  - (b) Issue of Direct Material to Production Department
  - (c) Material returned to suppliers.
  - (d) Total Salary & Wages paid.
  - (e) Recording sales return
  - (f) Recording overheads incurred & accrued.
3. Write short notes on 'Integrated Accounts'.
4. State the essential pre-requisites of integrated accounting system.
5. List three main advantages of integrated accounts.



6. As on 31st March, 2013, the following balances existed in a firm's Cost Ledger:

	<i>Dr.</i>	<i>Cr.</i>
	₹	₹
Stores Ledger Control A/c	13,01,435	
Work-in-Progress Control A/c	1,22,365	
Finished Stock Ledger Control A/c	2,51,945	
Manufacturing Overhead Control A/c		10,525
Cost Ledger Control A/c		<u>16,65,220</u>
	<u>16,75,745</u>	<u>16,75,745</u>

During the next three months the following items arose:

	₹
Finished product (at cost)	2,10,835
Manufacturing overhead incurred	91,510
Raw materials purchased	1,23,000
Factory Wages	50,530
Indirect Labour	21,665
Cost of Sales	1,85,890
Material issued to production	1,27,315
Sales returned at Cost	15,380
Material returned to suppliers	12,900
Manufacturing overhead charged to production	77,200

You are required to pass the Journal Entries; write up the accounts and schedule the balances, stating what each balance represents.

7. Cement Ltd. is maintaining separate set of books for financial accounts and cost accounts. You are required to prepare accounts in cost books and trial balance for the year ended 31<sup>st</sup> March 2013.

– Information Available From Financial Accounts:

- Sales: ₹3, 30, 000
- Indirect wages: Production ₹30, 000, Administration ₹12, 000, Sales and distribution ₹ 15, 000
- Materials purchased: ₹1,25, 000
- Direct factory wages: ₹1, 90, 000
- Production overheads: ₹79, 000
- Selling and distribution overheads: ₹56,000
- Administration overheads: ₹48, 000

The data available from cost accounts for the period include the following:

- Raw materials issued to production as indirect material ₹18, 000
- Stores issued to production as direct materials ₹1, 25, 000
- Raw materials of finished production ₹4, 25, 000
- Cost of goods sold at finished goods stock valuation ₹4, 00, 000
- Standard rate of production overhead absorption ₹0.50 per operating hour

- Rate of administration overhead absorption 20% of cost of production
- Rate of sales and distribution overhead absorption 10% of sales
- Actual operating hours worked 2, 40, 000
- There is no balance of stock on 1-4-2012

8. The following figures have been extracted from the cost records of a manufacturing unit:

	₹	₹
Stores: Opening Balance		32,000
Purchase of Material		1,58,000
Transfer from work-in-progress		80,000
Issues to work-in-progress		1,60,000
Issues to repair and maintenance		20,000
Deficiencies found in stock taking		6,000
Work-in-progress: opening balance		60,000
Direct wages applied	65,000	
Overhead applied	2,40,000	
Closing balance of WIP	45,000	

Finished product; Entire output is sold at a profit of 10% on actual cost from work-in-progress.

Wages incurred ₹ 70,000, overhead incurred ₹ 2,50,000.

Items not included in cost records: Income from investment ₹ 10,000.

Loss on sale of capital assets	₹20,000.
Direct wages applied	65,000
Overhead applied	2,40,000
Closing balance of WIP	45,000

Finished product; Entire output is sold at a profit of 10% on actual cost from work-in-progress.

Wages incurred ₹ 70,000, overhead incurred ₹2,50,000.

Draw up stores control account, work-in-progress control account, costing profit and loss account and reconciliation statement.

9. A company operates separate cost accounting and financial accounting systems. The following is the list of opening balances as on 1-4-2012 in the cost ledger

	Debit	Credit
	₹	₹
Stores Ledger Control a/c	53,375	—
WIP Control account	104,595	—
Finished Goods Control a/c	30,780	—
General Ledger Adjustment a/c	1,88,750	

Transactions for the period ended 31-3-2013 are as under:

		₹
Materials purchased		26,700

Materials issued to production	40,000
Materials issued for factory repairs	900
Factory wages paid (including indirect wages ₹ 23,000)	77,500
Production overhead incurred	95,200
Production overheads under-absorbed and written off	3,200
Sales	2,56,000

The company's gross profit is 25% on factory cost. At the end of the quarter, work-in-progress stocks increased by ₹ 7,500.

Prepare the relevant control accounts, costing profit & loss a/c, and General ledger adjustment account to record the above transactions for the period ended 31-3-2013.

10. Give reasons as to why it is necessary to reconcile cost accounts and financial accounts. What is the procedure to be adopted for their reconciliation?
11. State briefly the treatment of under or over absorption of overheads while reconciling costing profits with financial profits?
12. Summarised information extracted from the books of a company relating to year ended 31st March, 2013:
  - Factory overheads (actual) ₹ 60,000 of which 60% are fixed.
  - Selling and distribution overheads (actual) ₹12,000 of which 50% are fixed.
  - Administration overheads (actual) ₹ 18,000 are constant for all practical purposes.
  - Material and wages costs are ₹ 2,00,000 and ₹ 1,00,000 respectively.
  - Sales (20,000 units) are ₹ 4 lakh.
  - Normal output during the year was expected to be 16,000 units.
  - There is no opening and closing stock of finished product.

On the basis of information given above, you are required to —

  - (i) Ascertain the actual amount of profit.
  - (ii) Prepare a cost sheet and find out estimated profit assuming that the overheads are absorbed in cost on the basis of normal production.
  - (iii) Reconcile the above profits by preparing a statement of reconciliation.
13. From the following data, find out the profit as per financial records:

	₹
Profit as per cost records	70,500
Closing stock under-valued in cost records	10,300
Administration overheads under-recovered in cost records	5,600
Bad debts and preliminary expenses written-off in financial accounts only	7,845
Depreciation overcharged in cost records	3,645

14. Rayon Ltd. made a profit of ₹ 20,000 during the year ended 31st March, 2011 as per their costing system, whereas their financial accounts disclose a profit of ₹ 15,000. From the following Profit and Loss Account for the year ended 31st March, 2011 as per the financial books, you are required to prepare a Reconciliation Statement showing the causes for this difference:

<b>Profit and Loss Account</b>			
<i>Dr.</i>			<i>Cr.</i>
	₹		₹
To Opening Stock	1,00,000	By Sales	1,75,000
To Purchases	80,000	By Closing Stock	80,000
To Direct wages	20,000		
To Factory expenses	15,000		
To Gross Profit c/d	<u>40,000</u>		
	<u>2,55,000</u>		<u>2,55,000</u>
To Administrative expenses	10,000	By Gross Profit b/d	40,000
To Selling expenses	15,000		
To Net Profit	<u>15,000</u>		
	<u>40,000</u>		<u>40,000</u>

Costing records show the following:

(a) Stock Ledger closing balance	₹89,000
(b) Direct Labour	₹23,000
(c) Factory overheads	₹13,000
(d) Administration overheads and selling expenses calculated at 8 per cent of the selling price.	

15. The following is the audited accounts of a company for the year ended 31st March, 2011

<i>Dr.</i>			<i>Cr.</i>
<i>Particulars</i>	₹	<i>Particulars</i>	₹
To Materials consumed	27,00,000	By Sales (1,00,000 units)	60,00,000
To Wages	15,00,000	By Finished goods (4,000 units)	2,00,000
To Factory expenses	9,00,000	By Work-in-progress:	
To Administration expenses	4,25,000	Materials	60,000
To Selling and Distribution expenses	4,50,000	Wages	25,000
To Preliminary expenses (written off)	50,000	Factory expenses	<u>15,000</u>
To Goodwill written off	40,000		1,00,000
To Net Profit	<u>2,65,000</u>	By Dividend received	20,000
	<u>63,30,000</u>	By Rent received	<u>10,000</u>
			<u>63,30,000</u>

The following additional information is supplied. In cost accounts:

- (1) Factory expenses have been allocated to production @ 22% on prime cost.
- (2) Administration expenses at ₹4 per unit on units produced.
- (3) Selling and distribution expenses at ₹ 4.42 per unit on units sold. ₹ 2.00 packing cost on completed units not sold.

Ascertain profit/loss as per cost accounts and reconcile two sets of accounts.

16. From the following figures prepare a reconciliation statement:

	₹
Net profit as per financial records	1,28,755
Net profits as per costing records	1,72,400
Works overheads under recovered in costing	3,120
Administration overheads recovered in excess	1,700
Depreciation charged in financial records	11,200
Depreciation recovered in costing	12,500
Interest received but not included in costing	8,000
Obsolescence loss charged in financial records	5,700
Income tax provided in financial records	40,300
Bank interest credited in financial books	750
Stores adjustments (credit in financial books)	475
Depreciation of stock charged in financial books	6,750

17. The Profit and Loss Account of manufacturing company for the year ended 31st March, 2011 is as follows:

	₹		₹
To Material consumed	75,000	By Sales	1,86,000
To Carriage inwards	1,500		
To Direct Wages	51,000		
To Works expenses	18,000		
To Administrative expenses	6,750		
To Selling and distribution expenses	9,750		
To Debenture interest	1,500		
To Net Profit	<u>22,500</u>		
	<u>1,86,000</u>		<u>1,86,000</u>

The net profit shown by the cost accounts for the year is ₹ 24,405. Upon a detailed comparison of the two sets of accounts it is found that:

(a) The amount charged in the cost accounts in respect of overhead charges are as follows:

Works overhead charges ₹ 17,250, Office overhead charges ₹ 6,885, Selling and distributing expenses ₹ 9,960.

(b) No charge has been made in the cost accounts in respect of debenture interest. You are required to reconcile the profits shown by the two sets of accounts.

18. From the following Profit and Loss Account, you are required to draw up a Memorandum Reconciliation Account to ascertain the profit as per cost accounts:

**Profit and Loss Account as at 31.3.2011**

Dr.		Cr.	
	₹		₹
To Salaries	24,200	By Gross profit	1,15,400
To Rents and taxes	6,000	By Dividend received	600
To Depreciation	5,400	By Miscellaneous income	1,200



# Lesson 7

## COSTING SYSTEMS

### LESSON OUTLINE

- Unit and Output Costing
- Production Account
- Job Costing and its features, basic principle & special term, applications, advantages & limitations
- Batch Costing and its features, difference between job & batch costing and applications
- **Contract Costing:**
  - Distinction between job and contract costing, specific aspects and recording of transactions of contract costing
- Profits on Incomplete Contracts
- Process Costing and its general principles, features, applications, difference between job and process costing, advantage & limitation
- Process cost and accounting,
- Normal loss, Abnormal loss & Abnormal Gains
- Inter-Process Profit, Equivalent production units
- Joint Products, By-Products and their accounting
- Service Costing and its features and applications, Unit Costing and Multiple Costing
- Lesson Round Up
- Self-Test Questions

### LEARNING OBJECTIVES

Cost accounting is the "collection, assignment, and interpretation of cost". Costing is the process or activity of determining the costs incurred on various types of inputs used in the organization and apportioning it to different products and activities of a company. Costing is used for many different purposes such as fixing selling price of products, analyzing costs associated with different products and activities to facilitate decisions on product mix and methods, analysis of costs and profitability for investment decisions and cost control. There are no clearly defined classifications of different types of costing systems used in manufacturing or any other industry. Every organization has to design a costing system according to the nature of its products, operations and the way it intends to use the costing information.

Some of the well-known and popular costing systems which are in use today are as follows:

- Unit or output Costing
- Job Costing
- Batch costing
- Contract costing
- Process costing
- Service costing

The actual method used is not as important as whether the chosen system works. The simpler the system is, the easier it will be to understand and implement.

After reading this lesson, the user should be able to

1. Understand the meaning of different costing system.
2. Use the different costing systems in practical scenario.
3. Understand the characteristics. Advantages and limitations of different costing systems.

A costing system is not intended to replace an accounting system. Instead, the systems actually work within the broad framework of general accounting systems to extract specific data for quick and easy analysis.

## INTRODUCTION

Today different business and industry needs different costing systems to meet their individual requirements. It is not possible to devise a single costing system to fulfil everybody's needs. Different methods of costing for different industries depending upon the type of manufacture and their nature have been developed. Various methods of ascertaining costs are available to suit the business need. But the basic principles are the same in every method. The choice of a particular method of costing depends on the nature of business of the concern. There are two basic methods of costing viz. – (a) Specific order or job costing (b) Continuous operation or process costing Brief description of each of the methods are as follows:

## SINGLE/OUTPUT/UNIT COSTING

Unit costing refers to the costing procedure, under which costs are accumulated and analyzed under different elements of cost and then cost per unit is ascertained by dividing the total cost by number of units produced. It is ideally used in case of concerns producing a single article on large scale by continuous manufacture. The units of output are identical. The products are homogenous. Concern using single or output costing produces basically one product or two or more grades of one product.

It is not necessary to maintain separate cost accounts under this system. as all the information required can be obtained only by organizing and analyzing the financial accounts. On dividing the total expenditure incurred by the number of units produced, the cost per unit is ascertained.

This system of costing is suitable for breweries, collieries, cement works, steel, brick making, flour mills etc. In all these cases the unit cost of the article produced requires to be ascertained.

The information on expenditure incurred on material, labour and direct expenses can be available without any special difficulty. The works and administration expenses actually incurred also are included in the total cost. Items of indirect expenses which are paid at periodical intervals are included in cost accounts on the basis of estimates. Selling and distributing expenses are not included in cost sheets since these have no connection with the quantity produced, If, however, it is decided to include them, the same also are estimated on the basis of past experience.

## COST SHEET

Cost sheet is a document which provides for the assembly of the detailed cost of a cost centre or cost unit. It is a periodical statement of cost designed to show in detail the various components of cost of goods produced like prime cost, factory cost, cost of production, total cost and cost per unit. A specimen of a simple cost sheet is given below:

### Cost Sheet (or Statement of Cost) for the period.....

No. of units produced.....

<i>Particulars</i>	<i>Total cost</i>	<i>Cost per unit</i>
	₹	₹
Direct Materials		
Direct Labour		
Direct (or Chargeable) Expenses*		
Prime cost		
Add: Works Overheads		
Works Cost		
Add: Administrative Overheads		
Cost of Production		
Add: Selling and Distribution Overheads		
Total Cost or Cost of Sales		

\* The terms "direct expenses" have been excluded from prime cost as per CIMA terminology i.e. according to CIMA, prime cost is "the total cost of direct material and direct labour".



If possible the cost sheet should have columns for (i) total cost; (ii) percentage to total cost; (iii) cost per unit; and (iv) corresponding figures of the pervious period and clear figures for each element of cost.

### Treatment of stock

Stock requires special treatment while preparing a cost sheet. Stock may be of raw materials, work-in-progress and finished goods.

### Stock of Raw Materials

If opening stock of raw material, purchase of raw materials and closing stock of raw materials are given, then, raw material consumed can be calculated as follows:

Opening stock of raw materials	—
<i>Add:</i> Purchase of raw materials	—
<i>Less:</i> Closing stock of raw materials	—
<b>Value of raw materials consumed</b>	<u>—</u>

### Stock of Work-in-Progress

Work-in-progress is valued at prime cost or works cost basis, but latter is preferred. If it is valued at works or factory cost then opening and closing stock will be adjusted as follows :

Prime cost	—
<i>Add:</i> Factory overheads	—
Work-in-progress (beginning)	—
<i>Less:</i> Work-in-progress (closing)	—
<b>Works cost</b>	<u>—</u>

### Stock of Finished Goods

If opening and closing stock of finished goods are given, then these must be adjusted before calculating cost of goods sold:

Cost of production	—
<i>Add:</i> Opening stock of finished goods	—
<i>Less:</i> Closing stock of finished goods	—
Cost of goods sold	<u>—</u>

### USES OF COST SHEET

- (i) It gives total cost and cost per unit for a particular period.
- (ii) It gives information to management for cost control.
- (iii) It provides comparative study of actual current costs with the cost of corresponding periods, thus causes of inefficiencies and wastage can be known and suitably corrected by management.
- (iv) It acts as a guide to manufacture in formulation of suitable and definite policies and in fixing up the selling price.

### ITEMS EXCLUDED FROM COST SHEET

The following items are of financial nature and thus not included while preparing a cost sheet.

- (i) Cash discount
- (ii) Interest paid

- (iii) Preliminary expenses written off
- (iv) Goodwill written off
- (v) Provision for taxation
- (vi) Provision for bad debts
- (vii) Transfer to reserves
- (viii) Donations
- (ix) Income tax paid
- (x) Dividend paid
- (xi) Profit/loss on sale of assets
- (xii) Damages payable at law etc.

**PRODUCTION ACCOUNT**

If the details of cost sheet or production statement are shown in the form of a ledger account, it is known as production account. Besides cost of production it also includes selling and distribution expenses. It is prepared in three parts - the first part gives the cost of production, the second part gives the cost of goods sold and the third part shows cost of sales or total cost for the period. A specimen of a Production Account is as follows:

**PRODUCTION ACCOUNT**

<i>Particulars</i>	<i>Amount</i>	<i>Particulars</i>	<i>Amount</i>
	₹		₹
To Direct materials	—	By Prime Cost c/d	—
To Direct labour	—		
To Direct expense	—		
	—————		—————
	—		—
To Prime Cost b/d	—	By Cost of goods manufactured	—
To Works overheads	—		
Add: Work in progress	—		
(Opening)	—		
Less: Work in progress	—		
(closing)	—		
Less: Sale of by-	—		
products or scrap	—		
	—————		—————
	—		—
To Cost of goods manufactured b/d	—	By Sales	—
To Opening stock of finished goods	—	By Closing stock of finished goods	—
To Gross Profit c/d	—		
	—————		—————
	—		—
To Administration overhead	—	By Gross Profit b/d	—
To Selling and distribution overheads	—		
To Net Profit	—		
	—————		—————
	—		—

**Example**

From the following particulars prepare a Production Account showing all details of cost and their break up and also calculate gross profit and net profit.

	1-9-2012	30-9-2012
	₹	₹
Stock of Raw Material	75,000	91,500
Stock of Work-in-Progress	28,000	35,000
Stock of Finished Goods	54,000	31,000

	₹	₹
Direct Expenses	1,500	Sales
Raw Materials Purchased	66,000	Salesmen Salaries and Commission
Direct Wages	52,500	Office Rent, Rates etc.
Indirect Wages	2,750	Sundry Office Expenses
Factory Expenses	25,000	Advertisement
Depreciation on Plant and Machinery	3,500	Carriage Outwards
		2,500

**Solution**

**PRODUCTION ACCOUNT FOR SEPTEMBER, 2012**

	₹	₹		₹
To Materials Consumed:			By Prime Cost b/d	1,03,500
Opening Stock of				
Raw Material	75,000			
Add: Material Purchased	<u>66,000</u>			
	1,41,000			
Less: Closing Stock of				
Raw Materials	<u>91,000</u>	49,500		
To Direct Wages		52,500		
To Direct Expenses		<u>1,500</u>		
		<u>1,03,500</u>		<u>1,03,500</u>
To Prime Cost b/d		1,03,500	By Cost of Goods Manufactured	1,27,750
To Factory Overheads:				
Indirect Wages	2,750			
Factory Expenses	25,000			
Depreciation of Plant and Machinery	<u>3,500</u>	31,250		
To Work-in-Progress (opening)		<u>28,000</u>		
		1,62,750		
Less: Work-in-Progress (closing)		<u>35,000</u>		
		<u>1,27,750</u>		<u>1,27,750</u>
To Cost of Goods Manufactured b/d		1,27,750	By Sales	2,11,000
To Opening Stock of Finished Goods		54,000	By Stock of Finished Goods	31,000
To Gross Profit c/d		<u>60,000</u>		
		<u>2,42,000</u>		<u>2,42,000</u>

To Office Expenses:			By Gross Profit b/d	60,250
Rent, Rates etc.	2,500			
Sundry Office Expenses	<u>6,500</u>	9,000		
To Selling Expenses:				
Salesmen's Salaries and Commission	6,500			
Advertising	3,500			
Carriage Outwards	<u>2,500</u>	12,500		
To Net Profit		<u>38,750</u>		
		<u>60,250</u>		<u>60,250</u>

### COST SHEET AND PRODUCTION ACCOUNT

The following are the points of distinction between cost sheet and production account:

<i>Cost sheet</i>	<i>Production Account</i>
(1) It is prepared as a statement.	It is prepared as an account.
(2) Expenses are classified to ascertain prime cost, factory cost, total cost, etc.	Expenses are not classified.
(3) To enable comparison, figures of previous period are provided.	No figures of previous period are provided. Hence no comparison is possible.
(4) It is based on actual and estimated figures of expenses.	It is based on actual figures.
(5) It is prepared for each job and sometimes for the whole factory.	It is prepared for each production department.

### REVIEW QUESTIONS



**Re-write the following sentence after filling-in the blank spaces with appropriate word:**

- (i) An account giving details of cost of production, cost of sales and profit made during a particular period is called \_\_\_\_\_.
- (ii) Unit cost method is used in \_\_\_\_\_ (name two industry).

**Correct answer:** (i) Production account (ii) Brick, Coal

### Illustration 1

The following particulars have been extracted from the books of a manufacturing company for the month of March, 2013:

	₹
Stock of materials as on 1st March, 2013	47,000
Stock of materials as on 31st March, 2013	50,000
Materials purchased during the month	2,08,000
Drawing office salaries	9,600
Counting house salaries	14,000

Carriage on purchases	8,200
Carriage on sales	5,100
Cash discount allowed	3,400
Bad debts written off	4,700
Repairs of plant, machinery and tools	10,600
Rent, rates, taxes and insurance (factory)	3,000
Rent, rates, taxes and insurance (office)	1,000
Travelling expenses	3,100
Travellers' salaries and commission	8,400
Productive wages	1,40,000
Depreciation written off on plant, machinery and tools	7,100
Depreciation written off on office furniture	600
Directors' fees	6,000
Gas and water charges (factory)	1,500
Gas and water charges (office)	300
General charges	5,000
Manager's salary	12,000

Out of 48 working hours in a week, the time devoted by the Manager to the factory and office was on an average 40 hours and 8 hours respectively throughout the month. 1,00,000 units were produced and sold; there was no opening or closing stock of it.

Prepare a cost sheet showing the following:

- (i) Cost of Materials Consumed;
- (ii) Prime Cost;
- (iii) Works Overhead;
- (iv) Works Cost;
- (v) Office and Administration Overhead;
- (vi) Cost of Production;
- (vii) Selling and Distribution Overhead; and
- (viii) Total Cost or Cost Sales.

**Solution**

**Cost Sheet of..... Manufacturing Co.**

**For the month of March, 2013**

<i>Particulars</i>			<i>Total cost</i>	<i>% to total cost</i>	<i>Cost per unit</i>
	₹	₹	₹	cost	₹
Stock of materials as on 1st March, 2013		47,000			
Add: Purchase of materials	2,08,000				
Carriage on purchases	<u>8,200</u>	<u>2,16,200</u>			

Total material available for consumption	2,63,200			
Less: Stock of Materials as on 31st March, 2013	<u>50,000</u>	2,13,200	47.89	2.132
Direct labour or productive wages		<u>1,40,000</u>	<u>31.45</u>	<u>1.400</u>
<b>Prime Cost</b>		3,53,200	79.34	3.532
<i>Add: Works Overheads:</i>				
Drawing office salaries	9,600			
Repairs of plant, machinery and tools	10,600			
Rent, rates, taxes and insurance (factory)	3,000			
Depreciation on plant machinery and tools	7,100			
Gas and water charges (factory)	1,500			
Manager's salary $\left(\frac{40}{48} \times 12,000\right)$	<u>10,000</u>	<u>41,800</u>	<u>9.39</u>	<u>0.418</u>
<b>Works Cost or Factory Cost</b>		3,95,000	88.73	3.950
<i>Add: Office and Administrative Overheads:</i>				
Counting house salaries	14,000			
Rent, rates, taxes and insurance (office)	1,000			
Depreciation on office furniture	600			
Directors' fees	6,000			
Gas and water charges (office)	300			
General charges	5,000			
Manager's salary $\left(\frac{8}{48} \times 12,000\right)$	<u>2,000</u>	<u>28,900</u>	<u>6.49</u>	<u>0.289</u>
<b>Cost of Production</b>		4,23,900	95.22	4.239
<i>Add: Selling and Distribution Overheads:</i>				
Carriage on sales	5,100			
Bad debts written off	4,700			
Travelling expenses	3,100			
Traveller's salaries and commission	<u>8,400</u>	<u>21,300</u>	<u>4.78</u>	<u>0.213</u>
<b>Total Cost or Cost of Sales</b>		<u>4,45,200</u>	<u>100.00</u>	<u>4.452</u>

*Note:* Cash discount allowed is a matter of pure finance and hence it is excluded from costs.

### Illustration 2

The following information has been obtained from the records of ABC Co. Ltd. for the month of January, 2013:

	₹
Cost of raw materials on 1/01/2013	30,000
Purchase of raw materials during the month	4,50,000
Wages paid	2,30,000
Factory overheads	92,000
Cost of work-in-progress on 1/01/2013	12,000
Cost of raw materials on 30 /01/2013	25,000

Cost of work-in-progress on 30 /01/2013	15,000
Cost of stock of finished goods on 1 /01/2013	60,000
Cost of stock of finished goods on 30 /01/2013	55,000
Administration overheads	30,000
Selling and distribution overheads	20,000
Sales	9,00,000

Prepare: (i) Cost sheet showing the cost of production of goods manufactured, and (ii) Statement showing the cost of sales and the profit earned.

**Solution:**

**Cost Sheet of ABC Ltd. for the month of January, 2013**

	₹	₹
Direct materials consumed:		
Cost of raw materials on 1/01/2013	30,000	
Add: Purchases of raw-materials during the month	<u>4,50,000</u>	
	4,80,000	
Less: Cost of raw-materials on 30/01/2013	<u>25,000</u>	4,55,000
Direct Labour - wages paid		<u>2,30,000</u>
Prime Cost		6,85,000
Factory overheads		<u>92,000</u>
		7,77,000
Add: Cost of work-in-progress on 1/01/2013		<u>12,000</u>
		7,89,000
Less: Cost of work-in-progress on 30/01/2013		<u>15,000</u>
Works Cost or Factory Cost		7,74,000
Administration overheads		<u>30,000</u>
Cost of Production of Goods Manufactured		<u>8,04,000</u>

**Statement showing the Cost of Sales and Profit for the month of January, 2013**

	₹
Cost of Stock of finished Goods on 1/01/2013	60,000
Add: Cost of goods manufactured during the month	<u>8,04,000</u>
Cost of total goods available for sale	8,64,000
Less: Cost of stock of finished goods on 30/01/2013	<u>55,000</u>
Cost of Goods Sold	8,09,000
Add: Selling and distribution overhead	<u>20,000</u>
Total Cost or Cost of Sales	8,29,000
Sales Price	<u>9,00,000</u>
<b>Profit during the month</b>	<u><b>71,000</b></u>

*Notes:*

- (1) Costs of opening and closing stock of work-in-progress have to be adjusted after the Factory overhead is added to the Prime Cost but before the Works cost is arrived at since Factory overhead expenses are also incurred on work-in-progress.
- (2) Selling and distribution overhead expenses can be incurred only on the goods sold, but not on the goods lying in stock.

## JOB COSTING

### INTRODUCTION

This method of costing is used in Job Order Industries where the production is as per the requirements of the customer. In Job Order industries, the production is not on continuous basis, rather it is only when order from customers is received and that too as per the specifications of the customers. Consequently, each job can be different from the other one. Method used in such type of business organizations is the Job Costing or Job Order Costing.

The objective of this method of costing is to work out the cost of each job by preparing the Job Cost Sheet. A job may be a product, unit, batch, sales order, project, contract, service, specific program or any other cost objective that is distinguishable clearly and unique in terms of materials and other services used. The cost of completed job will be the materials used for the job, the direct labour employed for the same and the production overheads and other overheads if any charged to the job.

### MEANING

Job costing may be defined as a system of costing in which the elements of cost are accumulated separately for each job or work order undertaken by an organisation. Industries which manufacture products or render services against specific orders use job costing or job order method of cost accounting. In the job costing system, an order or a unit, lot or batch of product may be taken as a cost unit, i.e. a job. Job costing is a method of costing in which cost units can be separately identified and need to be separately costed. The primary purpose of job costing is to bring together all the costs incurred for completing a job.

The system of job costing can be sub-divided into two categories viz. (a) Factory job costing and (b) Contract costing. A variant of job costing system is batch costing in which costs are accumulated for specific batches of products of a similar type ordered for manufacture.

Job costing is applicable to engineering concern, construction companies, ship-building, furniture making, machine manufacturing industries, repair shops, automobile garages and such other in factories where jobs or orders can be kept separately.

As production in a job order system is not a continuous process, careful planning and strict control is essential to avoid wastage of materials, man-power, machinery and other resources. On receipt of an order, the production and planning department prepares a suitable design for the product or job. It also prepares a bill of materials and an operation schedule. A production order is issued giving instructions to the shops to proceed with the manufacture of the product. This production order (also known as work order or job order record) constitutes the authority of the work. The production order usually lays down the quantity of materials required, time allowed for the operations, sale price, customer's name, shipping instructions, etc. Sometimes the values of materials and labour are also indicated and then it serves the combined purpose of an order for manufacture as well as the cost sheet on which the cost of the order is compiled.

Every production order is assigned a number called the job number, job-order number, work order number.

### FEATURES

The following are the features of job costing.

- It is a specific order costing
- A job is carried out or a product is produced is produced to meet the specific requirements of the order



- Job costing enables a business to ascertain the cost of a job on the basis of which quotation for the job may be given.
- While computing the cost, direct costs are charged to the job directly as they are traceable to the job.
- Indirect expenses i.e. overheads are charged to the job on some suitable basis.
- Each job completed may be different from other jobs and hence it is difficult to have standardization of controls and therefore more detailed supervision and control is necessary.
- At the end of the accounting period, work in progress may or may not exist.

## **BASIC PRINCIPLES & SPECIAL TERMS**

The basic principles, procedures in the accounting of material, labour and overhead costs and other special features of the job costing system are mentioned below:

### **Material Costs**

An essential requirement of job order cost accounting is that direct materials and their cost must be traced to and identified with specific jobs or work orders. On receipt of a production order, the shop draws the requisite materials from stores. The withdrawals of material are made on materials requisitions on the authority of the bill of materials. The particular job order number for which material is drawn is indicated in each requisition. Surplus, excess or incorrect materials are returned from the shops to the stores with materials return note.

A daily or weekly analysis of materials requisitions, materials return notes and bills of materials is made and posted in the materials requisition journal. For cost accounting purposes, a materials issue analysis sheet is prepared showing the cost of materials issued against the various job order numbers. Direct material cost is posted on the cost sheet relating to the particular production order while, indirect materials cost is treated as overhead costs.

### **Labour Costs**

All direct labour costs must be analysed according to individual jobs or work orders. On the authority of operation schedule, time is booked on time sheets, job cards, time tickets or piece-work cards. The job cards are valued by the costing department; the wages paid are classified into direct and indirect labour and booked to production order and standing order numbers respectively. Labour summaries or wages analysis sheets are prepared for each accounting period; say a week. Amounts on account of overtime, idle time, shift-differential and fringe benefits may also be included in the wages analysis sheet. Direct labour costs are posted on the respective cost-sheets and indirect labour is treated as overhead costs.

### **Manufacturing Overheads**

Overhead costs are accumulated against standing order numbers and against cost centres. Overhead rates, predetermined or actuals as the case may be, are worked out for each centre. The amount of overhead cost recoverable on each job order is summarised in an Overhead Absorption or Applied Overhead Analysis-Sheet and is posted on the relevant cost-sheets. Usually, overheads are added only when the job is complete but, at the end of the accounting period, the amount of overheads which could be applied to incomplete jobs is ascertained for the purpose of establishing the extent of over or under absorption of overheads.

### **Completion of Jobs**

Postings of direct material, direct labour and manufacturing overhead costs to the cost-sheet for a job or production order are made throughout the run of the job or order. On the completion of a job, a job

completion report is sent by the production shop to the Production and Planning Department, with a copy to the Cost Office. Sometimes, information regarding completion is noted on the production order which is routed through Cost Office.

The expenditure booked under each element of cost is totalled up and the grand total of cost is arrived at.

### Job Account

An account is kept for each job so that its cost and the various components of cost can be readily ascertained. There can be various forms in which the account may be maintained. The following, therefore, may be treated as illustrative (all figures are assumed).

<b>Job Account</b>						
No.....			Date Commenced.....			
Brief Particulars.....			Date Completed.....			
.....			Remarks.....			
<i>Date</i>	<i>Particulars</i>	<i>Materials</i>	<i>Wages</i>	<i>Total</i>	<i>Total cost</i>	<i>₹</i>
<b>2013</b>						
May 7	Material analysis	340		340	Materials consumed	560
"	Wages analysis		410	410	Wages	<u>970</u>
" 14	Material analysis	220		220	Prime Cost	1,530
"	Wages analysis		560	560	Factory overheads(60% of wages)	<u>582</u>
					Works Cost	2,112
					Administrative overheads	
					10% of works cost	<u>211</u>
		<u>560</u>	<u>970</u>	<u>1,530</u>	Total Cost	<u>2,323</u>

### Work-in-Progress

The cost of an incomplete job, i.e., a job on which some manufacturing operation is still due is termed as work-in-progress. If a production order has been only completed by the end of an accounting period, it is essential that the closing stock of the work-in-progress be determined. Unless this is correctly done, the profits for the period will be distorted. Determination of work-in-progress is frequently essential where periodic profit and loss account is required to be prepared for control purposes without reference to the closure of the accounting period.

**Job-ticket/Job card:** A job card or job ticket is used to record the time spent on each job, having a specified work order or job order number. Job cards may be of two types, one, which is a job cost card, and contains information regarding material consumption as well as time spent by operators. The other one is, in effect, a job ticket, which is issued to an operator by the supervisor and contains only the operation details. When the operator starts the work, he records the time either manually or through time recording clock on the card. The finishing time is recorded when the operation is completed. If there is any break in between, then time 'out' and time 'in' are also recorded indicating hours not used on job and shall be considered indirect labour hours. When the job is completed, the operator deposits the card with the supervisor, and collects the next job ticket. At the end of each day, the time-keeper collects all these cards and records the time for each job or process or operation. Followings are the feature of job ticket/job cost card:

- It reduces normal idle time.
- It gives clear, logical and suitable information to the costing department.

- It provides a very useful link between the production control and costing.
- Job card gives information about number and particulars of job accurately.
- The entries are made by costing officer in card at the time of commencement and completion of the job.

## APPLICATIONS OF JOB COSTING

This method of costing is used in Job Order Industries where the production is as per the requirements of the customer. In Job Order industries, the production is not on continuous basis, rather it is only when order from customers is received and that too as per the specifications of the customers. Consequently, each job can be different from the other one. Method used in such type of business organizations is the Job Costing or Job Order Costing.

Companies that are likely to use a job costing system have a wide variety of products or services. These companies include printing shops, accounting firms, equipment companies, and construction companies. Companies that are likely to use a process costing system have homogeneous products or services. Such companies include automobile manufactures, food processors, and textile companies. Service industry companies most likely use a job costing system because each job is likely to have different quantities of materials and labour.

## ADVANTAGES OF JOB COSTING

Job costing offers the following specific advantages :

- (i) It helps management to detect which jobs are profitable and which are not. Estimates of cost for similar work in the future may be conveniently made on the basis of accurate record of job costs. This assists in the prompt furnishing of price quotations for specific jobs;
- (ii) The cost of materials, labour and overhead for every job or product in a department is available regularly and periodically, enabling the management to know the trend of cost and thus by suitable comparison, to control the efficiency of operations, materials and machines;
- (iii) The adoption of predetermined overhead rates in job costing necessitates the application of a system of budgetary control of overheads with all the advantages.
- (iv) Spoilage and defective work can be easily identified with specific jobs or products so that responsibility may be fixed on departments or individuals.
- (v) Job costing is particularly suitable for cost plus and such other contracts where selling price is determined directly on the basis of costs.

**N.B.** Job cost information can be used for estimation of future costs only after careful adjustments for variations likely to arise over time as well as for any difference in the size of the order. If major economic changes take place, comparison of cost of a job for one period with that of another becomes meaningless. Distortion of cost also occurs when the batch quantities are different.

## LIMITATIONS OF JOB COSTING

Job costing suffers from certain limitations.

These are as follows.

- It is said that it is too time consuming and requires detailed record keeping. This makes the method more expensive.

- Record keeping for different jobs may prove complicated.
- Inefficiencies of the organization may be charged to a job though it may not be responsible for the same.

In spite of the above limitations, it can be said that job costing is an extremely useful method for computation of the cost of a job. The limitation of time consuming can be removed by computerization and this can also reduce the complexity of the record keeping.

## REVIEW QUESTIONS



**Re-write the following sentence after filling-in the blank spaces with appropriate word:**

- (i) Labour time on each Job are recorded on a \_\_\_\_\_ which is then costed and recorded on the Job Cost Sheet.
- (ii) \_\_\_\_\_ costing is applied where work is usually carried out within a factory or workshop which is short duration.

**Correct answer:** (i) Job Card (ii) Job

### Illustration 3

The quantity specified on a production order was 2,000 units of an article in the manufacture of which four operations were involved. The piece-rates for these four operations were in sequence. ₹ 20, 25, 20 and 30 per unit. The company recovered factory overhead expenses on the basis of direct labour cost and the current overhead rate is 80%. The entire quantity of material authorised for the order, viz. 1,000 kgs. @ ₹ 200 per kg. was issued to the shop. Of this 50 kgs. were returned as scrap arising in course of manufacture, valued at ₹ 800.

At the year end, the order was incomplete; only 200 units were fully completed and transferred to finished stock. Stock-taking of the work-in-progress revealed the following position:

Materials in process	650 kgs.
Material in hand, in shop (unprocessed)	200 kgs.
Production in partly completed stage	1,300 units
Extent of work performed:	
Upto the first operation	600 units
Upto the second operation stage	400 units
Upto the third operation stage	300 units
Upto the fourth operation stage	Nil

Calculate the cost of the work-in-progress at the year end.

### Solution:

	₹	₹
Cost sheet showing cost of work-in-progress		
<i>Material Cost</i>		
Material in hand 200 kgs. @ ₹ 200 per kg.*		40,000

\* It is possible to exclude this from the cost of work-in-progress and include in the cost of materials in hand.

Material in process 650 kgs. @ ₹ 200 per kg.	1,30,000	
Less: Proportionate cost of scrap	<u>650</u>	<u>1,29,350</u>
		1,69,350
<i>Labour Cost</i>		
Operation I - 600 units @ ₹ 20	12,000	
Operation II - 400 units @ ₹ 45	18,000	
Operation III - 300 units @ ₹ 65	<u>19,500</u>	49,500
Factory overhead 80% on direct labour		39,600
Total cost of work-in-progress		<u>2,58,450</u>

**Illustration 4**

The Alpha Manufacturing Company processed production through two department (i) Machining and (ii) Finishing.

Overhead rates are predetermined on the basis of machine hours in the machine department and the direct labour wages in the finishing department.

The figures for 2012-13 based on which the overhead rates were arrived at are furnished below:

	<i>Machining Deptt</i>	<i>Finishing Deptt.</i>
	₹	₹
Direct labour - wages	36,00,000	40,00,000
Factory overheads	80,00,000	60,00,000
Direct labour hours	24,00,000	50,00,000
Machine hours	20,00,000	5,00,000

The Cost Sheet for Job Order No. 1748 indicates the following:

	<i>Machining Deptt</i>	<i>Finishing Deptt.</i>
	₹	₹
Material consumed	₹50	₹7
Direct labour wages	₹45	₹40
Direct Labour hours	24	35
Machine hours	15	5

Assuming that the production order No. 1,748 consisted of 10 numbers of Part No. P-1865, prepare a cost sheet showing the unit cost of the part.

**Solution:**

**Job Cost Sheet**

Job No. - 1748  
Part No. - P-1865  
No. of parts produced – 10

Started on.....

	₹	Cost for 10 parts of P-1865 Amount	₹	Cost per unit
<i>Direct Material</i>	₹		₹	₹
Machine Department	50			
Finishing Department	<u>7</u>		57	5.7

*Direct Labour Wages*

Machining Department	45		
Finishing Department	<u>40</u>	<u>85</u>	<u>8.5</u>
Prime Cost		142	14.2

*Factory Overheads*

$$\left( 15 \text{ hrs.} \times \frac{\text{₹ } 80,00,000}{\text{₹ } 2,00,000} \right) \quad 60$$

*Finishing Department*

Based on direct wages i.e.

$$\left( \frac{\text{₹ } 60,00,000}{\text{₹ } 40,00,000} \times 40 \text{ hrs.} \right) \quad 60 \quad 120 \quad 12.0$$

Total Cost		<u>262</u>	<u>26.2</u>
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**BATCH COSTING**

This is another form of job costing which is adopted in case of manufacturing of a large number of components of machines or of other articles. Since a large number of them are manufactured together and pass through the same process of manufacture, it is convenient to collect their cost of manufacture together. Separate job cost sheets are maintained for each batch of products. Each batch is allotted a number. Material requisitions are prepared batchwise, the direct labour is engaged batchwise and the overheads are also recovered batchwise. Cost of each component in the batch is then determined by dividing the total cost by the number of articles manufactured.

**FEATURE OF BATCH COSTING**

Features of batch costing system are as under:

- Batch costing is applied in industries where identical products are produced.
- A batch is a cost unit which consists of a separate, readily identifiable group of product units which maintains its separate identity throughout the production process.
- The output of batch consists of a number of units and it is not economical to ascertain cost of every unit of output independently
- The procedure is very similar to job costing:
  - (a) Each batch is treated a job and costs are calculated for total batch.
  - (b) On completion of production cost per unit is found as

$$\text{Cost per unit} = \frac{\text{Total Batch Cost}}{\text{Total Units in Batch}}$$

**DIFFERENCE BETWEEN JOB COSTING AND BATCH COSTING**

<i>Job Costing</i>	<i>Batch Costing</i>
It is carried out or a product is produced by specific orders.	The process of producing the product has a continuous flow and product is homogeneous.
It is determined for each job.	It is compiled on time basis.
Each job is separate and independent of other jobs.	Product lose their individuality as they are manufactured in a continuous flow

## APPLICATIONS OF BATCH COSTING

Batch costing is used for calculating total cost of each batch. Batch is small group of units which is produced for production purposes. We also identify batch of units in our production. All raw material is supplied on batch basis and other expenses are also paid on the basis of each batch.

For instance, in the drugs industry, producer will make the batch of tablets instead of producing single tablet. This will be easy to sell that batch in market. So, calculating cost of each batch, we will calculate material cost per batch, labour cost per batch and other expenses per batch. If we want to calculate cost per unit, we have to divide total batch cost with total batch units.

It is used in following industries:

1. Manufacturing industry for readymade garment
2. Manufacturing industry for toys
3. Manufacturing industry for tyre & tube

### Illustration 5

ABC Limited manufactures ring binders which are embossed with the customers' own logo. A customer has ordered a batch of 600 binders. The following illustrate the cost for a typical batch of 100 binders.

	₹
Direct materials	60
Direct labour	20
Machine set up	6
Design and art work	<u>30</u>
Prime cost	<u>116</u>

Direct employees are paid on a piecework basis.

ABC Limited absorbs production overheads at a rate of 20% of direct wages cost. 5 % is added to the total production cost of each batch to allow for selling, distribution and administration overheads.

ABC Limited requires a profit margin of 25% of sales value.

The selling price for 600 binders (to the nearest penny) will be:

- A. ₹ 756
- B. ₹ 772.8
- C. ₹ 806.4
- D. ₹ 1008

### Solution:

	₹
Prime cost (₹ 116 x 6)	696
Overheads (₹ 20 x 6 x 20%)	<u>24</u>
	720
Selling, distribution and admin overheads (180 x 5%)	<u>36</u>
Total cost	<u>756</u>
Selling price (756/75x100)	1008

## CONTRACT COSTING

Contract (or terminal) costing, is one form of application of the principles of job order costing. In contract costing each contract is treated as a cost unit and costs are ascertained separately for each contract. It is suitable for business concerned with building or engineering projects or structural or construction contracts.

Usually, there is a separate account for each contract. Also the number of contracts undertaken at a time, generally, not being very large, the Contract Ledger can very well be operated as part of the financial books. The contract account is debited with all direct and indirect expenditure incurred in relation to the contract. It is credited with the amount of contract price on completion of the contract. The balance represents profit or loss made on the contract and is transferred to the profit and loss account. In case, the contract is not completed at the end of the accounting period, a reasonable amount of profit, out of the total profit made so far on the incomplete contract, may be transferred to profit and loss account.

## DISTINCTION BETWEEN JOB AND CONTRACT COSTING

Contract jobs, while they resemble jobs, have a few distinctive features:

- (i) Under job costing, the cost is first allocated to cost centres and then to individual jobs. In contract costing, most of the expenses are of direct nature, overhead forms only a small percentage of total expenditure and it represents expenses like share of head office expenses, share of central storage cost etc.
- (ii) Under job costing pricing is influenced by individual conditions and general policy of the organisation. Under contract costing, pricing is influenced by specific clauses of the contract.
- (iii) Unlike job costing, each contract is a cost unit in contract costing.
- (iv) Under contract costing, the work is usually carried out at a site other than contractee's own premises. Job costing is often applied where jobs are carried out at the contractee's own premises.

## SPECIFIC ASPECTS AND RECORDING OF TRANSACTIONS OF CONTRACT COSTING

The recording procedure of the following items may be noted carefully:

**(1) Material:** Materials may be purchased in bulk and kept in store for supply to the contract, as and when required, or these may be purchased and directly supplied to the contract. In the latter case, the cost of material would be debited directly to the contract. If any materials are transferred from one contract to another, their costs would be adjusted on the basis of Material Transfer Note, signed both by the transferor and transferee foreman. In case certain materials charged to contract are returned to stores, the same will be credited to the contract account. Materials stolen or destroyed by fire will be transferred to profit and loss account. Materials in hand at the end of the year will appear on the credit side of the contract account.

**(2) Labour:** All labour actually employed on the site is regarded as direct labour irrespective of the nature of the task performed by the labour concerned. If it is desired to ascertain the labour cost for a particular job or work, each person would be provided with a job card upon which he must record the nature of the work performed by him. On the basis of the analysis of the job cards, labour analysis sheets are prepared for ascertaining the actual cost of labour on different operations.

If concurrently number of contracts are carried on and workmen are made to divide their time between two or more contracts, it would be necessary to prepare analysis sheets of labour, for charging to each contract, wages appropriate thereto.

**(3) Direct expenses:** The expenses which can be directly charged to different contracts will be posted



directly to the respective contracts. These include cost of special tools, cost of design, electric charge, insurance etc.

**(4) Plant used in a contract:** The value of plant used on a contract may be either debited to the contract and the written down value thereof at the end of the year entered on the credit side for closing the contract account, or only a charge for use of the plant (depreciation) may be debited to the account.

**(5) Overhead expenses:** In contract, overhead expenses are few and relate only to works or administration expenses which cannot be directly apportioned to individual contracts. These indirect expenses may be distributed on several contracts as a percentage of cost of materials or wages paid or the prime cost. If, however, the contracts are big, the labour hour method is often adopted for distribution of expenses since it is more efficacious. In making the distribution, the location of the site of the contract is another important factor to be considered, for contracts situated at a distance are not likely to receive the same supervision as compared to those which are close. Where such factors are prominent, some sort of quota basis for distribution of expenses may be followed.

**(6) Extras:** Where some additional work not stipulated in the contract is carried out, the expenditure on this additional work should be separately analysed from that charged to the main contract.

If the additional work is quite substantial, it should be treated as a separate contract and a separate account should be opened for it. If it is not very substantial, expenses incurred up on extra work should appear on the debit side of the contract account as 'cost of extra work', and the extra amount which the contractee has agreed to pay should be added to the contract price.

**(7) Sub-contracts:** Generally work of a specialised character e.g. the installation of lifts, special flooring etc. is entrusted to other contractors by the main contractor. The cost of such sub-contracts is a direct charge against the contract for which the work has been done.

**(8) Escalation clause:** Escalation clause is usually provided in the contract as a safeguard against any likely changes in the price or utilisation of material and/labour. This clause provides that in case prices of items of raw materials, labour etc. specified in the contract change during the execution of the contract, beyond a specified limit over the prices prevailing at the time of signing the agreement, the contract price will be suitably adjusted. The terms of the contract specify the procedure for calculating such adjustment in order to avoid all future disputes. Thus this clause safeguards the interest of both the contractor and the contractee in case of fluctuations in the prices of material, labour etc.

**(9) Cost plus contract:** Cost plus contract is a contract in which the value of the contract is ascertained by adding a certain percentage of profit over the total cost of the work. This is used in case of those contracts whose exact cost cannot be correctly estimated at the time of undertaking a work. The profit to be paid to the contractor may be a fixed amount or it may be a particular percentage of cost or capital employed. These type of contracts are undertaken for production of special articles not usually manufactured and is generally employed, when Government happens to be a contractee. Generally, in such contract, contractor and contractee have clear agreement about the items of cost to be included, type of material to be used, labour rates for different grades, normal wastages to be permitted and the rate or amount of profit.

#### ***Advantage of cost plus contract***

- (i) Cost plus contract ensures that a reasonable profit accrues to the contractor even in risky projects.
- (ii) It simplifies the work offering tenders and quotations.
- (iii) It provides escalation clauses and thus covers the contractor from fluctuations in price and utilisation of elements of production.

- (iv) The customer is assured of paying only reasonable amount of profit.
- (v) The customer has the right to conduct cost audit so that he can ensure that he is not being cheated by the contractor.

### ***Disadvantages of cost plus contract system***

In spite of the advantages mentioned above cost plus contract system has the following disadvantages:

- (i) Since the contractor is assured of profit margin, he may not take initiative for cost reduction by affecting economies of production and reducing wastages.
- (ii) The ultimate price to be paid by the customer cannot be exactly ascertained until the work is completed and this creates delay in preparing purchase budget by the customer.
- (iii) The customer has to pay not only the resultant high cost but also the resultant high profit. Thus, customer have to pay substantially for lack of proper attitude (towards cost and efficiency) on the part of contractor.

**(10) Progress payment, Retention money and Architects' certificate:** When a contractor is engaged on a contract for several years, he cannot afford to block a large amount of funds until the completion of the contract. Therefore, in case of large contracts the system of progress payment is adopted. The contractee agrees to pay a part of the contract price from time to time depending upon satisfactory progress of the work. The progress will be judged by the contractee's architect, surveyor or engineer who will issue a certificate stating the value of work so far done and approved by him. Such work is termed as work certified. The terms of the contract provide that whole of the amount shown by the certificate shall not be paid immediately but a percentage thereof shall be retained by the contractee until some time after the contract is completed. The sum retained is called retention money. Usually the contractor may be paid 75% or 80% of the work certified depending upon the terms of the contract. The object of this retention is to place the contractee in a favourable position in case the contractor does not fulfil some of the conditions laid down by the contract or in case of faulty work.

It may quite possible that at the end of a period a part of the work done may remain unapproved because it has not reached a stipulated stage. Such work which has not been so far approved by the contractee's architect or surveyor is termed as work uncertified. The full value of the work certified should be credited to the contract account and debited to the account of the contractee. Whenever any amount is received from the contractee cash account is debited and contractee's account is credited. Until the contract is completed, amount received from the contractee shows advance payments and is deducted from work in progress in the balance sheet. When the contract is completed, contractee's account is debited with the contract price and the contract account is credited.

**(11) Profit on incomplete contracts:** At the end of an accounting period it may be found that certain contracts which have been completed while others are still in process and will be completed in the coming years. The profit on completed contracts may be safely taken to the credit of the profit and loss account. In the case of incompleting contracts there are unforeseen contingencies which may lead to heavy fluctuations in costs and profit. At the same time it does not also seem desirable to consider the profits only on completed contracts and ignore completely incomplete ones as this may result in heavy fluctuations in the future for profit from year to year. If profit or loss is not shown in the intermittent years for the work in progress, contract will show high figure of profit in the year of completion and reverse may be the case in the year in which a large number of contracts remain incomplete. Therefore, profits on incomplete contracts should be considered, of course, after providing adequate sums for meeting unknown contingencies. There are no hard and fast rule regarding calculation of the figures for profit to be taken to the credit of profit and loss account.

However, the following rules may be followed:

- (i) Profit should be considered in respect of work certified only, work uncertified should always be valued at cost.
- (ii) No profit should be taken into consideration if the amount of work certified is less than 1/4th of the contract price because in such a case it is not possible to foresee the future clearly.
- (iii) If the amount of work certified is 1/4th or more but less than 1/2 of the contract price, 1/3rd of the profit disclosed as reduced by the percentage of cash received from the contractee, should be taken to the profit and loss account or

$$\text{Profit} = \frac{1}{3} \times \text{Notional Profit} \times \left\{ \frac{\text{Cash received}}{\text{Work certified}} \right\}$$

The balance be allowed to remain as a reserve.

- (iv) If the amount of work certified is 1/2 or more of the contract price, 2/3rd of the profit disclosed, as reduced by the percentage of cash received from the contractee, should be taken to the profit and loss account.

$$\text{Profit} = \frac{2}{3} \times \text{Notional Profit} \times \left\{ \frac{\text{Cash received}}{\text{Work certified}} \right\}$$

The balance should be treated as reserve.

- (v) In case the contract is very much near to completion, if possible the total cost of completing the contract should be estimated. The estimated total profit on the contract then can be calculated by deducting the estimated cost from the contract price. The profit and loss account should be credited with that proportion of total estimated profit on cash basis, which the work certified bears to the total contract price.

$$\text{Profit} = \text{Estimated total profit} \times \left\{ \frac{\text{Work certified}}{\text{Contract price}} \right\}$$

- (vi) The whole of loss, if any, should be transferred to the profit and loss account.

That part of the profit which is not credited to the profit and loss account is treated as a reserve against contingencies and is deducted from the amount of work-in-progress for balance sheet purpose. It is carried down as a credit balance in the contract account itself, the work-in-progress being represented by the debit balance in the contract account.

**Note:** The treatment of profit on incomplete contract will be computed as per specific instruction of problem. If there is no specific instruction then above rules should be applied.



**For Example:** If the total profit on a contract for ₹3,00,000 is ₹60,000 and the contract is 60% complete and has been certified accordingly. The retention money is 20% of the certified value, then the amount of profit that can be prudently credited to Profit and Loss Account may be calculated as follows :

(1) Apparent profit	₹60,000
(2) 2/3rd of this is ordinarily suitable for transfer to Profit and Loss Account (Since the Work certified is more than 50%)	₹40,000
(3) The percentage of cash received to certified value	80%
(4) The amount of profit determined on cash basis being suitable for transfer to Profit and Loss Account (80% of ₹40,000)	₹32,000

OR

Alternatively the profit to be transferred to the Profit and Loss Account can be:

$$\begin{aligned} & ₹60,000 \times \frac{80}{100} \times \frac{1,80,000}{3,00,000} \\ & = ₹28,800 \end{aligned}$$

**(12) Work-in-Progress:** In contract accounts, the value of work-in-progress includes the amount of work certified and the amount of work uncertified. The work-in-progress account will appear in the assets side of the balance sheet. The amount of cash received from the contractee and reserve for contingencies will be deducted out of this amount.

The work-in-progress account can be presented in balance sheet as follows:

**Balance sheet as on.....**

<i>Assets</i>	<i>Amount</i>
Work-in-progress	
Balance in contractee's Account	
Add: Work uncertified	
Less: Reserve for unrealised profit	

*Alternatively :*

**Balance sheet as on.....**

<i>Assets</i>	<i>Amount</i>
Work-in-Progress:	
Value of work certified	
Cost of work uncertified	
Less: Reserve for unrealised profit	
Less: Amount received from the contractee	

If the expenditure on incompleting contracts includes the value of plant and materials, these items may be shown separately in the balance sheet. Thus, instead of showing the total expenditure under the heading of work-in-progress, expenditure may split up and shown separately in the balance sheet, under the headings of plant at site, material at site, and work-in-progress.

## REVIEW QUESTIONS



**Re-write the following sentence after filling-in the blank spaces with appropriate word:**

- (i) Contracts are undertaken to \_\_\_\_\_ requirements of the customers.
- (ii) \_\_\_\_\_ costing is applied for Engineering Projects.
- (iii) In case of \_\_\_\_\_ contracts, only portion of the profit is taken to the Profit and Loss account depending on the extent of work completed on the contract.

**Correct answer:** (i) Special (ii) Contract (iii) Incomplete

**Illustration 6**

The following balances were extracted from the books of a building contract on 31st March, 2013 regarding Contract No. 123:

	₹
Materials issued to site	6,27,200
Wages Paid	7,34,550
Wages outstanding on 31.3.2013	7,200
Plant issued to site	60,000
Direct charges paid	25,150
Direct charges outstanding on 31.3.2013	2,100
Establishment charges	56,500
Stock of materials at site on 31.3.2013	12,000
Value of work certified on 31.3.2013	16,50,000
Cost of work not yet certified	35,000
Cash received on account of architect's certificate after deduction by customer of 5 percent retention money	14,10,750

The work was commenced on April 1, 2012 and the contract price agreed at ₹24,50,000.

Prepare contract account for the year providing for depreciation of plant of 25 per cent. Calculate the Profit or Loss in the contract to date and make such provision in the contract account as you consider desirable. Set out also contractor's balance sheet so far as it relates to the contract.

**Solution:****Contract Account**

Dr.		Cr.	
<i>Particulars</i>	₹	<i>Particulars</i>	₹
To Materials to site	6,27,200	By Stock of material at site	12,000
To Wages paid	7,34,550	By Work-in-Progress:	
To Wages outstanding	7,200	Work certified	16,50,000
To Direct charges	25,150	Work uncertified	35,000
To Direct charges outstanding	2,100		
To Establishment charges	56,500		
To Depreciation-Plant	15,000		
To National Profit c/d	<u>2,29,300</u>		
	<u>16,97,000</u>		<u>16,97,000</u>
To Profit and Loss A/c	1,30,700	By Notional Profit	2,29,300
$\left[ 2,29,300 \times \frac{2}{3} \times \frac{85.5}{100} \right]$			
To Work-in-Progress-Reserve	<u>98,600</u>		
	<u>2,29,300</u>		<u>2,29,300</u>

**Balance Sheet as on 31st March, 2013**

<i>Liabilities</i>	₹	<i>Assets</i>	₹
Wages outstanding	7,200	Stocks of material at site	12,000
Direct charges		Plant at site	45,000
Outstanding	2,100	Work-in-Progress:	
P&L A/c:		Work certified	16,50,000
Profit transferred		Work uncertified	<u>35,000</u>
from Contract A/c	1,30,700		16,85,000
		Less: Reserve	<u>98,600</u>
			15,86,400
	<u>          </u>	Less: Cash received	<u>14,10,750</u>
	<u>          </u>		<u>1,75,650</u>

**Illustration 7**

Three Contracts A, B and C, commenced on 1st January, 1st July and 1st October, 2012 respectively, were undertaken by the Bharat Contractors and their accounts on 31st December, 2012 showed the following position:

	<i>Contract A</i>	<i>Contract B</i>	<i>Contract C</i>
	₹	₹	₹
Contract price	8,00,000	5,40,000	6,00,000
<i>Expenditure:</i>			
Raw materials	1,44,000	1,16,000	40,000
Wages paid	2,20,000	2,24,800	28,000
General charges	8,000	5,600	2,000
Plant installed	40,000	32,000	24,000
Materials in hand	8,000	8,000	4,000
Wages accrued	8,000	8,000	3,600
Work certified	4,00,000	3,20,000	72,000
Work finished but not certified	12,000	16,000	4,200
Cash received in respect of work certified	3,00,000	2,40,000	54,000

The plant was installed on the date of commencement of each contract; depreciation is to be taken at 10 percent per annum.

Prepare the Contract Accounts in tabular form and show how they would appear in the Balance Sheet as on 31st December, 2012.

**Solution:****Contract Accounts**

Particulars	A			B			C		
	₹	₹	₹	₹	₹	₹	₹	₹	
To Raw material	1,44,000	1,16,000	40,000	By Material in hand	8,000	8,000	4,000		
To Wages paid	2,20,000	2,24,800	28,000	By Plant in hand less					
To General charges	8,000	5,600	2,000	depreciation*	36,000	30,400	23,400		
To Plant	40,000	32,000	24,000	Work certified	4,00,000	3,20,000	72,000		
To Wages accrued	8,000	8,000	3,600	By Work-in-progress:					
To Balance c/d	36,000	—	6,000	Work finished					
				but not certified	12,000	16,000	4,200		
				By Profit and					
				Loss A/c		12,000	—		
	<u>4,56,000</u>	<u>3,86,400</u>	<u>1,03,600</u>		<u>4,56,000</u>	<u>3,86,400</u>	<u>1,03,600</u>		
To Profit and Loss A/c				By Balance c/d	36,000	—	6,000		
36,000 x 2/3 x 3/4	18,000	—	—						
To Work-in-progress									
(Profit in Reserve)	<u>18,000</u>	<u>—</u>	<u>6,000</u>						
	<u>36,000</u>	<u>—</u>	<u>6,000</u>		<u>36,000</u>	<u>—</u>	<u>6,000</u>		

**Balance Sheet as on 31st December 2012**

₹		₹		₹		₹	
Profit and Loss A/c:				Materials in hand:			
Profit on Contract A	18,000			Contract A	8,000		
Less: Loss on Contract B	<u>12,000</u>	6,000		Contract B	8,000		
Sundry Creditors:				Contract C	<u>4,000</u>	20,000	
Wages Accrued				Plant in hand:			
Contract A	8,000			Contract A	36,000		
Contract B	8,000			Contract B	30,400		
Contract C	<u>3,600</u>	19,600		Contract C	<u>23,400</u>	89,800	
				Work-in-Progress:			
				Contract A	3,94,000		
				Contract B	3,36,000		
				Contract C	<u>70,200</u>		
					8,00,200		
				Less : Advances from			
				contractees:			
				Contract A	3,00,000		
				Contract B	2,40,000		
				Contract C	<u>54,000</u>		
					<u>5,94,000</u>	<u>2,06,200</u>	

\* Depreciation on Plant: Depreciation on plant is to be provided @ 10% p.a., so depreciation only for that period for which plant has been used will be deducted in order to arrive at the closing value of plant in land.

**Workings:***(1) Calculation of depreciation on plant*

Contract	Cost ₹	Contract commenced on	Depreciation for what period	Amount of depreciation ₹	Closing balance of Plant ₹
A	40,000	1st Jan., 2012	Full year	$40,000 \times \frac{10}{100} = 4,000$	36,000
B	32,000	1st July, 2012	6 months	$32,000 \times \frac{10}{100} \times \frac{6}{12} = 1,600$	30,400
C	24,000	1st Oct., 2012	3 months	$24,000 \times \frac{10}{100} \times \frac{3}{12} = 600$	23,400

*(2) Calculation of work-in-progress expenditures*

	Contracts		
	A ₹	B ₹	C ₹
Raw materials	1,44,000	1,16,000	40,000
Wages	2,20,000	2,24,800	28,000
General charges	8,000	5,600	2,000
Plant	40,000	32,000	24,000
Wages accrued	<u>8,000</u>	<u>8,000</u>	<u>3,600</u>
Total	4,20,000	3,86,400	97,600
Less: Materials in hand	<u>8,000</u>	<u>8,000</u>	<u>4,000</u>
	4,12,000	3,78,400	93,600
Less: Plant in hand	<u>36,000</u>	<u>30,400</u>	<u>23,400</u>
Total net expenditure of the period	3,76,000	3,48,000	70,200
Add: Profit transferred to Profit and Loss A/c	18,000	—	—
Less: Loss transferred to Profit and Loss A/c	—	<u>12,000</u>	—
Work-in-progress	<u>3,94,000</u>	<u>3,36,000</u>	<u>70,200</u>

**PROFITS ON INCOMPLETE CONTRACTS (BASED ON AS 7 – REVISED 2002)**

The basic principle of ascertaining profits on incomplete contracts is to give credit to share of profit on the outcome of a contract which can reasonably be foreseen. In calculating the total estimated profit on the contract, it is necessary to take into account the total costs to date and the total estimated further costs to completion and the estimated future costs or rectification and guarantee work, and any other future work to be undertaken. These are then compared to the total contract price.

The profit taken in any year is calculated on a cumulative basis having regard to profit taken in the earlier years. The amount to be reflected in the year's profit and loss account will be the appropriate proportion of this total profit by reference to the work done to date, less any profit already taken in previous year.



Hence, the profit is calculated as follows:

	(₹)
Total contract value	.....
Less: Costs incurred to date	.....
Estimated costs to completion	.....
Rectification and guarantee work	.....
Total estimated contract costs	.....
Estimated profit or loss on the contract	.....

The estimated profit should be adjusted in the following formula:

$$\text{Profit to date} = \frac{\text{Cost of work completed}}{\text{Total estimated contract cost}} \times \text{Estimated contract profit}$$

The amount of profit to be recognized in the current period is calculated on cumulative principles as under:

	(₹)
Profit to date	.....
Less: Profit recognized at the end of previous period	.....
Profit recognized in current period	.....

If a loss is disclosed, then this should be provided in full in the current period.

These general principles have been focused in the Accounting Standard (AS-7) Revised 2002 – ‘Construction Contracts’ issued by the Institute of Chartered Accountants of India. It is stated that when the outcome of a construction contract can be estimated reliably, contract revenue and contract costs associated with the construction contract should be recognized as revenue and expenses respectively by reference to the stage of completion of the contract activity at the reporting date. An expected loss on the construction should be recognized as an expense immediately.

However when the outcome of a construction cannot be estimated reliably then,

- (a) revenue should be recognized only to the extent of contract cost incurred of which recovery is probable; and
- (b) contract costs should be recognized as an expense in the period in which they are incurred.

An expected loss on the construction contract should be recognized as an expense. When it is probable that total contract cost will exceed total contract revenue the expected loss should be recognized as an expense immediately.



**For Example:**

The profit to be recognized as per AS 7 in the current period with regard to the following information is calculated as under:

Contract price	₹99,00,000
Cumulative figures:	
To end of previous period-profit recognized	₹2,25,000
To end of current period-total costs	₹49,50,000
Cost of work certified	₹36,00,000
Estimated future costs to completion	₹27,00,000
Estimated rectification costs	10% of contract price

**Answer:**

Contract Price		₹99,00,000
Less: Costs to date	₹49,50,000	
Costs to complete	27,00,000	
Rectification costs	<u>9,90,000</u>	<u>86,40,000</u>
Estimated contract profit		<u>12,60,000</u>

$$\begin{aligned} \text{Profit to date} &= \frac{\text{Cost of Work Certified}}{\text{Estimated Total Cost}} \times \text{Estimated Profit} \\ &= \frac{36,00,000}{86,40,000} \times 12,60,000 = ₹5,25,000 \end{aligned}$$

Profit in current period = ₹5,25,000 – ₹2,25,000 = ₹3,00,000.

**Illustration 8**

XYZ contractors obtained a contract to construct a house for ₹8,00,000. Work was started on 1st January, 2012 and it was estimated that contract would take 15 months to complete. Work is proceeding as per schedule and the details upto 31st December 2012 are as follows:

	₹
Materials and stores	1,87,000
Wages Paid	2,70,000
Plant hire charges and other expenses	60,000
Establishment charges	54,000
Material unused	11,000
Work Certified	6,00,000
Cash received	5,40,000
Work not yet certified (at cost)	20,000

It is further estimated that the following further expenses will be required to complete the work:

Additional material: ₹25,000; Wages : ₹20,000; Sub Contract cost : ₹50,000;

Plant hire charges : ₹10,000; Establishment Expenses : ₹11,800; and provision for contingencies : 5% of total cost

You are required to calculate the value of Work in Progress as on 31st December 2012 taking credit for a reasonable profit and also show the contract account.

**Solution:**

Dr.	<b>Contract Account as on 31st December, 2012</b>		Cr.
	₹		₹
To Material and Stores	1,87,000	By Material and stores	11,000
To Wages	2,70,000	By Work in Progress :	
To Plant hire charges & expenses	60,000	(a) Work uncertified at cost	20,000
To Establishment expenses	54,000	(b) Value of work certified	6,00,000
To Notional Profit c/d	<u>60,000</u>		
	<u>6,31,000</u>		<u>6,31,000</u>
To Profit & Loss Account	57,000	By Notional Profit b/d	60,000
To Work in progress (balancing figure)	<u>3,000</u>		
	<u>60,000</u>		<u>60,000</u>

## Statement of Estimated Cost and Estimated Profit

Cost incurred upto 31st December, 2012	₹
(₹1,87,000 + ₹2,70,000 + ₹60,000 + ₹54,000) – ₹11,000	5,60,000
<i>Add</i> : Additional Estimated Cost	
Material (₹11,000 + 25,000)	36,000
Wages	20,000
Sub-contract cost	50,000
Plant hire charges	10,000
Establishment charges	<u>11,800</u>
Estimated cost before provision	6,87,800
<i>Add</i> : Provision for Contingencies = (5/95) x 6,87,800	<u>36,200</u>
Estimated total cost	<u>7,24,000</u>

Estimated profit = ₹8, 00,000 – 7, 24,000 = ₹76, 000

$$\begin{aligned} \text{Profit to P\&L Account} &= \frac{\text{Estimated Profit} \times \text{Work certified}}{\text{Contract price}} \\ &= \frac{76,000 \times 6,00,000}{8,00,000} = ₹57,000 \end{aligned}$$

*Alternatively,*

$$\begin{aligned} \text{Profit to P\&L Account} &= \frac{\text{Estimated Profit} \times \text{Cash Received}}{\text{Contract price}} \\ &= \frac{76,000 \times 5,40,000}{8,00,000} = ₹51,300 \end{aligned}$$

## Value of Work in Progress as on 31st December, 2012 to be shown in Balance Sheet

Work in progress :		₹
Value of work certified		6,00,000
Cost of work uncertified		<u>20,000</u>
		6,20,000
<i>Less</i> : Reserve for unrealised profit :	3,000	
Amount received from contractee	<u>5,40,000</u>	<u>5,43,000</u>
		77,000

**Note:** Based on Accounting Standard (AS) – 7, Construction Contracts, the profit to date can be estimated as under:

Total contract price		₹
		8,00,000
<i>Less</i> : Costs to date	5,60,000	
Additional estimated cost	<u>1,64,000</u>	<u>7,24,000</u>
Estimated contract profit		<u>76,000</u>

$$\begin{aligned} \text{Profit to date} &= \frac{\text{Cost of work certified} \times \text{Estimated Profit}}{\text{Estimated total cost}} \\ &= \frac{₹6,00,000 \times 76,000}{7,24,000} = ₹62,983 \end{aligned}$$

## PROCESS COSTING

### INTRODUCTION:

Process costing is a form of operations costing which is used where standardized homogeneous goods are produced. This costing method is used in industries like chemicals, textiles, steel, rubber, sugar, shoes, petrol etc. Process costing is also used in the assembly type of industries also. In process costing, it is assumed that the average cost presents the cost per unit. Cost of production during a particular period is divided by the number of units produced during that period to arrive at the cost per unit.

### MEANING OF PROCESS COSTING

Process costing is a method of costing under which all costs are accumulated for each stage of production or process, and the cost per unit of product is ascertained at each stage of production by dividing the cost of each process by the normal output of that process.

#### Definition:

**CIMA London defines process costing as “that form of operation costing which applies where standardize goods are produced”**

### GENERAL PRINCIPLES OF PROCESS COSTING

1. The majority of items of cost can ordinarily be identified with specific processes and collected and accumulated separately for each period.
2. Production records of each process are so designed as would show the quantum of production for each period.
3. The total cost of each process is divided by the total production by the process for arriving at the unit cost of the article processed.
4. The cost of any normal spoilage or wastage is included in the cost of the total units produced. Thereby the average cost per unit is increased.
5. As the product travels from one process to another, the cumulative cost thereof in respect of the processes it has already undergone is transferred to the account of the process it has yet to undergo.

#### ***Features of Process Costing:***

- (a) The production is continuous
- (b) The product is homogeneous
- (c) The process is standardized
- (d) Output of one process become raw material of another process
- (e) The output of the last process is transferred to finished stock
- (f) Costs are collected process-wise
- (g) Both direct and indirect costs are accumulated in each process
- (h) If there is a stock of semi-finished goods, it is expressed in terms of equivalent units
- (i) The total cost of each process is divided by the normal output of that process to find out cost per unit of that process.

A common example of an industry where process costing may be applied is "Sugar Manufacturing Industry".

## APPLICATIONS OF PROCESS COSTING

Process costing is being used by following Industries as under:

### 1. Identical Products Industries

Process costing is most often used when manufacturers release identical products. If mass produced televisions have the same parts, manufacturers can assign consistent prices to the products based on how much the products cost to manufacture overall.

### 2. Industries with Multiple Departments

Businesses that have multiple departments usually use process costing so that management can assess the costs accumulated by each department. For example, one department can take the raw resources and refine them before turning them into finished parts, another department can assemble the parts and a third department can test the finished product to assess both quality and safety. Materials might need to be shipped from one department to another, which may incur additional costs. When the costs of production go up unexpectedly, process costing can allow management to quickly pinpoint the department responsible for the increased costs and identify the source of the increased cost.

### 3. Industries with Interchangeable Parts

Process costing comes into play when a factory manufactures identical parts. For example, a computer manufacturing plant will create numerous components that are interchangeable among computers of the same model. Process costing allows manufacturers to sell individual parts separately to computer repair shops or individual buyers, since the manufacturers know the cost of the separate parts.

### 4. Industries with Varying Product Features

Products that have multiple extraneous features can benefit from process costing. Manufacturers can release two versions of the product, with one version costing less but having fewer features and another product costing more but having more features. For example, a manufacturer might release two coffee pots, one with a timer and one without. Process costing lets the manufacturer know how much the timer costs to add to the coffee pot, which enables the manufacturer to gauge how much it must raise the price on the coffee pot with the timer.

### 5. Innovative Industries

Process costs are important in industries that have high innovation. For example, manufacturers cannot determine an appropriate price for a new type of product without knowing how much the product will cost to manufacture overall. In addition, businesses cannot determine if a product will be profitable until they know the overall cost so they can estimate the maximum price that customers will pay for the product.

## COMPARISON BETWEEN JOB COSTING AND PROCESS COSTING

The type of cost accumulation to be used is determined by the type of manufacturing operations. The differences between the two methods centre mainly around how costing is accomplished. The product cost under both method is ascertained by averaging process, size of denominator being different in both the cases. In job costing costs are applied to specific jobs consisting of a single or joint units, while process costing is applied to a large number of units.

The main points of distinction between job costing and process costing may be summarised below:

<b>Job costing</b>	<b>Process costing</b>
Goods are manufactured only against specific orders.	Production is of like units in continuous flow.
Costs are accumulated and applied to specific jobs.	Costs are accumulated and applied process-wise or department-wise.
Costs are computed after every job is completed.	Costs are computed after the expiry of a particular cost period.
Different jobs are independent of each other.	Production being in a continuous flow, products are intermingled in such a manner that lots are not distinguishable.
Products are normally not transferred from one job to another except in the case of surplus work or excess production.	Costs are normally transferred from one process to another. Generally the finished product of the process becomes the raw material of the next process until the goods are completely manufactured.
From the point of view of managerial control, more attention is needed because production is not in continuous flow and each job is different.	Because of the standard, mass and continuous production, managerial control is easier.
Different jobs may or may not have opening or closing work-in-progress.	As the production is in continuous flow there is always an opening and closing balance of work-in-progress.

#### **ADVANTAGES OF PROCESS COSTING**

1. Costs are be computed periodically at the end of a particular period
2. It is simple and involves less clerical work that job costing
3. It is easy to allocate the expenses to processes in order to have accurate costs.
4. Use of standard costing systems in very effective in process costing situations.
5. Process costing helps in preparation of tender, quotations
6. Since cost data is available for each process, operation and department, good managerial control is possible.

#### **LIMITATIONS OF PROCESS COSTING**

1. Cost obtained at each process is only historical cost and are not very useful for effective control.
2. Process costing is based on average cost method, which is not that suitable for performance analysis, evaluation and managerial control.
3. Work-in-progress is generally done on estimated basis which leads to inaccuracy in total cost calculations.
4. The computation of average cost is more difficult in those cases where more than one type of products is manufactured and a division of the cost element is necessary.

5. Where different products arise in the same process and common costs are prorated to various costs units. Such individual products costs may be taken as only approximation and hence not reliable.

## ACCOUNTING FOR ELEMENTS OF COST

### *Accounting for Materials*

Materials and supplies as in the case of job costing are issued to each process only against authorised requisitions. At the end of each process or of each costing period, the requisitions are sorted according to processes and their values listed on a material summary sheet. On the basis of this summary sheet, a journal entry is passed to debit the various process accounts and the material control account is credited.

### *Accounting for Labour*

In order to account for labour, the first step is identification of each worker with the process in which he is engaged. If the workers are permanently assigned to the process, such an identification would not pose any problem as the pay rolls would be prepared in a manner so as to show the wages cost of each process separately. In that case all that is required is that the pay roll section be notified of permanent transfers of workers from one process to another.

Where it is necessary to frequently transfer workers from one process to another, it may not be possible to have a permanent classification of workers according to processes. In such a case, it is necessary to prepare daily time reports showing the number of employees engaged in each process and, if any worker is required to divide his time among two or more processes, a transfer form would be used to record his times on different processes. At the end of the week or that of the costing period, the daily time reports and transfer forms would be abstracted on a labour summary sheet. On this basis a journal entry would be made, debiting various process accounts and crediting the wages control account.

### *Accounting for Overheads*

Since normally it is practicable to identify all materials and labour charges with specific processes, the overhead expenses chargeable to a process ordinarily would not contain cost of indirect materials or labour. But there still would be several items of expenses that do not relate to any particular process. It would be necessary to apportion them to various processes on suitable bases. Different bases that are generally adopted for making such a distribution are stated below:

<b>ITEMS OF EXPENSES</b>	<b>BASIS OF DISTRIBUTION</b>
Rent, rates and taxes	Area occupied by each process.
Power	Meter readings or horse power of plant employed for each process.
Fire insurance	Value of asset and the degree of risk involved.
Water, gas, steam, etc.	Meter readings or technical estimates.
Depreciation of plant	Value of assets employed.

Amounts of manufacturing overheads are, usually debited in totals to a total overhead account entitled 'Manufacturing Overhead Control Account'. From this account, the total amount is distributed to various process accounts on the basis of a manufacturing overhead summary sheet. The summary sheet contains a description of various items of manufacturing overheads and the manner in which the same has been distributed, i.e. one or other based mentioned above.

An alternative method of distributing the manufacturing overhead that could be followed is to apportion the total of the overhead expenses in a lump sum to the process on a blanket base, such as the number of units processed or total labour or operating hours of each process for the period. Such a lump sum distribution is generally unscientific since the figures are not analytically obtained.

For each process an individual process account is prepared. Each process of production is treated as a distinct cost centre.

#### Items on the Debit side of Process A/c

In process Costing, individual process Accounts are prepared for each process. Each process account is debited with –

- (a) Cost of materials used in that process.
- (b) Cost of labour incurred in that process.
- (c) Direct expenses incurred in that process.
- (d) Overheads charged to that process on some pre determined.
- (e) Cost of ratification of normal defectives.
- (f) Cost of abnormal gain (if any arises in that process)

#### Items on the Credit side:

Each process account is credited with

- (a) Scrap value of Normal Loss (if any) occurs in that process.
- (b) Cost of Abnormal Loss (if any occurs in that process)

### COST OF PROCESS

The cost of the output of the process (Total Cost less Sales value of scrap) is transferred to the next process. The cost of each process is thus made up to cost brought forward from the previous process and net cost of material, labour and overhead added in that process after reducing the sales value of scrap. The net cost of the finished process is transferred to the finished goods account. The net cost is divided by the number of units produced to determine the average cost per unit in that process.

#### Process Account Specimen

<i>Particulars</i>	<i>Units</i>	<i>Amount in ₹</i>	<i>Particulars</i>	<i>Units</i>	<i>Amount in ₹</i>
To Basic material	XX	XXX	By Normal Loss	XX	XXX
To Direct Material	XX	XXX	By Abnormal Loss	XX	XXX
To Direct labour		XXX	By Process II (Output transferred to next processes)	XX	XXX
To Direct Expenses		XXX			
To Production overhead		XXX			
To Cost of rectification of defective material		XXX	By Finished stock Account	XX	XXX
To Abnormal gains	XX	XXX			
	XX	XXX		XX	XXX



## PROCESS LOSSES

In manufacturing processes, entire input is not getting converted into output. A certain part of input is lost while processing which is inevitable. Certain production techniques are of such a nature that some loss is inherent to the production. Wastages of material, evaporation of material are un- avoidable in some process. But sometimes the Losses are also occurring due to negligence of Labourer, poor quality raw material, poor technology etc. These are normally called as avoidable losses. Basically process losses are classified into two categories (a) Normal Loss (b) Abnormal Loss

### Normal Loss:

Normal loss is an unavoidable loss which occurs due to the inherent nature of the materials and production process under normal conditions. It is normally estimated on the basis of past experience of the industry. It may be in the form of normal wastage, normal scrap, normal spoilage, and normal defectiveness. If the normal loss units can be sold as a scrap then the sale value is credited with process account. If some rectification is required before the sale of the normal loss, then the cost of rectification is debited in the process account. The cost per unit of a process is calculated after adjusting the normal loss. In case of Normal Loss the cost per unit is calculated by the under given formulae.

$$\text{Cost of Good Unit} = \frac{\text{Total Cost} - \text{Sale value of Scrap}}{\text{Input} - \text{Normal Loss Units}}$$

### Abnormal Loss:

Any loss caused by unexpected abnormal conditions such as plant breakdown, substandard material, carelessness, accident etc. such losses are in excess of pre-determined normal losses. This loss is basically avoidable. Thus abnormal losses arrive when actual losses are more than expected losses. Abnormal losses in calculated as per under given formulae:

$$\text{Value of Abnormal Loss} = \frac{\text{Total Cost} - \text{Scrap Value of Normal Loss}}{\text{Input Units} - \text{Normal Loss in Units}} \times \text{Units in abnormal loss}$$

Abnormal Process loss should not be allowed to affect the cost of production as it is caused by abnormal (or) unexpected conditions. Such loss representing the cost of materials, labour and overhead charges called abnormal loss account. The sales value of the abnormal loss is credited to Abnormal Loss Account and the balance is written off to costing P & L A/c.

#### Abnormal Loss Account

<i>Particulars</i>	<i>Units</i>	<i>Amount in</i> ₹	<i>Particulars</i>	<i>Units</i>	<i>Amount in</i> ₹
To Process A/c	XX	XXX	By Bank Account	XX	XXX
			By Costing P & L A/c.		XXX
	XX	XXX		XX	XXX

### Abnormal Gains:

The margin allowed for normal loss is an estimate (i.e. on the basis of expectation in process industries in normal conditions) and slight differences are bound to occur between the actual output of a process and that anticipates. This difference may be positive or negative. If it is negative it is called ad abnormal Loss and if it is positive it is Abnormal gain i.e. if the actual loss is less than the normal loss then it is called as abnormal gain. The value of the abnormal gain calculated in the similar manner of abnormal loss. The formula used for abnormal gain is:

The sales values of abnormal gain units are transferred to Normal Loss Account since it arrive out of the savings of Normal Loss. The difference is transferred to Costing P & L A/c. as a Real gain

#### Abnormal Gain Account

Particulars	Units	Amount in ₹	Particulars	Units	Amount in ₹
To Normal loss a/c	XX	XXX	By Process A/c	XX	XXX
To Costing P & L A/c.					XXX
	XX	XXX		XX	XXX

#### Illustration 9: (Normal / Abnormal Loss)

Prepare a Process Account and Abnormal Loss Account from the following information.

Input of Raw material	1000 units @ ₹ 20 per Unit
Direct Material	₹ 4,200/-
Direct Wages	₹ 6,000/-
Production Overheads	₹ 6,000/-
Actual output transferred to process II	900 units
Normal Loss	5%
Value of Scrap per unit	₹ 8/-

#### Solution:

#### Process 1 Account

Dr.			Cr.		
Particulars	Units	Amount in ₹	Particulars	Units	Amount in ₹
To Basic material	1,000	20,000	By Normal Loss	50	400
To Direct Material		4,200	By Abnormal Loss	50	1,884
To direct labour		6,000	By Process II (Output	900	39,916
To Production overhead		6,000	transferred to next		
			processes)		
		36,200			36,200

#### Working Notes:

Cost of abnormal Loss:

$$\frac{\text{Total Cost increased} - \text{Sales value of Scrap}}{\text{Input units} - \text{Normal Loss Units}} \times \text{abnormal units}$$

$$= \frac{36200 - 400}{1000 - 50} \times 50$$

It has been assumed that units of abnormal loss have also been sold at the same rate i.e. of Normal Scrap

#### Abnormal Loss Account

Particulars	Units	Amount in ₹	Particulars	Units	Amount in ₹
To Process 1 A/c	50	1884	By Bank Account	50	400
			By Costing P & L A/c.		1484
	50	1884		50	1884

**Illustration 10: (Normal / Abnormal Loss and Abnormal Gain)**

The product of a company passes through 3 distinct process. The following information is obtained from the accounts for the month ending January 31, 2013.

<i>Particulars</i>	<i>Process – A</i>	<i>Process – B</i>	<i>Process – C</i>
Direct Material	7800	5940	8886
Direct Wages	6000	9000	12000
Production Overheads	6000	9000	12000

3000 units @ ₹ 3 each were introduced to process – I. There was no stock of materials or work in progress. The output of each process passes directly to the next process and finally to finished stock A/c.

The following additional data is obtained:

<i>Process</i>	<i>Output</i>	<i>Normal Loss in %</i>	<i>Realisable Value of Scrap</i>
Process 1	2,850	5%	2
Process 2	2,520	10%	4
Process 3	2,250	15%	5

Prepare Process Cost Account, Normal Loss Account and Abnormal Gain or Loss Account

**Solution:****Process A Account**

<i>Dr.</i>			<i>Cr.</i>		
<i>Particulars</i>	<i>Units</i>	<i>Amount in ₹</i>	<i>Particulars</i>	<i>Units</i>	<i>Amount in ₹</i>
To Basic material	3,000	9,000	By Normal Loss	150	300
To Direct Material		7800	By Process B (Output transferred to next processes)	2,850	28,500
To direct labour		6,000			
To Production overhead		6,000			
	3,000	28,800			28,800

**Process B Account**

<i>Dr.</i>			<i>Cr.</i>		
<i>Particulars</i>	<i>Units</i>	<i>Amount in ₹</i>	<i>Particulars</i>	<i>Units</i>	<i>Amount in ₹</i>
To Process A Account	2,850	28,500	By Normal Loss	285	1,140
To Direct Material		5,940	By Abnormal Loss A/c	45	900
To Direct labour		9,000	By Process B (Output transferred to next processes)	2,520	50,400
To Production overhead		9,000			
	2,850	52,440		2,850	52,440

Cost of abnormal Loss:

$$\begin{aligned} & \frac{\text{Total Cost increased} - \text{Sales value of Scrap}}{\text{Input units} - \text{Normal Loss Units}} \times \text{abnormal units} \\ & = \frac{\text{₹ } 52,440 - \text{₹ } 1140}{2,850 - 285} \times 45 \\ & = \text{₹ } 20 \times 45 \\ & = \text{₹ } 900 \end{aligned}$$

**Process C Account**

<i>Dr.</i>					<i>Cr.</i>
<i>Particulars</i>	<i>Units</i>	<i>Amount in ₹</i>	<i>Particulars</i>	<i>Units</i>	<i>Amount in ₹</i>
To Process A Account	2,520	50,400	By Normal Loss	378	1890
To Direct Material		8,886	By Abnormal Loss A/C		
To Direct labour		12,000	By Process B (Output	2,250	85,500
To Production overhead		12,000	transferred to next		
To Abnormal gain	108	4,104	processes)		
	2,520	87,390		2,520	87,390

Cost of abnormal Gain :

$$\begin{aligned} & = \frac{\text{Total Cost increased} - \text{Sales value of Scrap}}{\text{Input units} - \text{Normal Loss Units}} \times \text{abnormal units} \\ & = \frac{\text{₹ } 82,396 - \text{₹ } 1890}{2,520 - 378} \times 45 \\ & = \text{₹ } 38 \times 108 \\ & = \text{₹ } 4,104 \end{aligned}$$

**Abnormal Loss Account**

<i>Particulars</i>	<i>Units</i>	<i>Amount in ₹</i>	<i>Particulars</i>	<i>Units</i>	<i>Amount in ₹</i>
To Process B A/c	45	900	By Bank Account	45	180
			By Costing P & L A/c.		720
	45	900		45	900

**Abnormal Gain Account**

<i>Particulars</i>	<i>Units</i>	<i>Amount in ₹</i>	<i>Particulars</i>	<i>Units</i>	<i>Amount in ₹</i>
To Normal loss A/c	108	540	By Process C Account	108	4104
To Costing P & L A/c.		3,564			
	108	4104		108	4104

## Normal Loss Account

Particulars	Units	Amount in ₹	Particulars	Units	Amount in ₹
To Process A A/c	150	300	By Bank Account		
To Process B A/C	285	1140	Process A	150	300
To Process C Account	378	1890	Process B	285	1,140
			Process C	270	1,350
			By Abnormal Gain Account	108	540
		3,330			3,330

**Illustration 11**

A product is manufactured by passing through three processes A, B and C. In process C a by-product is also produced which is then transferred to process D where it is completed. For the first week in January, the actual data included:

	Process			
	A	B	C	D
Normal loss of input (%)	5	10	5	10
Scrap value (₹ per unit)	1.50	2.00	4.00	2.00
Estimated sales value of by-product (₹. per unit)	-	-	8.00	-
Output (units)	5,760	5,100	4,370	-
Output of by-products (units)	-	-	510	450
Direct materials (6000 units) (₹)	12,000	-	-	-
Direct materials added in process (₹)	5,000	9,000	4,000	220
Direct wages (₹)	4,000	6,000	2,000	200
Direct expenses (₹)	800	1,680	2,260	151

Budgeted production overhead (based on direct wages) for the week is ₹ 30,500.

Budgeted direct wages for the week is ₹ 12,200.

You are required to prepare:

- Accounts for processes A, B, C and D.
- Abnormal loss and abnormal gain accounts.

**Solution:**

## Process A Account

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Input	6,000	12,000	By Normal loss A/c (scrap)	300	450
To Direct material added		5,000	By Process B A/c	5,760	31,680
To Direct wages		4,000	(@ ₹ 5.50 per unit)		
To Direct expenses		800			
To Production overhead (250% of direct wages)		10,000			
To Abnormal gain (@ ₹ 5.50 per unit)	60	330			
	<b>6,060</b>	<b>32,130</b>		<b>6,060</b>	<b>32,130</b>

**Workings:**

$$(i) \text{ Production overhead} = 250\% \left[ \frac{\text{₹ } 30,500}{\text{₹ } 12,200} \times 100 \right]$$

(ii) Cost per unit:

	₹		Units
Cost	31,800	Input	6,000
Less: Scrap	450	Less: Normal loss	300
	<b>31,350</b>		<b>5,700</b>

$$\text{Cost per unit} = \text{₹ } 5.50 \left[ \frac{\text{₹ } 31,350}{\text{₹ } 5,700} \right]$$

**Process B Account**

Particulars	Units	Amount	Particulars	Units	Amount
		(₹)			(₹)
To Process A A/c	5,760	31,680	By Normal loss	576	1,152
To Direct material added		9,000	By Abnormal loss	84	1,008
To Direct wages		6,000	By Process C A/c	5,100	61,200
To Direct expenses		1,680			
To Production overhead		15,000			
	<b>5,760</b>	<b>63,360</b>		<b>5,760</b>	<b>63,360</b>

**Working:**

(iii) Cost per unit:

	₹		Units
Cost	63,360	Input	5,760
Less: Scrap	1,152	Less: Normal loss	576
	<b>62,208</b>		<b>5,184</b>

$$\text{Cost per unit} = \text{₹ } 12 \left[ \frac{\text{₹ } 62,208}{\text{₹ } 5,184} \right]$$

**Process C Account**

Particulars	Units	Amount	Particulars	Units	Amount
		(₹)			(₹)
To Process B A/c	5,100	61,200	By Normal loss	255	1,020
To Direct material added		4,000	By Finished goods	4,370	69,920
To Direct wages		2,000	By Process D A/c	510	4,080
To Direct expenses		2,260			
To Production overhead		5,000			
To Abnormal gain	35	560			
	<b>5,135</b>	<b>75,020</b>		<b>5,135</b>	<b>75,020</b>

**Working:**

(iv) Cost per unit:

		₹			Units
Cost		74,460	Input		5,100
Less: Scrap	1,020		Less: Normal loss	255	
By-product	4,080	5,100	By-product	510	765
		<b>69,360</b>			<b>4,335</b>

$$\text{Cost per unit} = ₹ 16 \left[ \frac{₹ 69,360}{₹ 4,335} \right]$$

**Process D Account**

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Process C A/c	510	4,080	By Normal loss	51	102
To Direct material		220	By Finished goods	450	4,950
To Direct wages		200	By Abnormal loss	9	99
To Direct expenses		151			
To Production overheads		500			
	<b>510</b>	<b>5,151</b>		<b>510</b>	<b>5,151</b>

**Working:**

(v) Cost per unit:

		₹			Units
Cost		5,151	Input		510
Less: Scrap		102	Less: Normal loss		51
		5,049			459

$$\text{Cost per unit} = ₹ 11 \left[ \frac{₹ 5,049}{₹ 459} \right]$$

**Abnormal Loss Account**

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Process B A/c	84	1,008	By Scrap	84	168
To Process D A/c	9	99	By Scrap By Costing Profit and Loss A/c	9	18
				-	921
	<b>93</b>	<b>1,107</b>		<b>93</b>	<b>1,107</b>

**Abnormal Gain Account**

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Normal Loss A/c	60	90	By Process A/c	60	330
To Normal Loss A/c	35	140	By Process C A/c	35	560
To Costing Profit and Loss A/c		660			
	<b>95</b>	<b>890</b>		<b>95</b>	<b>890</b>

## INTER PROCESS PROFITS

Normally the output of one process is transferred to another process at cost but sometimes at a price showing a profit to the transfer process. The transfer price may be made at a price corresponding to current wholesale market price or at cost plus an agreed percentage. The advantage of the method is to find out Whether the particular process is making profit (or) loss. This will help the management whether to process the product or to buy the product from the market. If the transfer price is higher than the cost price then the process account will show a profit. The complexity brought into the accounting arises from the fact that the inter process profits introduced remain a part of the prices of process stocks, finished stocks and work-in-progress. The balance cannot show the stock with profit. To avoid the complication a provision must be created to reduce the stock at actual cost prices. This problem arises only in respect of stock on hand at the end of the period because goods sold must have realized the internal profits. The unrealized profit in the closing stock is eliminated by creating a stock reserve. The amount of stock reserve is calculated by the following formula.

### Illustration 12:

A product passes through three processes before its completion. The output of each process is charged to the next process at a price calculated to give a profit of 20% on transfer price. The output of Process III is transferred to finished stock account on a similar basis. There was no work-in-progress at the beginning of the years. Stock in each process has been valued at prime cost of the process. The following data is available at the end of 31st March, 2012

Particulars	Process A	Process B	Process C	Finished Stock in ₹
Direct Material	20,000	30,000	10,000	
Direct Wages	30,000	20,000	40,000	
Stock as on 31st March, 2012	10,000	20,000	30,000	15,000
Sales during the year				1,80,000

From above information prepare:

1. Process Cost Account showing the profit at each stage.
2. Actual realized profit and
3. Stock Valuation as would appear in the balance sheet

### Solution

#### Process A Account

Dr.				Cr.			
Particulars	Total in ₹	Cost in ₹	Profit in ₹	Particulars	Total in ₹	Cost in ₹	Profit in ₹
To Direct Material	20,000	20,000	-	By Process B (Transfer Price)	50,000	40,000	10,000
To Direct Wages	30,000	30,000	-				
Less: Closing Stock	10,000	10,000	-				
To Prime Cost	40,000	40,000	Nil				
To Gross Profit (20% of Transfer Price i.e. 25% of Cost)	10,000		10,000				
	50,000	40,000	10,000		50,000	40,000	10,000
To Stock B/d	10,000	10,000	Nil				



## Process B Account

Dr.				Cr.			
Particulars	Total in ₹	Cost in ₹	Profit in ₹	Particulars	Total in ₹	Cost in ₹	Profit in ₹
To Process A	50,000	40,000	10,000	By Process C (Transfer Price)	1,00,000	72,000	28,000
To Direct Material	30,000	30,000					
To Direct Wages	20,000	20,000					
	1,00,000	90,000	10,000				
Less: Closing Stock	20,000	18,000	2,000				
To Prime Cost	80,000	72,000	8,000				
To Gross Profit (20% of Transfer Price i.e. 25% of Cost)	20,000	-	20,000				
	1,00,000	72,000	28,000		1,00,000	72,000	28,000
To Stock B/d	20,000	18,000	2,000				

## Process C Account

Dr.				Cr.			
Particulars	Total in ₹	Cost in ₹	Profit in ₹	Particulars	Total in ₹	Cost in ₹	Profit in ₹
To Process B	1,00,000	72,000	28,000	By Finished Stock A/c (Transfer Price)	1,50,000	97,600	52,400
To Direct Material	10,000	10,000	-				
To Direct Wages	40,000	40,000	-				
	1,50,000	1,22,000	28,000				
Less: Closing Stock	30,000	24,400	5,600				
To Prime Cost	1,20,000	97,600	22,400				
To Gross Profit (20% of Transfer Price i.e. 25% of Cost)	30,000		30,000				
	1,50,000	97,600	52,400		1,50,000	97,600	52,400
To Stock B/d	30,000	24,400	5,600				

### Finished Stock Account

<i>Dr.</i>							<i>Cr.</i>
<i>Particulars</i>	<i>Total in ₹</i>	<i>Cost in ₹</i>	<i>Profit in ₹</i>	<i>Particulars</i>	<i>Total in ₹</i>	<i>Cost in ₹</i>	<i>Profit in ₹</i>
To Process C	1,50,000	97,600	52,400	By Sales	1,80,000	87,840	92,160
Less: Stock	15,000	9,760	5,240				
	1,35,000				1,80,000	87,840	92,160
To Gross Profit	45,000		45,000				
	1,80,000	87,840	92,160				
To Stock	15,000	9,760	5,240				

### VALUATION OF WORK-IN-PROGRESS

#### Meaning of Work-in-Progress:

Since in process industries, production is continuous, there may be some incomplete production at the end of an accounting period. Incomplete units mean those units on which percentage of completion with regular to all elements of cost (i.e. material, labour and overhead) is not 100%. Such incomplete production units are known as Work-in-Progress. Such Work-in-Progress is valued in terms of equivalent or effective production units.

#### Meaning of Equivalent Production Units:

This represents the production of a process in terms of complete units. In other words, it means converting the incomplete production into its equivalent of complete units. The term equivalent unit means a notional quantity of completed units substituted for an actual quantity of incomplete physical units in progress, when the aggregate work content of the incomplete units is deemed to be equivalent to that of the substituted quantity. The principle applies when operation costs are apportioned between work in progress and completed units.

Equivalent units of work in progress = Actual no. of units in progress x Percentage of work completed

Equivalent unit should be calculated separately for each element of cost (viz. material, labour and overheads) because the percentage of completion of the different cost component may be different.

#### Accounting Procedure:

The following procedure is followed when there is Work-in- Progress

- (1) Find out equivalent production after taking into account of the process losses, degree of completion of opening and / or closing stock.
- (2) Find out net process cost according to elements of costs i.e. material, labour and overheads.
- (3) Ascertain cost per unit of equivalent production of each element of cost separately by dividing each element of costs by respective equivalent production units.
- (4) Evaluate the cost of output finished and transferred work in progress

The total cost per unit of equivalent units will be equal to the total cost divided by effective units and cost of work-in progress will be equal to the equivalent units of work-in progress multiply by the cost per unit of effective production.

In short the following from steps are involved.

Step 1 – prepare statement of Equivalent production

Step 2 – Prepare statement of cost per Equivalent unit

Step 3 – Prepare of Evaluation

Step 4 – Prepare process account

The problem on equivalent production may be divided into four groups.

- I. When there is only closing work-in-progress but without process losses
- II. When there is only closing work-in-progress but with process losses
- III. When there is only opening as well as closing work-in progress without process losses
- IV. When there is opening as well as closing work-in progress with process losses

***Situation I: Only closing work-in-progress without process losses:***

In this case, the existence of process loss is ignored. Closing work-in-progress is converted into equivalent units on the basis of estimates on degree of completion of materials, labour and production overhead. Afterwards, the cost per equivalent unit is calculated and the same is used to value the finished output transferred and the closing work-in-progress

***Situation II: When there is closing work-in-progress with process loss or gain.***

If there are process losses the treatment is same as already discussed in this chapter. In case of normal loss nothing should be added to equivalent production. If abnormal loss is there, it should be considered as good units completed during the period. If units scrapped (normal loss) have any reliable value, the amount should be deducted from the cost of materials in the cost statement before dividing by equivalent production units. Abnormal gain will be deducted to obtain equivalent production.

***Situation III: Opening and closing work-in-progress without process losses.***

Since the production is a continuous activity there is possibility of opening as well as closing work-in-progress. The procedure of conversion of opening work-in-progress will vary depending on the method of apportionment of cost followed viz, FIFO, Average cost Method and LIFO. Let us discuss the methods of valuation of work-in-progress one by one.

- (a) **FIFO Method:** The FIFO method of costing is based on the assumption of that the opening work-in-progress units are the first to be completed. Equivalent production of opening work-in-progress can be calculated as follows:

Equivalent Production = Units of Opening WIP x Percentage of work needed to finish the units

- (b) **Average Cost Method:** This method is useful when price fluctuate from period to period. The closing valuation of work-in-progress in the old period is added to the cost of new period and an average rate obtained. In calculating the equivalent production opening units will not be shown separately as units of work-in-progress but included in the units completed and transferred.
- (c) **Weighted Average Cost Method:** In this method no distinction is made between completed units from opening inventory and completed units from new production. All units finished during the current accounting period are treated as if they were started and finished during that period. The weighted average cost per unit is determined by dividing the total cost (opening work-in-progress cost + current cost) by equivalent production.

- (d) **LIFO Method:** In LIFO method the assumption is that the units entering into the process is the last one first to be completed. The cost of opening work-in-progress is charged to the closing work-in-progress and thus the closing work-in progress appears cost of opening work-in-progress. The completed units are at their current cost.

**Format of statement of Equivalent Production**

Input		Output		Equivalent Production					
Particulars	Units	Particulars	Units	Material		Labour		Overhead	
				%	Units	%	Units	%	Units
Opening Stock	XX	Units completed	XX	XX	XX	XX	XX		
Units introduced	XX	Normal Loss	XX						
	XX	Abnormal Loss	XX	XX	XX	XX	XX		
		Equivalent units	XX	XX	XX	XX	XX	XX	XX

**Statement of Cost per Equivalent units**

Elements of Costing	Cost in ₹	Equivalent Units	Cost per equivalent Units in ₹
Material Cost	XX	XX	XX
Labour Cost	XX	XX	XX
Overhead Cost	XX	XX	XX

**Statement of Evaluation**

Particulars	Element of Cost	Equivalent Units	Cost per equivalent units in ₹	Cost in ₹	Total Cost in ₹
Units Completed	Material	XX	XX	XX	XX
	Labour	XX	XX	XX	XX
	Overhead	XX	XX	XX	XX
Closing WIP	Material	XX	XX	XX	XX
	Labour	XX	XX	XX	XX
	Overhead	XX	XX	XX	XX
Abnormal Loss	Material	XX	XX	XX	XX
	Labour	XX	XX	XX	XX
	Overhead	XX	XX	XX	XX

**Illustration 13: (Average Costing)**

Prepare a statement of equivalent production, statement of cost, process account from the following information using average costing method.

Opening Stock	50000 Units
Material	₹ 25000
Labour	₹ 10000

Overheads	₹ 25000
Units Introduced	2000000 Units
Material	₹ 100000
Wages	₹ 75000
Overheads	₹70000

During the period 1,50,000 units were completed and transferred to Process II.

Closing stock 1,00,000 units.

Degree of completion.

Material	100 %
Labour	50 %
Overheads	40 %

**Solution**

**Format of statement of Equivalent Production**

Input		Output		Equivalent Production					
Particulars	Units	Particulars	Units	Material		Labour		Overhead	
				%	Units	%	Units	%	Units
Opening Stock	50,000	Units completed	1,50,000	100	1,50,000	100	1,50,000	100	1,50,000
Units introduced	2,00,000	Closing Stock	1,00,000	100%	1,00,000	50	50,000	40	40,000
	2,50,000	Equivalent units	2,50,000		2,50,000		2,00,000		1,90,000

**Statement of Cost**

Element	Opening Cost	Current Cost	Total Cost	Equivalent Units	Cost per unit
Material	25,000	1,00,000	1,25,000	2,50,000	0.50
Labour	10,000	75,000	85,000	2,00,000	0.425
Overhead	25,000	70,000	95,000	1,90,000	0.50
	<b>60,000</b>	<b>2,45,000</b>	<b>3,05,000</b>		<b>1.425</b>

**Statement of Evaluation**

Particulars	Units	Cost per unit	Cost	Total cost
Units introduced and transferred	1,50,000	1.425		2,13,750
Closing Work in progress				
Material	1,00,000	0.500	50,000	
Labour	50,000	0.425	21,250	
Overhead	40,000	0.500	20,000	91,250

**Process 1 Account**

<i>Particulars</i>	<i>Units</i>	<i>Amount in ₹</i>	<i>Particulars</i>	<i>Units</i>	<i>Amount in ₹</i>
To Opening Stock	50,000	60,000	By Units Completed	1,50,000	2,13,750
To Material	2,00,000	1,00,000	By Closing Stock		91,250
To Labour		75,000			
To Overhead		70,000			
		3,05,000			3,05,000

**Illustration 14**

Following details are related to the work done in Process 'X' Pearson Company during the month of January, 2013:

<i>Opening work-in progress (2,000 units)</i>	<i>Value in ₹</i>
Materials	80,000
Labour	15,000
Overheads	45,000
Materials introduced in Process 'A' (38,000 units)	14,80,000
Direct Labour	3,59,050
Overheads	10,77,000
Units scrapped -3000 Units	
Degree of Completion	
Material	100%
Labour and Overhead	80%
Closing work-in progress:	2,000 units
Degree of Completion	
Material	100%
Labour and Overhead	80%

Units finished and transferred to Process B 35000 Units, Normal Loss is 5% of total Output including opening work-in-progress. Scrapped units fetch ₹ 20 per unit

You are required to prepare:

- (i) Statement of equivalent production
- (ii) Statement of cost
- (iii) Statement of distribution cost, and
- (iv) Process 'A' Account, Normal and Abnormal Loss Accounts

**Solution:****Statement of Equivalent Production**

Input		Output		Equivalent Production			
Particulars	Units	Particulars	Units	Material	Labour & Overhead Overhead		
				%	Units	%	Units
Opening Stock	2,000	Units completed and transferred to Process B	35,000	100	35,000	100	35,000
Units introduced	38,000	Normal Loss 5%	2,000	-	-	-	-
		Abnormal Loss	1000	100	1000	80	800
		Closing Stock	2000	100	2000	80	1600
	40,000	Equivalent units	40,000		38,000		37,400

**Statement of Cost**

Element	Opening Cost in ₹	Current Cost in ₹	Total Cost in ₹	Equivalent Units	Cost per unit in ₹
Material	80,000	14,80,000	15,60,000		
Less: Scrap Value of Normal Loss			40,000		
			15,20,000	38,000	40
Labour	15,000	3,59,000	374,000	37,400	10
Overhead	45,000	10,77,000	11,22,000	37,400	30
	45,000	2,45,000	3,05,000		80

**Statement of Evaluation**

Particulars	Units	Cost per unit in ₹	Cost in ₹	Total cost in ₹
Units introduced and transferred	35,000	80		28,00,000
Abnormal Loss				
Material	1000	40	40,000	
Labour and Overhead	800	40	32,000	72,000
Closing Work in progress				
Material	2000	40	80,000	
Labour & Overhead	1600	40	64,000	1,44,000

**Process A**

Particulars	Units	Amount in ₹	Particulars	Units	Amount in ₹
To Opening Stock	2,000	1,40,000	By Normal Loss	2000	40,000
To Material	38,000	14,80,000	By Abnormal Loss	1000	72,000
To Labour		359000	By Units Completed	35,000	28,00,000
To Overhead		1077000	By Closing Stock	2,000	144,000
	40,000	30,56,000		40,000	30,56,000

**Normal Loss A/c**

Particulars	Units	Amount in ₹	Particulars	Units	Amount in ₹
To Process A A/c	2000	40,000	By Bank A/c	2000	40,000

**Abnormal Loss A/c**

Particulars	Units	Amount in ₹	Particulars	Units	Amount in ₹
To Process A A/c	1000	72,000	By Bank A/c	1000	20,000
			By Costing P & L A/C		52,000
		72,000			72,000

**Illustration 15**

During the month of July 2012 in a Industry 2,000 units were introduced into Process I. The cost of the 2,000 units was ₹ 11,600. At the end of the month 1,500 units had been produced and transferred to Process II; 360 units were still in process; and 140 units had been scrapped. A normal loss of 5% on input is allowed. It was estimated that the incomplete units (i.e. the work-in-progress) had reached a stage in production as follows :

Material	75% completed
Labour	50% completed
Production overhead	50% completed

The total cost incurred were (in addition to the 2,000 units):

Direct materials introduced during the process	₹ 3,080
Direct wages	₹ 6,880
Production overheads	₹ 3,440
Units scrapped realized	₹ 2 each

The units scrapped had passed through the process, so were 100% completed as regards material, labour and overhead.

Prepare the Process Account and Abnormal Loss Account.

**Solution****Statement of Production****Process 1**

Input Units		Output Units	Equivalent production (Units)					
			Material		Labour		Overhead	
			Qty.	%	Qty.	%	Qty.	%
2,000	Normal loss	100	-	-	-	-	-	-
	Abnormal loss	40	40	100	40	100	40	100
	Finished							
	Production	1,500	1,500	100	1,500	100	1,500	100
	Work-in-progress	360	270	75	180	50	180	50
2,000	Total	2,000						
	Equivalent production		1,810		1,720		1,720	



## Statement of Cost

## Process 1

<i>Elements of Cost</i>	<i>Cost</i>	<i>Equivalent Production</i>	<i>Cost per unit</i>
	₹	(Units)	
<b>Materials:</b>			
Units introduced	11,600		
Direct	<u>3,080</u>		
	14,680		
Less: Scrap value of normal loss	<u>200</u>		
	14,480	1,810	8
Labour: Direct	6,880	1,720	4
Overhead: Production	3,440	1,720	2
<b>Total</b>	<b>24,800</b>		<b>14</b>

## Statement of Evaluation

## Process 1

<i>Production</i>	<i>Elements of cost</i>	<i>Equivalent production (units)</i>	<i>Cost per unit</i>	<i>Cost</i>	<i>Total cost</i>
Abnormal loss	Material	40	8	320	
	Labour	40	4	160	
	Overhead	40	2	80	560
Finished production	Material	1,500	8	12,000	
	Labour	1,500	4	6,000	
	Overhead	1,500	2	3,000	21,000
Work-in-progress	Material	270	8	2,160	
	Labour	180	4	720	
	Overhead	180	2	360	3,240
					<b>24,800</b>

## Process Account

	<i>Units</i>	₹		<i>Units</i>	₹
To Units introduced	2,000	11,600	By Normal loss	100	200
To Material		3,080	By Abnormal loss	40	560
To Labour		6,880	By Process II	1,500	21,000
To Overhead		3,440	By Work-in-Progress	360	3,240
	<b>2,000</b>	<b>25,000</b>		<b>2,000</b>	<b>25,000</b>

**Abnormal Loss Account**

	Units	₹		Units	Rs
To Process A/c	40	560	By Cash	40	80
			By Costing P & L A/c		480
	<b>40</b>	<b>560</b>		<b>40</b>	<b>560</b>

**Illustration 16**

Opening work-in-process - 1,000 units (60% complete) Cost ₹ 1,100. Units introduced during the period 10,000 units; Cost ₹ 19,300. Transferred to next process - 9,000 units.

Closing work-in-process - 800 units (75% complete). Normal loss estimated at 10% of total input including units in process at the beginning. Scrap realised Re. 1.00 per unit. Scrapped units are 100% complete.

Compute equivalent production and cost per equivalent unit according to FIFO and average cost method. Also evaluate the output.

**Solution:****FIFO Method****Statement of equivalent production and cost per unit**

Particulars	Input Units	Particulars	Output units	Equivalent Percentage of work done During period	Production Equivalent units
Op. work-in- process	1,000	Op. WIP completed	1,000	40	400
Units Introduced	10,000	Completed	8,000	100	8,000
		Normal loss	1,100	-	-
		Closing work- in-process	800	75	600
		Abnormal loss	100	100	100
	<b>11,000</b>		<b>11,000</b>		<b>9,100</b>

Cost of the process (for the period) ₹ 19,300

Less: Scrap value of normal loss  $\frac{₹1,100}{₹18,200}$

₹ 18,200

Cost per equivalent unit ₹ 18,200 / 9,100 = ₹ 2

## Statement of Evaluation

<i>Particulars</i>	<i>Equivalent units</i>	<i>Cost per equivalent units</i> ₹	<i>Amount</i> ₹
1. Opening WIP completed	400	2.00	800
Add: Cost of Opening WIP	–	–	1,100
(Complete Cost of 1,000 units of opening WIP	1,000	1.90	(1,900)
2. Completely processed units	8,000	2.00	16,000
3. Abnormal loss	100	2.00	200
4. Closing WIP	600	2.00	1,200

## Average Cost Method

## Statement of equivalent production and cost per unit

<i>Output</i>	<i>Units</i>	<i>Equivalent percentage</i>	<i>Production units</i>
Transferred to next process	9,000	100	9,000
Normal loss	1,100	-	-
Abnormal loss	100	100	100
Closing WIP	800	75	600
			9,700

## Costs

	₹
Opening work-in-process	1,100
Costs of units introduced	<u>19,300</u>
	20,400
Less: Scrap value realised on normal loss	<u>1,100</u>
	₹ 19,300
Cost per equivalent unit	₹ 19,300 / 9,700 = ₹ 1.99 (approx)

## Statement of Evaluation

<i>Particulars</i>	<i>Equivalent units</i>	<i>Cost per equivalent unit</i> ₹	<i>Amount</i> ₹
1. Transferred to next process	9,000	1.99	17,910
2. Abnormal loss	100	1.99	199
3. Closing work-in-process	600	1.99	1,191
			19,300

## BY-PRODUCTS AND JOINT PRODUCTS

By-products are defined as “any saleable or usable value incidentally produced in addition to the main product”. By-products means secondary or subsidiary products arising in the course of manufacturing the main product(s). In the process of producing the main product it frequently occurs that materials or other products emerge which are of smaller value. These are the by-products and even if subsequent processing enhances their value, the resulting profit will be less than that from the main product; otherwise, of course the by-product would become the main product and vice-versa. For example, in oil refinery crude oil is processed but by-products, i.e. bitumen, chemical fertilizer are obtained with the main product-refined oil. Similarly in coke ovens, gas and tar are incidentally produced in addition to the main product coke. Gas and tar are therefore treated as by-products.

There are certain industries where two or more products of equal importance are simultaneously produced such products are regarded as joint products. Joint-products thus represent two or more products separated in the course of same processing operations, usually requiring further processing, each product being in such proportion that no single product can be designated as a major product. CIMA has defined it as “two or more products separated in processing, each having a sufficiently high saleable value to merit recognition as a main product.”

So joint products imply the following :

- (i) They are produced from the same basic raw materials.
- (ii) They are comparatively of equal importance.
- (iii) They are produced simultaneously by a common process.
- (iv) They may require further processing after the point of separation.

Examples of joint products are gasoline, diesel, kerosene, lubricants, tar, paraffin and asphalt obtained from crude oil. Different grades of lumber resulting from a lumbering operation is another example.

The classification of various products from the same process into joint products and by-products depends upon the relative importance of the products and their value of the various end-products are almost equal in importance and their value is also more or less the same, they may be identified as joint products. But, if one end-product has greater importance and higher value and the other products are of less importance and rather of low value, the latter may be classified as by-products. It may be noted that the value of some end-products may be so insignificant as that they may be classified as waste or scrap. Thus by-products are distinguished from joint products and waste or scrap only in respect of degree of importance and value. Joint products are produced simultaneously but the by-products are produced incidentally in addition to the main product.

## ACCOUNTING FOR BY-PRODUCTS

Accounting for by-products may be classified as follows :

### Non-cost or Sales Value Methods

- (i) Other income method: In this method the sales value of by-products is credited to profit and loss account, treating it as other miscellaneous income.
- (ii) By-products sales deducted from total cost: Under this method the sale proceeds of the by-products are treated as deductions from total costs. The sales value is deducted either from the production costs or cost of sales.

- (iii) By-product sales added to the main product sales: In this case all costs incurred on main and by-products are deducted from the combined sales of the main product and by-products.
- (iv) Crediting sales value less administration, selling and distribution expenses: In this method, a portion of the administration, selling and distribution overhead incurred for disposing of the by-product is deducted from the sale value for credit to process account.
- (v) Crediting sales value less the costs incurred on by-products after split off point: In certain cases it becomes necessary to perform some further operations on by-products after the split off point, in order to make it saleable. Credit is given to the process account for sale value less the cost after split off point.
- (vi) Reverse cost method: Under this method, an estimated profit from the sale of by-products, selling and distribution expenses and further processing cost, after the split off points are deducted from the sale value of by-products and the net amount is credited to the main product.

### Cost methods

- (i) *Opportunity or replacement cost method*: This method is adopted where by-products are utilised by the factory itself as input material for some other process. The opportunity cost or replacement cost which otherwise would have been incurred if the by-products were to be purchased from outside suppliers is taken as the basis for costing by-products. The process account is credited with the value of by-products so ascertained.
- (ii) *Standard cost method*: A standard cost is set on the basis of technical assessment for each by-product and credit is given to the process account on this basis. Because of the stability of this method, effective control would be exercised on the cost of the main product.
- (iii) *Apportionment on suitable basis*: Where by-products are of major significance, cost should be apportioned on the most suitable basis, i.e. physical measurement, market value etc.

### ACCOUNTING FOR JOINT PRODUCTS

Joint products are not identifiable as separate products until a certain point or stage of production is complete. This stage is known as split off point. Cost incurred prior to the split off point are referred to as joint costs. Costs incurred after this stage are referred to as separate or subsequent costs. Accounting of joint products implies the assignment of a portion of the joint cost to each of the joint product. Unless the joint costs are properly and reasonably apportioned to different joint products produced, the cost of joint products will vary considerably and this will affect valuation of inventory, pricing of products and profit or loss on sale of different products. The commonly used methods for apportioning total process costs up to the point of separation over the joint products are as follows :

- (i) Physical unit method
- (ii) Average unit cost method
- (iii) Survey method
- (iv) Contribution margin method
- (v) Market value method :
  1. At the point of separation
  2. After further processing
  3. Net realisable value.

**Physical unit method**

This method is based on the assumption that the joint products are capable of being measured in the same units. Accordingly joint costs here are apportioned on the basis of some physical base, such as weight or measure expressed in gallons, tonnes etc. In other words, the basis used for apportioning joint costs over the joint products is the physical volume of materials present in the joint products at the point of separation. Any loss arising during the stage of processing is also apportioned over the products on the same basis. This method cannot be applied if the physical units of the two joint products are different. The main defect of this method is that it gives equal importance and value to all the joint products.

**Average unit cost method**

Under this method, total process costs (upto the point of separation) are divided by total units of joint products produced. On division, average cost per unit of production is obtained. The effect of application of this method is that all joint products will have uniform cost per unit. Under this method customers of high quality items are benefited as they have to pay less price on their purchases.

**Survey method**

This method is also known as points value method. It is based on technical survey of all the factors involved in the production and distribution of products. Under this method joint costs are apportioned over the joint products, on the basis of percentage/point values, assigned to the products according to their relative importance. This method is considered to be more equitable than other methods.

**Contribution margin method**

According to this method, joint costs are segregated into two parts-variable and fixed. The variable costs are apportioned over the joint products on the basis of units produced (average method) or physical quantities. In case the products are further processed after the point of separation, then all variable costs incurred be added to the variable costs determined earlier. In this way total variable cost is arrived at which is deducted from their respective sales values to ascertain their contribution. The fixed costs are then apportioned over the joint products on the basis of the contribution ratios.

**Market value method**

This is the most popular and convenient method because it makes use of a realistic basis for apportioning joint costs. Under this method joint costs are apportioned after ascertaining "what the traffic can bear". In other words, the products are made to bear a proportion of the joint costs on the basis of their ability to absorb the same. Market value means weighted market value i.e. units produced x price of a unit of joint product.

**(i) Market value at the point of separation or relative market value method:**

The adoption of this method involves the following steps :

- (a) The physical output of each product is multiplied with the market price at the split off point.
- (b) The resultant market value of all products are then added.
- (c) The percentage of the market value of each product to the total of the market values under (b) above is found out.
- (d) These percentages are used to allocate the total input cost among the joint products.

**(ii) Market value after further processing:**

Here the basis of apportionment of joint costs is the total sales value of finished products and involves the same principle as stated in (i) above.

**(iii) Net realisable value method:**

From the sales value of the joint products (at finished stage) the followings are deducted :

- (a) estimated profit margins.
- (b) selling and distribution expenses, if any, and
- (c) post-split off costs.

The resultant figure so obtained is known as net realisable value of joint products. Joint costs are apportioned in the ratio of net realisable values. This method is extensively used in many industries.

**CO-PRODUCTS**

Co-products are particular type of products but produced in different varieties. These products may not necessarily arise from the same operation or raw materials and may be produced in different quantities without any co-relation to the others according to the needs of the market. For example, in fan manufacturing industry, a number of co-products may be produced in different quantities, such as, ceiling fan, table fan, pedestal fan, cabin fan etc. Similarly, in automobile industry co-products are, cars, jeeps, trucks, buses etc. Co-products are distinguished from joint products in as much as the quantities of joint products remain in linear relationship between them whereas co-products are independent ones and may be produced in different quantities without any co-relationship with others.

**Illustration 17**

A by-product 'Kappa' is derived in the course of manufacturing a product 'Gamma'. The by-product is further processed for sale. From the following data available from cost records, prepare an account showing the cost per kg. of the product 'Gama'.

	Joint expenses	Separate expenses	
		Gamma	Kappa
Materials	₹ 20,000	₹ 12,000	₹ 1,000
Labour	14,000	10,000	4,000
Overheads	5,000	3,000	1,200

The quantities produced during the period under consideration were:

Gamma	400 kgs.
Kappa	100 kgs

The selling price of Kappa was ₹ 240 per kg. on which the profit earned was estimated at 30% of the selling price.

**Solution:**

The cost of production of the main product 'Gamma' is to be determined. It is necessary to prepare the cost of Kappa to the split-off point by applying the reverse cost method.

The cost of by-product 'Kappa' up the split-off point is worked out as under:

	₹/Kg.
Selling Price	240
Less: Profit (30% of S.P.)	<u>72</u>
Cost of sales	168
Less: Cost split-off expenses ₹ 6,200 /100 =	<u>62</u>
Joint cost of by-product upto split-off point	<u>106</u>

Joint cost of by-product upto split-off point = ₹ 106 x 100 = ₹ 10,600

Joint cost of Gamma upto = Total joint cost less joint cost of by split-off point product upto split-off point  
₹

Materials	=	20,000
Labour	=	14,000
Overheads	=	<u>5,000</u>
		<u>39,000</u>

Share of Joint cost of Gamma = ₹ 39,000 – ₹ 10,600 = ₹ 28,400

#### Gama Product Account

Dr.			Cr.
	₹		₹
To Joint expenses	28,400	By Cost of production	
To Post-separation expenses		400 kg. @ ₹ 133.50	53,400
Materials	12,000		
Labour	10,000		
Overheads	3,000		
	53,400		53,400

So total cost of production of Gamma is = ₹ 53,400

Cost per kg. = 53,400 /400 or ₹ 133.50

#### **Illustration 18**

In the course of manufacture of the main product 'A', by-products 'X' and 'Y' also emerge. The joint expenses of manufacture amount to ₹ 1,19,550. All the three products are processed further after separation and sold as per details given below :

	<i>Main product</i>		<i>By-products</i>	
	'A'	'X'	'Y'	
Sales	₹ 90,000	60,000	40,000	
Cost incurred after separation	₹ 6,000	5,000	4,000	
Profit as percentage on sales	25	20	15	

Total fixed selling expenses are 10% of total cost of sales which are apportioned to the three products in the ratio of 1 : 2 : 2.

Prepare a statement showing the apportionment of joint costs to the main product and the two by-products.



If the by-product 'X' is not subjected to further processing and is sold at the point of separation for which there is a market, at ₹ 58,500 without incurring any selling expenses, would you advise its disposal at this stage?

Show the workings.

**Solution:**

**(i) Statement showing apportionment of joint costs to main product and the two by-products**

	Main product		By-products		Total
	'A'	'X'	'Y'		
	₹	₹	₹	₹	
Sales	90,000	60,000	40,000	1,90,000	
Less: Profit	<u>22,500</u>	<u>12,000</u>	<u>6,000</u>	<u>40,500</u>	
Cost of sales	67,500	48,000	34,000	1,49,500	
Less: Selling expenses	<u>2,990</u>	<u>5,980</u>	<u>5,980</u>	<u>14,950</u>	
Cost of production	64,510	42,020	28,020	1,34,550	
Less: Post-separation cost	<u>6,000</u>	<u>5,000</u>	<u>4,000</u>	<u>15,000</u>	
Cost at the stage of separation	58,510	37,020	24,020	1,19,550	

**Note:** The fixed selling expenses are 10% of cost of sales (₹ 1,49,500) i.e. ₹ 14,950. These are apportioned to main product 'A' and by-products 'X' and 'Y' in the ratio of 1 : 2 : 2.

**(ii) Decisional Economics of By-Product 'X'**

	Sales at split off stage	Sales after further processing
	₹	₹
Sales	58,500	60,000
Costs	<u>37,020</u>	<u>42,020</u>
Contribution	21,480	17,980

It is advisable to sell the by-product 'X' before processing since the contribution earned is more if the by-product is not processed further.

Since selling expenses are fixed and do not affect the contribution from the two alternatives, selling expenses need not be taken into account while working out the economics of the by-product.

## SERVICE COSTING

### INTRODUCTION

Service Costing or operation costing is normally used in service sector. When the service is not completely standardized, it is the cost of producing and monitoring a service. It is a method of costing applied to undertakings which provide service rather than production of commodities. Service may be performed internally and externally. Services are termed as internal when they have to be performed on inter-departmental basis in factory itself e.g. Power house services, canteen service etc. Services are termed as external when they are to be rendered to outside parties. Public utility services like transport, water supply, electricity supply, hospitals are the best example for the service costing. Thus Service costing is a method of

cost accumulation which is designed to determine the cost of services. Service costing is just a variant of unit or output costing. Service costs are collected periodically like process cost. The cost of rendering the service for particular period is related to quantum of services rendered during the particular period to arrive at cost per unit of service rendered. So the principal of unit costing is used in service costing.

### MEANING OF SERVICE COSTING

Service costing is a method of ascertaining the cost of providing or services a service. It is also known as operation costing CIMA London, defines Service Costing as “that form of operation costing which applies where standardized services are rendered either by an undertaking or by a service cost center within an undertaking”.

### FEATURES OF SERVICE COSTING

The main features of operating costing are as following:

- (1) The undertaking which adopts service costing does not produce any tangible goods. These undertakings render unique services to their customers.
- (2) The expenses are divided into fixed and variable cost. Such a classification is necessary to ascertain the cost of service and the unit cost of service.
- (3) The cost unit may be simple or composite. The examples of simple cost units are cost per unit in electricity supply, cost per litre in water supply, cost per meal in canteen etc. Similarly cost per passenger kilometers in transport cost per patient-day in hospital, costs per room-day in hotel etc. are the examples of composite cost unit.
- (4) Total cost is averaged over the total amount of service rendered.
- (5) Costs are usually computed period-wise. However, in the case of utilization of vehicles, use of road-rollers etc., the costs are computed order wise.
- (6) Service costing can be used for service performed internally or externally.
- (7) Documents like the daily log sheet, cost sheet etc. are used for the collection of cost data.

### APPLICATION OF SERVICE COSTING

Service costing is very useful in determining the cost of providing services which became a base for ascertaining the price of services. Service costing is extensively used in Transport industries. Hotel industries, electricity company etc.

Service costing helps an organisation in ascertaining

1. Inter-departmental service prices
2. Service cost to be charged from outside clients
3. Benchmarking the processes/operations
4. Tracking and controlling the excess cost

### UNIT COSTING AND MULTIPLE COSTING

**Unit Costing:** It refers to a costing method which is used when cost units are identical. Cost units that are identical should have identical costs. It is mainly used where a single product is the cost object. It is mainly used in mining, quarries and cement industries.

**Multiple Costing:** It refers to the method of costing followed by a business wherein a large variety of articles are produced, each differing from the other both in regard to material required and process of manufacture. In such cases, cost of each article is computed separately by using, generally, two or more methods of costing.

### Cost Unit

Determining the suitable cost unit to be used for cost ascertainment is a major problem in service costing. Selection of a proper cost unit is a difficult task. A proper unit of cost must be related with reference to nature of work and the cost objectives. The cost unit related must be simple i.e. per bed in a hospital, per cup of tea sold in a canteen and per child in a school. In a certain cases a composite unit is used i.e. Passenger – Kilometer in a transport company.

Examples of Cost Units in different Service Industries:

1. Passenger transport Kilometer
2. Goods transport Ton – Kilometer
3. Hotel Per room per day
4. Hospital Per bed per day
5. Canteen Per item, per meal
6. Water supply Per 1000 liters
7. Electricity Per kilowatt

Operating costs are usually collected under following headings:

1. Fixed or standard charges
2. Semi-fixed or maintenance charges
3. Variable or running charges.

An important feature of operating costing is that mostly such costs are fixed in nature. The operating costs may be collected for different cost units so that the relevance, and utility of cost data could be understood e.g. in hospital cost accounting; fixed charges may be apportioned in accordance with the number of available bed days but variable costs in hospitals may be ascertained in terms of occupied bed days.

### (a) Transport Costing

In transport undertakings, the cost unit is normally the tonne-km or passenger-km; but according to the nature of the undertakings, the organisation may vary the cost unit. It is selected keeping in view the needs of each concern depending upon the weight, bulk and types of goods carried and distance covered in each trip. The motor transport costing has the following objectives:

- (i) Control of operating and running costs and avoidance of waste of fuel and other consumable material.
- (ii) Cost of running own vehicles may be compared with hired or other forms of transport.
- (iii) Facilitates quotation of hiring rates to outside parties who ask for the transport service.
- (iv) Cost of running a vehicle may be compared with that of another similar vehicle.
- (v) Cost of idle vehicles and lost running time are easily obtained.

(vi) Since transport department is treated as separate department, the cost of services rendered to other departments can easily be determined.

**Composition of costs**

The total costs consist of: (i) Standing charges; (ii) Running charges; (iii) Maintenance charges.

**Standing charges**

1. Licence duty and insurance; 2. Garage costs and administrative expenses; 3. Wages of drivers and conductors; 4. Depreciation; 5. Tax; etc.

**Running (variable) costs:**

1. Petrol or diesel; 2. Oil; 3. Grease; etc.

**Maintenance charges**

1. Repairs and maintenance; 2. Cost of tyres, tubes, batteries, etc.; 3. Garage charges; 4. Overhauling of vehicles;

The number of cost units is calculated as follows in transport costing:

<b>Number of vehicles x capacity x distance travelled x days x passengers (or weight carried)</b>
---

Accumulation and control of costs in transport costing are achieved through a daily log sheet and operating cost sheet. A daily log report is prepared for each vehicle and filled in by the drivers. This is a document which contains information regarding each journey. The details shown in the log book enable the management to make suitable allocation of vehicles to avoid waste or idle running capacity. The records also provide data for the proper allocation of costs and in this respect, these may be compared with the production details available in a manufacturing concern.

**Vehicle Log Book**

Vehicle No. :	Date :
Make and Specification :	Driver :
Registration/Licence No.:	Route on which playing :
Date of Purchase :	

**PARTICULARS OF TRIPS**

Trip No.	From	To	Dis-tance K.M.	Goods/ Passengers		Ton/ Kilometer	Time		Ac-tual	Stan-dard	Re-marks
				Out	En-route		Out	In			
Total											
Supplies:						Time:					
Petrol/Diesel:						Driver:					
Lubricating Oil:						Cleaner:					
						Mechanic:					
						Details of Delays					



**(b) Boiler House Costing**

Operating costing is also applied in those undertakings engaged in steam production. In large firms, a boiler house is a service department providing services to production departments. The total costs are obtained for producing steam. A cost unit is generally in terms of kilograms.

**Boiler House Cost Sheet**

Month.....	Total Consumption.....	
Total Steam Produced.....		
Items	Total cost	Cost per 1000 kgs.
(A) Fixed Overheads		
Rent, rates etc.		
Depreciation of plant		
Depreciation of building		
Insurance		
(B) Maintenance		
Meters		
Furnace		
Service materials		
Tools and accessories		
(C) Labour Charges		
Coal handlers		
Ash removers		
(D) Fuel		
Fuel		
Power		
(E) Water Charges		
Water purchased		
Water softening		
(F) Supervision and other charges		
Foremen		
Engineers		
General labour		
Cleaners		
<b>Total</b>		

**(c) Canteen Costing**

In most organisations, canteen facilities are provided at subsidy so that food and other items can be provided at minimum price. The costs are accumulated on a cost sheet which gives the total cost incurred. From the total cost, the subsidy is deducted to arrive at the net-cost of operating the canteen. After comparing the net cost with the sales proceeds profit or loss is calculated.

**Canteen Cost Sheet**

Month.....

Items	Total Cost		Cost per meal
	Current Month	Previous Month	
(A) Provisions			
Bread			
Biscuits			
Cakes			
Eggs			
Meat			
Fish			
Vegetables			
Milk			
Fruits			
Others			
(B) Labour and Supervision			
Supervisor			
Cooks			
Helpers			
Counter clerks			
Cleaners			
Sweepers			
(C) Maintenance			
Crockery			
Glassware			
Towels			
Rent			
Light			
Gas			
Insurance			
Consumable store			
Total Cost			
Less: Subsidy			
Net Cost			
Total Cost			
Sales			
Profit/Loss			

**(d) Hospital Costing**

The main purpose of hospital costing is to ascertain the cost of providing medical services. For costing purposes hospital service can be divided into the following categories :

- (i) Out-patient department
- (ii) Casualty or emergency
- (iii) Wards
- (iv) Medical service departments, such as, Radiotherapy, X-ray, Pathology etc.
- (v) General service departments, such as, power, heating, lighting, catering, laundering, medical records and administration.
- (vi) Other service departments, such as, dispensary, transport etc.

Following units are used in hospital costing:

Out-patient department - per out patient

Casualty - per patient

Wards - per patient - bed per day

Radiotherapy - per course of treatment per day or per person.

Laundry - per 100 articles laundered.

For ascertaining cost figures, a hospital operating cost sheet is prepared.

**REVIEW QUESTIONS**

**Re-write the following sentence after filling-in the blank spaces with appropriate word:**

- (i) Service costing is also known as \_\_\_\_\_.
- (ii) Boiler house costing is an example of \_\_\_\_\_ costing.
- (iii) Room-day is the cost unit used in \_\_\_\_\_.
- (iv) An electricity supply company uses \_\_\_\_\_ as cost unit.

**Correct answer:** (i), (ii) Operating Costing, (iii) Hotel (iv) Kilowatt hour

**Illustration 19**

The under given data is supplied by Fair deal travel services, From the following information calculate fare for passenger KM

The cost of the Bus	₹ 4,50,000
Insurance charges	3 % p.a.
Annual tax	₹ 4500
Garage rent	₹ 500 p.m.
Annual repairs	₹ 4800
Expected life of the bus	5 yrs
Value of scrap at the end of 5 years	₹30,000
Route distance	20 km long
Driver's salary	₹ 550 p.m.



Conductor's Salary	₹ 500 p.m.
Commission to Driver & conductor (shared equally)	10 % of the takings
Stationary	₹ 250 p.m.
Manager-cum-accountant's Salary	₹ 1750 p.m.
Diesel and Oil (for 100 kms)	125

The bus will make 3 rounds trips for carrying on the average 40 passenger's in each trip. Assume 15 % profit on takings. The bus will work on the average 25 days in a month.

**Solution**

**Operating Cost Statement**

<i>Particulars</i>	<i>Amount in ₹</i>	
Standing Charges		
Depreciation [₹ (4,50,000-30,000)/5]	84,000	
Tax	4,500	
Stationary	3,000	
Manager Salary	21,000	
Insurance (3% of ₹4,50,000)	13,500	1,26,000
Maintenance Charges		
Garage rent @ ₹500 P.M	6,000	
Annual repair	4,800	10,800
Variable Charges		
Driver salary @ ₹550 P.M	6,600	
Diesel and Oil @ ₹125 for 100 kms (20*3*2*25*125)/100	3,750	
Conductors' Salary @ ₹500 per month	6,000	16,350
Total		1,53,150
Commission to Driver and Conductor (10% of undertaking)		20,420
Profits ( 15% of undertakings)		30,630
<b>Total Takings</b>		<b>2,04,200</b>

Total No. of Km run in a Year = 3 x 2 x 20 x 25 X 12 = 36,000 km

Total No. of passenger km per annum: 360,00 x 40 = 14,40,000

$$\text{Fare for passengers km} = \frac{\text{Total Fare}}{\text{Passenger Km}} = \frac{₹2,04,200}{14,40,000} = ₹0.14180$$

**Illustration 20**

Union Transport Company supplies the following details in respect of a truck of 5 tonne capacity :

Cost of truck	₹ 4,50,000
Estimated life	10 years
Diesel, oil, greese	₹ 150 per trip each way
Repairs and maintenance	5,000 per month
Drivers' wages	5,000 per month

Cleaners' wages	2,500 per month
Insurance	4,800 per year
Tax	2,400 per year
General supervision charges	4,800 per year

The truck carries goods to and from the city covering a distance of 50 km. each way.

In outward trip, freight is available to the extent of full capacity and on return 20% of capacity. Assuming that the truck runs on an average of 25 days a month, work out:

- Operating cost per tonne-km.
- Rate per tonne per trip that the company should charge if a profit of 50% on freight is to be earned.

**Solution:**

**Working Notes:**

- Tonne-km per month = 6 tonnes x 50 km x 25 days = 7,500 tonne - km. (5 tonnes on outward trip and one tonne on return trip)
- It is assumed that the truck makes only one trip per day.
- The scrap value of the truck is assessed to be nil.

Depreciation = ₹ 4,50,000/10 = ₹ 45,000

**Union Transport Company**  
**Statement showing operation costs**

	Cost per month		Per tonne Km.
	₹		₹
<b>Fixed Costs:</b>			
Driver's wages	5,000		
Cleaner's wages	2,500		
Insurance	400		
Taxes	200		
General supervision	<u>400</u>	8,500	1.133
<b>Variable Costs:</b>			
Diesel, oil, grease	7,500		
Depreciation	3,750		
Repairs and maintenance	<u>5,000</u>	<u>16,250</u>	<u>2.167</u>
(a) Operating Costs		<u>24,750</u>	<u>3.300</u>
<b>(b) Freight rate:</b>			
Cost per tonne-km	3.30		
Profit per tonne-km	<u>3.30</u>		
	<u>6.60</u>		

Freight per trip (both ways) ₹ 1,980.

**Illustration 21**

20 Hp unit is required to drive a pump for watering an agricultural farm. Two plans A and B for supplying are under consideration :

	A	B
Purchase and installation	₹ 10,000	₹ 4,000
Life in years	4	4
Salvage value	1,000	—
Interest on capital	10%	10%
Maintenance per year	₹ 3,000	—
Maintenance per hour	—	0.50
Operating wages per hour	₹ 0.20	₹ 0.60
Power per hour	₹ 1.00	—
Fuel and oil per hour	—	2.00

Assuming that 3 million litres of water is to be pumped in a year and that the pump will pump 1,000 litres in an hour, find out the cost per 1,000 litres of water under both the plans and find out the number of hours for which the operating costs of both the machines will be even.

**Solution:****Operating Cost Statement****30,00,000 litres of water pumped**

	<i>Plan A</i>	<i>Plan B</i>
	₹	₹
Depreciation	2,250	1,000
Interest	1,000	400
Maintenance	3,000	1,500
Operating wages	600	1,800
Power	3,000	-
Fuel and oil	-	6,000
	<u>9,850</u>	<u>10,700</u>
Cost per 1,000 litres	₹ 3.28	₹ 3.57

Number of hours in a year = 30,00,000/1,000= 3,000

If the number of hours for which the operating costs of both the machines is even, say, x, then

$1.20x + 6,250$  (Cost under A) =  $3.10x + 1,400$  (Cost under B)

whereby  $x = 2,553$  hours (approximately).

Thus, the cost of operating the machine under both the place will be even when they have worked for 2,553 hours.

### **Illustration 22:**

The following information is available from an intensive care unit.

Rent (including repairs) ₹ 10000 p.m.

The unit cost consists of 25 beds and 5 more beds can be accommodate when the occasion demands. The permanent staff attached to the unit is as follows:

2 supervisors each at a salary of ₹ 2000 per month. 4 nurse each at a salary of ₹ 1500 per month. 2 ward boys each at a salary of ₹ 1000 per month.

Though the unit was open for the patients all the 365 days in a year, security of accounts of 2012 revealed that only 150 days in a year the unit had the full capacity of 25 patients per day and for another 80 days it had on an average 20 beds only occupied per day. But there were occasions when the beds were full, extra beds were hired from outside at a charge of ₹ 10 per bed per day . The total hire charges for the whole year were ₹ 8,000. The unit engaged expert doctor from outside to attend on the patients and the fees were paid on the basis of number of patients attended at time spent by them on an average worked out to ₹ 20,000 per month in 2012.

The other expenses for the year were as under.

Repairs and maintenance	₹ 8,000
Food supplied to patients	₹ 1,00,000
Janitor and other services for patients	₹ 25,000
Laundry charges for bed linens	₹ 40,000
Medicines supplied	₹ 70,000
Cost of oxygen, x ray etc other than directly born	₹ 90,000
for treatment of patients (Fixed)	
General administration charges allocated to the unit	₹ 1,00,000

(1) If the unit recovered an overall amount of ₹ 200 per day on an average from each patient what is the profit per patient day made by the unit in 2012.

(2) The unit wants to work out a budget for 2009, since the number of patients is very uncertain, annuity the same revenue and expenses prevail in 2013, work out the number of patient days required break-even.

### **Solution:**

#### **Total Number of patients in Year 2012**

#### **Patients at Full /below capacity**

150 days at full capacity of 25	= 3,750
80 days at average occupancy of 20	= 1600

**Extra bed utilized at peak demand**

Total money spent on extra beds	= ₹ 8,000
Hiring charges of one bed	= ₹ 10 per bed per day
Extra bed utilized	= (₹8,000/10)
	= 800
Total number of Patients handled	= 3,750+1,600+800
	= 6,150

**Statement of Cost and Profit**

<i>Particulars</i>	<i>Amount in ₹</i>	<i>Total in ₹</i>
<b>A. Income Received (6,150 x 200)</b>		12,30,000
<b>B. Variable Cost</b>		
Food supplied to patients	1,00,000	
Janitor and other services for patients	25,000	
Laundry charges for bed linens	40,000	
Medicines supplied	70,000	
Doctor fee @ ₹ 20,000 per month	2,40,000	
Hire charges for extra bed	<u>8,000</u>	<u>4,83,000</u>
Contribution		7,47,000
<b>C. Fixed Cost</b>		
Salaries for 2 supervisors @ ₹2,000 per month for 12 months	48,000	
Salaries for 4 nurses @ ₹ 1500 per month for 12 months	72,000	
Salaries of 2 ward boys @ ₹1,000 per month for 12 months	24,000	
Rent @ ₹10,000 per month for 12 months	1,20,000	
General Administration Charges	1,00,000	
Cost of Oxygen, X rays	90,000	
Repair and Maintenance	<u>8,000</u>	<u>4,62,000</u>
<b>Profit</b>		<u>2,85,000</u>

A- Profit = 2,85,000

$$\text{Profit per patient day} = \frac{\text{₹}2,85,000}{6,150} = \text{₹}46.34$$

B- Break even in ₹ = Fixed Cost /PV Ratio

$$\begin{aligned} \text{PV ratio} &= (\text{Sales}-\text{Variable cost})/\text{Sales} \\ &= (\text{₹ } 12,30,000 - \text{₹}4,83,000)/ \text{₹}12,30,000 \\ &= 0.6073 \end{aligned}$$

$$\begin{aligned} \text{BEP} &= (\text{₹ } 4,62,000/0.6073) \\ &= \text{₹}7,60,744 \end{aligned}$$

$$\begin{aligned} \text{No of patients for break even} &= \text{₹ } 7,60,744/\text{₹}200 \\ &= 3804 \end{aligned}$$

**Illustration 23**

A public health centre runs an Medical Care Unit. For this purpose, it has hired a building at a rent of ₹ 50,000 per month with the understanding that it would bear the repairs and maintenance charges also.

The Unit consists of 25 beds and 5 more beds can be comfortably accommodated when the occasion demands. The permanent staff attached to the unit are as follows:

1. Supervisor each at a salary of ₹ 2,000 p.m.
2. Nurses each at a salary of ₹ 1,200 p.m.
3. Ward boys, each at a salary of ₹ 300 p.m.

Though, the unit is open for patients all the 365 days in a year scrutiny of accounts in 2012-13 reveals that only for 120 days in the year, the unit bed the full capacity of 25 patients per day and for another 80 days, it had on an average 20 beds occupied per day. But there were occasion when the beds were full, extra beds were hired at a charge of ₹ 50 per day and this did not come to more than 5 beds extra above the normal capacity on any one day. The total hire charges for extra beds incurred for the whole year accounted to ₹ 20,000.

The unit engaged expert doctors from outside to attend the patients and the fees were paid on the basis of the number of patients attended and time spent by them which on an average worked out to ₹ 50,000 per month in 2012-13.

The other expenses for the year as under:

	₹
Repairs and maintenance	25,000
Food supplied to patients	88,000
Janitor and other service for patients	25,000
Laundry charges for bed linen	56,000
Medicines supplied	70,000
Cost of Oxygen, X-ray etc. other than directly borne for treatment of patients	2,08,000
General administrative charges allocated to the unit	98,000

- (i) If the unit recovered an overall amount of ₹ 500 per day on an average from each patient, what is the profit per patient day made by the unit in 2012-13?
- (ii) The unit wants to work on a budget for 2013-14 but the number of patients requiring intensive medical care is a very uncertain factor. Assuming that the same revenue and expenses prevail in 2013-14, work out the number of patient days required by the unit to break-even.

**Solution:**

Number of Patient days in 2012-13:

25 beds x 120 days	3,000	
20 beds x 80 days	1,600	
Extra bed days	<u>400</u>	
	5,000 Patient days	

(Total hire charges of extra beds/charges per bed per day = ₹ 20,000/₹ 50).

We have presumed in the solution that the cost of janitor and other services are variable as they are related to number of patient days. Cost of oxygen, X-ray has been taken as a fixed cost since it has been stated that this cost is other than costs directly borne for treatment of patients.

**Statement of Cost and Profit**

	₹	₹
Income received (₹ 500 x 5000 patient days)		25,00,000
<b>Variable costs:</b>		
Food	88,000	
Janitor services	25,000	
Laundry	56,000	
Medicines	70,000	
Doctors' fee (50,000 x 12)	6,00,000	
Hire charges for extra beds	<u>20,000</u>	<u>8,59,000</u>
Contribution		16,41,000
<b>Fixed Costs:</b>		
Salaries (1 x 2,000 + 2 x 1,200 + 2 x 300) x 12	60,000	
Rent (50,000 x 12)	6,00,000	
Repairs and maintenance	25,000	
General administration	98,000	
Cost of Oxygen, X-ray etc.	<u>2,08,000</u>	<u>9,91,000</u>
Profit		<u>6,50,000</u>

Profit per patient day = ₹ 6,50,000/5,000 = ₹ 130

$$\begin{aligned}
 \text{Break-even Point} &= \frac{\text{Total Fixed Cost}}{\text{Total Contribution}} \times \text{Gross Income} \\
 &= \frac{₹9,91,000}{₹16,41,000} \times ₹25,00,000 \\
 &= ₹ 15,09,750 \\
 &= \frac{₹15,09,750}{₹5000} \\
 &= 3,020 \text{ Patient day}
 \end{aligned}$$

**Illustration 24**

Following are the information given by an owner of a hotel. You are requested to advice him that what rent should be charge from his customers per day so that he is able to earn 25 % on cost other than interest.

- (1) Staff salaries ₹ 80,000 per annum
- (2) Room attendant's salary ₹ 2 per day. The salary is paid on daily basis and services of room attendant are needed only when the room is occupied. There is one room attendant for one room.

- (3) Lighting, heating and power. The normal lighting expenses for a room if it is occupied for the whole month is ₹ 50. Power is used only in winter and normal charge per month if occupied for a room is ₹ 20.
- (4) Repairs to building ₹ 10,000 per annum
- (5) Linen etc. ₹ 4,800 per annum
- (6) Sundries ₹ 6,600 per annum
- (7) Interior decoration and furnishing ₹ 10,000 annually
- (8) Cost of building ₹ 4,00,000; rate of depreciation 5 %
- (9) Other equipments ₹ 1,00,000; rate of depreciation 10 %
- (10) Interest @ 5% may be charged on its investment of ₹ 5,00,000 in the building and equipment .
- (11) There are 100 rooms in the hotel and 80 % of the rooms are normally occupied in summer and 30 % of the rooms are busy in winter. You may assume that period of summer and winter is six month each. Normal days in a month may be assumed to be 30.

**Solution****Operating Cost Statement**

Particulars	Amount in ₹	Total in ₹
Staff Salaries	80,000	
Room attendant Salaries ( See working Note)	39,600	
Lighting, heating and power( See working Note)	36,600	
Repairs to building	10,000	
Linen etc.	4,800	
Sundries	6,600	
Interior decoration and furnishing	10,000	
Depreciation	30,000	
Interest on investment (5% on ₹ 5,00,000)	25,000	2,42,600
Add : 25 % profit on cost other than interest (See Working Note)		54,400
<b>Total Cost</b>		<b>2,97,000</b>

**Room attendant Salaries**

For summers	-	$100 \times 80\% \times 30 \times 6 \times 2 = ₹28,800$
For winter	-	$100 \times 30\% \times 6 \times 30 \times 2 = ₹10,800$
Total		$= ₹39,600$

**Lighting, heating and power**

Summer	-	$50 \times 6 \times 100 \times 80\% = ₹24,000$
--------	---	--



Winter	-	$50 \times 6 \times 100 \times 30\% = ₹ 9,000$
Power	-	$20 \times 6 \times 100 \times 30\% = ₹ 3,600$
Total		$= ₹ 36,600$

**Depreciation**

Building	-	₹ 20,000
Other equipments	-	₹ 10,000
Total	-	₹ 30,000
Profit	-	$₹ (2,42,600 - 25,000) \times 0.25 = ₹ 54,400$

**No of Room Days**

No. of Rooms x Percentage x days in a month x no. of months

$$\text{Summer: } 100 \times 80\% \times 30 \times 6 = 14,400$$

$$\text{Winter: } 100 \times 30\% \times 30 \times 6 = 5,400$$

$$\text{Total room days} = 19,800$$

**Calculation of Room rent per days**

$$\begin{aligned} \text{Rent per room for one day} &= \text{Total Cost} \div \text{No. of room days} \\ &= 2,97,000 \div 19,800 \\ &= ₹ 15 \text{ per day} \end{aligned}$$

**Illustration 25**

An Iron and Steel Works which generates its own power for the purpose of using the same for running the factory gives the following information:

(a) Coal-consumed 500 quintals @ ₹ 24 per quintal.

Oil-15 quintals @ ₹ 1,000 per quintal.

Water - 1,00,000 litres @ ₹ 2.00 per 1,000 lts.

Cost of steam boiler ₹ 60,000, which has a residual value of ₹ 12,000 and a life of 10 years.

(b) Salaries and wages for generating plant :

3 skilled workers @ ₹ 1,000 p.m.

3 unskilled workers @ ₹ 500 p.m.

(c) Generating plant cost ₹ 1,50,000, Depreciation @ 10%.

(d) Share of administrative charges 2,050 per month

(e) Salaries and wages for the Boiler House:

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5 men @ ₹ 600 p.m.

4 women @ ₹ 600 p.m.

(f) Repairs and maintenance of steam boiler and generating plant ₹ 1,000 p.m.

(g) No. of units generated 2,00,000

(h) Sale of ash ₹ 300.

(i) 1/10 of units generated were used by Generating Department itself.

Calculate cost per unit of electricity generated.

**Solution:**

**Cost Sheet of Generating Electricity**

		₹ per month
Coal used 500 quintals @ ₹ 24 per quintal	12,000	
Oil 15 quintals @ ₹ 1,000 per quintal	15,000	
Water 1,00,000 Lts. @ ₹ 2.0 per 1,000 Lts.	<u>200</u>	
	27,200	
Depreciation of steam boiler		27,200
$\frac{60,000 - 12,000}{10 \times 12} =$		<u>400</u>
		27,600
Less: Sale of Ash		<u>300</u>
Salaries and wages for boiler house		27,300
5 men @ ₹ 600 p.m.	3,000	
4 women @ ₹ 600 p.m.	<u>2,400</u>	5,400
Salaries and wages for generating plant		
3 skilled workers @ ₹ 1,000 p.m.	3,000	
3 unskilled workers @ ₹ 500 p.m.	<u>1,500</u>	4,500
Repairs and maintenance		1,000
Depreciation on generating plant		
$\frac{15,00,000 \times 10}{100 \times 12} =$		1,250
Share of administrative charges		<u>1,050</u>
		40,500
Add: Cost of electricity used in generation		<u>4,500*</u>
Consumed by Iron and Steel Works = 180,000 units		<u>45,000</u>
Cost per unit		25 paise

**Working Notes:**

\*Calculation of Cost of Electricity used in Generation.

Let A be cost of Electricity used and B the total cost of Generation:

$$\therefore B = 40,500 + \frac{1}{10}(40,500 + A)$$

$$A = \frac{1}{10} \text{ of } B$$

$$A = \frac{1}{10} \left[ 40,500 + \frac{1}{10} (40,500 + A) \right]$$

$$100A = 4,05,000 + 40,500 + A$$

$$99A = 4,45,500$$

$$A = \frac{4,45,000}{99}$$

$$= ₹4,500$$

### LESSON ROUND-UP

- Unit costing refers to the costing procedure, which is ideally used in case of concerns producing a single article on large scale by continuous manufacture. The cost units are identical with identical costs. The cost incurred during a period is divided by the total output for ascertaining the cost per unit.
- Cost sheet is a document which provides for the assembly of the detailed cost of a cost centre or cost unit.
- Production account is an account giving details of cost of production, cost of sales and profit made during a particular period.
- Job costing ascertains the cost of a job that is produced as per the requirements of the customers.
- Job costing is a costing system which considers job a cost unit. A job is a cost unit which consists of a single order or contract.
- Batch costing system is used when production is in batches.
- A batch is a cost unit which consists of a separate, readily identifiable group of product units which maintains its separate identity throughout the production process.
- Contract costing is that form of specific order costing which applies where work is undertaken as per customers' special requirements and each order is of long duration.
- Escalation clause is a provision in the contract for adjustment of prices quoted and accepted, in the event of specified contingencies.
- Cost plus contract is a contract where the contractee agrees to pay to the contractor the cost price for the work done on the contract plus an agreed percentage thereof by way of overhead cost and profit.
- Work certified is the work approved by the contractee or his nominee on a specific date.
- Work which has not been so far approved by the contractee or his nominee is known as work uncertified.

- Process costing method is applicable where the output results from a sequence of continuous or repetitive operations or processes and products are identical and cannot be segregated.
- Process costing enables the ascertainment of cost of the product at each process or stage of manufacture.
- The input will pass through two or more processes before it takes the shape of the output. The output of each process becomes the input for the next process until the final product is obtained, with the last process giving the final product.
- Contract costing is "A form of specific order costing; attribution of costs to individual contracts".
- "Contract Costing such jobs take a long time to complete & may spread over two or more of the contractor's accounting years".
- Service Costing is a Method Costing applied to undertaking which provides service rather than production of commodities.

### SELF-TEST QUESTIONS

1. Describe the different components of total cost.
2. Draw up a job cost-sheet for a simple product, to find out the cost of a product.
3. What is cost sheet? In what respect it differs from production account?
4. What is Job Costing?
5. Discuss the nature of contract costing and explain how costs are recorded in contracts.
6. Discuss briefly the principles to be followed while taking credit for profit on incomplete contracts.
7. Explain the terms: (a) escalation clause and (b) cost plus contract.
8. What is operating or service cost? State the industries where is it to be used.
9. State the salient features of service costing?
10. What is meant by process costing? State the industries where is it to be used.
11. Distinguish between 'Job Costing' and 'Process Costing' & 'Job Costing' and 'Contract Costing'.
12. Explain normal wastage, abnormal wastage and abnormal gain and state the accounting treatment of the same.
13. The cost of sales of product A is made up as follows :

	₹
Materials used in manufacturing	5,500
Materials used in packing materials	1,000
Materials used in selling the product	150
Materials used in the factory	75
Materials used in office	125
Labour required in production	1,000
Labour required for supervision of the management of factory	200
Expenses - direct, factory	500
Expenses - indirect, factory	100
Expenses - office	125
Depreciation - office building and equipment	75
Depreciation - factory	175
Selling expenses	350

Freight	500
Advertising	125

Assuming that all the products manufactured are sold, what should be the selling price to obtain a profit of 25% on selling price ?

Illustrate in a chart form for presentation to your manager, the division of costs for Product 'A'.

14. From the following particulars of a manufacturing firm, prepare a statement showing: (a) Cost of Materials Used, (b) Prime Cost, (c) Works Cost, (d) Cost of Production, (e) Cost of Sales, and (f) Profit Earned.

	₹
Stocks of materials on 1st January, 2013	40,000
Purchase of materials in January, 2013	11,00,000
Stock of Finished goods on 1st January, 2013	50,000
Stock of work-in-progress on 1st January, 2013	35,000
Productive wages	5,00,000
Works overhead charges	1,50,000
Office and administration overheads	90,000
Selling and distribution overheads	60,000
Stock of materials on 31st January, 2013	1,40,000
Stock of finished goods on 31st January, 2013	60,000
Stock of work-in-progress on 31st January, 2013	25,000
Finished Goods sold in January, 2013	22,50,000

15. In a factory, two types of radios are manufactured viz. Orient and Sujan Models. From the following particulars, prepare a statement showing cost and profit per radio sold. There is no opening or closing stock.

	Orient ₹	Sujan ₹
Direct materials	27,300	1,08,680
Direct labour	15,600	62,920

Works overhead is charged @ 80% on labour and office overhead is taken at 15% on works cost. The selling price of both the radios is ₹1,000 each. 78 Orient radios and 286 Sujan radios were sold.

16. A firm of building contractors began to trade on 1st January, 2010. During the year, the company was engaged on only one contract. The contract price was ₹ 50,00,000.

Of the plant and materials charged to the contract, the plant which cost ₹50,000 and materials which cost ₹40,000 were lost in an accident.

On December 31, 2011, the plant which cost ₹50,000 was returned to the stores the cost of work done but uncertified was ₹20,000 and the materials costing ₹40,000 were in hand on site.

Charge 10% depreciation of the plant, carry forward by way of reserve one-third of the profit received and compile the Contract Account and the Balance Sheet from the following Trial Balance on December 31, 2011.

	₹	₹
Share capital		12,00,000
Creditors		1,00,000
Cash received on contract (80% of work certified)		20,00,000

Land, buildings, etc.	4,30,000	
Bank balance	2,50,000	
Charged to contract		
Materials	9,00,000	
Plant	2,50,000	
Wages	14,00,000	
Expenses	<u>70,000</u>	
	<u>33,00,000</u>	<u>33,00,000</u>

(Ans.: P & L A/c ₹1,12,000, Balance sheet total ₹13,22,000)

17. Mr. Sudhir owns a fleet of taxis and the following information is available from the records maintained by him.

(i) Number of Taxis	10
(ii) Cost of each Taxi	₹ 2,00,000
(iii) Salary of manager	₹ 6000 p.m.
(iv) Salary of Accountant	₹ 5000 p.m.
(v) Salary of cleaner	₹3000 p.m.
(vi) Salary of Mechanic	₹ 4000 p.m.
(vii) Garage Rent	₹ 7000 p.m.
(viii) Insurance premium	5%
(ix) Annual Tax	₹ 6000 per taxi
(x) Drivers Salary	₹ 4000 p.m.
(xi) Annual Repairs	₹ 15,000 per taxi

Total life of a taxi is about 2,00,000 kms. A taxi runs in all 3000 kms. in a month of which 25% its runs empty. Petrol consumption is one liter for 10 kms @ ₹ 40 per liter. Oil and other sundries are ₹10 per 100 kms. Calculate the cost of running a taxi per km.

18. Radisson Hotel has a capacity of 100 single rooms and 20 double rooms. It has a sports centre with a swimming pool which is also used by persons other than residents of the hotel. The hotel has a shopping arcade at the basement and a specialty restaurant at the roof top. The following information is available:

(1) Average occupancy: 75% for 365 days of the year

(2) Current costs are:

	<i>Variable cost</i>	<i>Fixed cost</i>
Single room	400	200
Double room	500	250

(3) Average sales per day of restaurant ₹ 1, 00,000; contribution is at 30 %. Fixed cost ₹ 10, 00,000 per annum.

(4) The sports centre / swimming pool is likely to be used by 50 non-residents daily; average contribution per day per nonresident is estimated at ₹ 50; fixed cost is ₹ 5,00,000 per annum.

(5) Average contribution per month from the shopping arcade is ₹ 50,000; fixed cost is ₹ 6,00,000 per annum.

You are required to find out:

- (a) Rent chargeable for single and double room per day, so that there is a margin of safety of 20% on hire of rooms and that the rent for a double room should be kept at 120% of a single room.
- (b) Evaluate the profitability of restaurant, sports centre and shopping arcade separately.

19. The following data are available from the Cost Ledger of Acme Industries for the year 2012:

Plant Maintenance	₹25,000
Lighting	6,300
Depreciation on Plant	8,100
Rates and Taxes for the Works	3,900
Staff Salaries	32,000
Management Salaries	22,000
Power (for this Plant)	10,600
Rental for Leasehold Equipments	9,600
Indirect Wages	37,100
Rectification Cost of Defectives (Normal)	8,400
Consumable Stores	17,600
Selling Expenses	30,000
General Charges	15,600
Sale Proceeds from Scrap	4,200

During the year total production was 120,000 units. The break-up of prime cost per unit was: Materials ₹ 2.20 and Wages ₹1.80. The average selling price was ₹6.75 per unit and entire quantity produced during the year was sold out.

With effect from January 1, 2013, the selling price was reduced to ₹ 6.40 per unit. It was envisaged that production could be enhanced during 2013 by 33 1/3 per cent without incurring any overtime or extra-shift work, or additional selling expenses.

You are required to prepare statement showing:

- (i) Actual cost and profit for the year 2012
- (ii) Estimated cost and profit for 2013 assuming that the entire production will be sold during the year

Assumption, if any, required to be made in the above exercise should be clearly stated.  
(Ans. Sales – ₹ 8,10,000; per unit ₹6.75; Estimate ₹10,24,000)

20. Usha Engineering Works Ltd. manufactured and sold 1,000 sewing machines in 1997. Following are the particulars obtained from the records of the company.

Cost of materials	₹80,000
Wages paid	1,20,000
Manufacturing expenses	50,000
Salaries of managerial staff	60,000
Rent, rates and insurance	10,000
Selling expenses	30,000
General expenses	20,000
Sales	4,00,000

The company plans to manufacture 1,200 sewing machines in 1998. You are required to submit a statement showing the price at which machines would be sold so as to show a profit of 10% on the selling price. The following additional information is supplied to you:

- The price of materials will rise by 20 per cent on the previous year's level.
- Wages rates will rise by 5 per cent
- Manufacturing expenses per unit will rise in proportion to the combined cost of material and wages.
- Selling expenses per unit will remain uncharged.
- Other expenses will remain unaffected by the rise in output.

(Ans. Per unit ₹425; ₹5,10,000)

21. A company makes two distinct types of vehicles, A and B. The total expenses during a period as shown by the books for the assembly of 600 of the type A and 800 of the type B vehicles are as under :

Materials	₹1,98,000
Direct wages	12,000
Stores	19,800
Running expenses of machine	4,400
Depreciation	2,200
Labour amenities	1,500
Works general overhead	30,000
Administration and selling overhead	26,800

The other data available to you is:

	A: B
Material cost ratio per unit	1: 2
Direct labour ratio per unit	2: 3
Machine utilisation ratio per unit	1: 2

Calculate the cost of each vehicle per unit giving reasons for the bases of apportionment adopted by you. (Ans. Cost per unit A-₹138.78; B- ₹264.28)

22. Jolly Shoes Co. manufactures two types of shoes A and B. Production costs for the year ended 31 March, 2013 were :

Direct materials	₹15,00,000
Direct wages	8,40,000
Production overhead	3,60,000
Total	27,00,000

There was no work in progress at the beginning or at the end of the year.

It is ascertained that :

- Direct material in type A shoe consists twice as much as that in type B shoes.
- The direct wages for type B shoes were 60% of those of type A shoes
- Production overhead was the same per pair of A and B type,
- Administrative overhead for each type was 150% of direct wages
- Selling cost was ₹ 1.50 per pair
- Production during the year were : Type A 40,000 pairs of which 36,000 were sold; Type B 1,20,000 pairs of which 1,00,000 were sold
- Selling price was ₹44 for type A and ₹28 for type B per pair. Prepare a statement showing cost and profit.

(Ans. Per Unit A – ₹44; B - ₹28)



23. In respect of a factory the following particulars have been extracted for the year 2012:

Cost of materials	₹6,00,000
Wages	5,00,000
Factory overheads	3,00,000
Administration charges	3,36,000
Selling charges	2,24,000
Distribution charges	1,40,000
Profit	4,20,000

A work order has to be executed in 1998 and the estimated expenses are :

Materials ₹ 8,000, wages ₹5,000

Assuming that in 2013 the rate of factory overheads has gone up by 20%, distribution charges have gone down by 10% and selling and administration charges have gone each up by 15% at what price should the product be sold so as to earn the same rate of profit on the selling price as in 2012?

Factory overheads are based on wages and administration, selling and distribution overheads on factory cost. (Ans. Total Sales ₹25,20,000; Estimate ₹30,875)

24. Metal Products Company produces a sewing machine that sells for ₹300 . A n increase of 15% in cost of materials and of 10% in cost of labour is anticipated. If the only figures available are those given below, what must be the selling price to give the same percentage of gross profit as before?

(a) Material costs have been 45% of cost of sales (b) Labour costs have been 40% of cost of sales (c) Overhead costs have been 15% of cost of sales (d) The anticipated increased costs in relation to the present sales price would cause 35% decrease in the present gross profit. (Ans. Estimate ₹332.25)

25. The following particulars relating to the year 2012 have been taken from the books of a chemical works manufacturing and selling a chemical mixture

	Kg.	₹
Stock on 1 January 2012		
Raw materials	2,000	2,000
Finished mixture	500	1,750
Factory stores	-	7,250
Purchases:		
Raw materials	1,60,000	1,80,000
Factory stores		24,250
Sales:		
Finished mixture	1,53,050	9,18,000
Factory scrap		8,170
Factory wages		1,78,650
Power		30,400
Depreciation of machinery		18,000
Salaries:		
Factory		72,220
Office		37,220
Selling		41,500

Expenses:		
Direct		18,500
Office		18,200
Selling		18,000
Stock on 31 December, 2012:		
Raw materials	1,200	-
Finished mixture	450	-
Factory stores	-	5,550

The stock of finished mixture at the end of 2012 is to be valued at the factory cost of the mixture for that year. The purchase price of raw materials remained unchanged throughout 2012. Prepare a Production Statement. (Ans. Estimate ₹9,18,000)

26. M.K Works can produce 60,000 units per annum t its optimum (100%) capacity. The estimated costs of production are as under:

Direct material	₹ 3 per unit
Direct labour	₹ 2 per unit
Indirect expenses:	
Fixed	₹1,50,000 per annum
Variable	₹ 5 per unit

Semi variable ₹ 50,000 p.a. upto 50% capacity and an extra expenses of ₹ 10,000 for every 25% increase in capacity on part thereof .

The factory produced only against orders an not for own stock. If the production programme of the factory is as indicated below, and the management desires to ensure a profit of ₹1,00,000 for the year, work out the average selling price at which each unit should be quoted.

First 3 months of the year	50% of capacity
Remaining 9 months	80% of capacity

Ignore selling, distribution and administration overheads.(Ans.Per unit ₹17.24; Total Sales ₹7,50,000)

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# Lesson 8

## MARGINAL COSTING

### LESSON OUTLINE

- Introduction
- Features of marginal costing
- Advantages of marginal costing
- Limitations of marginal costing
- Break-even analysis/cost-volume profit analysis & its objectives, advantages, limitations
- Uses of cost-volume-profit analysis
- Contribution
- Marginal cost equation
- Profit-volume ratio & its significance
- Margin of safety
- Methods for determining break even points:
  - Algebraic methods
  - Graphic presentation
- Applications of marginal costing
- Composite Break Even Point
- Absorption costing, system of profit reporting and stock valuation
- Difference between marginal costing and absorption costing
- Income measurement under marginal costing and absorption costing
- Pricing decision
- Lesson Round Up
- Self-Test Question

### LEARNING OBJECTIVES

Marginal costing is not a distinct method of ascertainment of cost but is a technique which applies existing methods in a particular manner so that the relationship between profit & the volume of output can be clearly brought out. It is an accounting system where only variable cost or direct cost will be charged to the cost units. It concentrates on the controllable aspects of business by separating fixed and variable costs. Explains to answer various operating decisions, such as what level of sales is required to break even, how many units of a product is to be sold in order to earn a target level of operating profit etc.

After reading this study one should be able to understand:

1. Concepts of marginal costing and absorption costing.
2. Difference between absorption and marginal costing, advantages, limitations of marginal costing.
3. How to use break-even analysis for decision making.
4. Income statement under absorption costing and marginal costing.
5. Practical applications of marginal costing in fixation of selling price, Key or limiting factor, make or buy decisions, selection of a suitable product mix, effect of change in price, closing down or suspending activities, maintaining a desired level of profit.

The full cost theory is based upon assumptions which are far more typical of reality than those based in marginal costing.

– R. Hall and C. Hitch, in *Managerial Cost Accounting*

## MARGINAL COSTING

Marginal costing, as one of the tools of management accounting helps management in making certain decisions. It provides management with information regarding the behavior of costs and the incidence of such costs on the profitability of an undertaking. Marginal costing is defined as “the ascertainment of marginal costs and of the effect on profit of changes in volume or type of output by differentiating between fixed costs and variable costs”. Marginal costing is not a separate costing. It is only a technique used by accountants to aid management decision. It is also called as “Direct Costing” in U.S.A. This technique of costing is also known as “**Variable Costing**”, “**Differential Costing**” or “**Out-of-pocket**” costing.

Marginal cost is the cost of one unit of product or service which would be avoided if that unit were not produced or provided.

According to **CIMA Terminology** Marginal Costing is the ascertainment of marginal costs and of the effect on profit of changes in volume or type of output by differentiating between fixed costs and variable costs in this technique of costing only variable costs are charged to operations, processes or products leaving all indirect costs to be written off against profits in the period in which they arise.

Thus marginal costing is the accounting system in which variable costs are charged to cost units and fixed costs of the period are written-off in full against the aggregate contribution. Its special value is in decision-making. It is a technique of applying the existing methods in a particular manner in order to bring out the relationship between profit and volume of output.

## FEATURES OF MARGINAL COSTING

- (a) Costs are separated into the fixed and variable elements and semi-variable costs are also differentiated like wise.
- (b) Only the variable costs are taken into account for computing the value of stocks of work-in-progress and finished products.
- (c) Fixed costs are charged off to revenue wholly during the period in which they are incurred and are not taken into account for valuing product cost/inventories.
- (d) Prices may be based on marginal costs and contribution but in normal circumstances prices would cover costs in total.
- (e) It combines the techniques of cost recording and cost reporting.
- (f) Profitability of departments or products is determined in terms of marginal contribution.
- (g) The unit cost of a product means the average variable cost of manufacturing the product.

## ADVANTAGES OF MARGINAL COSTING

- (1) Cost-volume-profit relationship data wanted for profit planning purposes is readily obtained from the regular accounting statements. Hence management does not have to work with two separate sets of data to relate one to the other.
- (2) The profit for a period is not affected by changes in absorption of fixed expenses resulting from building or reducing inventory. Other things remaining equal (e.g. selling prices, costs, sales mix), profits move in the same direction as sales when direct costing is in use.
- (3) Manufacturing cost and income statements in the direct cost form follow management’s thinking

more closely than does the absorption cost form for these statements. For this reason, management finds it easier to understand and use direct cost reports.

- (4) The impact of fixed costs on profits is emphasised because the total amount of such cost for the period appears in the income statement.
- (5) Marginal income figures facilitate relative appraisal of products, territories, classes of customers, and other segments of the business without having the results obscured by allocation of joint fixed costs.
- (6) Marginal costing lies in with such effective plans for cost control as standard costs and flexible budgets.
- (7) Marginal costing furnishes a better and more logical basis for the fixation of sales prices as well as tendering for contracts when business is at low ebb.
- (8) Break-even point can be determined only on the basis of marginal costing.

### LIMITATIONS OF MARGINAL COSTING

Marginal costing technique has the following limitations:

- (1) In marginal costing, costs are classified into fixed and variable. Segregation of costs into fixed and variable is rather difficult and cannot be done with precision.
- (2) Marginal costing assumes that the behaviour of costs can be represented in straight line. This means that fixed costs remains completely fixed over a period at different levels and variable costs change in linear pattern i.e. the change is proportion to the change in volume. In real life, fixed costs are liable to change at varying levels of production especially when extra plant and equipments are introduced and hence variable costs may not vary in the same proportion as the volume.
- (3) Under marginal costing technique fixed costs are not included in the value of stock of finished goods and work-in-progress. As fixed costs are incurred, these should also form part of the costs of the product. Due to this elimination of fixed costs from finished stock and work-in-progress, the stocks are understated. This affects the results of profit and loss account and the balance sheet. Thus, profit may be unnecessarily deflated.
- (4) In the marginal costing system monthly operating statements will not be as realistic or useful as under the absorption costing system. This is because under this system, marginal contribution and profits vary with change in sales value. Where sales are occasional, profits fluctuate from period to period.
- (5) Marginal costing fails to give complete information, for example rise in production and sales may be due to extensive use of existing machinery or by expansion of the resources or by replacement of the labour force by machines. The marginal contribution of P/V ratio fails to bring out reasons for this.
- (6) Under marginal costing system the difficulties involved in the apportionment and computation of under and over absorption of fixed overheads are done away with but problem still remains as far as the under absorption or over absorption of variable overheads is concerned.
- (7) Although for short term assessment of profitability marginal costs may be useful, long-term profit is correctly determined on full costs basis only.
- (8) Marginal costing does not provide any standard for the evaluation of the performance. Marginal contribution data do not reveal many effects which are furnished by variance analysis. For example,

efficiency variance reflects the efficient and inefficient use of plant, machinery and labour and this sort of valuation is lacking in the marginal cost analysis.

- (9) Marginal costing analysis assumes that sales price per unit will remain the same on different levels of production but these may change in real life and give unrealistic results.
- (10) In the age of increased automation and technology advancement, impact of fixed costs on product is much more than that of variable costs. As a result a system that does not account the fixed costs is less effective because a substantial portion of the cost is not taken into account.
- (11) Selling price under the marginal costing technique is fixed on the basis of contribution. This may not be possible in the case of 'cost plus contracts'.

Thus the above limitations indicate that fixed costs are equally important in certain cases.

## REVIEW QUESTIONS



### Fill in the blanks:

1. Marginal Costing is also known as\_\_\_\_\_.
2. \_\_\_\_\_ is a variable cost of one unit of a product or a service i.e. a cost which would be avoided if that unit was not produced.

**Correct answer:** 1. Variable Costing/Differential Costing/ Out of Pocket Costing 2. Marginal Cost

## BREAK-EVEN ANALYSIS/COST-VOLUME PROFIT ANALYSIS

A fundamental of accounting is that all revenues and costs must be accounted for and the difference between the revenues and costs is the profit, or loss, of the business. Costs can be classified as either a fixed cost or a variable cost.

**A fixed cost** is one that is independent of the level of sales; rather, it is related to the passage of time. Examples of fixed costs include rent, salaries and insurance.

**A variable cost** is one that is directly related to the level of sales, such as cost of goods sold and commissions.

This categorisation of costs into "variable" and "fixed" elements and their relationship with sales and profits has been developed as "break-even analysis". This break even analysis is also known as **Cost–volume–profit (CVP) analysis**.

Cost–volume–profit (CVP) analysis is defined in **CIMA's Official Terminology** as

**'the study of the effects on future profit of changes in fixed cost, variable cost, sales price, quantity and mix'.**

In break even analysis or CVP analysis an activity level is determined at which all relevant cost are recovered and there is a situation of no profit or no loss. This activity level is called breakeven point.

The break-even point in any business is that point at which the volume of sales or revenues exactly equals total expenses or the point at which there is neither a profit nor loss under varying levels of activity. The break-even point tells the manager what level of output or activity is required before the firm can make a

profit; reflects the relationship between costs, volume and profits. In another words breakeven point is the level of sales or production at which the total costs and total revenue of a business are equal.

At Break-even point or level, the sales revenues are just equal to the costs incurred. Below Breakeven point level the firm will make losses, while above this level it will be making profits. This is so because that while the variable costs vary according to the variations in the volume or level of activity while the fixed costs do not change.

Below the breakeven point, fixed costs will eat up all excess of sales over variable cost and yet be unsatisfied, leaving a loss. Above the BEP, excess of sales over variable costs (this excess is known as contribution) is much more than the fixed costs of the activities and, it, thus leads to profits. Thus in Break Even analysis or Cost Volume Profit Analysis, it is possible to analyse the effect of changes in volume, prices and variable costs on the profits of an organization, while taking fixed costs as unchangeable.

The cost-volume-profit (CVP) analysis helps management in finding out the relationship of costs and revenues to profit. The aim of an undertaking is to earn profit. Profit depends upon a large number of factors, the most important of which are the cost of manufacture and the volume of sales effected. Both these factors are interdependent-volume of sales depends upon the volume production, which in turn is related to costs. Cost, again, is the resultant of the operation of a number of varying factors. Such factors affecting cost are:

- (i) Volume of production;
- (ii) Product-mix;
- (iii) Internal efficiency;
- (iv) Methods of production; and
- (v) Size of plant; etc.

Analysis of cost-volume-profit involves consideration of the interplay of the following factors:

- (i) Volume of sales;
- (ii) Selling price;
- (iii) Product mix of sales;
- (iv) Variable costs per unit; and
- (v) Total fixed costs.

The relationship between two or more of these factors may be (i) present in the form of reports and statements, (ii) shown in charts or graphs, or (iii) established in the form of mathematical deductions.

### **OBJECTIVES OF BREAK EVEN ANALYSIS/COST-VOLUME-PROFIT ANALYSIS**

The objectives of cost-volume profit analysis are given below:

- (1) In order to forecast profit accurately, it is essential to know the relationship between profits and costs on the one hand and volume on the other.
- (2) Cost-volume-profit analysis is useful in setting up flexible budgets which indicate costs at various levels of activity.
- (3) Cost-volume-profit analysis is of assistance in performance evaluation for the purposes of control. For reviewing profits achieved and cost incurred the effects on costs of changes in volume are required to be evaluated.

- (4) Pricing plays an important part in stabilizing and fixing up volume. Analysis of cost-volume-profit relationship may assist in formulating price policies to suit particular circumstances by projecting the effect which different price structures have on costs and profits.
- (5) As predetermined overhead rates are related to a selected volume of production, study of cost-volume relationship is necessary in order to know the amount of overhead costs which could be charged to product costs at various level of operation.

### ADVANTAGES OF BREAK-EVEN ANALYSIS

- (i) It provides detailed and clearly understandable information. The chart visualises the information very clearly and a glance at the chart gives a vivid picture of the whole affairs. The information is presented in a simple form and therefore, is clearly understandable even to a layman.
- (ii) The profitability of different products can be known with the help of break-even charts, besides the level of no-profit no-loss. The problem of managerial decision regarding temporary or permanent shutdown of business or continuation at a loss can be solved by break-even analysis.
- (iii) The effect of changes in fixed and variable costs at different levels of production or profits can be demonstrated by the graph legibly.
- (iv) The break-even chart shows the relative importance of fixed cost in the total cost of a product. If the costs are high, it induces management to take measures to control such costs.
- (v) The economies of scale, capacity utilisation, comparative plant efficiencies can be analysed through the break-even chart. The operational efficiency of a plant is indicated by the angle of incidence formed at the intersection of the total cost line and sales line.
- (vi) Break-even analysis is very helpful for forecasting, long-term planning, growth and stability.

### LIMITATIONS OF BREAK-EVEN ANALYSIS

Though break-even analysis has gradually become service tool for modern financial management, there are certain objections raised against the utility of break-even analysis:

- (i) Fixed costs do not always remain constant.
- (ii) Variable costs do not always vary proportionately.
- (iii) Sales revenue does not always change proportionately.
- (iv) The horizontal axis cannot measure the units sold in as much as many unlike type of products are sold by the same enterprise.
- (v) Break-even analysis is of doubtful validity when the business is selling many products with different profit margins.
- (vi) Break-even analysis is based on the assumption that income is influenced by changes in sales so that changes in inventory would not directly affect income. If marginal costing is used, this assumption would hold good but in other cases, changes in inventory will affect income because the absorption of fixed costs will depend on production rather than sales.
- (vii) Condition of growth or expansion in an organisation are not assumed under break-even analysis. In actual life of any business organisation, the operation undergoes a continuous process of growth and expansion.
- (viii) Only a limited amount of information can be presented in a single break-even chart. If we have to



study the changes of fixed costs, variable costs and selling prices, a number of charts will have to be drawn up.

- (ix) Even simple tabulation of the results of costs and sales can serve the purpose which is served by a break-even chart, hence there is no need of presenting the data through a break-even chart.
- (x) The chart becomes very complicated and difficult to understand for a layman, if the number of lines or curves depicted on the graph are large.
- (xi) The chart does not provide any basis for comparative efficiency between different units or organisations.

### USES OF COST-VOLUME-PROFIT ANALYSIS

1. C.V.P. analysis helps in forecasting costs and profits as a result of change in volume.
2. It helps fixing a sales volume level to earn or cover a given revenue, return on capital employed, or rate of dividend.
3. It assists determination of effect of change in volume due to plant expansion or acceptance of an order, with or without increase in costs or in other words a quantum of profit to be obtained can be determined with change in volume of sales.
4. C.V.P. analysis helps in determining relative profitability of each product, line, project or profit plan.
5. Through cost volume-profit analysis inter-firm comparison of profitability can be done intelligently.
6. It helps in determining cash requirements at a desired volume of output, with the help of cash break-even charts.
7. Break-even analysis emphasises the importance of capacity utilisation for achieving economy.
8. From break-even analysis during severe recession, the comparative effects of a shut down or continued operation at a loss is indicated.
9. The effect on total cost of a change in the fixed over-head is more clearly demonstrated through break-even analysis and cost- volume-profit charts.
10. The conditions of a business such as profit potentialities, requirements of capital, financial stability and incidence of fixed and variable costs can be gauged from a study of the position of the break-even point and the angle of incidence in the break-even chart.

### CONTRIBUTION

If a system of marginal costing is operated in an organisation with more than one product, it will not be possible to ascertain the net profit per product because fixed overheads are charged in total to the profit and loss account rather than recovered in product costing. The contribution of each product is charged to the firm's total fixed overheads and profit is ascertained. Contribution is the difference between selling price and variable cost of sales. It is visualised as some sort of a fund or pool, out of which all fixed costs, irrespective of their nature are to be met, and to each product has to contribute its share. The excess of contribution over fixed costs is the profit. If the total contribution does not meet the entire fixed cost, there will be loss.

In normal circumstances, selling prices contain an element of profit but there may be circumstances, when products may have to be sold at cost or even at loss. Therefore, the character of contributions will have the following composition under different circumstances:

- (i) Selling price containing profit:

Contribution = Fixed cost + Profit

(ii) Selling price at cost:

Contribution = Fixed cost

(iii) Selling price at loss:

Contribution = Fixed cost – Loss

## MARGINAL COST EQUATION

As we know: Sales-Cost= Profit

or Sales- (Fixed cost + Variable cost)= Profit

or Sales- Variable cost= Fixed cost + Profit

It is known as marginal cost equation. We can convey it as under:

$$\boxed{S - V = F + P}$$

Where S = Sales      V= Variable cost

F= Fixed cost      P= Profit

## PROFIT-VOLUME RATIO

The ratio or percentage of contribution margin to sales is known as P/V ratio. This ratio is also known as marginal income ratio, contribution to sales ratio, or variable profit ratio. P/V ratio, usually expressed as a percentage, is the rate at which profit increases with the increase in volume. The formulae for P/V ratio are:

$$P / V \text{ ratio} = \frac{\text{Marginal Contribution}}{\text{Sales}}$$

Or

$$\frac{\text{Sales Value} - \text{Variable Cost}}{\text{Sales Value}}$$

Or

$$1 - \frac{\text{Variable Cost}}{\text{Sales Value}}$$

Or

$$\frac{\text{Fixed Cost} + \text{Profit}}{\text{Sales Value}}$$

Or

$$\frac{\text{Change in Profits / Contributions}}{\text{Change in Sales}}$$

(All the above formulae really mean the same thing).

A comparison for P/V ratios of different products can be made to find out which product is more profitable.

Higher the P/V ratio more will be the profit and lower the P/V ratio, lesser will be the profit. P/V ratio can be improved by:

- (i) Increasing the selling price per unit.
- (ii) Reducing direct and variable costs by effectively utilising, men, machines and materials.
- (iii) Switching the production to more profitable products showing a higher P/V ratio.

### SIGNIFICANCE OF PROFIT-VOLUME (P/V) RATIO

Profit volume (or contribution-sales) ratio is a logical extension of marginal costing. It is the study of the inter-relationships of cost behaviour patterns, levels of activity and the profit that results from each alternative combination. The significance of profit volume ratio may be enumerated from the following application which are as under:

- (a) Ascertainment of profit on a particular level of sales volume.
- (b) Determination of break-even point.
- (c) Calculation of sales required to earn a particular level of profit.
- (d) Estimation of the volume of sales required to maintain the present level of profit in case selling prices are to be reduced by a stipulated margin.
- (e) Useful in developing flexible budgets for cost control purposes.
- (f) Identification of minimum volume of activity that the enterprise must achieve to avoid incurring losses.
- (g) Provision of data on relevant costs for decisions relating to pricing, keeping or dropping product lines, accepting or rejecting particular orders, make or buy decision, sales mix planning, altering plant layout, channels of distribution specification, promotional activities etc.
- (h) Guiding in fixation of selling price where the volume has a close relationship with the price level.
- (i) Evaluation of the impact of cost factors on profit.

### MARGIN OF SAFETY

Margin of safety is the difference between the actual sales and sales at break-even point. Sales beyond break-even volume brings in profits. Such sales represent a margin of safety. Margin of safety is calculated as follows:

$$\text{Margin of safety} = \text{Total sales} - \text{Break even sales}$$

Margin of safety can also be calculated with the help of P/V ratio i.e.

$$\text{Margin of safety} = \frac{\text{Profit}}{\text{P/V Ratio}}$$

Margin of safety can also be expressed as percentage of sales

$$\text{i.e. } \frac{\text{Margin of safety} \times 100}{\text{Total sales}}$$

It is important that there should be reasonable margin of safety, otherwise, a reduced level of activity may prove disastrous. The soundness of a business is gauged by the size of the margin of safety. A low margin of safety usually indicates high fixed overheads so that profits are not made until there is a high level of activity to absorb fixed costs.

A high margin of safety shows that break-even point is much below the actual sales, so that even if there is a fall in sales, there will still be a point. A low margin of safety is accompanied by high fixed costs, so action is called for reducing the fixed costs or increasing sales volume.

The margin of safety may be improved by taking the following steps:

- (i) Lowering fixed costs.
- (ii) Lowering variable costs so as to improve marginal contribution.
- (iii) Increasing volume of sales, if there is unused capacity.
- (iv) Increasing the selling price, if market conditions permit, and
- (v) Changing the product mix as to improve contribution.

## REVIEW QUESTIONS



**State whether the following statement is “True” or “False”:**

B.E.P. is a level where total revenue is equal to total cost:

- True
- False

**Correct answer:** True

## METHODS FOR DETERMINING BREAK EVEN POINTS

The sales volume which equates total revenue with related costs and results in neither profit nor loss is called break-even point (BEP). Break-even point can be determined by the following methods:

### 1. Algebraic methods:

- (i) Contribution Margin Approach
- (ii) Equation technique

### 2. Graphic presentation:

- (i) Break-even chart
- (ii) Profit volume chart

## 1. Algebraic Methods

### (i) Contribution Margin Approach

$$\text{Break-even point (in units)} = \frac{\text{Total fixed costs}}{(\text{Selling price per unit} - \text{Variable cost per unit})}$$

$$\text{Or} = \frac{\text{Total fixed costs}}{\text{Contribution per unit}}$$

OR

$$\begin{aligned} \text{Break-even point (in ₹)} &= \frac{\text{Fixed Cost}}{\text{P/V Ratio}} \\ \text{Or} &= \text{Break-even points (units)} \times \text{Selling price per unit} \end{aligned}$$

### (ii) Equation Technique

It is based on an income equation i.e.

Sales – Total costs = Net profit.

Breaking up total costs into fixed and variable,

Sales – Fixed costs – Variable cost = Net profit

Sales = Fixed costs + Variable cost + Net profit

i.e.

$$\mathbf{SP(S) = FC + VC(S) + P}$$

where

SP = Selling price per unit

S = Number of units required to be sold to break-even

FC = Total fixed costs

VC = Variable cost per unit

P = Net profit (Zero)

$$SP(S) = FC + VC(S) + \text{Zero}$$

$$SP(S) = FC + VC(S) + 0$$

$$SP(S) - VC(S) = FC$$

or

$$S(SP - VC) = FC$$

$$S = \frac{FC}{SP - VC}$$

To calculate the level of sales required to earn a particular level of profit, the formula is:

$$\text{Required Sales (in ₹)} = \frac{\text{Fixed cost} + \text{Desired profit}}{\text{P/V Ratio}}$$

### Illustration 1

A product is sold at a price of ₹120 per unit and its variable cost is ₹80 per unit. The fixed expenses of the business are ₹ 8,000 per year. Find (i) BEP in ₹ and units, (ii) profits made when sales are 240 units, (iii) Sales to be made to earn a net profit of ₹ 5,000 for the year.

### Solution:

	₹
Selling prices per unit	120
Less: Variable cost	<u>80</u>
Contribution per unit	<u>40</u>

$$\text{P/V ratio} = \frac{\text{Contribution}}{\text{Sales}} = \frac{40 \times 100}{120} = 33 \frac{1}{3} \%$$

$\begin{aligned} \text{(i) BEP in ₹} &= \frac{\text{FC}}{\text{P/V ratio}} \\ &= \frac{\text{₹ 8,000}}{33 \frac{1}{3}} \\ &= \frac{\text{₹ 8,000} \times 3}{1} \\ &= \text{₹ 24,000} \end{aligned}$	$\begin{aligned} \text{BEP in units} &= \frac{\text{FC}}{\text{Contribution per unit}} \\ &= \frac{\text{₹ 8,000}}{\text{₹ 40}} \\ &= 200 \text{ units} \end{aligned}$
---	--

(ii) Contribution per unit ₹40

Total contribution of 240 Units = 240 x 40 =		₹ 9,600
Less: Fixed Cost for the year	=	<u>₹ 8,000</u>
Profit	=	<u>₹ 1,600</u>

$$\begin{aligned} \text{(iii) Required Sales} &= \frac{\text{FC} + \text{Desired profit}}{\text{P/V ratio}} \\ &= \frac{\text{₹8,000} + \text{₹5,000}}{\frac{1}{3}} \\ &= \text{₹13,000} \times 3 = \text{₹39,000.} \end{aligned}$$

## 2 Graphic Presentation

### (i) Break-even chart

According to the **Chartered Institute of Management Accountants, London** the break-even chart means “a chart which shows profit or loss at various levels of activity, the level at which neither profit nor loss is shown being termed as the break-even point”.

It is a graphic relationship between costs, volume and profits. It shows not only the BEP but also the effects of costs and revenue at varying levels of sales. The break-even chart can therefore, be more appropriately called the cost-volume-profit graph.

Assumptions regarding Break-Even Charts are as under:

- (i) Costs are bifurcated into variable and fixed components.
- (ii) Fixed costs will remain constant and will not change with change in level of output.
- (iii) Variable cost per unit will remain constant during the relevant volume range of graph.
- (iv) Selling price will remain constant even though there may be competition or change in volume of production.
- (v) The number of units produced and sold will be the same so that there is no operating or closing stock.
- (vi) There will be no change in operating efficiency.
- (vii) In case of multi-product companies, it is assumed that the sales mix remains constant.

A break-even chart can be presented in different forms.

### **First Method of Break even chart**

On the X-axis of the graph is plotted the volume of productions or the quantities of sales and on the Y-axis (vertical line) costs and sales revenues are represented. The fixed costs line is drawn parallel to X-axis. The variable costs for different levels of activity are plotted over the fixed cost line, which shows that the cost is increasing with the increase in the volume of output. The variable cost line is joined to fixed cost line at zero volume of production. This line is regarded as the total cost line. Sales values at various levels of output are plotted from the origin and joined is called the sales line. The sales line will cut the total cost line at a point where the total costs equal to total revenues and this point of intersection of two lines is known as break-even point or the point of no profit no loss. The lines produced from the inter-section to Y-axis and X-axis may give sales value and the number of units produced at break-even point respectively. Loss and profit are as have been shown in the chart which shows that if production is less than the break-even point, the business shall be running at a loss and if the production is more than the break even level, there will be profit. The angle which the sales line makes with total cost line while intersecting it at BEP is called angle of incidence. A large angle of incidence denotes a good profit position of a company.

### ***Illustration 2***

From the following data, calculate the break-even point by means of a break-even chart:

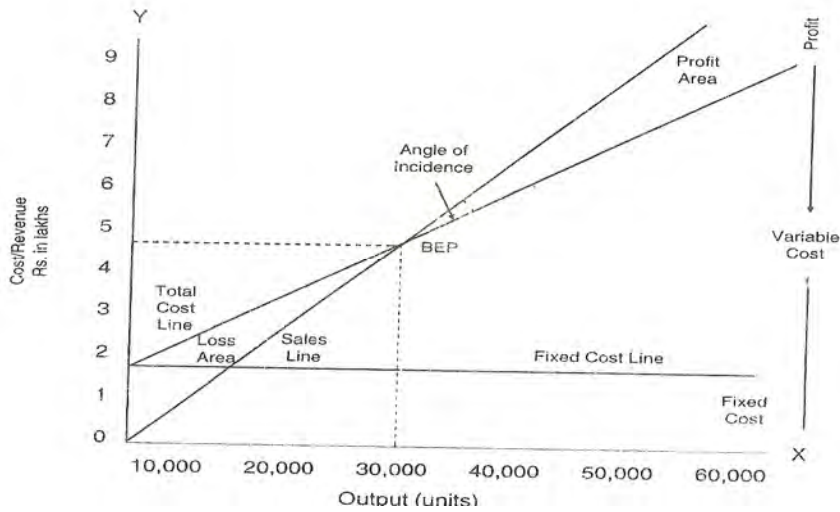
Selling price per unit	= ₹ 15
Variable cost per unit	= ₹ 10
Total fixed cost	= ₹ 1,50,000

### ***Solution:***

For plotting the data, we need at least two points - one for plotting the total cost line and other for plotting the total sales line. Therefore, it will be necessary to presume different levels of output and sales as below:

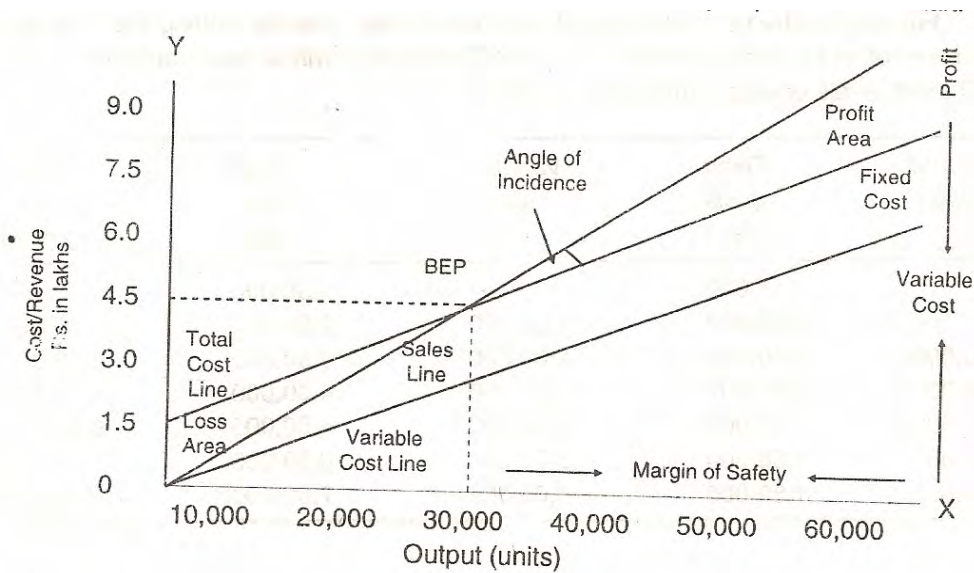
<i>Output units</i>	<i>Fixed costs (₹)</i>	<i>Variable costs (₹)</i>	<i>Total cost (₹)</i>	<i>Sales (₹)</i>
0	1,50,000	—	1,50,000	—
10,000	1,50,000	1,00,000	2,50,000	1,50,000
20,000	1,50,000	2,00,000	3,50,000	3,00,000

30,000	1,50,000	3,00,000	4,50,000	4,50,000
40,000	1,50,000	4,00,000	5,50,000	6,00,000
50,000	1,50,000	5,00,000	6,50,000	7,50,000
60,000	1,50,000	6,00,000	7,50,000	9,00,000



**Second Method of Break even chart**

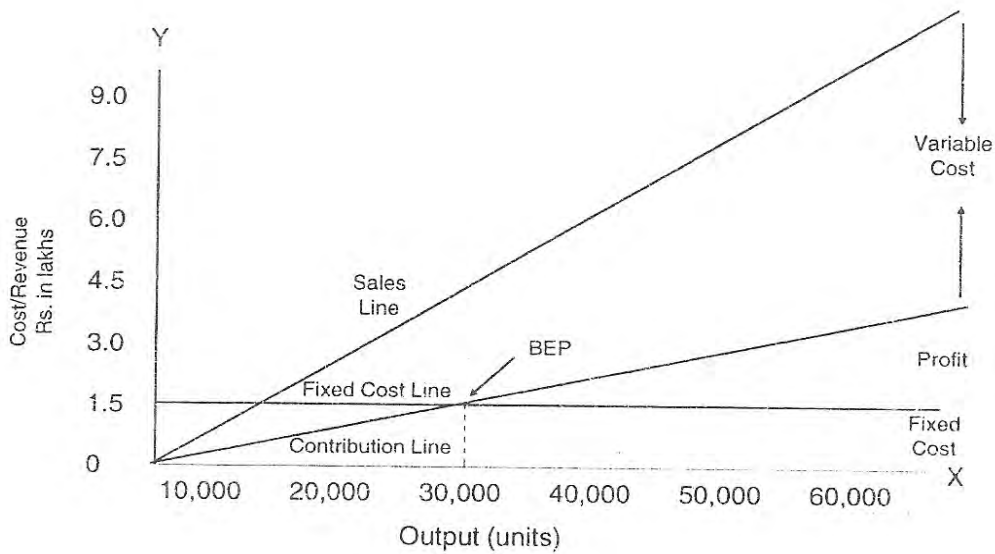
This is variation of the first method in which variable cost line is drawn first and thereafter drawing the fixed cost line above the variable cost line. The later line will be the total cost line. The sales line is drawn as usual. The added advantage of this method is that contributions at various levels of output are automatically depicted in the chart.





**(a) Contribution break-even chart**

The chart helps in ascertaining the amount of contribution at different levels of activity besides the break-even point. In this method, the fixed cost line is drawn parallel to the X-axis. The contribution line is then drawn from the origin which goes up with the increase in output. The sales line is plotted as usual, but the question of intersection of sales line with cost line does not arise. The contribution line crosses the fixed cost line and the point of intersection is treated as break-even point. At this point, contribution is equal to fixed expenses and there is no profit or loss. If the contribution is more than the fixed expenses, profit will arise and if the contribution is less than the fixed expenses, loss will arise.



**(b) Profit-volume Graph**

Profit volume graph is the graphical representation of the relationship between profit and volume. Separate lines for costs and revenues are eliminated from the P/V graph as only profit points are plotted. It is based on the same information as is required for the traditional break-even chart and is characterised by the same limitations. The steps in the construction of profit volume graph are as follows:

- (i) Profit and fixed costs are represented on the vertical axis.
- (ii) Sales are shown on the horizontal axis.
- (iii) The sale line divides the graph into two parts both horizontally and vertically. The area above the horizontal line is the 'profit area' and that below it is the 'loss area' at which fixed costs are represented on the vertical axis below the sale line and profits on the same axis above the sale line.
- (iv) Profits and fixed costs are plotted for corresponding sales volume and the points are joined by a line which is the profit line.

**Illustration 3**

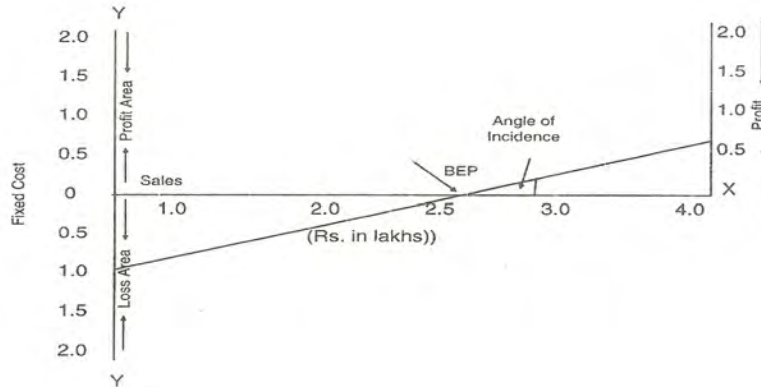
Y Ltd. represents the following data:

	₹
Sales	4,00,000
Variable costs	2,40,000

Fixed costs	1,00,000
Net profit	60,000

Draw a profit volume graph.

**Solution:**



From the above graph the following data can be calculated:

$$\begin{aligned} \text{P/V Ratio} &= \frac{\text{Sales} - \text{Variable expenses}}{\text{Sales}} \times 100 \\ &= \frac{\text{₹}4,00,000 - \text{₹}2,40,000}{\text{₹}4,00,000} \times 100 \\ &= \frac{\text{₹}1,60,000}{\text{₹}4,00,000} \times 100 = 40\% \end{aligned}$$

$$\begin{aligned} \text{BEP (in ₹)} &= \frac{\text{Fixed Cost}}{\text{P/V Ratio}} \\ &= \frac{\text{₹}1,00,000}{40\%} \\ &= \text{₹}2,50,000 \end{aligned}$$

$$\begin{aligned} \text{Margin of safety (in ₹)} &= \frac{\text{Profit}}{\text{P/V ratio}} = \frac{\text{₹}60,000}{40\%} \\ &= \text{₹}1,50,000 \end{aligned}$$

**Illustration 4**

From the following figures ascertain the break-even sales and also show the computation by means of a graph.

	₹
Sales	20,00,000
Fixed Costs	5,00,000
Variable costs	12,00,000

**Solution:**

	₹
Sales	20,00,000
Less: Variable Cost	<u>-12,00,000</u>
Contribution	<u>8,00,000</u>

P/V Ratio =  $\frac{\text{Contribution}}{\text{Sales}}$

=  $\frac{₹8,00,000}{₹20,00,000}$

= 0.40 OR 40%

Break-even sales =  $\frac{\text{Fixed Cost}}{\text{P/V Ratio}}$

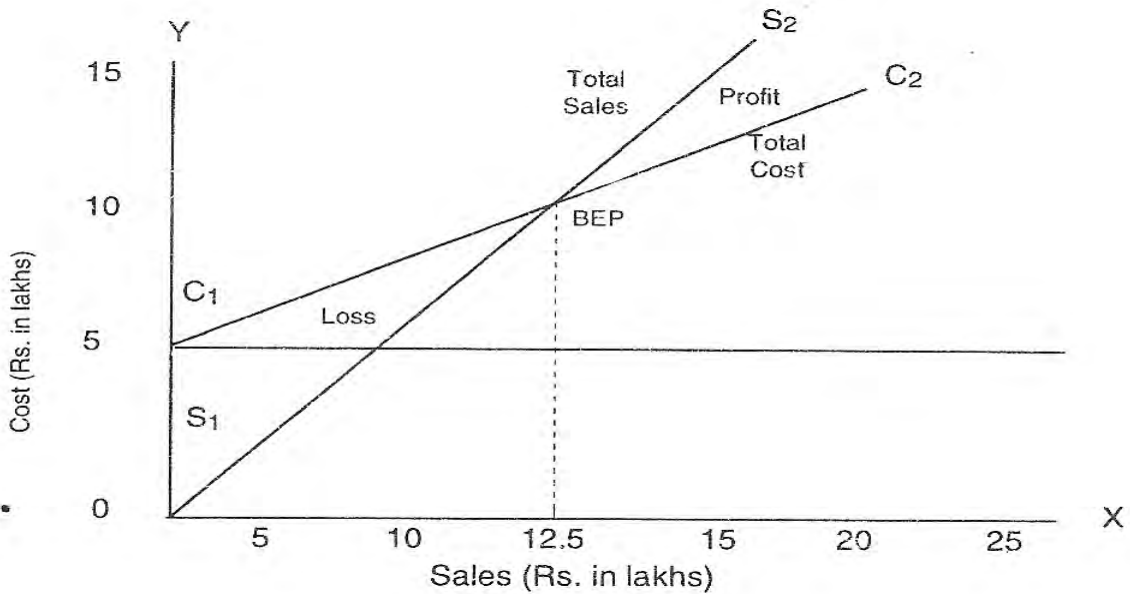
=  $\frac{₹5,00,000}{40\%}$

= ₹ 12,50,000

**BREAK-EVEN CHART**

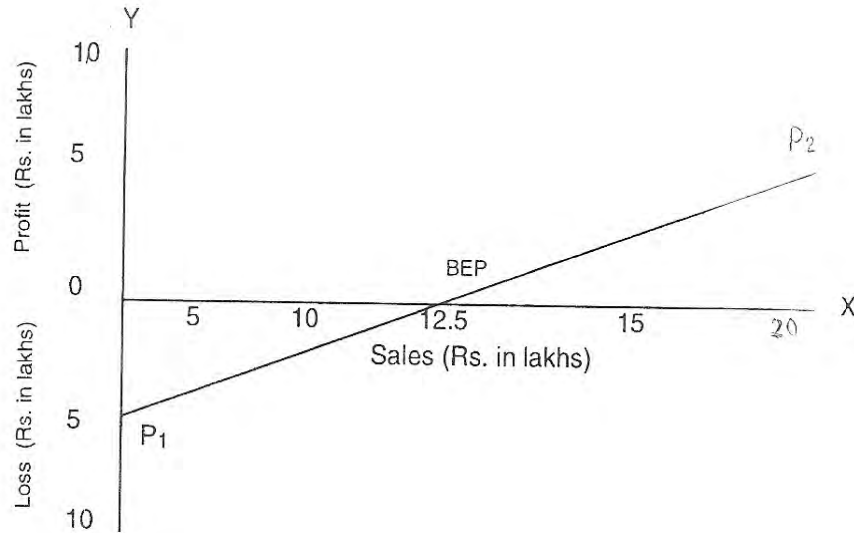
Points plotted:

Sales ₹	Variable Costs ₹ (60% of sales)	Fixed Costs ₹	Total Cost ₹.
0	0	5,00,000	5,00,000 (C1)
15,00,000	9,00,000	5,00,000	14,00,000 (C2)



### PROFIT-VOLUME CHART

(At zero sale loss is ₹5 lakh: at ₹20,00,000 sales, profits is ₹3 lakh (P<sub>2</sub>). Draw a line to join these two points. The break-even sale is at the point where it meets the X-axis).



#### Illustration 5

The sales of a company are @ ₹ 200 per unit	₹ 20,00,000
Variable cost	12,00,000
Fixed cost	6,00,000
The capacity of the factory	15,000 units

Determine the BEP. How much profit is the company making?

#### Solution:

$$\begin{aligned}
 \text{Number of Units Presently Sold by Company} &= \frac{\text{₹ 20,00,000}}{\text{₹ 200}} \\
 &= 10,000 \text{ Units} \\
 \text{Variable Cost per Unit} &= \frac{\text{Total Variable Cost}}{\text{No. of Units}} \\
 &= \frac{\text{₹ 12,00,000}}{10,000} \\
 &= \text{₹ 120} \\
 \text{Contribution per Unit} &= \text{SP} - \text{VC} \\
 &= \text{₹ 200} - \text{₹ 120} \\
 &= \text{₹ 80}
 \end{aligned}$$

$$\begin{aligned} \text{BEP (in Units)} &= \frac{\text{Fixed Cost}}{\text{Contribution Per Unit}} \\ &= \frac{\text{₹6,00,000}}{\text{₹80}} = 7,500 \text{ Units} \end{aligned}$$

$$\begin{aligned} \text{Profit by the Company} &= (\text{No. of Units Sold} \times \text{Contribution Per Unit}) - \text{Fixed Cost} \\ &= (\text{₹10,000} \times \text{₹80}) - \text{₹6,00,000} \\ &= \text{₹2,00,000} \end{aligned}$$

**Illustration 6**

Sales are ₹1,50,000, producing a profit of ₹4,000 in period I. Sales are ₹1,90,000, producing a profit of ₹12,000 in period II. Determine the BEP.

**Solution:**

The Question may be presented in the given format:

	<i>Sales</i>	<i>Profit</i>
Period 1	₹1,50,000	₹ 4,000
Period 2	₹ 1,90,000	₹ 12,000

$$\begin{aligned} \text{PV Ratio} &= \frac{\text{Change in Profit}}{\text{Change in Sale}} \\ &= \frac{\text{₹12,000} - \text{₹4,000}}{\text{₹1,90,000} - \text{₹1,50,000}} \\ &= \frac{\text{₹8,000}}{\text{₹40,000}} \\ &= 0.2 \text{ or } 20\% \\ \text{As Profit} &= \text{Sales} \times \text{PV Ratio} - \text{Fixed Cost} \\ 4,000 &= \text{₹1,50,000} \times 20\% - \text{Fixed Cost} \\ \text{Fixed Cost} &= \text{₹30,000} - \text{₹4,000} \\ &= \text{₹26,000} \\ \text{BEP (in ₹)} &= \frac{\text{Fixed Cost}}{\text{PV Ratio}} \\ &= \frac{\text{₹26,000}}{0.2} \\ &= \text{₹1,30,000} \end{aligned}$$

**APPLICATIONS OF MARGINAL COSTING**

1. Profit planning
2. Evaluation of Performance

3. Make or Buy Decisions
4. Closure of a Department or Discontinuance of a Product
5. Maintaining a Desired Level of Profit
6. Offering Quotations
7. Accepting an Offer or Exporting below Normal Price
8. Alternative Use of Production Facilities
9. Problem of Key Factor
10. Selection of a Suitable Product Mix

## 1. Profit planning

There are four ways in which profit performance of a business can be improved:

- (a) by increasing volume;
- (b) by increasing selling price;
- (c) by decreasing variable costs; and
- (d) by decreasing fixed costs.

Profit planning is the planning of future operations to attain maximum profit or to maintain a specified level of profit. The contribution ratio (which is the ratio of marginal contribution to sales) indicates the relative profitability of the different sectors of the business whenever there is a change in selling price, variable costs or product mix. Due to the merging together of fixed and variable costs, absorption costs fail to bring out correctly the effect of any such change on the profit of the concern.

### Illustration 7

A toy manufacturer makes an average net profit of ₹2.50 per piece on a selling price of ₹14.30 by producing and selling 60,000 pieces or 60% of the potential capacity. His cost of sales is:

Direct material	₹3.50
Direct wages	₹1.25
Works overhead	₹6.25 (50% fixed)
Sales overhead	₹0.80 (25% variable)

During the current year, he anticipates that his fixed charges will go up by 10%, while rates of direct material and direct labour will increase by 6% and 8% respectively. But he has no option of increasing the selling price. Under this situation he obtains an offer for an order equal to 20% of his capacity. The concerned customer is a special customer.

What minimum price will you recommend for acceptance to ensure the manufacturer an overall profit of ₹1,67,300?

### Solution:

Solution to

Particulars	Cost at Present in ₹	Anticipated cost in Current Year in ₹
<b>No of Units</b>	60,000	

<b>Sales value</b>	8,58,000	8,58,000
<b>Variable Cost:</b>		
Direct Material	3.50	3.71 (3.50 × 106%)
Direct Labour	1.25	1.35 (1.25 × 108%)
<b>Variable Cost</b>		
Work overhead	3.125 (6.50 × 50%)	3.125
Sales Overhead	0.600 (0.80 × 25%)	0.600
Total Variable Cost per unit	8.075	8.385
<b>Fixed Cost</b>		
Work overhead	60,000 (6.250 – 3.125) = 1,87,500	2,06,250 (1,87,500 × 110%)
Sales Overhead	60,000 (0.80 × 75%) = 36,000	39,600 (36,000 × 110%)
Total Fixed Cost	2,23,500	2,45,850
Present selling Price	14.30	14.30
Contribution per unit	14.30-8.075	14.30 – 8.385
Contribution in ₹	3,73,500	3,54,900
Profit (Contribution-Fixed Cost)	1,50,000	1,09,050
Profit desired in current year		1,67,300
Increase in profit		58,250
Sales in No of units by increasing the Sales level by 20%	=	₹60,000/60% × 80%
	=	₹20,000
Additional Variable Cost of 20,000 units	=	₹20,000 × 8.385
	=	₹1,67,700
Minimum sales price for 20,000 additional units	=	₹ (1,67,700 + 58,250)/20,000
	=	₹11.297

### Illustration 8

The following data relate to a manufacturing company:

Plant capacity: 4,00,000 units per annum

Present utilisation: 40%

Actuals for the year were:

Selling price	₹ 50 per unit
Materials cost	₹ 20 per unit
Variable manufacturing costs	₹15 per unit
Fixed costs	₹ 27 lakhs

In order to improve capacity utilisation the following proposals are being considered:

Reduce selling price by 10%.

Spend additionally ₹3 lakhs on sales promotion.

How many units should be made and sold in order to earn a profit of ₹5 lakhs per year?

**Solution:**

Revised selling price (₹50 less 10%) ₹45 per unit

**Variable cost:**

Material cost	₹20
Variable manufacturing cost (per unit)	₹15
Total variable cost	₹35 per unit
Contribution	₹10 per unit

**Total contribution required:**

Fixed costs	₹ 27,00,000
Additional promotion expenses	₹ 3,00,000
Profit	₹ 5,00,000
Total	₹ 35,00,000

Total number of units to be made and sold to earn a contribution of ₹35,00,000

$$= \frac{\text{Total Contribution}}{\text{Contribution per unit}}$$

$$= \frac{₹ 35,00,000}{₹ 10} = 3,50,000 \text{ units.}$$

**2. Evaluation of Performance**

The various section of a concern such as a department, a product line, or a particular market or sales division, have different revenue earning potentialities. A company always concentrates on the departments or product lines which yield more contribution than others. The performance of each such sector can be brought out by means of cost volume-profit analysis or the contribution approach. The analysis will help the company to take decision that will maximise the profits.

**Illustration 9**

A business produces three products A, B and C for which the standard variable costs and budgeted selling prices are as follows:

	A	B	C
	₹	₹	₹
Direct Material	3	6	8
Direct Wages	4	4	10
Variable overhead	3	5	7
Selling price	18	25	48

In two successive periods, sales are as follows:

	A	B	C
	Units	Units	Units
Period I	10,000	10,000	10,000
Period II	20,000	13,000	5,000

The budgeted fixed overheads amounted to ₹1,35,000 for each period. In spite of increased sales the profit for the second period has fallen below that of the 1st period.

Present figures to management to show why this fall in profit should, or should not have occurred.



**Solution:**

		Product A		Product B		Product C		Total	
		Period I	Period II	Period I	Period II	Period I	Period II	Period I	Period II
A	Sales (Units)	10,000	20,000	10,000	13,000	10,000	5,000	30,000	38,000
B	Selling Price P.U in ₹	18	18	25	25	48	48	-	-
C	Sale value in (₹'000) (A × B)	180	360	250	325	480	240	910	925
D	Variable Cost P.U in ₹	10	10	15	15	25	25	50	50
E	Variable Cost (₹'000) (A × D)	100	200	150	195	250	125	500	520
F	Contribution (₹'000) (C-E)	80	160	100	130	230	115	410	405
G	Fixed Overhead (₹'000)	-	-	-	-	-	-	135	135
H	Net Profit (F-G) (₹'000)	-	-	-	-	-	-	275	270
	P/V Ratio	44.4		40		47.9			

*Comments:* Sales have increased by 8,000 units but the sales value has increased by ₹15,000. Marginal costs have increased by ₹20,000 to meet cost of increased units of production, resulting in the fall of profit by ₹5,000.

Product C which yields the highest percentage of contribution to sales is the most profitable line. Product A comes next and product B is the least profitable of the three.

The unsatisfactory position in Period II is because of unfavourable sales mix as the production of most profitable line C has been cut down and the less profitable products A and B have been pushed up.

**3. Make or Buy Decisions**

When the management is confronted with the problem whether it would be economical to purchase a component or a product from outside sources, or to manufacture it internally, marginal cost analysis renders useful assistance in the matter. Under such circumstances, a misleading decision would be taken on the basis of the total cost analysis. In case the proposal is to buy from outside then, what is already being made, and the price quoted by the outsider should be lower than the marginal cost. If the proposal is to make something what is being purchased outside, the cost of making should include all additional costs like depreciation on new plant, interest on capital involved and that cost should be compared with the purchase price.

**Illustration 10**

A T.V. manufacturing company finds that while it costs to make component X, the same is available in the market at ₹5.75 each, with all assurance of continued supply. The breakdown of cost is:

Materials	₹2.75 each
Labour	₹1.75 each
Variable overheads	₹0.50 each
Depreciation and other fixed cost	₹1.25 each
	<u>₹6.25 each</u>

- Should the company make or buy the component?
- What should be your decision if the supplier offered component at ₹4.85 each?

**Solution:**

Marginal cost per unit of component X

Materials	₹2.75
Labour	₹1.75
Variable overheads	<u>₹0.50</u>
Total	<u>₹5.00</u>

- (a) The purchase cost of the above component is ₹5.75 each. If the company is having spare capacity which can not be filled with more remunerative jobs, it is recommended that the above component be manufactured in the company since the marginal cost at ₹5.00 each is less than the purchase cost of ₹5.75.
- (b) In the event of purchase cost of ₹4.85 each being less than the marginal cost of ₹5.00 each, it is recommended that the component be bought from the supplier as this results in a saving of ₹0.15 each. The spare capacity thus available can be utilised for other purposes, as far as possible.

**4. Closure of a Department or Discontinuance of a Product**

As discussed earlier, marginal costing technique helps in deciding the profitability of a product. It provides the information in a manner that tells us how much each product contributes towards fixed cost and profit; the product or department that gives least contribution should be discarded except for a short period. If the management is to choose some product out of the given ones, then the products giving the highest contribution should be chosen and those giving the least should be discontinued.

**5. Maintaining a Desired Level of Profit**

A company has to cut prices of its products from time to time because of competition, Government regulations and other compelling reasons. The contribution per unit on account of such cutting is reduced while the industry is interested in maintaining a minimum level of its profits. In case the demand for the company's product is elastic, the maximum level of profits can be maintained by pushing up the sales. The volume of such sales can be found out by marginal costing techniques.

**Illustration 11**

S. Ltd. manufactures and markets a single product. The following information is available:

	<i>₹ per unit</i>
Materials	8.00
Conversion costs (variable)	6.00
Dealer's margin	2.00
Selling price	20.00
Fixed cost ₹2,50,000	
Present sales, 80,000 units	
Capacity utilisation: 60 per cent.	

There is acute competition. Extra efforts are necessary to sell. Suggestions have been made for increasing sales:

- (i) By reducing sales price by 5%
- (ii) By increasing dealers margin by 25% over the existing rate.

Which of the two suggestions you would recommend if the company desires to maintain the present profit? Give reasons.

**Solution:****Present marginal cost per unit:**

	₹
Material	8.00
Conversion costs	6.00
Dealer's margin	<u>2.00</u>
<b>Total</b>	<b><u>16.00</u></b>

Contribution per unit	= Selling price – Marginal cost
	= ₹20.00 – 16.00 = ₹4.00
Total contribution	= ₹4 × 90,000 = 3,60,000
Profit	= Contribution – Fixed cost
	= ₹3,60,000 – ₹2,50,000 = ₹1,10,000

Since in both suggestions fixed costs remain unchanged, the present profit can be maintained by keeping the total contribution at the present level i.e. ₹3,60,000.

**(i) Reducing sales price by 5%**

New sales price	= (₹20.00 × 0.95) = ₹19.00
New dealers margin	= 10% of ₹19.00
	= ₹1.90
Variable costs	= ₹8 + ₹6 + ₹1.90 = ₹15.90
Contribution per unit	= ₹19.00 – ₹15.90 = ₹3.10

Sales (units) required to maintain the present level of profit.

$$= \frac{\text{Total contribution}}{\text{Contribution per unit}} = \frac{\text{₹ } 3,60,000}{\text{₹ } 3.10}$$

$$= 1,16,111 \text{ units}$$

**(ii) Increasing dealer's margin by 25%**

New dealer's margin	= ₹2 + 25%	= ₹2.50
New variable cost	= ₹8 + ₹6 + ₹2.50	= ₹16.50
Contribution	= ₹20 – ₹16.50	= ₹3.50
Sales (units)	= $\frac{\text{₹ } 3,60,000}{\text{₹ } 3.50}$	= 1,02,857 units

The second proposal is recommended because the contribution per unit is higher and the sales (in units) are lower. Lower sales efforts and less finance would be required in implementing the (ii) proposal.

**6. Offering Quotations**

One of the best ways for sales promotion is to offer quotations at low rates. A company is producing 80,000 units (80% of capacity) and making a profit of ₹2,40,000. Suppose the Punjab Government has given a tender notice for 20,000 units. It is expected that the units taken by the Government will not affect the sale of 80,000 units which the company is already selling and the company also wishes to submit the lowest possible quotation. The company may quote any amount above marginal cost, because it will give an additional marginal contribution and hence profit.

## 7. Accepting an Offer or Exporting below Normal Price

Sometimes the volume of output and sales may be increased by reducing the normal prices of additional sale. In this case the concern should be cautious enough to see that the sale below normal price in additional markets should not affect the normal market. To be on the safe side the product may be sold under the label of a different brand. If there is additional sale because of export orders, goods may be sold at a price below the normal.

### Illustration 12

The cost of a manufacturing company for the product is:

	₹
Materials	12.00
Labour	9.00
Variable expenses	6.00
Fixed expenses	<u>18.00</u>
<b>Total</b>	<b><u>45.00</u></b>

The unit of product is sold for ₹51.00.

The company's normal capacity is 1,00,000 units. The figures given above are for 80,000 units. The company has received an offer for 20,000 units @ ₹36 per unit from a foreign customer.

Advise the manufacturer on whether the order should be accepted. Also give your advice if the order is from a local merchant.

### Solution:

Marginal cost for additional 20,000 units

	<i>Per unit</i>	<i>For 20,000 units</i>
	₹	₹
Material	12.00	2,40,000
Labour	9.00	1,80,000
Variable expenses	<u>6.00</u>	<u>1,20,000</u>
<b>Marginal cost</b>	<b><u>27.00</u></b>	<b><u>5,40,000</u></b>
Additional revenue to be realised		7,20,000
Marginal cost		5,40,000
Net additional revenue (Marginal contribution)		1,80,000

The offer should be accepted because it gives an additional contribution of ₹1,80,000. The total profit will also increase by ₹1,80,000 because fixed expenses have already been recovered from the local market. Furthermore, the order from the local customer should not be accepted at ₹36 per unit or at any rate below the normal price i.e., ₹45 because it will result in the general reduction of selling prices of the product.

Note: Acceptance of the additional order should not lead to production being in excess of the present capacity since, in that case, some fixed expenses may also go up substantially. If there is such an increase in fixed expenses, the increase should also be considered by inclusion in the total additional cost to be compared with the additional revenue.

## 8. Alternative Use of Production Facilities

When alternative use of production facilities or alternative methods of manufacturing a product are available,

contribution analysis should be used to arrive at the final choice. The alternative which will yield highest contribution, shall generally and obviously be selected.

### 9. Problem of Key Factor

The product giving the greatest contribution will be the most profitable. To maximise profit, resources should be mobilised towards that product which gives the maximum contribution. But contribution is not the only criterion for deciding profitability. In real life, there may be several factors which may put a limit on the number of units to be produced even if the products give a high contribution. These factors are equally important for arriving at managerial decisions because these factors limit the volume of output at a particular point of time or over a period. These are called key factors, scarce factors, limiting factors, principal budget factors or governing factors. The limiting factors may be sale, raw material, labour, plant capacity and availability of capital e.g., for a concern established in a relatively new town, labour may be a key factor or the concern may find it difficult to acquire an unlimited quantity of raw material because of scarcity or the quota system, etc. In the later case material will be the key factor. The extent of influence of these factors should be carefully examined before arriving at a particular decision. Contribution per unit of key factor should be considered and that course of action should be adopted which gives the highest contribution per unit of key factor.

#### Illustration 13

You are given the following information in respect of products X and Y of Bee Cee Co. Ltd.

	<i>Product X</i>	<i>Product Y</i>
Selling price	₹42	₹33
Direct material	₹15	₹15
Labour hours (50 paise per hour)	18 hours	9 hours
Variable overheads	50% of Direct wages	

Show which product is more profitable during labour shortage.

#### Solution:

#### Computation of Marginal Contribution

<i>Particulars</i>	<i>Product X</i>	<i>Product Y</i>
Selling price per unit in ₹	42	33
Direct Material per unit in ₹	15	15
Labour Hours (A)	18	9
Labour cost per hour (B) in ₹	0.50	0.50
Labour cost per unit (A × B) in ₹	9	4.50
Variable overhead (50% of Labour Cost) in ₹	4.50	2.25
Total Variable Cost per unit in ₹	28.50	21.75
Contribution per unit in ₹	13.50	11.25

Since Labour is in shortage so it will be treated as Key factor and the product which is generating higher contribution per hour will be preferred.

#### Contribution per labour hour:

$$\begin{aligned} \text{Product X} &= ₹ 13.50/18 \\ &= ₹ 0.75 \end{aligned}$$

$$\begin{aligned}\text{Product Y} &= ₹ 11.25/9 \\ &= ₹ 1.25\end{aligned}$$

Since contribution per labour hour for product Y is higher so product Y is more profitable.

### 10. Selection of a Suitable Product Mix

A concern, which manufactures more than one product, may have to decide in what proportion should these products be produced or sold. The technique of marginal costing helps to a great extent in the determination of most profitable product or sales mix. The best product mix is that which yields the maximum contribution. In the absence of key factor, contribution under various mix will be found out and the mix which gives the highest contribution will be selected for production.

#### Illustration 14

A company engaged in plantation activities has 200 hectares of virgin land which can be used for growing jointly or individually tea, coffee, and cardamom. The yield per hectare of the different crops and their selling price per kg. are as under:

	Yield (kgs.)	Selling Price (₹ per kg.)
Tea	2,000	20
Coffee	500	40
Cardamom	100	250

The relevant cost data are given below:

(a) Variable cost per kg.:

	Tea (₹)	Coffee (₹)	Cardamom (₹)
Labour charges	8	10	120
Packing materials	2	2	10
Other costs	<u>4</u>	<u>1</u>	<u>20</u>
<b>Total cost</b>	<b><u>14</u></b>	<b><u>13</u></b>	<b><u>150</u></b>

(b) Fixed cost per annum:

	₹
Cultivation and growing cost	10,00,000
Administrative cost	2,00,000
Land revenue	50,000
Repairs and maintenance	2,50,000
Other costs	<u>3,00,000</u>
<b>Total cost</b>	<b><u>18,00,000</u></b>

The policy of the company is to produce and sell all the three kinds of products and the maximum and minimum are to be cultivated per product is as follows:

	Maximum Area (hectares)	Minimum Area (hectares)
Tea	160	120
Coffee	50	30
Cardamom	30	10

Calculate the priority of production, the most profitable product mix and the maximum profit which can be achieved.

**Solution:**

Contribution of different products:

	Tea (₹)	Coffee (₹)	Cardamom (₹)
Selling price per kg.	20	40	250
Less: Variable cost per kg.:			
Labour charges	8	10	120
Packing materials	2	2	10
Other costs	<u>4</u>	<u>1</u>	<u>20</u>
Total variable cost	<u>14</u>	<u>13</u>	<u>150</u>
Contribution per kg.	<u>6</u>	<u>27</u>	<u>100</u>
Contribution per hectare	<u>12,000</u>	<u>13,500</u>	<u>10,000</u>
Rating on the basis of contribution per hectare	II	I	III

(i) Therefore, to maximise profit, subject to other constraints, the order of priority of production would be Coffee, Tea and Cardamom.

(ii) Optimum product mix:

	Area (hectares)	Yield (kg./hect.)	Total Production (kgs.)
(a) Maximum of coffee	50	500	25,000
(b) Minimum of Cardamom	10	100	1,000
(c) Balance of Tea	<u>140</u>	<u>2,000</u>	<u>2,80,000</u>
	<u>200</u>	<u>2,600</u>	<u>3,06,000</u>

(iii) Maximum profit

	Production (kgs.)	Rate (₹)	Total (₹)
Contribution from Coffee	25,000	27	6,75,000
Contribution from Cardamom	1,000	100	1,00,000
Contribution from Tea	2,80,000	6	<u>16,80,000</u>
			24,55,000
Less: Fixed Costs			<u>18,00,000</u>
Profit			<u>6,55,000</u>

**COMPOSITE BREAK EVEN POINT**

A business undertaking may have different manufacturing establishments each having its own production capacity, and fixed costs but producing the same product. At the same time, the concern as a whole is a unit having different establishments under the same management. Hence the combined fixed costs have to be met by the combined BEP sales. In this analysis, there are two approaches namely:

(i) Constant product mix approach.

(ii) Variable product mix approach.

Under the first approach, the ratio in which the products of the various establishments are mixed is constant. This mix will be maintained at BEP sales also. Under the second approach the product of that establishment would be preferred where the contribution ratio is higher. The above two approaches are explained by the following illustration.

**Illustration 15**

'A Limited' has two factories X and Y producing the same article whose selling price is ₹150 per unit. The following are the other particulars:

	<i>Factory X</i>	<i>Factory Y</i>
Capacity (unit)	10,000	15,000
Variable cost per unit	₹ 100	₹120
Fixed expenses	₹3,00,000	₹2,10,000

Determine the BEP for the two factories and for the company as a whole assuming

(i) Constant Sales Mix, (ii) Variable Sales Mix.

**Solution:**

BEP for the two factories separately:

	<i>Factory X</i>	<i>Factory Y</i>
Contribution per unit	₹50	₹30
Fixed expenses	₹3,00,000	₹2,10,000
∴ Break-even point	6,000 units	7,000 units
	$= \left( \frac{\text{Fixed Expenses}}{\text{C Per Unit}} \right)$	$= \frac{₹3,00,000}{50}$
		$= \frac{₹2,10,000}{30}$

**Composite BEP:****1. Constant sales mix:**

$$\text{Combined P/V ratio} = (2/5 \times ₹50) + (3/5 \times ₹30) = \frac{₹38}{₹150} \times 100 = \frac{76}{3}$$

$$\text{Combined fixed expenses} = ₹5,10,000$$

$$\therefore \text{BEP} = \frac{₹5,10,000 \times 3 \times 100}{76}$$

$$= ₹20,13,158$$

As sales price is uniform, the mix ratio is the capacity ratio itself, i.e., 2 : 3

$$X = ₹8,05,263 \text{ or } 5,369 \text{ units}$$

$$Y = ₹12,07,895 \text{ or } 8,052 \text{ units}$$

*Workings:*

Ratios of Sales Mix:

$$\text{Total units} = 10,000 + 15,000 = 25,000$$

$$\therefore X = \frac{10,000}{25,000} = 2/5$$

$$\therefore Y = \frac{15,000}{25,000} = 3/5$$



**2. Variable Sales Mix**

As factory X is giving a higher contribution, it shall be used in full, i.e., 10,000 units should be produced here before production is commenced at Y. This will give a contribution of ₹5,00,000.

Total fixed expenses for the two factories	₹5,10,000
Additional contribution required to meet the fixed expenses fully	₹10,000
Number of units to be produced at Y to produce this contribution	334
Total number of units:	
X	10,000
Y	<u>334</u>
	10,334

The above discussion could also be applied to an undertaking selling different products each having its own contribution and sales potential. The composite BEP for the business could be worked out keeping the product mix constant. This would involve working out a composite P/V Ratio as in the above case.

**Illustration 16**

The budget of N Ltd. includes the following data for the forthcoming financial year:

(a) Fixed expenses	₹3,00,000
(b) Contribution per unit	Product A - ₹6; Product B - ₹2.50; Product C - ₹4
(c) Sales Forecast	Product A - 24,000 units @ ₹12.50 Product B - 1,00,000 units @ ₹7.00 Product C - 50,000 units @ ₹10.00

Calculate the combined P/V ratio and combined BEP.

**Solution:**

Sales mix forecast	A = 24,000 x ₹12.50	=	₹ 3,00,000
	B = 1,00,000 x ₹7.00	=	₹ 7,00,000
	C = 50,000 x ₹10.00	=	<u>₹ 5,00,000</u>
		Total	<u>₹15,00,000</u>

∴ Ratio of sales mix = 3 : 7 : 5

$$\text{Combined P/V Ratio} = \frac{(3 / 15 \times 6) + (7 / 15 \times 2.50) + (5 / 15 \times 4)}{(3 / 15 \times 12.50) + (7 / 15 \times 7) + (5 / 15 \times 10)}$$

Or

$$= \frac{(1,44,000 + 2,50,000 + 2,00,000)}{15,00,000}$$

$$= \frac{594}{1500}$$

$$\text{Composite BEP} = \frac{\text{Total fixed expenses}}{\text{Composite P / V ratio}}$$

$$= \frac{3,00,000 \times 1,500}{594}$$

$$= ₹7,57,575$$

BEP Sales for the 3 products = A ₹1,51,515 or 12,121 units  
 (in the ratio of 3 : 7 : 5) = B ₹3,53,535 or 50,505 units  
 = C ₹2,52,525 or 25,253 units

If we solve this problem on the basis of second alternative, i.e., to change the sales mix so that priority is given to that product which gives the highest per unit contribution then product A will have to be produced in full, i.e., 24,000 units and secondly product C. The BEP in that case will be:

Total fixed cost upto BEP = ₹3,00,000

	Sales Per Unit ₹	Total Sales ₹	Contribution Per Unit ₹	Total Contribution ₹
I Priority: Product A 24,000	12.50	3,00,000	6	1,44,000
II Priority: Product C 39,000	10.00	<u>3,90,000</u>	4	<u>1,56,000</u>
		<u>6,90,000</u>		<u>3,00,000</u>
Above BEP				
Product C 11,000	10.00	1,10,000	4	44,000
Product B 1,00,000	7	<u>7,00,000</u>	2.50	<u>2,50,000</u>
		<u>8,10,000</u>		<u>2,94,000</u>

Hence the sales at BEP will be ₹6,90,000. This is lower than the BEP already worked out by keeping the sales mix constant.

### Illustration 17

The under mentioned information is given below:

- (1) The P/V Ratio of a firm is 40%.
- (2) The firm wants to increase its selling price by 10%.
- (3) The firm's variable cost is higher now by 5%.
- (4) The fixed expenses of the firm have gone up from ₹2,00,000 to ₹2,58,500.

Work out the original BEP sales and the revised BEP sales.

### Solution:

Original BEP sales

P/V ratio	= 40%
Fixed expenses	= ₹2,00,000
Present BEP	= $\frac{₹ 2,00,000 \times 100}{40}$
	= ₹5,00,000
New sales	= 110 (i.e., 10% increase)
Variable cost	= 63 (i.e., 5% increase)
Revised P/V ratio	= $\frac{47}{110} \times 100$
	= 42.73%

$$\begin{aligned} \text{Revised fixed expenses} &= ₹2,58,500 \\ \text{Revised BEP} &= \frac{₹ 2,58,500 \times 100}{40} \\ &= ₹6,04,961 \end{aligned}$$

**Illustration 18**

With a view to increase the volume of sales, Ambitious Enterprises has in mind a proposal to reduce the price of its product by 20%. No change in total fixed costs or variable costs per unit is estimated. The directors, however, desire the present level of profit to be maintained.

The following information has been provided:

Sales—50,000 units	₹5,00,000
Variable costs	₹5 per unit
Fixed Costs	₹50,000

Advice management on the basis of various calculations made from the data given.

**Solution:**

Marginal Cost Statement

	₹
Sales	5,00,000
Less: Variable Costs	<u>2,50,000</u>
Contribution	2,50,000
Less: Fixed Costs	<u>50,000</u>
Profit	<u>2,00,000</u>

$$\begin{aligned} \text{Profit/Volume Ratio} &= \frac{\text{Sales} - \text{Variable Costs}}{\text{Sales}} \times 100 \\ &= \frac{₹ 5,00,000 - ₹ 2,50,000}{5,00,000} \times 100 \\ &= \frac{₹ 2,50,000}{₹ 5,00,000} \times 100 \\ &= 50\% \end{aligned}$$

In the event of reduction in selling price without any corresponding increase in sales volume.

$$\begin{aligned} \text{P/V Ratio} &= \frac{₹ 4,00,000 - ₹ 2,50,000}{5,00,000} \times 100 \\ &= \frac{₹ 1,50,000}{₹ 4,00,000} \times 100 \\ &= 37.5\% \end{aligned}$$

In the view of the fact that the directors wish to maintain the same level of profit after reduction of selling price as before reduction and it is expected that fixed costs will not change, sales volume required to meet such a situation would be:

$$= \frac{\text{Fixed Costs} + \text{Profit}}{\text{P/V Ratio}}$$

$$\begin{aligned}
 &= \frac{\text{₹ } 50,000 + \text{₹ } 2,00,000}{37.5\%} \\
 &= \text{₹ } 2,50,000 \times \frac{100}{1} \times \frac{2}{75} \\
 &= \text{₹ } 6,66,667 \\
 &= 83,333 \text{ units approximately.}
 \end{aligned}$$

Thus, a reduction of 20% in the selling price requires an increase of about 66% in the sales volume.

Armed with this information, the management has to decide between two alternatives of to reduce or not to reduce the selling price, taking into consideration whether it would be able to measure up to the task of increasing the sales volume by 66%.

Verification: The conclusion that, with a view to get an approximate sales revenue of ₹6,66,667, sale of additional 33,333 units approximately would be required, can be verified as thus:

Sales	₹	
		6,66,667 (approx.)
Less: Variable Cost (83,333 units @ ₹5 each)		4,16,665 "
Contribution		2,50,002 "
Less: Fixed Costs		50,000 "
Profit		<u>2,00,002</u> "

### Illustration 19

A factory produces 300 units of a product per month. The selling price is ₹120 and variable cost ₹80 per unit. The fixed expenses of the factory amount to ₹8,000 per month. Calculate: (i) the estimated profit in a month wherein 240 units are produced, (ii) the sales to be made to earn a profit of ₹7,000 per month.

### Solution:

	₹
Selling price per unit	120.00
Less: Variable cost per unit	<u>80.00</u>
Contribution per unit	<u>40.00</u>

$$\therefore \text{P/V ratio} = \left( \frac{\text{Contribution}}{\text{Selling price}} \times 100 \right) = \frac{40}{120} \times 100 = 33\text{-}1/3\%$$

#### (i) Profit on sale of 240 units:

Sale of 240 units at ₹ 120 each	₹ 28,800
Contribution from the above at 33-1/3%	₹9,600
Less: Fixed cost of 1 month	<u>₹8,000</u>
∴ Profit	<u>₹1,600</u>

This result can also be arrived at as follows:

No. of units to be sold	= 240
Contribution per unit	= ₹40
∴ Contribution from 240 units	= 240 × ₹40
	= ₹9,600
Less: Fixed cost for the month	= <u>₹8,000</u>
∴ Profit	= <u>₹1,600</u>

**(ii) Sales required to earn a profit of ₹7,000:**

$$\begin{aligned}
 \text{Desired sales (in ₹)} &= \frac{\text{Fixed cost} + \text{Desired profit}}{\text{P/V Ratio}} \\
 &= \frac{₹8,000 + ₹7,000}{33.33\%} \\
 &= \frac{₹15,000 \times 100}{33 \frac{1}{3}} \\
 &= ₹45,000 \\
 \text{Desired sales (in units)} &= \frac{\text{Fixed cost} + \text{Desired profit}}{\text{Contribution per unit}} \\
 &= \frac{₹8,000 + ₹7,000}{₹40} \\
 &= 375 \text{ units} \\
 \text{Selling price per unit} &= ₹120 \\
 \therefore \text{Total sales} &= 375 \times ₹120 \\
 &= ₹45,000
 \end{aligned}$$

**Illustration 20**

There are two plants manufacturing the same products under one corporate management which decides to merge them.

Following particulars are available regarding the two plants:

	<i>Plant I</i>	<i>Plant II</i>
Capacity operation	100%	60%
Sales	₹6,00,00,000	₹2,40,00,000
Variable costs	₹4,40,00,000	₹1,80,00,000
Fixed costs	₹ 80,00,000	₹ 40,00,000

You are required to calculate for the consideration of the Board of directors:

- What would be the capacity of merged plant to be operated for purpose of break-even?
- What would be the profitability on working at 75 per cent of the merged capacity?

**Solution:**

Note: Sales and variable costs of Plant II must be brought from 60% to 100% before merger of two plants data at 100% capacity operation.

(a) Calculation of the Capacity of Merged Plant to Break-even at 100% Capacity.

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100$$

$$\text{P/V ratio} = \frac{2,60,00,000}{10,00,000} \times 100$$

$$= 26 \text{ per cent.}$$

$$\begin{aligned}
 \text{Sales at Break-even Point} &= \frac{\text{Fixed Costs}}{\text{P/V Ratio}} \\
 &= \frac{\text{₹ 1,20,000}}{26\%} \\
 &= \text{₹ 4,61,53,846 (Approx.)}
 \end{aligned}$$

In terms of percentage capacity, sales at break-even point work out to 46.15 per cent approximately.

$$\left( \frac{\text{₹ 4,61,53,846}}{\text{₹ 10,00,00,000}} \times 100 \right) = 46.15\%$$

**Workings:**

$$\begin{aligned}
 \text{Sales at 100\% capacity} &= \text{₹6,00,00,000} + \left( \frac{100}{60} \times \text{₹ 2,40,00,000} \right) \\
 &= \text{₹10,00,00,000}
 \end{aligned}$$

$$\begin{aligned}
 \text{Contribution at 100\% capacity} &= (\text{₹6,00,00,000} - \text{₹4,40,00,000}) + \left( \frac{100}{60} \times \text{₹ 2,40,00,000} \right) - \left( \frac{100}{60} \times \text{₹ 1,80,00,000} \right) \\
 &= (\text{₹1,60,00,000}) + (\text{₹1,00,00,000}) \\
 &= \text{₹2,60,00,000.}
 \end{aligned}$$

(b) Calculation of profit on working at 75% of the merged capacity.

**MARGINAL COST STATEMENT**

	₹
Sales (75% of ₹10,00,00,000)	7,50,00,000
Less: Variable Costs:	
75% of $\left[ \text{₹4,40,000} + \left( \frac{100}{60} \times \text{₹1,80,00,000} \right) \right]$	<u>5,55,00,000</u>
Contribution	1,95,00,000
Less: Fixed Costs	<u>1,20,00,000</u>
Profit	<u>75,00,000</u>

**Illustration 21**

The budgeted results of X Ltd., include the following:

Sales	Amount (in lakhs)	Variable Costs as % of Sales Value
A	5.00	60%
B	4.00	50%
C	8.00	65%
D	3.00	80%
E	<u>6.00</u>	<u>75%</u>
	<u>26.00</u>	<u>65.77%</u>

Fixed costs for the period are ₹9 lakhs. You are required to:

- (i) Produce a statement showing the amount of loss expected, and
- (ii) Recommend a change in sales volume of each product which will eliminate the expected loss assuming that sale of only one product can be increased at a time.

**Solution:**

**(a) Statement showing the loss expected**

Product	Sales	Variable Cost as % Sales Value	Variable Cost	Contribution	P/V Ratio
A	5,00,000	60%	3,00,000	2,00,000	40%
B	4,00,000	50%	2,00,000	2,00,000	50%
C	8,00,000	65%	5,20,000	2,80,000	35%
D	3,00,000	80%	2,40,000	60,000	20%
E	6,00,000	75%	4,50,000	1,50,000	25%
	26,00,000	65.77%	17,10,000	8,90,000	34.23%

Contribution	₹8,90,000
Less: Fixed Cost	<u>₹9,00,000</u>
Loss/Under recovery of fixed cost	<u>(10,000)</u>

**(b) Additional Volume of sales required:**

$$\text{Additional Sales} = \frac{\text{Underrecovery of fixed costs}}{\text{P/V Ratio}}$$

Thus

$$\text{Product A} = \frac{₹10,000}{40\%} = ₹25,000$$

$$\text{Product B} = \frac{₹10,000}{50\%} = ₹20,000$$

$$\text{Product C} = \frac{₹10,000}{35\%} = ₹28,571 \text{ approx.}$$

$$\text{Product D} = \frac{₹10,000}{20\%} = ₹50,000$$

$$\text{Product E} = \frac{₹10,000}{25\%} = ₹40,000$$

$$\text{Total} = \frac{₹10,000}{34.23\%} = ₹29,214 \text{ approx.}$$

The calculations given above clearly shows that, if X Co. Ltd., can increase sales of product A by ₹25,000 or that of product E by ₹40,000 its business operations would touch the break- even point.

*Note:* P/V Ratio in respect of different products has been calculated as thus:

Using the formula:

$$\frac{\text{Sales} - \text{Variable cost}}{\text{Sales}}$$

Therefore:

$$\text{Product A} = \frac{\text{₹ } 5,00,000 - \text{₹ } 3,00,000}{\text{₹ } 5,00,000} \times 100 = 40\%$$

$$\text{Product B} = \frac{\text{₹ } 4,00,000 - \text{₹ } 2,00,000}{\text{₹ } 4,00,000} \times 100 = 50\%$$

$$\text{Product C} = \frac{\text{₹ } 8,00,000 - \text{₹ } 5,20,000}{\text{₹ } 8,00,000} \times 100 = 35\%$$

$$\text{Product D} = \frac{\text{₹ } 3,00,000 - \text{₹ } 2,40,000}{\text{₹ } 3,00,000} \times 100 = 20\%$$

$$\text{Product E} = \frac{\text{₹ } 6,00,000 - \text{₹ } 4,50,000}{\text{₹ } 6,00,000} \times 100 = 25\%$$

## ABSORPTION COSTING

Absorption costing means that all of the manufacturing costs are absorbed by the total units produced. In short, the cost of a finished unit in inventory will include direct materials, direct labour, and both variable and fixed manufacturing overhead. As a result, absorption costing is also referred to as full costing or the full absorption method. Absorption costing is often contrasted with variable costing or direct costing. Under variable or direct costing, the fixed manufacturing overhead costs are not allocated to the products manufactured. Variable costing is often useful for management's decision-making. However, absorption costing is required for external financial reporting and for income tax reporting. It is also referred to as the full- cost technique

## SYSTEM OF PROFIT REPORTING

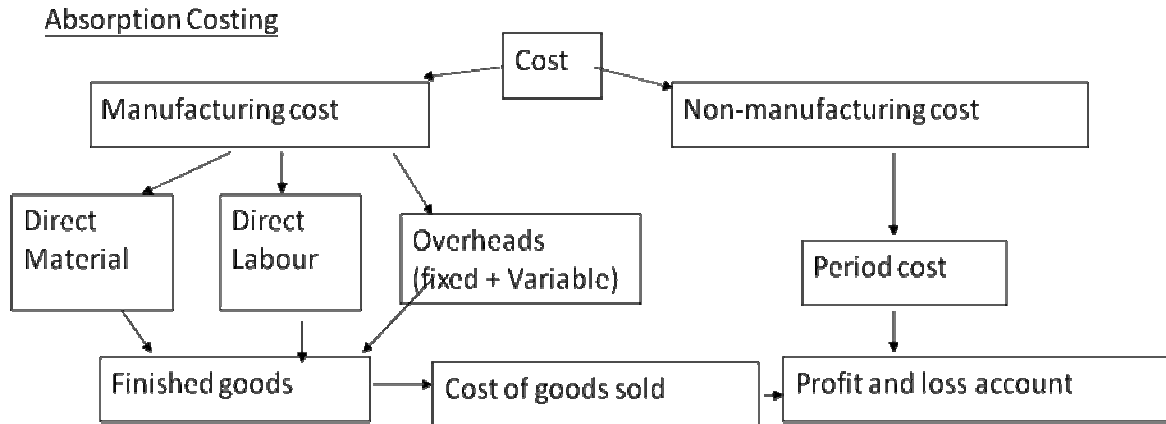
Absorption costing is a costing technique that includes all manufacturing costs, in the form of direct materials, direct labour, and both variable and fixed manufacturing overheads, while determining the cost per unit of a product.

In the context of costing of a product/service, an absorption costing considers a share of all costs incurred by a business to each of its products/services. In absorption costing technique; costs are classified according to their functions. The gross profit is calculated after deducting production costs from sales and from gross profit, costs incurred in relation to other business functions are deducted to arrive at the net profit. Absorption costing gives better information for pricing products as it includes both variable and fixed costs.

Absorption costing technique absorbed fixed manufacturing overhead into the cost of goods produced and are only charged against profit in the period in which those goods are sold. In absorption costing income statement, adjustment pertaining to under or over-absorption of overheads is also made to arrive at the profit. Absorption costing is a simple and fundamental method of ascertaining the cost of a product or service.



It is based on sharing of all indirect costs and direct cost to cost units/cost centers. Following chart shows the ascertaining the profit under absorption costing:



### STOCK VALUATION

Finished goods inventories are over-stated in absorption costing as it includes one more cost element in inventory value than under variable costing, i.e the fixed manufacturing cost.

Inventory value under absorption costing

$$= \text{Direct material} + \text{Direct labour} + \text{variable manufacturing costs} + \text{Fixed manufacturing costs}$$

### DIFFERENCE BETWEEN ABSORPTION COSTING AND MARGINAL COSTING

<i>Absorption costing</i>	<i>Marginal costing</i>
(i) Fixed production overheads are charged to the product to be subsequently released as a part of goods sold i.e., it is included in cost per unit.	Fixed production costs are regarded as period cost and are charged to revenue along with the selling and administration expenses, i.e., they are not included while computing cost per unit.
(ii) Profit is the difference between sales and cost of goods sold.	Profit in marginal costing is ascertained by establishing the total contribution and then deducting therefrom the total fixed expenses. Contribution is the excess of sales over variable cost.
(iii) Costs are seldom classified into variable and fixed. Although such a classification is possible, it fails to establish a cost-volume profit relationship.	Cost-volume profit relationship is an integral part of marginal costing studies. Costs have to be classified into fixed costs and variable costs.
(iv) If inventories increase during a period, this method will reveal more profit than marginal costing. When inventories decrease, less profits are reported because under this method closing stock is valued at higher figures. Since inventories are valued at total cost, a portion of fixed overheads are also included in inventories.	If inventories increase during a period, this method generally reports less income than absorption costing; but when inventories decrease this method reports more net income. The difference in the net income is due to difference in accounting for fixed manufacturing costs as compared to inventory valuation.

- (v) Arbitrary apportionment of fixed costs may result in under or over recovery of overheads. Since fixed costs are excluded, there is no question of arbitrary apportionment of fixed overheads and thus under or over absorption of overheads.

### INCOME MEASUREMENT UNDER MARGINAL COSTING AND ABSORPTION COSTING

Under marginal costing, only factory overheads costs that tend to vary with volume are charged to product cost in addition to prime cost. While evaluating inventory only direct materials, direct labour and variable factory overhead are included and are considered as product costs. Fixed factory overhead under direct or marginal costing is not included in inventory. It is treated as a period cost and charged against revenue when incurred. Under absorption costing, sometimes called full or conventional costing, all manufacturing costs, both fixed and variable are charged to product costs. Thus Absorption costing is “a principle whereby fixed as well as variable costs are allotted to cost units”. It means a system under which cost per unit includes fixed expenses, especially fixed production overheads in addition to the variable cost.

Profit emerges only after charging all costs minus fixed and variable. In marginal costing also this is true; only profit is ascertained by charging the fixed expenses costs to contribution.

Contribution is the difference between selling price and marginal costs. Fixed costs are written off against contribution during the period. Thus:

$$\begin{aligned} \text{Selling price} - \text{Variable cost} &= \text{Contribution} \\ \text{Contribution} - \text{Fixed costs} &= \text{Profit} \end{aligned}$$

If profit and fixed costs are known,

$$\text{Fixed costs} + \text{Profit} = \text{Contribution}$$

This gives us a basic marginal equation:

$$\text{Sales} - \text{Marginal costs} = \text{Contribution} = \text{Fixed costs} + \text{Profit (if there is a profit)} \\ \text{or Sales} = \text{Marginal costs} + \text{Fixed costs} + \text{Profit.}$$

Since the closing stocks do not have any element of fixed costs, profit shown by marginal costing technique may be different from that shown by absorption costing. When the entire stock is sold, there is no inventory i.e., neither there is opening nor closing stock, the profit revealed by both the methods will be same. But when sales and production are out of balance, difference in net profit is reported. When absorption costing is applied, the fixed manufacturing costs are shifted from one year to another year as a part of the inventory cost i.e. stock. If a company produces more than it sells in a given period, not all of the current manufacturing overheads will be deducted from sales i.e., closing stock will include a portion of fixed overheads. In other words, in absorption costing inventory will be valued at a higher figure; therefore, profit will be more as revealed by absorption costing than marginal costing. Hence, profits will not necessarily increase with an increase in sale value. The position will be reverse, in case a company produces less than it sells in a given period. Thus, marginal costing can produce a net profit figure which is similar than or greater than or equal to the net profit as shown under absorption costing.

An example illustrating the variations in the results obtained under the two methods is given below:

The basic production data are:

$$\begin{aligned} \text{Normal volume of production} &= 19,500 \text{ units per period} \\ \text{Sale price} &- ₹ 4 \text{ per unit} \\ \text{Variable cost} &- ₹ 2 \text{ per unit} \end{aligned}$$

Fixed cost - ₹ 1 per unit

Total fixed cost = ₹19,500 (₹1 x 19,500 units, normal)

Selling and distribution costs have been omitted.

The opening and closing stocks consist of both finished goods and equivalent units of work-in-progress.

The profit and loss calculated under the two methods for the various periods are as follows:

	<i>Period I</i>	<i>Period II</i>	<i>Period III</i>	<i>Period IV</i>	<i>Total</i>
Opening stock units	—	—	4,500	1,500	—
Production units	19,500	22,500	18,000	22,500	82,500
Sales units	19,500	18,000	21,000	24,000	82,500
Closing stock units	—	4,500	1,500	—	—
<b>Marginal Costing Method</b>					
Sales	78,000	72,000	84,000	96,000	3,30,000
Direct cost:					
Opening stock @ ₹2 per unit	—	—	9,000	3,000	—
Variable cost @ ₹2 per unit	39,000	45,000	36,000	45,000	1,65,000
Closing stock @ ₹2 per unit	—	9,000	3,000	—	—
Cost of goods sold	39,000	36,000	42,000	48,000	1,65,000
Contribution	39,000	36,000	42,000	48,000	1,65,000
Fixed cost	19,500	19,500	19,500	19,500	78,000
Profit	19,500	16,500	22,500	28,500	87,000
<b>Absorption Costing Method</b>					
Sales	78,000	72,000	84,000	96,000	3,30,000
Opening stock @ ₹3 per unit	—	—	13,500	4,500	—
Cost of production @ ₹3 per unit	58,500	67,500	54,000	67,500	2,47,500
Less: Cost of closing stock @ ₹3 per unit	—	13,500	4,500	—	—
Cost of sales (actual)	58,500	54,000	63,000	72,000	2,47,500
Less: Over-absorbed fixed cost	—	3,000	—	3,000	6,000
Add: Under-absorbed fixed cost	—	—	1,500	—	1,500
Profit	19,500	21,000	19,500	27,000	87,000

The above example reveals the following features:

- (i) Since there is no opening or closing stock in the accounting period I, the profit under the marginal costing and absorption costing methods is the same. Production being at the normal level, there is no under or over-absorption of the fixed costs under the absorption costing method. Marginal costing does away with the problem of over-absorption or under-absorption of fixed overheads.
- (ii) In the accounting period II, the marginal costing method shows a profit of ₹16,500 and as against this, the absorption costing method shows profit of ₹21,000. Under the absorption costing method, a portion of the fixed cost, instead of being charged against the profit for the period is charged to the closing stock and carried over to the next period.

- (iii) In the accounting period III, the profit calculated in absorption costing is less than that of marginal costing. This is because when sales exceeds output, a portion of the fixed cost carried over as part of the opening stock under absorption costing, is charged to the product sold in the current period.
- (iv) In the accounting period IV, the profit shown under the absorption costing system is lesser than under the marginal costing system. This is because the fixed cost pertaining to the opening stock of 1,500 units now sold is brought over to the current accounting period.
- (v) In the long run when sales and output tend to equate, there is no difference or very little difference in the results under the two methods. In the example above the net profit for the four accounting periods taken together are the same under both the methods.

The relationship shown above may be summarised as follows:

- (i) When output is equal to sales i.e. with no opening or closing stock the profit under absorption costing and marginal costing is equal;
- (ii) When output is less than sales i.e. closing stock is less than opening stock, the profit under marginal costing is greater than the profit under absorption costing;
- (iii) When output is greater than sales i.e. closing stock is more than the opening stock, the profit under the marginal costing is less than the profit under absorption costing.

**The differences between the profits revealed by absorption costing and marginal costing can be computed with the help of the following formula:**

$$= \frac{\text{Fixed factory overhead}}{\text{Denominator used for utilizing}} \times (\text{Volume produced} - \text{Volume sold})$$

**Or**

$$= (\text{Fixed factory overheads per unit}) \times (\text{Change in inventory units})$$

Analysis regarding the net operating income under absorption costing and marginal costing presented above, although often correct, is not universally valid.

The net operating income under both the methods of costing can be analysed in relation to four methods of inventory costing: Average costing, FIFO, LIFO and Standard costing. This would show that the usual generalisations about full and direct costing hold good only under the LIFO and standard costing methods. Further, under the LIFO and the average costing methods, the results are more complex than those considered by the usual generalisations which therefore do not apply.

In absorption costing the effects of sales and production are combined, in marginal costing on the other hand, the emphasis is placed on sales. The cost of one unit of product manufactured is not effected due to the changes in the level of activities. The variable costs of a unit is assumed to remain constant over certain ranges of output though both unit variable costs and total fixed cost may change at certain levels of production. The data used for marginal costing applied to a range of output at which variable costs and total fixed costs are relatively constant. Variable costs serve as a useful tool in bringing out relationships between price, cost and volumes. But reliance on variable costing system may make the management think that the company can operate profitably at low contribution margin, only to find that profit does not come up to expectations.

Selling below the normal price may help on short term but in the long run this may result in margins that are not sufficient in relation to resources invested. Thus, both costing method can be useful when applied to appropriate circumstances.

**Illustration 22**

A company makes and sells a single product. At the beginning of period 1, there is no opening stock of the product, for which the variable production cost is ₹4 and the sale price is ₹6 per unit. Fixed costs are ₹2,000 per period of which ₹1,500 are fixed production costs.

The following details are available:

	Period 1	Period 2
Sales	1,200 units	1,800 units
Production	1,500 units	1,500 units

What would be the profit in each period using -

- (a) Absorption costing. (Assume normal output is 1,500 units per period); and
- (b) Marginal costing?

**Solution:**

**(a) Absorption Costing Method**

The absorption rate for fixed production overhead is:

$$\left(\frac{₹1,500}{1,500}\right) \text{ units} = ₹ 1 \text{ per unit}$$

	Period 1		Period 2		Total
	₹	₹	₹	₹	₹
Sales		7,200		10,800	18,000
Production costs					
Variable @ ₹ 4	6,000		6,000		12,000
Fixed @ ₹1	<u>1,500</u>		<u>1,500</u>		<u>3,000</u>
₹ 5	7,500		7,500		15,000
Add: Opening stock	<u>—</u>		<u>1,500</u>		<u>—</u>
	7,500		9,000		
Less: Closing stock	<u>1,500</u>				
(300 units @ ₹5)					
Production cost of sales	6,000		9,000		15,000
Other costs	<u>500</u>		<u>500</u>		<u>1,000</u>
Total cost of sales		6,500		9,500	16,000
Profit		700		1,300	2,000

**(b) Marginal Cost Method:**

	Period 1		Period 2		Total
	₹	₹	₹	₹	₹
Sales		7,200		10,800	18,000
Variable production					
Cost	6,000		6,000		12,000
Add: Opening stock	<u>—</u>		<u>1,200</u>		<u>—</u>
	6,000		7,200		12,000
Less: Closing stock	<u>1,200</u>		<u>—</u>		<u>—</u>

Variable production			
Cost of sales	<u>4,800</u>	<u>7,200</u>	<u>12,000</u>
Contribution	2,400	3,600	6,000
Fixed cost	2,000	2,000	4,000
Profit	400	1,600	2,000

### PRICING DECISIONS (DISCRIMINATING PRICE AND DIFFERENTIAL SELLING)

Under normal circumstances, selling price is based on total cost i.e. production, administration and selling overheads - fixed as well as variable plus normal profit. In the long term planning selling price must cover all costs plus a desired profit. There are however, variety of business situations where fixation of selling price may vary from inclusion of desired profit to selling even below total cost. Marginal costing technique helps in determining the most profitable relationship between costs, prices and volume of business.

When there is considerable unfilled capacity it may be necessary to accept a lower contribution in order to provide work in the factory. Alternatively, if there is sufficient order normal price may be quoted and the contribution obtainable may be high. The aim of the prices fixer is to sell the present and future capacity for the greatest obtainable contribution. When the capacity is remaining unused, the potential contribution is being sacrificed and the acceptance of an order with a lower contribution will at least partially meet from fixed costs being incurred. This amount of contribution would otherwise be lost if the order is refused. In fixing the lower price than normal, the price fixed must take into consideration the following:

- (i) the amount of contributions at the proposed price;
- (ii) the possibility of other more remuneration job;
- (iii) comparison with normal selling price in order to determine the concession being offered; and
- (iv) the possible adverse effect upon the future sales and customer's confidence in the company's pricing or trading policy.

If the selling price is below the marginal cost, loss will be more than the fixed costs because variable expenses will not be covered fully. Hence efforts should be made to sell the products at a price which is equal to the marginal cost or more than the marginal cost. Product should be discontinued if the price obtained is below the marginal cost so that loss may not be more than the fixed costs. But in the following special circumstances production may be continued even if the selling price is below the marginal cost.

- (i) When a new product is introduced in the market: The new product may be sold at a very low price to make it popular. This is done with the expectation that sale will increase with the passage of time and cost of production will come down as a result of increase in sales.
- (ii) When foreign market is to be explored to earn foreign exchange: Government sometimes allow import quota against foreign exchange earned and profit from import quota may be much more than the loss on exporting the product at a price below the marginal cost.
- (iii) When the firm has already purchased large quantities of materials: It is appropriate to convert the material into finished goods and sell these at a price below the marginal cost if the sale of materials will give rise to loss which is more than the loss incurred if the production is done.
- (iv) Closure of business means breaking of business connections with customers and the connections may be re-established at a heavy expenditure on advertisement and sales promotion and the same may likely to be retarded because other firms will take advantage of the particular firm's closure and

win over the customers. In such instances, it is better to continue the production and to sell the product at a price below the marginal cost.

- (v) When the sales of one product at a price below the marginal cost will push up the sales of other profitable product.
- (vi) When the employees can not be retrenched.
- (vii) When competitors are to be eliminated from the market.
- (viii) When goods are of perishable nature. It is better to sell the perishable goods at a price which they can realise, otherwise these goods will perish and nothing will be realised.

In the case of export orders, besides the usual variable cost, the quotation should take into account, the following:

- (1) Increase in the cost arising out of:
  - (a) Additional packing cost required for sea-worthiness;
  - (b) Additional checks for quality (this being vital as goods should not be returned if rejected for quality);
  - (c) Freight and insurance charges, if not borne by the purchaser;
  - (d) Cost of capital blocked, if payment is not made in advance or is delayed.
- (2) Cost benefits arising out of:
  - (a) Exemptions (non-payments) of customs duty;
  - (b) Exemption of central excise duty on excisable goods or draw-back as per the Central Excise and Sales Tax Act;
  - (c) Subsidies from Government;
  - (d) Saving in Sales promotion expenses and other overheads.
- (3) Earning of Foreign Exchange.

Though the principles applicable for pricing exports are much the same as for home markets, special points to be noted are:

- (a) High export price may facilitate reduction of selling price in the home market.
- (b) Low export price, as low as marginal cost, may be advocated on grounds of benefits that arise out of large volume, (recovery of fixed charges) thus increasing profitability.
- (c) Export prices even below marginal cost may be advocated with an idea of obtaining from the Government, import licences for essential raw materials on grounds of having contributed to export trade and foreign exchange.
- (d) Even lower price when goods are dumped in the export market. Dumping is a sales technique often tried in export markets. Large quantities of merchandise are sold at low prices and before competitors recover of the shock, these dumped merchandise get a foot hold in the export market paving its way for future sales, when upward revision of prices may be possible. One has to be careful that dumped merchandise are not re-exported to compete in the internal market.
- (e) Tax credit on export profits and sales may justify lower export prices.

However, in normal times, pricing should be based on full costs as far as practicable since selling only on the basis of marginal cost may mean a loss (contribution may be less than the total fixed expenses). Marginal costing as a basis for fixation of selling price, is suitable only for utilising excess or idle capacity. If any concessional price is to be offered to a new set of customers, it must not affect the existing market.

## MISCELLANEOUS PROBLEMS & SOLUTIONS

### Illustration 23

State, with reasons in brief, whether the following statements are true or false:

- (i) When a factory operates at full capacity, fixed cost also becomes relevant for make or buy decisions.
- (ii) Semi-variable costs are ignored in marginal costing.
- (iii) 'Cost volume profit relationship' is a more comprehensive term than 'break-even analysis'.
- (iv) Margin of safety is the difference of actual sale and standard sale.
- (v) Contribution is not only the criterion for deciding profitability.

### Solution:

(i) True, (ii) False, (iii) True, (iv) False, (v) True]

### Illustration 24

Write the most appropriate answer from the given options in respect of the following:

- (i) Product cost under marginal costing include —
  - (a) Prime cost only
  - (b) Prime cost and fixed overheads
  - (c) Prime cost and variable overheads
  - (d) Material cost and variable overheads.
- (ii) Fixed cost per unit increases when —
  - (a) Production volume decreases
  - (b) Production volume increases
  - (c) Variable cost per unit decreases
  - (d) Variable cost per unit increases.
- (iii) The costing method in which fixed factory overheads are added to inventory is —
  - (a) Direct costing
  - (b) Marginal costing
  - (c) Absorption costing
  - (d) Activity based costing.



- (iv) When the sales increase from ₹ 40,000 to ₹ 60,000 and profit increases by ₹ 5,000, the P/V ratio is—
- 20%
  - 30%
  - 25%
  - 40%.
- (v) A company which has a margin of safety of ₹ 4,00,000 makes a profit of ₹ 80,000. Its fixed cost is ₹ 5,00,000, its break-even sales will be —
- ₹ 20 lakh
  - ₹ 30 lakh
  - ₹ 25 lakh
  - ₹ 40 lakh.
- (vi) Absorption means —
- Charging of overheads to cost centres
  - Charging of overheads to cost units
  - Charging of overheads to cost centres or cost units
  - None of the above
- (vii) Fixed costs remain fixed —
- Over a short period
  - Over a long period and within relevant range
  - Over a short period and within a relevant range
  - Over a long period.

**Solution:**

(i) (c), (ii) (a), (iii) (c), (iv) (c), (v) (c), (vi) (a) or (c), (vii) (c)

**Illustration 25**

Re-write the following sentences after filling-in the blank spaces with appropriate word(s)/ figure(s) :

- At break-even point, the contribution will be equal to \_\_\_\_\_. (**fixed costs**)
- Excess of budgeted revenues over the break-even revenue is called\_\_\_\_\_, (**Margin of Safety**)
- When there is no \_\_\_\_\_, profit figures revealed under marginal and absorption costing are identical. (**Inventories**)

**Illustration 26**

Metro Service Ltd. is operating at 70% capacity and presents the following information:

Break-even point : ₹ 200 crore

P/V Ratio	:	40%
Margin of safety	:	₹ 50 crore

Metro management has decided to increase production to 95% capacity level with the following modifications—

- Selling price will be reduced by 8%
- The variable cost will be reduced to 55% on sales.
- The fixed cost will increase by ₹ 27 crore including depreciation on additions, but excluding interest on additional capital.
- Additional capital of ₹ 50 crore will be needed for capital expenditure and working capital.

You are required to calculate –

- (i) Sales required to earn ₹7 crore over and above the present profit and also to meet 20% interest on additional capital;
- (ii) Revised break-even point;
- (iii) Revised P/V ratio; and
- (iv) Revised margin of safety.

### **Solution:**

Total Sales = Break even sales + Margin of Safety

= ₹ 200 Crore + ₹ 50 Crores = ₹ 250 Crores

P/V Ratio = 40% (given) (100 – PV Ratio)

Variable Cost = 60% of Sales

= ₹ 250 Crores × 60% = ₹ 150 Crores

Fixed cost = Break Even Sales × P/V Ratio

= ₹ 200 Crores × 40% = ₹ 80 Crores

Total Cost = Variable Cost + Fixed Cost

= ₹ 150 Crores + ₹ 80 Crores = ₹ 230 Crores

Profit = Total Sales – Total Cost

= ₹ 250 Crores - ₹ 230 Crores = ₹ 20 Crores

### **Illustration 27**

A company has annual fixed cost of ₹ 1,68,00,000. In the year 2012-13, sales amounted to ₹ 6,00,00,000 as compared with ₹ 4,50,00,000 in the preceding year 2011-12. The profit in the year 2012-13 is ₹42,00,000 more than that in 2011-12. On the basis of the above information, answer the following:

- (i) What is the break-even level of sales of the company?
- (ii) Determine profit/loss on the forecast of a sales volume of ₹ 80,00,00,000.

- (iii) If there is a reduction in selling price by 10% in the financial year 2013-14 and company desires to earn the same amount of profit as in 2012-13, what would be the required sales volume?

**Solution:**

$$(i) \text{ P/V Ratio} = \frac{\text{Change in Profits}}{\text{Change in Sales}} = \frac{42,00,000 \times 100}{600,00,000 - 450,00,000} = 28\%$$

$$\begin{aligned} \text{Break Even Sales} &= \frac{\text{Fixed Costs}}{\text{P/V Ratio}} \\ &= \frac{1,68,00,000}{28\%} \\ &= ₹ 600,00,000 \end{aligned}$$

$$\begin{aligned} (ii) \text{ Contribution for Sales Volume of ₹ 800,00,000} &= \text{P/V Ratio} \times \text{Sales} \\ &= 28\% \times 800,00,000 \\ &= ₹ 224,00,000 \end{aligned}$$

$$\begin{aligned} \text{Profits} &= \text{Contribution} - \text{Fixed costs} \\ &= ₹ 224,00,000 - ₹ 168,00,000 \\ &= ₹ 56,00,000 \end{aligned}$$

		₹
(iii)	If Selling Price is	100
	Variable Cost is (₹100 – ₹28)	72
	New Selling Price (₹100 -10%)	90
	New Contribution (₹90 – ₹72)	18
	New P/V Ratio = $\frac{18 \times 100}{90} = 20\%$	

Contribution for Sales Volume of ₹ 600,00,000 for the year 2012-13

$$\begin{aligned} &= \text{P/V Ratio} \times \text{Sales} \\ &= 28\% \times ₹ 600,00,000 \\ &= ₹ 168,00,000 \end{aligned}$$

$$\begin{aligned} \text{Desired Profits} &= \text{Contribution} - \text{Fixed Costs} \\ &= ₹ 168,00,000 - ₹ 168,00,000 \\ &= \text{Nil} \end{aligned}$$

$$\begin{aligned} \text{Required Sales Volume} &= \frac{\text{Fixed Costs} + \text{Desired Profits}}{\text{P/V Ratio}} \\ &= \frac{₹1,68,00,000}{20\%} \\ &= ₹840,00,000] \end{aligned}$$

**Illustration 28**

Two manufacturing companies which have the following operating details decided to merge:

	<i>Company – I</i>	<i>Company – II</i>
Capacity utilization (%)	90	60
Sales (₹ In lakhs)	540	300
Variable costs (₹ In lakhs)	396	225
Fixed costs (₹ in lakhs)	80	50

Assuming that the proposal is implemented, calculate –

- (i) Break-even sales of the merged plant and the capacity utilization at that stage.
- (ii) Profitability of the merged plant at 80% capacity utilization.
- (iii) Sales turnover of the merged plant to earn a profit of ₹ 75 lakh.
- (iv) When the merged plant is working at a capacity to earn a profit of ₹75 lakh, what percentage increase in selling price is required to sustain an increase of 5% in fixed overheads?

**Solution:****(i) Position of the Merged Plant at 100% capacity**

	<i>(₹ in lakhs)</i>		
	<i>Company I</i>	<i>Company II</i>	<i>Total</i>
Sales	600	500	1,100
Less: Variable Costs	<u>440</u>	<u>375</u>	<u>815</u>
Contribution	160	125	285
Less: Fixed Costs	<u>80</u>	<u>50</u>	<u>130</u>
Profit	<u>80</u>	<u>75</u>	<u>155</u>

$$\begin{aligned} \text{P/V Ratio of the merged plant} &= \frac{\text{Contribution}}{\text{Sales}} \times 100 \\ &= \frac{285}{1100} \times 100 = 25.909\% \end{aligned}$$

$$\begin{aligned} \text{Break ever sales of the merged plant} &= \frac{\text{Fixed Cost}}{\text{P/V Ratio}} \\ &= \frac{130 \times 1,100}{285} \\ &= ₹ 501.75 \text{ lakhs} \end{aligned}$$

$$\text{Percent of capacity utilization} = \frac{501.75}{1,100} \times 100 = 45.61\%$$

**(ii) Profitability of the merged plant at 80% capacity**

	<i>₹ (Lakhs)</i>
Sales (at 80% capacity i.e., 80% of ₹ 1,100 lakh)	880
Less: Variable Costs (80% of ₹ 815 lakh)	<u>652</u>
Contribution	228
Less: Fixed costs	<u>130</u>
Profit	<u>98</u>

OR

Total contribution at 80% capacity = 285 lakh × 80% =	228
Less: Fixed costs	<u>130</u>
Profit	<u>98</u>

$$\text{Profitability} = \frac{98}{880} \times 100 = 11.14\%$$

**(iii) Sales required to earn a profit of ₹ 75 lakh:**

$$= \frac{\text{Fixed Costs} + \text{Desired Profit}}{\text{P/V Ratio}}$$

$$= \frac{\text{₹ 130 lakhs} + \text{₹ 75 lakh}}{25.909\%}$$

$$= \text{₹791.23 lakh}$$

**(iv) Percentage of increase in selling price to sustain 5% increase in fixed overheads:**

$$5\% \text{ of fixed costs} = \frac{130 \times 5}{100} = \text{₹Rs. 6.5 lakh}$$

$$\text{Percentage increase in selling price} = \frac{6.5}{791.23} \times 100 = 0.8215\%$$

**LESSON ROUND UP**

- Marginal cost is the cost of one unit of product or service which would be avoided if that unit were not produced or provided. In other words marginal cost is the amount at any given volume of output by which the aggregate costs are changed if the volume of output is increased or decreased by one unit.
- Marginal costing is the accounting system in which variable costs is charged to cost units and fixed costs of the period are written-off in full against the aggregate contribution. Its special value is in decision-making.
- Contribution or gross margin is the difference between sales and the marginal cost of sales. Fixed costs are written off against contribution during the period. Thus:

$$\text{Selling price} - \text{Variable cost} = \text{Contribution}$$

$$\text{Contribution} - \text{Fixed costs} = \text{Profit}$$

$$\text{Fixed costs} + \text{Profit} = \text{Contribution}$$

$$\text{Sales} = \text{Marginal costs} + \text{Fixed costs} + \text{Profit.}$$

- Absorption costing is a method of costing by which all direct costs and applicable overheads are charged to products or cost centres for finding out the total cost of production. Absorbed cost includes production cost as well as administrative and other costs. It is a principle whereby fixed as well as variable costs are allotted to cost units, i.e. full costs are charged to production.
- Profit Volume Ratio (P/V Ratio) is the ratio or percentage of contribution margin to sales. i.e.

$$P / V \text{ ratio} = \frac{\text{Marginal Contribution}}{\text{Sales}}$$

OR

$$\frac{\text{Change in Profits / Contributions}}{\text{Change in Sales}}$$

- Break-even analysis is the categorization of costs into variable and fixed elements and their relationship with sales and profits.
- Break-even point is the level of activity where total revenue equals the total costs (variable and fixed). It is that level of activity at which an enterprise makes neither a loss nor any profit. At break-even point, the sales revenues are just equal to the costs incurred. i.e.

$$\text{Break-even points (Units)} = \frac{\text{Total fixed costs}}{(\text{Selling price per unit} - \text{Marginal cost per unit})}$$

OR

$$= \frac{\text{Total fixed costs}}{\text{Contribution per unit}}$$

$$\text{Break-even point (₹)} = \frac{\text{Fixed Cost}}{P / V \text{ Ratio}}$$

OR

$$= \text{Break-even points (units)} \times \text{Selling price per unit}$$

- Break-even chart is graphic presentation showing approximate profit or loss of an organization at different levels of activity within a limited range.
- Cash break-even point is the level of activity where there is neither a cash profit nor a cash loss.
- Profit volume graph is the graphical representation of the relationship between profit and volume.
- $\text{BEP (\%)} + \text{Margin of Safety (\%)} = 100\%$
- $\text{Variable Cost ratio (\%)} + \text{P/V Ratio (\%)} = 100\%$
- Margin of safety is the difference between the actual sales and sales at break-even point. Margin of safety is calculated as follows:

$$\text{Margin of safety} = \text{Total sales} - \text{Break even sales}$$

OR

$$\text{Margin of safety} = \frac{\text{Profit}}{P / V \text{ ratio}}$$

Margin of safety in percentage:

$$\frac{\text{Margin of safety} \times 100}{\text{Total sales}}$$

**SELF TEST QUESTIONS**

1. Define marginal cost and marginal costing. How variable costs and fixed costs are treated in marginal costing?
2. What is contribution? How it is related to profits?
3. Explain the role of contribution technique in decision making, giving suitable illustrations.
4. "Fixed costs do not change with changes in volume and it is difficult for management to control them". Discuss.
5. "While variable costs are fixed per unit of output, the fixed costs are variable per unit of output although all costs tend to be variable in the long run". Explain.
6. What do you understand by P/V ratio? Discuss the importance of P/V ratio and state how P/V ratio can be improved?
7. What is a break-even chart? What is a profit graph? State the purposes of constructing such charts.
8. Taking suitable data construct a simple break-even chart and show the break-even point, angle of incidence and margin of safety on the chart.
9. Draw a break-even chart that will show contribution more clearly than the orthodox presentation. Mention two other forms of break-even charts.
10. State the limitations of break-even charts.
11. Construct a profit graph with suitable data and obtain an equation of the profit line. Use this equation to profit planning.
12. "The effect of a price reduction is always to reduce the P/V ratio to raise break-even point and to shorten the margin of safety". Explain and illustrate by numerical examples.
13. (a) What do you understand by break-even point?  
(b) Explain the concept of break-even analysis.
14. (a) Distinguish between P/V ratio and break-even point?  
(b) Explain the uses of profit volume analysis.  
(c) What are the limitations of break-even analysis?
15. Kaku Ltd. produces one standards type of article. The results of the last four months of the year 2010 are as follows:

	<i>Output units</i>
September, 2010	200
October, 2010	300
November, 2010	400
December, 2010	600

Prime cost is ₹10 per unit. Variable expenses are ₹2 per unit. Fixed expenses are ₹36,000 per annum. Find out the cost per unit in each month.

**[Ans.: September: ₹7.00, October: ₹22.00,  
November: ₹19.50, December: ₹17.00].**

16. From the following data, which product would you recommend to be manufactured in a factory, time being the key factor?

	<i>Per unit of Product A</i>	<i>Per unit of Product B</i>
	₹	₹
Direct material	24	14
Direct labour (₹ 1 per hr.)	2	3
Variable overhead (₹2 per hr.)	4	6
Selling price	100	110
Standard time to produce	2 hrs.	3 hrs.

[Ans.: Contribution per hour: A: ₹35 per hr., B: ₹29 per hr.  
Therefore product 'A' is recommended].

17. From the following information, find out the amount of profit earned during the year using the marginal costing technique:

Fixed cost	₹5,00,000
Variable cost	₹10 per unit
Selling price	₹15 per unit
Output level	1,50,000 units

[Ans.: Profits: ₹2,50,000].

18. From the following data, recommend the most profitable product mix, presuming that direct labour hours available are only 700:

	<i>Products</i>	
	<i>A</i>	<i>B</i>
Contribution per unit	₹30.00	₹20.00
Direct labour per unit	10 hrs.	5 hrs.

The maximum production possible for each of the products A and B is 100 units. Fixed overheads are ₹2,000.

[Ans.: Product A - 20 units, Product B - 100 units; Net Profit - ₹600]

19. A new firm commenced production on 1st July. During the 6 months to 31st December, it produced 1,00,000 units, selling 80,000 out of these @ ₹20 per unit. The total costs were the following:

	₹
Materials	6,00,000
Labour	4,00,000
Production Overheads	
Variable	3,00,000
Fixed	2,00,000
Administration and Selling expenses	1,50,000

Ascertain the profit under marginal costing and under absorption costing.

[Ans.: ₹2,10,000 and ₹2,50,000].

20. From the figures given below ascertain the marginal cost per unit:

	<i>October</i>	<i>November</i>	
No. of units produced	10,000	9,000	
Total cost of production	₹80,000	74,000	[₹6 per unit]



21. A factory produces 1,00,000 units and sells the whole quantity @ ₹25. The variable cost is ₹18 and the fixed cost is ₹5 per unit. An order is received for 20,000 units @ ₹26 per unit. State the circumstance(s) in which the order should be accepted.

(If there is idle capacity and if the order is from govt. or from abroad).

22. A company produces a component for its main product at a cost of ₹15 per unit — the operations are heavily mechanised. An outsider offers to supply the component at ₹14, should the offer be accepted? (No).
23. In a slump likely to last for one year, the available price is ₹20 per unit whereas the marginal cost is ₹22. Should production be suspended? (No).
24. You are given the following data for the coming year of a factory:

Budgeted output	80,000 units
Fixed expenses	₹4,00,000
Variable expenses per unit	₹10
Selling price per unit	₹20

Draw a break even chart showing the break-even point. If the selling price is reduced to ₹16 per unit what will be the new break-even point?

25. (a) Explain P/V ratio.

(b) The sales turnover and profit during two periods were as follows:

Period No. 1	Sales ₹20 lakhs	Profit ₹2 lakhs
Period No. 2	Sales ₹30 lakhs	Profit ₹4 lakhs

(i) Calculate P/V Ratio, (ii) The sales required to earn a profit of ₹5 lakhs.

26. What do you understand by the term 'break-even point'? Mention the types of problems which an accountant can expect to solve with the help of such analysis.

You are required to calculate the break-even point in the following case:

The fixed costs for the year are ₹80,000, variable cost per unit for the single product is ₹4.

Estimated sales for the period are valued at ₹2,00,000. The number of units involved coincides with the expected volume of output. Each unit sells at ₹20.

27. From the following results of a company, determine by how much the value of sales must be increased for the company to break-even?

Net sales	₹4,00,000
Fixed costs	₹2,00,000
Variable costs	₹2,40,000

Use a break-even chart to illustrate the case.

28. Golden Ltd. has annual fixed cost of ₹1,20,000. In the year 2010 sales amounted to ₹6,00,000 as compared with ₹4,50,000 in 2009 and the profit for 2010 was ₹50,000 higher than in 2009. You are required to:

(i) Estimates profits for 2011 on forecast sales volume of ₹8,40,000 on the assumption that this would not involve any addition to the company's capacity; and

(ii) Calculate the break-even sales volume (in rupees) [Ans.: (i) ₹1,50,000 (ii) ₹3,60,000]

29. Following informations are available from the cost records of a manufacturing company:

Fixed expenses	₹4,000
Break-even point	₹10,000

You are required to calculate:

- (i) P/V ratio
- (ii) Profit where sales are ₹20,000
- (iii) New break even point if selling price is reduced by 20%.

[Ans.: (i) 40%; (ii) ₹4,000; (iii) ₹16,000].

30. From the following information, calculate the break-even point and the turnover required to earn a profit of ₹36,000.

	₹
Fixed overheads	1,80,000
Variable cost per unit	2.00
Selling price	20.00

If the company is earning a profit of ₹36,000 express the margin of safety available to it.

[Ans.: 10,000 units; ₹2,40,000; ₹40,000].

31. Merry Manufacturers Ltd., has supplied you the following information in respect of one of its products:

Total fixed costs	18,000
Total variable costs	30,000
Total sales	60,000
Unit sold	20,000

Find out:

- (a) Contribution per unit,
- (b) Break-even point,
- (c) Margin of safety
- (d) Profit and
- (e) Volume of sales to earn a profit of ₹24,000.

[Ans.: (a) ₹1.50; (b) 12,000 units; (c) 8,000 units;  
(d) ₹12,000; (e) 28,000 units].




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# Lesson 9

## STANDARD COSTING

### LESSON OUTLINE

- Standard Costing
  - Definition and Meaning
  - Significance/ Advantage
  - Applications
- Various Types of Standards
- Standard Costing System:
  - Installations, Functions and Features of a Standard Costing System
- Standard Cost for Material, Labour & Overhead
- Variance Analysis
- Two way analysis of variances
- Material Variance
- Labour Variance
- Overhead Variance
  - Variable overhead variance
  - Fixed overhead variance
- Accounting Treatment of Variances
- Benchmarking for Setting of Standards
- Variance Reporting to Management
- Lesson Round Up
- Self Test Questions

### LEARNING OBJECTIVES

The term standard cost refers to the cost that management believes should be incurred to produce a goods or service under anticipated conditions. Establishing a Standard costing system will be quite useful to the Management in both planning and control. In the planning stage, it can assist the Management with necessary data; at the control stage, it can be used to find the deviations between the actuals *vis-a-vis* the standards. The measurement of such deviations is carried out through the technique of variance analysis.

This chapter examines the functional-based standard costing systems in managing costs, improving planning and control and facilitating decision making and product costing. It provides detailed discussion of cost variance analyses for all product cost elements and considers their behavioral implications. Mix and yield variance analyses are also presented when it is possible to make input substitutions.

After studying this chapter, you should be able to:

1. Explain how standard costs are set.
2. Explain the concept of standard costing.
3. Identify and describe the purpose of a standard costing system.
4. Practical applications of standard costing.
5. Compute and analyse the direct material, direct labour and overhead variances and explain how they are used for control.
6. Calculate mix and yield variances for direct materials and direct labour.

“Standard costing discloses the cost of deviations from standard and classifies these as to their causes, so that management is immediately informed of the sphere of operations in which remedial action is necessary.” –**W.W. Bigg**

## STANDARD COSTING

Cost control, leading to cost reduction, should always be the objective of any firm or institution where scarce resources are used. Even if the firm can sell its goods or services at a very remunerative price, it should still try to reduce the use of factors of production, without jeopardising the quality of the product or the services. The best way of doing this is to constantly think as to whether the cost can be further reduced, but the first step is to try to see that these do not go beyond a level determined beforehand. If this approach is adopted, i.e., if an attempt is made to ascertain beforehand what costs should be and a further attempt is made to see that actual costs do not go beyond this level, the approach will be that of standard costing. In fact, it is the philosophy of standards which will bring the best results and not merely the mechanism of adopting the standard costing techniques. The philosophy of standards, in a nutshell, means scrupulously separating all types of wastages and losses and not allowing them to cloud the cost of production, at least for purposes of internal consumption. Suppose, a worker normally working 8 hours should produce 20 units for a wage of ₹20; the proper labour cost of production is ₹1 per unit. Suppose for any reason the worker produces only 12 units. Normally, the payment of ₹20 will be spread over 12 units and one would say that the labour cost per unit is ₹1.67. But if the philosophy of standards is practised, one would say that the proper labour cost of 12 units will still remain ₹1 per unit of ₹12 in all; 8 units have not been produced and, therefore, at the rate of ₹1 per unit, there is loss of ₹8. This amount should be charged to a separate account. This account should be shown as a separate item in the revenue accounts of the firm so that management would know, at the end of each period, the extent of losses that have unnecessarily taken place. Of course, if extra efficiency has been obtained, the effect of that efficiency should be credited to a separate account and shown as a separate item in the revenue account.

This really is the essence of standard costing - to set targets of cost, to try to achieve those targets, to compare the actual cost with the targets, to ascertain the reasons and to record the reasons in the books of account, or if a regular record is not maintained, at least to bring the monetary effects of various factors that have operated in the organisation, to the notice of the management. Thus standard costing is an excellent system of control of costs and of measuring efficiency, and of improving upon it.

It may be noted in passing that usually standard costs are also given the name of pre-determined costs. This means that before work is actually started an extremely careful estimate of cost is prepared to serve as the standard against which the actual is to be measured. This term should not be confused with pre-production costs since that would mean the cost to be incurred actually before production commences, such as on trial runs. Further, standards should not be confused with estimates. Estimates connote rather loose forecasts of anything and in fact one thinks of actuals being correct and tends to judge the accuracy of estimates on the basis of actuals. In case of standard costs, the emphasis is that the figures of standard costs are correct and that one must explain why the actuals differ from the standards. Standards are far more exact and exacting than forecasts or estimates.

## DEFINITION AND MEANING

Standard costs are the scientifically pre-determined costs of manufacturing a single unit or a number of units of product or of rendering a service during a specified future period. The Chartered Institute of Management Accountants, London, defines standard cost as "a standard expressed in money. It is built up from an assessment of the value of cost elements. Its main uses are providing bases for performance measurement, control by exception reporting, valuing stock and establishing selling prices."

What is evident from the above definition is that standard costs are planned costs of a product under current or anticipated operating conditions. The dictionary meaning of the word 'standard' is that it is a "thing serving

as a basis for comparison”, “thing recognised as model for imitation”. But it should be noted ‘standard’ is a relative term. Admittedly, what is standard for one may be substandard for another and vice versa. However, what is significant is that within an organisation, it serves as a desirable target.

The term ‘standard cost’ consists of two parts, viz., ‘standard’ and ‘cost’. ‘Standards’ can be established in respect of quantities and qualities like materials and labour. Cost involves the expression of the standard so established in values.

**CIMA defines standard costing as “a control technique which compares standard costs and revenues with actual results to obtain variances which are used to stimulate improved performance”.** The technique of standard costing may be summarised as follows:

- (i) Pre-determination of technical data related to production, i.e. details of materials and labour operations required for each product, the quantum of losses, level of activity, etc.
- (ii) Pre-determination of standard costs, in full details for each element of cost viz. material, labour and overhead.
- (iii) Comparison of the actual performances and costs with the standards and working out the variances i.e., the difference between the actuals and the standards.
- (iv) Analysis of the variances in order to determine the reasons for deviations of actuals from the standards, and
- (v) Presentation of information to the appropriate level of management for suitable action.

### **SIGNIFICANCE/ADVANTAGE OF STANDARD COSTING**

Though the advantages will be fully comprehended when one has gone through the whole study paper and has studied the various implications of standard costing, we give below the important significance/advantages:

1. To determine standards which are at once practicable and represent efficient performance, the management will have to be fully aware of all the facilities that are available, the best way in which work can be done (for example, time and motion study is essential if labour standards are to be fixed properly) and will have to gather continuous and up-to-date information about all the happenings; this exercise will enable the firm to locate many sources of wastages and losses and to block them.
2. Human beings often work hard to achieve standards which are within their reach; therefore, setting up of such standards will almost automatically mean greater efficiency in operations. Further, almost everyone will think in terms of setting the targets and of achieving them. This will be specially so if the system of rewards and punishment is also geared to the results.
3. If standards are themselves challenged periodically on a systematic basis, it will mean a constant increase in efficiency.
4. Standard costing involves not only pre-determined quantity standards but also standards in respect of prices and rates. This may mean that all materials issued and labour applied will be evaluated on the basis of standard price and rates. This will itself reduce clerical labour. One can say that in general standard costing is more economical than the ordinary system of costing where quantities and prices vary day by day or week by week.
5. Standard costing will enable objective judgement of the people and to that extent the systems of promotions, etc., will be more acceptable in the firm.

6. The management's own time can be saved to a large extent because the attention of management will be invited only to those matters which really require their attention. This will be done through the analysis of the deviation between the standard costs and actual costs. Management need pay attention only to those factors which have meant efficiency or inefficiency. (Management by Exception).
7. For the purpose of fixing prices, standard costs play a useful role; they exclude the day-to-day fluctuations in cost resulting from inefficient use of resources and movement in prices. Standard cost represent the long-term estimates; cost and price, therefore, can be fixed on a long-term basis.
8. Even for valuation of inventory, standard cost should be the proper basis. If actual costs are high only because there has been a wastage of resources, it is not proper to capitalise those losses by including them in the value of inventory. Nothing becomes more valuable simply because of wastage and, therefore, inventory values should better be determined on the basis of standard costs.
9. In short, one can say that if a firm practices standard costing on proper lines, i.e., standards are themselves determined in a way which will not impose too great a burden on the worker or other employees or the firm, it may infuse in the minds of the staff a desire to achieve the standards and thus show greater efficiency.
10. At every stage of setting the standards, simplification and standardisation of productions, methods and operations are effected and waste of time and material is eliminated. This assists in managerial planning for efficient operation and benefits all the divisions of the concern.
11. Costing procedure is simplified. There is a reduction in paper work in accounting and less number of forms and records are required. There is considerable saving in clerical time and expenditure leading to reduction in the cost of the costing system.
12. This system facilitates delegation of authority and fixation of responsibility for each department or individual.
13. Where constantly reviewed, the standards provides means for achieving cost reduction. This is attained through, improved quality of products, better materials and men, effective selection and use of capital resources etc.
14. Standard costs assist in performance analysis by providing ready means for preparation and interpretation of information.
15. This facilitates the integration of accounts so that reconciliation between cost accounts and financial accounts may be eliminated.

### **APPLICATIONS OF STANDARD COSTING**

Standard costing is quite useful to the management in its function say planing, controlling etc and most important in decision making and performance evaluation. Standard costing can be used for:

1. Projecting the profit level of the business at any level of production.
2. To help in execution of management's function effectively i.e. planning and controlling of cost.
3. To analyse the impact of cost if sales volume increase/decrease by certain percentage.
4. To measure the efficiency of production.
5. To measure the performance of each segment.

6. To identify and measurement of variances between standards and actuals.
7. To design performance measurement systems to encourage employees to participate for the betterment of the Organisation.

## REVIEW QUESTIONS



**Re-write the following sentence after filling-in the blank spaces with appropriate word:**

\_\_\_\_\_ is a technique which uses standards for costs and revenues for the purpose of control through variance analysis.

**Correct answer: Standard costing**

## VARIOUS TYPES OF STANDARDS

As 'standard' is a relative expression, one has to determine for oneself what one deems appropriate as a 'standard'. However, one should not lose sight of the objective which normally should be avoidance of all losses and wastages as far as possible. Management may certainly fix standards on the basis of maximum possible efficiency, possibly with an assumption of no wastage, no idle time, etc. However, this is not realistic; the standard will be the 'Ideal Standard' but impracticable - no one will even make an attempt to achieve it.

Alternatively an average of past few years' costs could be taken as basis but this will mean perpetuating past inefficiencies, by making them the target. This will defeat the very purpose of standard costing. A target should be such that it will induce the worker to give out his best. In order to make people believe in standards and to induce them towards achieving them, standards should better be such as can be achieved but with an effort; in other words, they should be somewhat idealistic.

**Basic Standard:** This is a "standard" which is established for use, unaltered over a long period of time. Standards are fixed scientifically and hence it is more of a technical job. These standards are supposed to remain unchanged so long as quality requirements are constant. Moreover, if forward contracts are entered into regarding materials and labour pact signed for a certain period, the costs can be planned accordingly. Such costs, i.e., basic standards may, however, have to be adjusted for changes in circumstances in a period.

**Current Standard:** In practice, standards are fixed on the basis of scientific studies but adjusted for current subjective factors. A standard, therefore, is made realistic to reflect the anticipated conditions affecting operations; it is not too idealistic. Such a standard would bring to sharp focus the avoidable causes for variances, leading to control action. A current standard is a standard for a certain period, for certain condition and for certain circumstances. Basic standards are more idealistic whereas current standards are more realistic. Most companies use current and not basic standards.

**Expected or Attainable Standard:** A standard though idealistic should also be realistic. If targets are fixed for a certain budgeted period, taking into account the expected conditions, it can be known as "expected standard" or "attainable standard". It is defined by CIMA, London as "a standard which can be attained if a standard unit of work is carried out efficiently, a machine properly operated or a material properly used. Allowances are made for normal losses, waste and machine downtime."

**Normal Standard:** Yet another target is one which is intended to cover a longer period of time - a period long enough to cover one trade cycle, i.e., roughly 7 to 10 years. This is defined as “the average standard which it is anticipated can be attained over a future period of time, preferably, long enough to cover one trade cycle”.

**Ideal Standard:** This standard refers to the target which can be attained under most ideal conditions. Hence, it is more idealistic and less realistic. It is defined by the Terminology as: “The standard which can be attained under the most favourable conditions, with no allowance for normal losses waste and machine down time”.

## STANDARD COSTING SYSTEM

Standard costing system provides standard cost for budgeting purpose to plan future performance. Standards are pre-determined and it helps organisation to achieve its objectives in economic and efficient manner. It can be used to motivate employee to achieve set standards of production/expenses level i.e. ideal standards. It provides some allowances for wastage and idle time (attainable standards), it recognizes the fact the labour are likely to waste some material and will become absent for various reasons like sickness.

A standard costing system initially records the cost of production at standard. Units of inventory flow through the inventory accounts (work-in-process → finished goods → cost of goods sold) at their per-unit standard cost. Standards are compared with actual outcomes to find deviations and reasons for these deviations, so that corrective action can be taken. It helps in managing human resources by giving them signal that their performances are being measured, compared and analysed.

Rewards can be given and Disciplinary action can be taken based on pre-defined criteria communicated to them, so that decisions regarding whatever action taken can be justified to avoid resentment among workforce. The management evaluates the performance of a company by comparing it with some predetermined measures. Therefore, it can be used as a process of measuring and correcting actual performance to ensure that the plans are properly set and implemented

## INSTALLATION OF A STANDARD COSTING SYSTEM

**The installation of a standard costing system involves the following steps:**

- To Set the predetermined standards for sales margin and production costs
- To ascertain and collect the actual results
- To compare the actual performance with pre-determined standards
- To determine the variances
- To analyze and investigate the variances
- To ascertain the causes of variance
- To take corrective action where necessary.
- To adjust the budget in order to make the standards more realistic

## FUNCTIONS OF STANDARD COSTING SYSTEM

- **Valuation:** Assigning the standard cost to the actual output.
- **Planning:** Use the current standards to estimate future sales volume and future costs.
- **Controlling:** Evaluating performance by determining how efficiently the current operations are being carried out.



## FEATURES OF A STANDARD COSTING SYSTEM

- The fact that standards are based on estimates.
- Standards will change according to conditions.
- It provides continual incentive for employee to keep costs and performance in line with predetermined standard.
- A standard cost system helps focus management's attention on the following questions and their causes:
  - (a) Were materials purchased at prices above or below standard?
  - (b) Were materials used in quantities above or below standard?
  - (c) Is labour being paid at rates above or below standard?
  - (d) Is labour being used in amounts above or below standard?

## STANDARD COSTS FOR MATERIAL, LABOUR AND OVERHEAD

It should be noted that though standards must be set for materials, labour and overheads, only an integrated approach will bring the best results. There can be saving in labour, for example, if materials of certain quality or size are purchased or if more automatic machines are introduced. When standards are to be laid down, the exact process of production and the facilities that are to be used for the purpose should be decided and taken into account. Then only the standards can be fixed properly.

The first step in the development of a standard costing system is to set standard cost, i.e., to predetermine the standards in respect of each element of cost - direct material, direct labour and overheads. Extreme care is essential in the fixation of standards as the success of a standard costing system depends largely upon the accuracy of the standard costs used. While setting production cost standards, the following factors should be considered:

- (i) Technical and operational aspects of the concern.
- (ii) Industrial engineering criteria for materials, labour, etc.
- (iii) The type of standard to be used.
- (iv) Proper classification of the accounts so that variance may be determined properly.
- (v) Responsibility for setting standards. As definite responsibility for variances from standards is ultimately to be laid on individuals or departments, it is obvious that all those individuals or departments should be associated with setting of standards.

## DIRECT MATERIALS STANDARDS

The standard cost of direct materials is closely related to the quantities and prices of materials to be used in production. Hence, two related standards are set:

- (i) **Materials Usage Standard:** The object of setting the materials usage standard is to achieve maximum efficiency in materials usage. The first step in this connection lies in specifying the size and quality of materials. This is followed by an analysis of the materials requirements. A list is prepared showing the details of materials-size, grade, quantity etc. - for setting the standard. This is known as a 'Standard Materials Specification.' The standard quantities of materials to be used per unit of production can be laid down by one of the following means:
  - (a) By reference to the weight of materials in the final production.

- (b) On the basis of past performance with due allowance for change in conditions.
- (c) By means of test runs conducted under different conditions and taking an average of quantities used.

Due allowance must be made for normal wastage. This is generally based on an estimate wastage which is unavoidable, e.g., normal loss through evaporation, off-cuts, broken parts, etc.

- (ii) **Materials Price Standard:** Standards are set for material prices after due consideration of the efficiency of purchasing and store-keeping functions. The aim of setting materials price standard is to achieve maximum efficiency in these function, and thus minimise direct materials costs. The price standard should provide for discount on purchases, economy of bulk purchasing and anticipated changes in market price.

### STANDARD COST FOR DIRECT LABOUR

Direct labour costs depends upon labour time and wage rates and therefore, setting standard cost for direct labour involves setting two related standard:

- (i) **Standard Labour Time:** This indicates the precise time (hours) that labour of a particular grade should take to perform a given operation. The main object of setting standard labour time is to derive maximum efficiency in the use of labour time. The standard time may be set on the basis of past performance with adjustments for change of conditions. Time and motion studies are a great help in setting standard time.
- (ii) **Labour Rate Standard:** This refers to the wage rates expected to be paid to different grades of labour employed in the organisation. The object is to plan for the actual wages to be paid. A variety of factors should be considered and allowance made for them while setting standard wage rates, principal of them are-future trend of wages which can be anticipated; collective agreement between labour and management; guaranteed minimum wages; and overtime wages, if the level of activity makes overtime inevitable.

Both these standards must be set after a detailed study of labour work involved. Besides, the workers employed must be graded on a standard basis.

### STANDARD OVERHEAD RATES

The principal object of setting standard overhead rates is to minimise the overhead costs chargeable to production. Following steps are necessary for setting standard rates:

- (i) The level of activity of production departments and the work to be done by the service departments should be determined.
- (ii) Overheads costs should be classified into fixed, variable and semi-variable overheads. The costs expected to be incurred under each head for each of the production and service departments should be calculated for a given period. The expected costs may be laid down in details in the form of cost-budgets based on past experience, present conditions and future trends.
- (iii) The standard overhead rates for each of the service departments should be calculated, and applied to the producing departments.
- (iv) The standard overhead rates for the producing departments may be determined as a direct labour hour rate, or a machine hour rate, or as a percentage of direct wages. The rates may be computed using the following ratios:

$$\text{Direct Labour rate} = \frac{\text{Amount of overheads}}{\text{Labour hours during a given period}}$$

$$\text{Machine hour rate} = \frac{\text{Amount of overheads}}{\text{Machine hours during a given period}}$$

$$\text{Percentage of Direct Wages} = \frac{\text{Amount of overheads}}{\text{Direct Labour Cost during a given period}}$$

## STANDARD ADMINISTRATION COSTS

The object of setting standard administration cost is to secure the maximum quantity and quality of administrative services at minimum cost. For this purpose, all administrative functions should be studied in detail. O and M division by examining the office operations and suggesting simplification and standardisation of methods and procedures may help a lot in this.

The standard quantity of work to be performed may be set by one or more of the following methods:

- I. On the basis of past performance;
- II. On the advice of organisation and methods team;
- III. Time and motion studies; and
- IV. Choosing appropriate 'work units' and fixing standard costs per work-unit.

Administrative costs should be classified into fixed, variable and semi-variable items before setting the standard rates.

## STANDARD COST FOR SELLING AND DISTRIBUTION

Since selling and distribution expenses are primarily related to volume of sales, a sales forecast is essential before setting standards of selling and distribution costs. The classification of these costs into fixed, variable and semi-variable items is necessary. Another pre-requisite for setting standards is a detailed examination of the functions and determining standard units of operation.

## VARIANCE ANALYSIS

The primary object of standard costing is to reveal the difference between actual cost and standard cost. A 'variance' in standard costing refers to the divergence of actual cost from standard cost. Variances of different cost items provide the key to cost control. They indicate whether and to what extent standards set have been achieved. This enables management to correct adverse tendencies.

After standard costs have been established, the next step is to ascertain the actual cost under each element and compare them with the standard cost. The difference between these two is termed as cost variance. Cost variance is the difference between a standard cost and the comparable actual cost incurred during a given period.

**The Chartered Institute of Management Accountants London**, defines variance as

***“the difference between planned, budgeted, or standard cost and actual cost; and similarly for revenue”.***

Variance analysis can be defined as “the analysis of performance by means of variances”. It is the process of computing the amount of and isolating the cause of variances between actual costs and standard costs.

Variance analysis involves:

- (a) Computation of individual variances, and
- (b) Determination of the cause(s) of each variance.

Actual cost which is higher than the standard costs would be a sign of inefficiency and the difference would be termed as unfavourable or adverse. A variance that reduces profit is adverse or unfavourable. A variance that increases profit is favourable. Variance are computed under each element of cost for which standards have been established. Each variance is analysed to ascertain the causes so that the management can exercise proper control. The cause is affixed to the variance, for example, materials price variance will show that the variance arose due to change in the price of materials. Some of the variance are controllable while others are not. The purpose of such classification is that proper emphasis can be placed on the controllable variance. This follows the principle of management by exception.

Variances occurring in a period may be compared with variances on the same account expressed as a percentage of the standard costs and compared with the percentage for the previous month. Comparison may be made between the standard and actual or between basic standard and current standard.

As already stated, the origin and causes of the variances need to be traced by analysing the total variances into their components parts in order to determine and isolate the causes giving rise to each variance.

Equal emphasis should be laid on favourable and unfavourable variances. An unfavourable variance points out the inefficiency in use or waste of materials, labour, and resources. A favourable variance may be due to improvement in efficiency or production of substandard products or an incorrect standard. An unfavourable variance may be off-set by a favourable variance; hence the need for analysis and appropriate action.

A detailed probe into the variances, particularly the controllable variance, helps the management to ascertain:

- (a) the amount of variance;
- (b) its occurrence;
- (c) the factors responsible for it;
- (d) the executive responsible for the variance;
- (e) corrective action which should be taken to obviate or reduce the variance.

**Favourable and Unfavourable Variance:** If the actual cost is less than standard cost, the difference is known as a favourable variance, credit variance or positive variance denoted by (F) or Cr. - it increases the profit. on the other hand, if actual cost exceeds, standard costs, the divergence is known as an unfavourable variance, debit variance, negative variance or adverse variance denoted by (A) or Dr. - it reduces the profit.

**Controllable and Uncontrollable Variance:** When the variance with respect to any cost item reflects the degree of efficiency of an individual or department, i.e., a particular individual or departmental head is responsible for the variance, the variance is known as a controllable variance. Obviously, such a variance is amenable to control by suitable action. An uncontrollable variance is one which is not amenable to control by individual or departmental action. Such a variance is caused by external factors like change in market conditions, fluctuations in demand and supply, etc. No particular individual within the organisation can be held responsible for it.

When variances are reported, attention of the management is particularly drawn towards controllable variances. If a variance has been caused by multiple factors, the part of cost variance relevant to each factor should be determined.

There are certain variances which may arise under material, labour or overhead due to change in the basic condition on which the standards are established.

**Revision Variance:** This is amount by which a budget is revised but which is not incorporated in the standard cost rate as a matter of policy. The standard costs may be affected by wage rate changes after wage accords, fiscal policy etc. The standard costs are not disturbed to account for these uncontrollable factors and to avoid the amount of labour and cost involved in revision, the basic standard costs are allowed to stand. It is essential to isolate the variance arising out of non-revision in order to analyse the other variances correctly.

**Method Variance:** It is the difference between the standard cost of the product manufactured or operation performed by the normal methods and the cost of operation by alternative method. Standards usually take into account the best method applicable, and any deviation will result in an unfavourable variance. Hence such deviations should be as few as possible.

Variance analysis usually proceeds after amending the standards according to the revision variance and the methods of variance.

### Illustration 1

Standard cost of a product in a factory is predetermined as follows:

	₹
Material (5 units @ ₹4 each)	20
Labour (20 hours @ ₹1.50 per hour)	30
Overhead expenses	<u>10</u>
Total	<u>60</u>

During a period, 8,000 units were produced whose actual cost was as follows:

	₹
Material (40,500 units @ ₹5 each)	2,02,500
Labour (1,50,000 hours @ ₹1.60 each)	2,40,000
Overhead expenses	<u>90,000</u>
Total	<u>5,32,500</u>

Prepare a statement showing standard cost, actual cost and variances.

### Solution:

#### Statement of Standard Cost, Actual Cost, and Variances

Particulars	Standard cost (₹)	Actual cost (₹)	Variance (₹)
Material	1,60,000	2,02,500	42,500 (A)
Labour	2,40,000	2,40,000	—
Overhead expenses	<u>80,000</u>	<u>90,000</u>	<u>10,000 (A)</u>
Total	<u>4,80,000</u>	<u>5,32,500</u>	<u>52,500 (A)</u>

The above statement shows the variance in respect of each element of cost. Each such variance can be further analysed. Before making such analysis it is necessary to recognise the two broad process in cost accumulation. The cost is first incurred and then charged to production. For example, materials are purchased first (normally) and then issued for production and wages are incurred first and then charged to production on the basis of time spent on production. Thus, there are two stages in cost accumulation, namely, (i) the incurring stage, (ii) the recovery stage. The recognition of these two stages is essential because variances arise both at the incurring and recovery stages. Analysis involves identifying and quantifying the variances at both these stages.

Before we proceed to analyse the variances, the following essential points should be noted regard to the utility of the variance analysis:

- (i) Variances should not be automatically applied for control purposes. They are just indicators of where the reason for higher cost exists. It is upto the controlling authority to judge whether the higher costs are well justified. The actual cost may be higher due to factors absolutely out of the control of the responsible authority and perhaps the responsible authority had contributed in preventing the actual cost from escalating too high. In such a situation applying controls implicit on the basis of variances disclosed will lead to demoralisation of staff.
- (ii) While comparing the actual costs with the standards, the level of activity should be checked up for comparability. If standards have been evolved for a budgeted level of activity and if the actual level is different, a simple comparison of actuals with budgets would be erroneous. The standards should be revised in accordance with the actual level of activity attained. But, in doing so care should be taken to distinguish between fixed costs and variable costs. The difference between the original standard and revised standard is known as "Revision Variance".
- (iii) While working out the variance in respect of fixed costs (particularly fixed overheads), it should be kept in mind that what is charged to cost is not the actual cost but an amount based on pre-determined recovery rates multiplied by the output which may be expressed in standard hours.

## TWO-WAY ANALYSIS OF VARIANCES

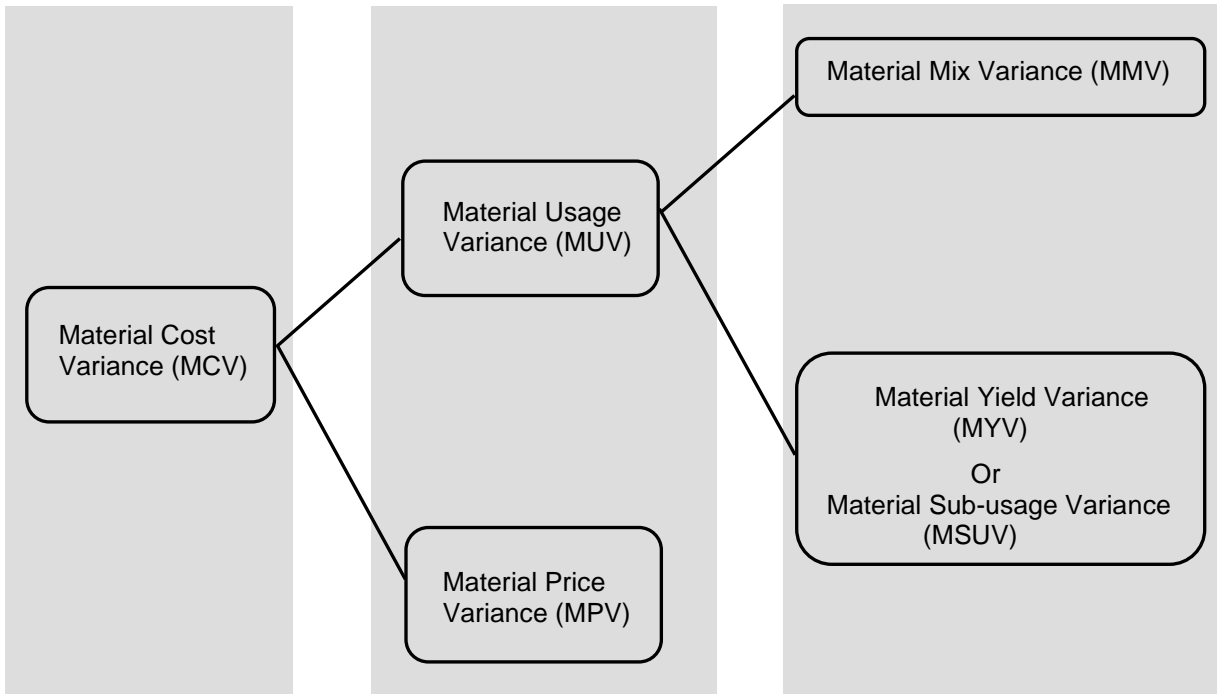
Each variance has to be analysed as (i) incurring variance, and (ii) recovery variance. Also, broadly, the causes leading to a variance may be either efficiency or inefficiency in the use of resources or change in the price paid for the resources. Accordingly, we have the following analysis:

- (i) Material cost variance
  - Material price variance
  - Material usage variance
- (ii) Labour cost variance
  - Labour rate variance
  - Labour time variance
- (iii) Overheads cost variance
  - Overhead expenditure variance
  - Overhead volume variance

As each element of cost is analysed into two broad groups. It is known as "Two- way Analysis".

## MATERIAL VARIANCE

Classification of material variances are as under:



## MATERIAL COST VARIANCES

Materials cost variance is the difference between the standard cost of materials specified and the actual cost of materials used.

$$\text{Material Cost Variance} = \text{Standard Cost of Material for Actual Output} - \text{Actual Cost of Materials Used}$$

OR

$$(\text{TSC} - \text{TAC})$$

OR

$$(\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{AP})$$

Material cost variances arise due to variation in the price of the material or in its usage. In accordance with this, material cost variances may be analysed under two heads, viz. material price variance and material usage variance.

## MATERIAL PRICE VARIANCE

This is that portion of the material cost variance which is due to the difference between the standard price specified and the actual price paid. Material price variance is that portion of the direct materials cost variance which is the difference between the standard price specified and actual price paid for the direct materials used. This is an "incurring" variance. This reflects the extra price paid on the units purchased. While making this calculation standard consumption of units should not be given any consideration. It is computed by

multiplying the actual quantity by the difference between the standard price and the actual price. The formula is:

$$\text{Material Price Variance} = \text{Actual Quantity (Standard unit price – Actual unit price)}$$

OR

$$\text{AQ (SP – AP)}$$

In other words, material price variance is the difference between 'what it actually cost and what it would have cost if the actual usage had been paid for at the standard price'.

### Causes of Material Price Variance

The reasons for material price variance may be one or more of the following:

- (i) Changes in market price of materials used;
- (ii) Changes in quantity of purchase or uneconomical size of purchase order resulting in a different price;
- (iii) Failure to obtain cash and/or trade discounts which were provided while setting standards;
- (iv) Rush order to meet shortage of supply;
- (v) Failure to take advantage of off-season price, or failure to purchase when price is cheaper;
- (vi) Emergency purchase on the request of production/sales manager;
- (vii) Changes in issue price due to differences in changes related to store-keeping, materials handling, carriage inward expenses etc.;
- (viii) Changes in the amount of taxes and duties;
- (ix) Changes in quality or specification of materials purchased;
- (x) Use of substitute material having a higher or lower unit price;
- (xi) Changes in the pattern or amount of taxes and duties.

The materials price variance is generally the responsibility of the purchase manager. However, the variance may be ultimately traceable to factors beyond his control like changes in the market price.

### MATERIAL USAGE VARIANCE

This is that portion of material cost variance which is due to the difference between the standard quantity of materials specified and the actual quantity used. Material usage variance is that portion of the direct material cost variance which is the difference between the standard quantity specified for the production achieved and the actual quantity used both valued at standard prices. The difference of actual quantity of materials used from the standard quantity set, multiplied by the standard price is known as the materials usage variance. The formula for the calculation of this variance is:

$$\text{Material Usage Variance} = \text{Standard Price (Actual Quantity – Standard Quantity)}$$

i.e. SP (AQ – SQ)



### Causes of Material Usages Variance

The usage variance may have been caused by one or more of the undernoted factors:

- (i) Lack of due care in the use of materials;
- (ii) Defective production necessitating additional materials for correction;
- (iii) Abnormal wastage through pilferage or other losses in the use of materials;
- (iv) Inefficiency in production due to improper method or lack of necessary skill in workmen;
- (v) Use of a material-mix other than the standard mix; and
- (vi) Yield from materials in case excess of or less than that provided as the standard yield;
- (vii) Purchase of inferior materials or change in quality of materials;
- (viii) Rigid technical specifications and strict inspection leading to more rejections which require more materials for rectifications;
- (ix) Use of substitute material leading to poor quality;
- (x) Improper maintenance of machine leading to breakdowns and more use of materials; and
- (xi) Poor inspection of raw materials.

A favourable variance may not always be advantageous for the concern. For instance, a saving in material usage may perhaps be effected by a reduction in wastage by slowing down the work but the resulting increase in the labour and overhead costs may far exceed the favourable materials usage variance.

Material usage variance may further classified into:

### MATERIAL MIX VARIANCE

One of the reasons for material usage variance is change in the composition of the materials mix. It results from a variation in the material mix used in production. Thus, if a larger proportion of the more expensive material is used than that laid down in the standard mix, materials usage will reflect a higher cost than the standard. Contrarily, the use of cheaper materials in large proportions will indicate a lower cost of materials usage than the standard.

It is that portion of the material usage variance which is due to the difference between the standard and actual composition of a mixture of materials. In other words, this variance arises due to a change in the ratio of actual material mix from the standard ratio of material mix. It is calculated as the difference between the standard price of standard mix and the standard price of actual mix.

Suppose for producing an article the materials standard is 6 kg. of material A @ ₹ 5 per Kg. and 4 Kg. of material B @ ₹ 6 per kg. and the actual quantities used are 5 kg. of material A and B each. The total quantity used is still 10 kg. but the materials cost will increase as shown below:

		₹	₹
Standard:	Material A 6 kg. @ ₹ 5	30.00	
	Material B 4 kg. @ ₹ 6	24.00	54.00
Actual:	Material A 5 kg. @ ₹ 5	25.00	
	Material B 5 kg. @ ₹ 6	30.00	55.00

Due to the change in the relative proportions of the two materials, the total cost has risen; this is the nature of the mix variance. It is calculated by comparing (revised) standard mix at standard prices and the actual mix at standard prices.

$$\text{Material Mix Variance} = \text{Standard Price (Revised Standard Quantity - Actual Quantity)} \\ \text{i.e. SP (RSQ - AQ)}$$

### Revised Standard Quantity (RSQ)

$$= \frac{\text{Total of Actual quantities of all types of material (TAQ)}}{\text{Total of Standard quantities of all types of material (TSQ)}} \times \text{Standard Quantity of each material}$$

### REVIEW QUESTIONS



**Re-write the following sentence after filling-in the blank spaces with appropriate word:**

- (i) \_\_\_\_\_ is the difference between planned, budgeted or standard cost and actual costs and similarly in respect of revenue.
- (ii) The difference between standard material cost of actual production and the actual cost of direct material is \_\_\_\_\_

**Correct answer: (i) Variance (ii) Material cost variance**

### MATERIALS YIELD VARIANCE

Yield variance is the difference between the standard yield specified and the actual yield obtained. In other words, the difference between actual yield of materials in manufacture and the standard yield (i.e. expected yield from a given standard input) valued at standard output price is known as materials yield variance. This variance is of great significance in processing industries, in which the output of one process becomes the input of the next process till the finished product is obtained at the final stage. The analysis of this variance helps effective control over usage. A low actual yield is unfavourable yield variance which indicates that consumption of materials was more than the standard. A high actual yield indicates efficiency, but a constant high yield is a pointer for the revision of the standard.

$$\text{Material Yield Variance} = \text{Standard cost per unit (Actual yield - Standard yield)} \\ \text{i.e. SC p.u. (AY-SY)}$$

*Note:* AY will never change. SY will calculate for actual mix of quantity as under:

$$\text{New SY} = \frac{\text{Old SY}}{\text{TSQ}} \times \text{TAQ}$$

The yield variance may be caused by such factors as: defective methods of operation, sub-standard quality of materials purchased, lack of due care in handling, lack of proper supervision etc.

**Point to be noted:**

- (i) Ensure the Level of output (yield i.e. AY/SY) is the same for actual data and standard data, if same are the different then calculate new SY)
- (ii) Always prepare cost sheet or put all given figure in a table before starting question for both standard data and actual data for same level of output.
- (iii) Write formula before computing variances.
- (iv) Mix variance is computed when any difference is found in actual input and standard input for same level of output.
- (v) Material Yield Variance (MYV) is also known as Material Sub Usage Variance.
- (vi) For calculating the MYV actual yield (AY) will never change whereas standard yield may be changed.

**Illustration 2**

For producing one unit of a product, the materials standard is:

Material X : 6 kg. @ ₹8 per kg., and

Material Y : 4 kg. @ ₹10 per kg.

In a week, 1,000 units were produced the actual consumption of materials was:

Material X : 5,900 kg. @ ₹9 kg., and

Material Y : 4,800 kg. @ ₹9.50 per kg.

Compute the various variances.

**Solution:****Standard cost of materials of 1,000 units:**

	₹
Material X: 6,000 kg. @ ₹ 8	48,000
Material Y: 4,000 kg. @ ₹ 10	<u>40,000</u>
Total	88,000
Actual cost: Material X 5,900 kg. @ ₹ 9	53,100
Material Y 4,800 kg. @ ₹ 9.50	<u>45,600</u>
Total	<u>98,700</u>
Total materials cost variance	10,700 (A)

**Analysis****Material Price Variance: Actual Quantity (Standard Price - Actual Price)**

X = 5900 (₹ 8 - ₹ 9)	= ₹5,900 (A)
Y = 4800 (₹ 10 - ₹ 9.50)	= ₹ <u>2,400</u> (F)
	<u>3,500</u> (A)

**Material Usage Variance: Standard Price (Standard Quantity - Actual Quantity)**

X = ₹8 (6,000 - 5,900)	= ₹ 800 (F)
Y = ₹10 (4,000 - 4,800)	= ₹ <u>8,000</u> (A)
	<u>7,200</u> (A)

*Verification*

$$\begin{aligned} \text{Material Cost Variance} &= \text{Materials price variance [₹3,500 (A)]} + \text{Material Usage Variance} \\ &10,700 (A) = 3500 (A) + 7200 (A) \end{aligned}$$

$$\text{Material Mix Variance} = \text{SP (RSQ - AQ)}$$

$$\begin{aligned} \text{For Material X} &= ₹8 (6420 - 5900) \\ &= ₹4160 (F) \end{aligned}$$

$$\begin{aligned} \text{For Material Y} &= 10 (4280 - 4800) \\ &= ₹5200 (A) \end{aligned}$$

$$₹4160 (F) + ₹5200 (A) = ₹1040 (A)$$

**Note:**  $\text{RSQ} = \frac{\text{TAQ}}{\text{TSQ}} \times \text{SQ}$

$$\text{For X} = \frac{10700}{10} \times 6 = 6420 \text{ kg.}$$

$$\text{For Y} = \frac{10700}{10} \times 4 = 4280 \text{ kg.}$$

$$\begin{aligned} \text{Material Yield Variance} &= \text{SC per unit} \times (\text{AY} - \text{SY}) \\ &= 88(1,000 - 1,070) \\ &= ₹ 6,160 \end{aligned}$$

$$\begin{aligned} \text{SC per unit} &= \frac{\text{TSC}}{\text{SY}} \\ &= \frac{88}{1} = 88 \text{ per unit} \end{aligned}$$

$$\begin{aligned} \text{TSC} &= \text{Standard cost of material X and material Y} \\ &= (6 \times ₹8) + (4 \times ₹10) \\ &= ₹48 + ₹40 \\ &= ₹88 \end{aligned}$$

AY given in question i.e. 1000 kg.

$$\begin{aligned} \text{New SY} &= \frac{\text{Old SY}}{\text{TSQ}} \times \text{TAQ} \\ &= \frac{1}{10} \times 10700 \\ &= 1070 \text{ kg.} \end{aligned}$$

**Illustration 3**

In a manufacturing process, the following standards apply:

Standard Price: Raw material A ₹1 per kg.

Raw materials B ₹5 per kg.

Standard Mix 75% A; 25% B (by weight)

Standard Yield : 90%

In a period the actual costs, usage and output were as follows:

Used: 4,400 kgs. of A costing ₹4,650

1,600 kgs. of B costing ₹7,850

Output: 5,670 kgs. of products

**Solution:**

**Standard yield from 6,000, i.e. (4,400 + 1,600) kgs. of output is**

		₹
6,000 kgs. × 90%, i.e. 5,400 kgs.		
Material A (75%)	= 4,500 kgs. @ ₹1	4,500
Material B (25%)	= 1,500 kgs. @ ₹5	7,500
	6,000 kgs.	12,000
Less:	600 kgs. (loss)	—
Output:	5,400 kgs.	12,000

**Standard cost of actual output (5,670 kgs.)**

$$\frac{₹12000}{₹5400} \times 5670 = ₹12,600$$

**Actual cost**

	Kgs.	₹
Material A	4,400	4,650
Material B	1,600	7,850
	6,000	12,500
Less:	<u>330</u> (loss)	<u>      </u>
	<u>5,670</u>	<u>12,500</u>

**Variance Analysis**

Material cost variance = Actual cost - Standard cost  
 = ₹12,500 - ₹12,600 = ₹100 (F)

Price Variance = AQ (SP - AP)  
 OR  
 = (AQ × SP) - (AQ × AP)  
 OR  
 = (AQ × SP) - AC

Material A = (4400 × ₹1) - ₹4650 = ₹250 (A)

Material B = (1600 × ₹5) - ₹7850 = ₹150 (F)  
 = ₹100 (A)

Mix Variance = SP (RSQ - AQ)  
 Material A = ₹1 (4500 - 4400) = ₹100 (F)  
 Material B = ₹5 (1500 - 1600) = ₹500 (A)  
 = ₹400 (A)

RSQ for A, B is computed above in start.

Yield Variance = Standard cost per unit (Actual yield - Standard yield)

$$\frac{₹12000}{₹5400} (5670 - 5400) = ₹600 (F)$$

**Total Material Cost Variance**

	₹
Price Variance	100 (A)
Mix Variance	400 (A)
Yield Variance	<u>600 (F)</u>
	<u>100 (F)</u>

**Reconciliation**

	₹
Standard cost of materials	12,600
Price Variance	100 (A)
Mix Variance	400 (A)
Yield Variance	<u>600 (F)</u>
Actual Cost	<u>12,500</u>

**Illustration 4**

The standard material input required for 1,000 kgs. of a finished product are given below:

<i>Material</i>	<i>Quantity (Kg.)</i>	<i>St. Rate per Kg. (₹)</i>
P	450	20
Q	400	40
R	<u>250</u>	60
	1,100	
Standard loss	<u>100</u>	
Standard output	<u>1,000</u>	

Actual production in a period was 20,000 kg. of finished product for which the actual quantities of material used and the prices paid therefore were as under:

<i>Material</i>	<i>Quantity (Kg.)</i>	<i>Purchase price per Kg. (₹)</i>
P	10,000	19
Q	8,500	42
R	4,500	65

Calculate:

- (i) Material cost variance;
- (ii) Material price variance;
- (iii) Material usage variance; and
- (iv) Material yield variance.

Also show a reconciliation of the variances.

### Solution

Material	Standard for 20,000 kg. Output			Actual for 20,000 kg. Output		
	Qty. (kg.)	Rate (₹)	₹	Qty. (kg.)	Rate (₹)	₹
P	9,000	20	1,80,000	10,000	19	1,90,000
Q	8,000	40	3,20,000	8,500	42	3,57,000
R	<u>5,000</u>	60	<u>3,00,000</u>	<u>4,500</u>	65	<u>2,92,500</u>
	22,000		<u>8,00,000</u>	23,000		<u>8,39,500</u>
Less: Loss	<u>2,000</u>			<u>3,000</u>		
	<u>20,000</u>			<u>20,000</u>		

### Calculation of Variances

(i) Material Cost Variance = Standard Cost – Actual Cost  
 = ₹ 8,00,00 – ₹8,39,500 = ₹ 39,500 (A)

(ii) Material price variance = Actual quantity (Standard price – Actual price)

P = 10,000 (₹20 – ₹19) = ₹10,000 (F)

Q = 8,500 (₹40 – ₹42) = ₹17,000 (A)

R = 4,500 (₹60 – ₹65) = ₹22,500 (A)

= ₹29,500 (A)

(iii) Material usage variance = Standard price (Standard price – Actual quantity)

P = ₹20 (9,000 – 10,000) = ₹20,000 (A)

Q = ₹40 (8,000 – 8,500) = ₹20,000 (A)

R = ₹60 (5,000 – 4,500) = ₹30,000 (F)

= ₹10,000 (A)

(iv) Material yield variance = Standard cost per unit (Actual yield – Standard yield)

$$\text{Standard cost per unit} = \frac{\text{₹8,00,000}}{20,000} = \text{₹40}$$

$$\text{New Standard Yield} = \frac{20,000}{22,000} \times 23,000 = 20,909$$

Material yield variance = ₹ 40 (20,000 – 20,909) = ₹ 36,360 (A)

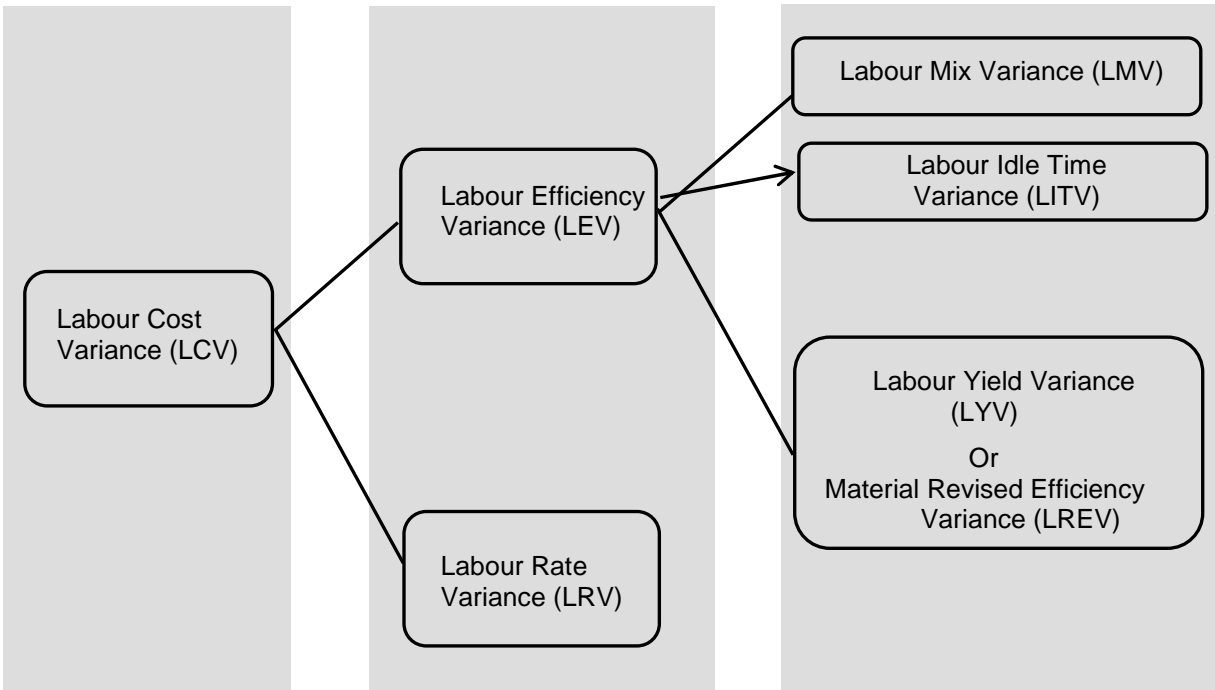
### Reconciliation:

Material Cost Variance = Material Price Variance + Material Usage Variance

₹ 39,500 (A) = ₹29,500 (A) + ₹10,000 (A)

## LABOUR VARIANCE

Classification of labour variances as under:



## LABOUR COST VARIANCES

Labour cost variance (also termed as direct wage variance) is the difference between the standard direct wages specified for the activity achieved and the actual direct wages paid. The formula for labour cost variance is:

$$\text{LCV} = (\text{Standard Hours} \times \text{Standard Rate}) - (\text{Actual Hours} \times \text{Actual Rate})$$

OR

$$\text{LCV} = (\text{SH} \times \text{SR}) - (\text{AH} \times \text{AR})$$

As the cost of labour is determined by labour time and wages, the labour cost variance is composed of either or both of variances relating to labour time and labour rate. As such, labour cost variance is analysed into two separate variances, viz., wages (labour) rate variance and labour efficiency variance.

## LABOUR RATE VARIANCE

This is that portion of the wages variance which is due to the difference between the actual rate and standard rate of any specified. It is calculated like the materials price variance.

$$\text{Labour Rate Variance} = \text{Actual Hours} (\text{Standard Rate} - \text{Actual Rate})$$

OR

$$\text{LRV} = \text{AH} \times (\text{SR} - \text{AR})$$



## CAUSES OF WAGES (LABOUR) RATE VARIANCE

Wage rate variance occurs due to the following causes:

- (i) Change in basic wage structure or change in piece work rate.
- (ii) Overtime work in excess of that provided in the standard rate.
- (iii) Employment of one or more workers of a different grade than the standard grade.
- (iv) Payment of guaranteed wages to workers who are unable to earn their normal wages if such guaranteed wages form part of direct labour cost.
- (v) New workers not being allowed full normal wage rates.
- (vi) Use of different method of payment i.e. payment of day rates while standards are based on piece work method of remuneration.
- (vii) Higher wages paid on account of overtime for urgent work.
- (viii) The composition of a gang as regards the skill and rate of wages being different from that laid down in the standard.

Wage rates are usually determined by factors beyond the control of the personnel department such as conditions in the labour market, wage awards by wage boards, etc. Wage rate variances are therefore, mostly uncontrollable except for the portion which arises due to deployment of wrong grade of labour for which the departmental executive may be held responsible.

## LABOUR TIME OR EFFICIENCY VARIANCE

Also termed as labour efficiency variance, is that portion of the direct wages variance which is due to the difference between the standard labour hours specified and the actual labour hours expended. Obviously, this variance provides a key to the control of workers' efficiency and labour cost. In effect, it is a usage variance. The computation of variance is as follows:

$$\text{Labour Efficiency Variance} = \text{Standard Wage Rate (Standard Hours of Production} - \text{Actual Hours Worked)}$$

OR

$$\text{LEV} = \text{SR} \times (\text{SH} - \text{AHW})$$

## CAUSES OF LABOUR EFFICIENCY VARIANCE

The causes giving rise to labour efficiency variance are as follows:

- (i) Lack of proper supervision or stricter supervision than specified;
- (ii) Poor working conditions;
- (iii) Defective machinery and equipment;
- (iv) Discontentment in workers due to unsatisfactory personnel relations;
- (v) Increase in labour turnover;
- (vi) Use of non-standard material requiring more or less operation time;

(vii) Basic inefficiency of workers due to insufficient training, faulty instructions, incorrect scheduling of jobs, etc.

(viii) Wrong selection of workers.

LABOUR COST VARIANCE = LABOUR EFFICIENCY VARIANCE + LABOUR RATE VARIANCE

OR

LCV = LEV + LRV

Calculation of wage variance is illustrated below:

**Example:**

**Assuming**

Actual hours worked	5,600
Actual wage paid	₹7,840
Standard rate per hour	₹2
Standard hours produced	4,000

**Answer:**

Wages variance = Standard cost – Actual cost

$(4,000 \times ₹2) = ₹8,000 - ₹7,840 = ₹160 (F)$

Wages rate variance = Actual hours (Standard rate - Actual rate)

= 5600 (2-1.4)

= ₹3,360 (F)

Actual Rate =  $\frac{₹7840}{5600} = ₹1.4$

Labour efficiency rate variance

$2 (4,000 - 5,600) = ₹3,200 (A)$

Labour Cost Variance = Labour Rate Variance + Labour Efficiency Variance

= 3360 (F) + 3200 (A)

= ₹160 (F)

Labour efficiency variance is sub-divided into the following variances:

- (i) Idle time variance
- (ii) Labour mix variance
- (iii) Labour yield variance (or Labour revised-efficiency variance)

**IDLE TIME VARIANCE**

This variance which forms a portion of wages efficiency variance, is represented by the standard cost of the actual hours for which the workers remain idle due to abnormal circumstances.

$$\begin{aligned} \text{Labour Idle Time Variance (LITV)} &= \\ &(\text{Actual hours paid for} \times \text{Standard rate}) - (\text{Actual hours worked} \times \text{Standard rate}) \\ &\text{OR} \\ &\text{Idle Hours} \times \text{Standard rate.} \end{aligned}$$

It is always adverse. Suppose in the example given above the actual time includes 1,000 idle hours. The Idle Time Variance will then be ₹2,000 (A); the efficiency variance will be then ₹1,200 (A), making a total of ₹3,200 (A).

### LABOUR MIX VARIANCE

It is also known as Gang Composition Variance. This is a sub-variance which arises due to change in the composition of a standard gang or combination of labour force.

$$\begin{aligned} \text{Labour mix variance} &= \\ &(\text{Actual hours at standard rate of actual gang} - \text{Actual hours at standard rate of standard gang}) \\ &\text{OR} \\ &\text{Standard rate} (\text{Revised standard labour hours} - \text{Actual labour hours}) \\ &\text{OR} \\ &\text{LMV} = (\text{RSH} - \text{AHW}) \times \text{SR} \end{aligned}$$

$$\text{Revised labour hours} = \frac{\text{Total actual time}}{\text{Total standard time}} \times \text{Standard time}$$

The calculation is just like that the materials. It is included in the efficiency or time variance discussed above.

### LABOUR YIELD VARIANCE

This is due to the difference in the standard output specified and the actual output obtained. This is computed as follows:

$$\begin{aligned} \text{Labour yield variance} &= \\ &\text{Standard labour cost unit} (\text{Actual output} - \text{Standard output}) \\ &\text{OR} \\ &(\text{Standard loss of actual total input} - \text{Actual loss}) \times \\ &\text{Average standard rate per unit.} \\ &\text{OR} \\ &\text{LYV} = \text{SC p.u.} (\text{AY} - \text{SY}) \end{aligned}$$

*Note: AY will never change. SY will calculate for actual mix of hour as under:*

$$\text{New SY} = \frac{\text{Old SY}}{\text{TSH}} \times \text{TAH}$$

If the actual output is more than standard output, it is favourable variance and vice versa.

**Point to be noted**

- (i) Ensure the Level of output (yield i.e. AY/SY) is the same for actual data and standard data, if same are the different then calculate new SY)
- (ii) Always prepare cost sheet or put all given figure in a table before starting question for both standard data and actual data for same level of output.
- (iii) Write formula before computing variances.
- (iv) Mix variance is computed when any difference is found in standard hour and actual hour worked for same level of output.
- (v) Labour Yield Variance (LYV) is also known as Labour Sub Usage Variance. Computed on the basis of actual hour worked irrespective of standard hour.
- (vi) For calculating the LYV actual yield (AY) will never change whereas standard yield (SY) may be changed.

**Illustration 5**

A factory, working for 50 hours a week, employs 100 workers on a job work.

The standard rate is ₹1 an hour and standard output is 200 units per gang hour.

During a week in June, ten employees were paid at 80 p. an hour and five at ₹1.20 an hour. Rest of the employees were paid at the standard rate.

Actual number of units produced was 10,200

Calculate labour cost variances.

**Solution:****(i) Cost Variance**

Standard Cost – Actual Cost

$$₹5,100 - ₹4,950 = ₹150 \text{ (F)}$$

**Workings:**

(a) Calculation of Actual Cost:

	₹
85 workers for 50 hours @ ₹1 per hour	= 4,250
10 workers for 50 hours @ 80 p. per hour	= 400
5 workers for 50 hours @ ₹1.20 per hour	= <u>300</u>
Total actual cost	<u>4,950</u>

(b) Calculation of Standard Rate:

$$\text{Standard cost per (gang hour)} = 100 \times 50 \times ₹1 = ₹5000$$

Standard production (per gang hour)

$$= 100 \times 200 \times 50$$

$$= 10000 \text{ unit}$$

$$\text{Standard rate per unit} = \frac{\text{₹}5000}{10000} = 50 \text{ p. per unit.}$$

(c) *Calculation of Standard Cost:*

$$\begin{aligned} &\text{Actual production} \times \text{Standard rate} \\ &10,200 \text{ units} \times 50 \text{ p. per unit} = \text{₹}5,100 \end{aligned}$$

**(ii) Rate Variance:**

As the actual wage rate has deviated from the standard in respect of only 15 workers from out of a total of 100 workers, wages rate variance would be calculated only in respect of these 15 workers.

Actual Hours (Standard Rate – Actual Rate)

Therefore,

$$500 \text{ Hours (₹1 – 80 p.)} = \text{₹}100 \text{ (F)}$$

$$250 \text{ Hours (₹1 – ₹1.20)} = \text{₹}50 \text{ (A)}$$

Thus, the total rate variance is ₹50 (F).

**(iii) Efficiency Variance:**

Efficiency variance is indicated by the fact that, as compared with standard production of 10,000 units (200 units × 50 hours), the actual production is 10,200 units

Standard Rate (Standards Hours – Actual Hours)

$$\text{₹}1 (5,100 - 5,000) = \text{₹}100 \text{ favourable.}$$

$$\text{Calculation of Standard Hours} = \frac{5000}{10000} \times 10200 = 5,100 \text{ hours.}$$

*Yield Variance:*

Standard labour cost per unit of output (SY – AY)

$$0.50 (10,000 – 10,200) = \text{₹}100 \text{ (F)}$$

*Verification:*

Cost Variance = Rate Variance + Efficiency Variance

$$\text{₹}150 \text{ (F)} = 50 \text{ (F)} + \text{₹}100 \text{ (F)}$$

### Illustration 6

The standard labour component and the actual labour component engaged during the month are given below:

	Skilled	Semi-skilled	Unskilled
(a) Standard number of workers in a group	30	10	10
(b) Standard wage rate (Rupees per hour)	20	12	8
(c) Actual number of workers employed during the month in the group	24	15	12
(d) Actual wage rate per hour (₹)	24	10	8

During the month of 200 working hours, the group produced 9,600 standard hours of work.

You are required to calculate:

(i) Wage rate variance; (ii) Labour efficiency variance; (iii) Labour mix variance and (iv) Total labour cost variance.

### Solution

Category of workers	Standard			Standard		
	Hours	Rate (₹)	₹	Hours	Rate (₹)	₹
Skilled	6,000	20	1,20,000	4,800	24	1,15,200
Semi-skilled	2,000	12	24,000	3,000	10	30,000
Unskilled	<u>2,000</u>	8	<u>16,000</u>	<u>2,400</u>	8	<u>19,200</u>
	<u>10,000</u>		<u>1,60,000</u>	<u>10,200</u>		<u>1,64,400</u>

$$\text{Standard Cost of Labour for Actual Output} = \frac{1,60,000 \times 9,600}{10,000} = ₹ 1,53,600$$

$$\begin{aligned} \text{Labour Cost Variance} &= \text{Standard Cost for Actual Output} - \text{Actual Cost} \\ &= ₹ 1,53,600 - 1,64,400 = ₹ 10,800 \text{ (A)} \end{aligned}$$

$$\text{Labour Rate Variance} = \text{Actual Hours (Standard Rate - Actual Rate)}$$

$$\begin{aligned} \text{Skilled} &= 24 \times 200 (\text{₹}20 - \text{₹}24) = ₹ 19,200 \text{ (A)} \\ \text{Semi-skilled} &= 15 \times 200 (\text{₹}12 - \text{₹}10) = ₹ 6,000 \text{ (F)} \\ \text{Unskilled} &= 12 \times 200 (\text{₹}8 - \text{₹}8) = \text{Nil} \\ &= ₹ 13,200 \text{ (A)} \end{aligned}$$

$$\text{Labour Efficiency Variance} = \text{Standard Rate (Standard Time for Actual Output - Actual Time)}$$

$$\begin{aligned} \text{Skilled} &= ₹20 (5,760 - 4,800) = ₹ 19,200 \text{ (F)} \\ \text{Semi-skilled} &= ₹12 (1,920 - 3,000) = ₹ 12,960 \text{ (A)} \\ \text{Unskilled} &= ₹ 8 (1,920 - 2,400) = ₹ 3,840 \text{ (A)} \\ &= ₹ 2,400 \text{ (F)} \end{aligned}$$

$$\text{Labour Mix Variance} = \text{Standard Rate (Revised Standard Hours - Actual Hours)}$$

$$\begin{aligned} \text{Skilled} &= ₹20 (6,120 - 4,800) = ₹ 26,400 \text{ (F)} \\ \text{Semi-skilled} &= ₹12 (2,040 - 3,000) = ₹ 11,520 \text{ (A)} \\ \text{Unskilled} &= ₹ 8 (2,040 - 2,400) = ₹ 2,880 \text{ (A)} \\ &= ₹ 12,000 \text{ (F)} \end{aligned}$$

Revised standard hours have been calculated as under:

$$\text{Revised Standard Hours} = \frac{\text{Total Actual Hours}}{\text{Total Standard Hrs.}} \times \text{Standard Hrs. of the Grade}$$

$$\begin{aligned} \text{Skilled} &= 10,200/10,000 \times 6,000 = 6,120 \text{ hours} \\ \text{Semi-skilled} &= 10,200/10,000 \times 2,000 = 2,040 \text{ hours} \\ \text{Unskilled} &= 10,200/10,000 \times 2,000 = 2,040 \text{ hours} \end{aligned}$$

Verification:

$$\begin{aligned} \text{Labour Cost Variance} &= \text{Labour Rate Variance} + \text{Labour Efficiency Variance} \\ 10,800 \text{ (A)} &= \text{Rs. } 13,200 \text{ (A)} + \text{Rs. } 2,400 \text{ (F)} \end{aligned}$$

## OVERHEAD COST VARIANCES

The total overhead cost variance is the difference between the standard cost of overhead allowed for the actual output achieved and the actual overhead cost incurred. In other words, overhead cost variance is the under or over absorption of overheads.

However before we proceed to study these variances, we should aware about the basic terms used in the computation of overhead variance:

- (i) Standard overhead rate (per unit) =  $\frac{\text{Budgeted overhead}}{\text{Budgeted output in units}}$
- (ii) Standard overhead rate (per hour) =  $\frac{\text{Budgeted overhead}}{\text{Budgeted hours}}$
- (iii) Standard hours for actual output =  $\frac{\text{Budgeted hours} \times \text{Actual output}}{\text{Budgeted output}}$
- (iv) Standard output for actual hours =  $\frac{\text{Budgeted output (in units)} \times \text{Actual hours}}{\text{Budgeted hours}}$
- (v) Absorbed (or Recovered) overhead = Standard Rate per hour  $\times$  Actual Output  
Or standard rate per unit  $\times$  standard hours for actual output
- (vi) Budgeted overhead = Budgeted output  $\times$  Std. overhead rate per unit  
Or Budgeted hours  $\times$  Std. overhead rate per hour
- (vii) Standard overhead = Std. output for actual time  $\times$  Std. overhead rate per unit  
Or Actual hours  $\times$  Std. overhead rate per hour
- (viii) Actual overhead = Actual output  $\times$  Actual overhead rate per unit  
Or Actual overhead = Actual output  $\times$  Actual overhead rate per unit

## OVERHEAD COST VARIANCE

$$[\text{Actual Output} \times \text{Standard Overhead Rate Per Unit}] - \text{Actual Overhead Cost}$$

OR

$$[\text{Standard Hours for Actual Output} \times \text{Standard Overhead Rate Per Hour}] - \text{Actual Overhead Cost}$$

**Overhead cost variances can be classified as:**

- Variable overhead variance
- Fixed overhead variance

## VARIABLE OVERHEAD VARIANCE

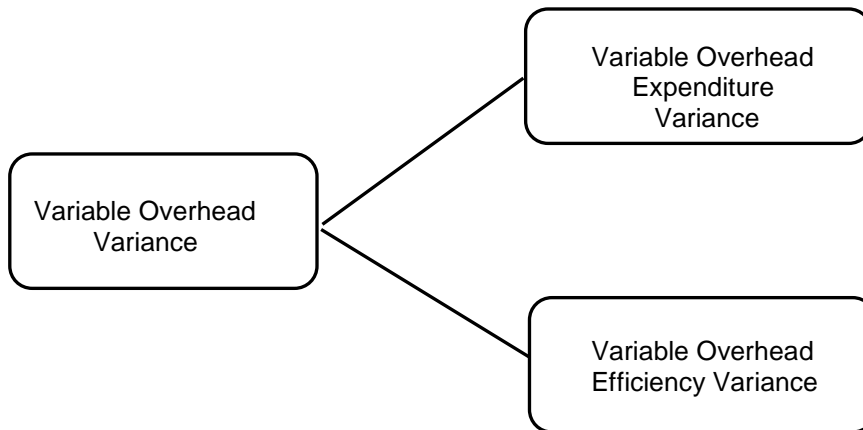
It is the difference between the standard variable overhead cost allowed for the actual output achieved and the actual variable overheads. Normally this variance is represented by expenditure (cost) variance only because variable overhead cost will vary in proportion to production so that only a change in expenditure can cause such variance.

It is calculated as:

$$\begin{aligned} \text{Variable Overhead Variance} = & \\ & (\text{Standard Variable Overhead Rate} \times \text{Actual Output}) - \text{Actual Variable Overheads} \\ & \text{OR} \\ & (\text{Standard Hours for Actual Output} \times \text{Standard Variable Overhead Rate}) - \text{Actual Variable Overheads} \\ & \text{OR} \\ & (\text{Standard Rate} \times \text{Actual output}) - (\text{Actual Rate} \times \text{Actual output}) \end{aligned}$$

The variable overhead cost variance is usually calculated in total only since variable overheads vary according to output and not according to time, hence, there is only one variance. However, some accountants argue that certain variable overhead may vary according to time also, hence variable overhead efficiency variance arise just like labour efficiency variance and it can be calculated if information relating to actual time taken and allowed is given. In such case variable overhead variance can be segregated into two parts.

Classification of labour variances as under:



**(i) Variable Overhead Expenditure Variance (VOExV) =**

$$\begin{aligned} & (\text{Actual Hours} \times \text{Standard Variable Overhead Rate per Hour}) - \text{Actual Variable Overhead} \\ & \text{OR} \\ & \text{Actual Hours} (\text{Standard Variable Overhead Rate per Hour} - \text{Actual Variable Overhead Rate per Hour}) \end{aligned}$$



**(ii) Variable Overhead Efficiency Variance (VOEfV) =**

$$(\text{Standard Time for Actual Production} \times \text{Standard Variable Overhead Rate per Hour}) - \text{Actual Hours Worked} \times \text{Standard Variable Overhead Rate per Hour}.$$

OR

$$\text{Standard Variable Overhead on Actual Production} - \text{Standard Variable Overhead for actual time.}$$

OR

$$\text{Recovered Overheads} - \text{Standard Overheads}$$

It is better to compute variance related to variable overhead on the basis of hours rather than on the basis of units.

**Illustration 7**

The following data is obtained from the books of a manufacturing company regarding variable overheads:

Budgeted production for January	300 units
Budgeted variable overhead	₹7,800
Standard time for one unit	20 hours
Actual production for January	250 units
Actual hours worked	4,500 hours
Actual variable overhead	₹7,000

**Solution**

$$\begin{aligned} \text{Variable Overhead Variance} &= \text{Standard Cost} - \text{Actual Cost} \\ &= ₹6,500 - ₹7,000 = ₹500 \text{ (A)} \end{aligned}$$

*Workings:*

(a) Standard variable overhead cost of actual output

$$= 250 \text{ units} \times ₹26 \text{ per unit} = ₹6,500$$

(b) Standard variable cost per unit

$$= \frac{₹7800}{300} \text{ or } ₹26 \text{ per unit}$$

Sometimes, a little refinement is introduced in the calculation of variable overhead variance and, therefore, the computation is as follows:

(i) *Variable Overhead Expenditure Variance*

= Actual Cost – Standard overheads on hours worked

$$₹7,000 - ₹5,850 = ₹1,150 \text{ (A)}$$

(a) *Standard variable overhead on hours worked is—*

$$4,500 \text{ hours} \times ₹1.30 \text{ per hour} = ₹5,850$$

(b) *Standard variable overhead per hour*

$$= \frac{\text{₹7800}}{20 \times 300} = \text{₹1.3}$$

(ii) *Variable Overhead Efficiency Variance*

= Standard variable overhead on hours worked – Standard variable overhead on actual output.

$$\text{₹5,850} - \text{₹6,500} = \text{₹650 (F)}$$

(iii) *Variable Overhead Total Variance*

= Expenditure Variance + Efficiency Variance

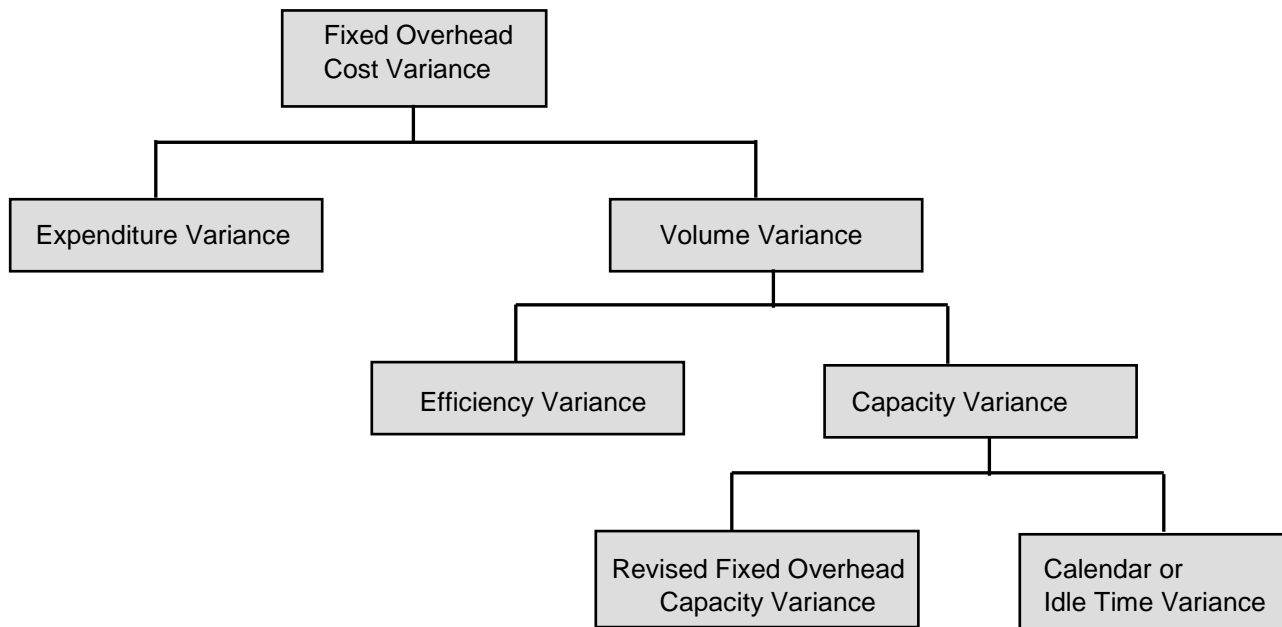
$$\text{₹1,150 (A)} + \text{₹650 (F)} = \text{₹500 (A)}$$

This is the same as variable overhead variance already arrived at.

### FIXED OVERHEAD VARIANCE

Fixed overhead represents all items of expenditure which are more or less remain constant irrespective of the level of output or the number of hours worked.

### CLASSIFICATION OF FIXED OVERHEAD VARIANCES



### FIXED OVERHEAD COST VARIANCE

Fixed overhead cost variance is the difference between the standard costs of fixed overhead allowed for the actual output achieved and the actual fixed overhead cost incurred i.e.

$$\text{FOCV} = (\text{Actual output} \times \text{Standard fixed overhead rate}) - \text{Actual fixed overheads}$$

OR

$$(\text{Standard hours produced} \times \text{Standard fixed overhead rate per hour}) - \text{Actual fixed overheads}$$

OR

$$\text{Recovered fixed overhead} - \text{Actual fixed Overhead}$$

Standard overhead produced means hours which should have been taken for the actual output.

Fixed overhead variance may broadly be divided into:

- (i) Expenditure variance and
- (ii) Volume variance.

**(i) EXPENDITURE VARIANCE**

This is also known as budget variance. This is obtained by comparing the total overhead cost actually incurred against the budgeted overhead cost i.e.

$$\text{Budgeted fixed overhead} - \text{Actual fixed overhead}$$

OR

$$(\text{Budgeted hours} \times \text{Std. fixed overhead rate}) - \text{Actual fixed overhead}$$

If the actual overheads are more, it shall result in an adverse variance and vice versa. This variance gives a measure of efficiency of spending.

**Illustration 8**

The following information relates to the month of June, 2013

	<i>Budgeted</i>	<i>Actual</i>
Output	20,000 units	22,000 units
	₹	₹
Overheads - Variable	1,00,000	1,07,000
- Fixed	1,50,000	1,58,000

Compute the overheads variance.

**Solution:**

Variable overheads allowed or budgeted for actual output	₹
Standard Overhead for actual output (10000/20000 × 22000)	1,10,000
Actual amount spent	<u>1,07,000</u>
Variable overhead variance	<u>3,000 (F)</u>
Fixed overheads for the period (change in output having no effect on expenditure)	1,50,000
Actual fixed overhead	<u>1,58,000</u>
Fixed overheads expenditure variance	<u>8,000 (A)</u>
Total overheads variance	5,000 (A)

**(ii) VOLUME VARIANCE**

The difference between overhead absorbed on actual output and those on budgeted output is termed as volume variance. This variance shows the over or under absorption of fixed overheads during a particular period. If the actual output is more than the standard output, there is over-recovery of fixed overheads and volume variance is favourable and vice versa if the actual output is less than the standard output.

$$\begin{aligned} \text{Volume Variance (FOVV)} &= (\text{Actual output} \times \text{Standard rate}) - \text{Budgeted fixed overheads} \\ &\text{OR} \\ &\text{Standard rate (Actual output - Standard output)} \\ &\text{OR} \\ &\text{Standard rate per hour (Standard hours produced - Budgeted hours)} \\ &\text{OR} \\ &(\text{Absorbed overhead} - \text{Budgeted overhead}) \end{aligned}$$

**N.B.:** Standard hour produced means number of hours which should have been taken for the actual output as per the standard laid down.

**VERIFY:-**

$$\text{F.O. COST VARIANCE} = \text{F.O. EXPENDITURE VARIANCE} + \text{F.O. VOLUME VARIANCE}$$

Volume variance can be further sub-divided into the following variances:

**(a) EFFICIENCY VARIANCE**

It arises due to the difference between the output actually achieved and the output which should have been achieved in the actual hours worked. This variance will be favourable if the actual production is more than the standard production in actual hours.

$$\begin{aligned} \text{Fixed Overhead Efficiency Variance (FOEfV)} &= \\ &\text{Standard Fixed Overhead Rate per hour [Standard Production} - \text{Actual Production]} \end{aligned}$$

**(b) CAPACITY VARIANCE**

It is that portion of the volume variance which is due to working at higher or lower capacity than the standard capacity. It is related to the under or over utilisation of plant and equipment. If the capacity utilization is more than the budgeted capacity, the variance is favourable, otherwise it will be adverse. It is represented as:

$$\begin{aligned} \text{F. O. Capacity Variance} &= \\ &\text{Standard rate ( Standard quantity} - \text{Budgeted quantity)} \end{aligned}$$

**(c) REVISED CAPACITY VARIANCE**

This variance indicates the difference in capacity utilization due to working for more or less number of days than the budgeted one. The computation of this variance is done by using the following formula.

$$\begin{aligned} \text{Fixed Overhead Revised Capacity Variance (FORCV)} &= \\ &\text{Standard Rate [Standard Quantity} - \text{Revised Budgeted Quantity]} \end{aligned}$$

**(d) CALENDAR (IDLE TIME) VARIANCE**

It is that portion of the volume variance which is due to the difference between the number of working days anticipated in the budget period and the actual working days in the period to which the budget is applied. If the actual working days exceed standard days, the variance will be favourable and vice-versa.

It is calculated as:

$$\text{FO Calendar Variance} = \text{Standard rate (Revised budgeted units - Budgeted units)}$$

OR

$$\text{Increase or decrease in production due to more or less working days at the rate of revised capacity} \times \text{Standard rate per unit.}$$

**Illustration 9**

The budgeted capacity of a factory per month of 25 days was 2,00,000 hours and the budgeted fixed overheads were ₹2,40,000. The management increased the capacity by 20% in the beginning of October, 2000, the actual number of working days in that month were 23. Compute the variance that emerge.

**Solution:**

Budgeted fixed overheads recovery rate ₹1.20 i.e.  $2,40,000/2,00,000$ .

Actual production in terms of hours  $(2,00,000 + 20\%) \times 23/25$  or 2,20,800

Volume Variance: Fixed overheads absorbed on 2,20,800  
 hours @ ₹1.20 per hours ₹2,64,960  
 Budgeted fixed overheads ₹2,40,000  
 Volume Variance 24,960 (F)  
 (or 20,800 hours @ ₹1.20)

**Analysis**

Capacity Variance: Production in terms of hours at new capacity - i.e. $2,00,000 + 20\%$	Hrs. 2,40,000
Fixed overheads absorbed @ of ₹1.20 per hour	₹ 2,88,000
Fixed overheads, budgeted	₹ 2,40,000
	₹ 48,000 (F)
Calendar Variance: Loss of hours due to 2 extra Holidays	
$2,40,000 \times 2/26$	19,200
Loss of fixed overheads absorbed because of loss of hours	
$19,200 \times 1.20$	₹ 23,040 (A)

**Illustration 10**

From the following information extracted from the books of a manufacturing company, calculate Fixed and Variable Overhead Variances.

<i>Particulars</i>	<i>Budgeted</i>	<i>Actual</i>
Production – Units	22, 000	24, 000
Fixed Overheads	₹44, 000	₹49, 000
Variable Overheads	₹33, 000	₹39, 000
Number of Days	25	26
Number of man hours	25, 000	27, 000
Capacity Variance		₹ 48,000 (F)
Calendar Variance		₹ 23,040 (A)
Volume Variance		24,960 (F)

**Solution:****(A) Fixed Overhead Variances:****(I) Fixed Overhead Cost Variance:**

Standard Fixed Overheads for Actual Production – Actual Fixed Overheads

$$= ₹48, 000 - ₹49, 000 = ₹1, 000 \text{ [A]}$$

*Note:* Standard fixed overheads for actual production = Actual Production 24, 000 × standard rate ₹2 [₹44, 000 budgeted fixed overheads / 22, 000 budgeted production = ₹2]

**(II) Fixed Overhead Expenditure Variance**

Budgeted Fixed Overheads – Actual Fixed Overheads

$$= ₹44, 000 - ₹49, 000 = ₹5, 000 \text{ [A]}$$

**(III) Fixed Overhead Volume Variance**

Standard Rate [Budgeted Quantity – Actual Quantity] =

$$2 [22, 000 - 24, 000] = ₹4, 000 \text{ [F]}$$

The variance is favourable as the actual quantity produced is more than the budgeted quantity.

Reconciliation I = Cost Variance = Expenditure Variance + Volume Variance

$$1, 000 \text{ [A]} = ₹5, 000 \text{ [A]} + ₹4, 000 \text{ [F]}$$

**(IV) Fixed Overhead Efficiency Variance**

Standard Rate [Standard Quantity – Actual Quantity] = ₹2 [23, 760 – 24, 000] = ₹480 [F]

*Note:* Standard quantity of production is in reference to actual number of hours. If 22, 000 units are produced in 25, 000 hrs [standard hours], in actual 27, 000 hours, 23, 760 units should have been produced. When number of days and number of hours, both are given, the standard quantity is always to be computed in relation to the actual hours. However, if only number of days is given, the standard quantity will have to be computed in relation to number of days.

**(V) Fixed Overhead Capacity Variance**

Standard Rate [Standard Quantity – Budgeted Quantity] = ₹2 [23, 760 – 22, 000] = ₹3, 520 [F]

Reconciliation II = Volume Variance = Efficiency Variance + Capacity Variance

$$4, 000 \text{ [F]} = ₹480 \text{ [F]} + 3, 520 \text{ [F]}$$

**(VI) Fixed Overhead Revised Capacity Variance**

= Standard Rate [Standard Quantity – Revised Budgeted Quantity]

$$= ₹2 [23,760 - 22,880] = ₹2 \times 880 = ₹1760 \text{ [F]}$$

*Note:* Standard quantity is computed as shown in the Efficiency Variance. Revised Budget Quantity is computed as: in 25 days, the production is 22,000 so in 26 days the revised quantity is 22,880 units.

**(VII) Fixed Overhead Calendar Variance**

Standard Rate [Revised Budgeted Quantity – Budgeted Quantity]

$$= ₹2 [22,880 - 22,000] = ₹2 \times 880 = ₹1,760 \text{ [F]}$$

Reconciliation III = Capacity Variance = Revised Capacity Variance + Calendar Variance =

$$3,520 \text{ [F]} = ₹1760 \text{ [F]} + ₹1760 \text{ [F]} = 367$$

**(I) Cost Variance:** Standard Variable Overheads for Actual Production – Actual Variable Overheads:

$$36,000 - ₹39,000 = ₹3,000 \text{ [A]}$$

*Note:* Standard Variable Overheads for Actual Production = Standard Rate Per Unit × Actual Production Units = ₹1.5 [Budgeted variable overheads ₹33,000 / Budgeted production units

$$22,000 = ₹1.5] \times 24,000 \text{ units} = ₹36,000$$

**(II) Expenditure Variance:** Standard Variable Overheads for Standard Production – Actual Variable Overheads: ₹1.5 × 23,760 – ₹39,000 = ₹3360 [A]

**(III) Efficiency Variance:** Standard Rate [Standard Quantity – Actual Quantity]

$$1.5 [23,760 - 24,000] = ₹360 \text{ [F]}$$

## ACCOUNTING TREATMENT OF VARIANCES

The cost records maintained and entries made under a system of standard costing vary from company to company depending upon the information that is desired from cost records, and the intended use of standard cost and variance analysis. Variances which emerge in standard costing and recorded in the cost books may be disposed of in any of the following ways:

**(i) Transfer to costing profit and loss account**

In this method, the stock of work-in-progress, finished goods and cost of sales are maintained at standard cost and all variances are charged to costing profit and loss account at the end of the accounting period. This method is favoured because standard costs facilities prompt inventory valuation and also variances are separated out so as to attract the attention of the management.

**(ii) Allocation of variances to finished stock, work-in-progress and cost of sales account**

Under this method the variances are distributed over stocks of finished goods, work-in-progress and to cost of sales account in proportion to the closing balances (value) of each account depending upon the type of variance.

**(iii) Transfer to reserve account:**

In this method favourable variances are carried forward as deferred credits until they are set-off by adverse variances. It is considered that controllable variances according to method (ii).

## BENCHMARKING FOR SETTING OF STANDARDS

First of all we should have knowledge what is benchmarking.

Benchmarking is the process of identifying "best practice" in relation to product and the processes by which those products are created and delivered. The objective of benchmarking is to understand and evaluate the current position of a business or organisation in relation to "best practice" and to identify areas and means of performance improvement.

### *The Benchmarking Process*

Benchmarking involves looking outward (outside a particular business, organisation, industry, region or country) to examine how others achieve their performance levels and to understand the processes they use. In this way benchmarking helps explain the processes behind excellent performance.

Application of benchmarking involves four key steps:

- (1) Understand in detail existing business processes
- (2) Analyse the business processes of others
- (3) Compare own business performance with that of others analysed
- (4) Implement the steps necessary to close the performance gap

Benchmarking should not be considered a one-off exercise. To be effective, it must become an ongoing, integral part of an ongoing improvement process with the goal of keeping abreast of ever-improving best practice.

In the same way benchmarking should be followed while determining the standard for costs. Production manager and cost accountant must work together in setting the standards. Production manager should determine the quantity standards and cost accountant should work out for price standards. While setting the production cost standards, the following preliminaries should be considered:

1. To study the technical and operational aspects of the manufacturing processes and method etc (of self business).
2. To analyse the process as discussed in (1.) of others.
3. To review of the existing costing system, cost records and forms in use. It should review while considering of following:
  - (a) Quantities
  - (b) Prices
  - (c) Mix proportion of different grades
  - (d) Scrap and its value
  - (e) Yield
4. To implement the necessary step to close the performance gap say:
  - (a) Proper classification of accounts so that variance is also accounted for.
  - (b) Fixation of responsibility for every work should be there.



## REPORTING OF VARIANCES TO MANAGEMENT

The primary purpose of reporting to management is to enable them to take corrective action and arrest unfavourable variances to the extent possible. Therefore, timely and prompt reporting of the variance is of utmost importance. The individual or department responsible for adverse controllable variance should be located. For instance, a variation in the price paid for raw materials would be the responsibility of the purchase manager and a variation in production efficiency is the responsibility of the production manager. The board and the managing director would be concerned with the overall efficiency, with which their plans have been operated by the lower levels of management. The profit and loss account should be prepared in a special manner - starting with the standard or budgeted profit, the various variances would be put in two columns, favourable and unfavorable, and the net results added to or deducted from the standard profit, thus arriving at the actual profit. Management can easily see the factors that have contributed to the change in the profit picture. While reporting the analysis of variances to management, graphs and charts might be used or analysis may be reported in the form of statement and reports giving main details.

In order that variance reporting should be effective, it is essential that the following conditions are fulfilled:

- (i) The variances arising out of each factor should be correctly segregated. If part of a variance due to one factor is wrongly attributed to or merged with that of another, the analysis report submitted to the management would be misleading and wrong inferences may be drawn from it;
- (ii) Variances, particularly the controllable variances should be reported with promptness as soon as they occur. This would enable corrective action being taken in time;
- (iii) Analysis of uncontrollable variances should be made with the same care as for controllable variances since the analysis of the off standard situation may reveal far reaching effects on the economy of the concern; and
- (iv) The forms of reports for the different types of variances should be designed keeping in view the needs of the management and the size of the concern, and no standard forms can, therefore, be suggested.

It is better to present the profit figures by way of reconciliation of budgeted (or standard) and actual profits on the basis of variances.

## LESSON ROUND-UP

- Standard costs are pre-determined estimates of cost of a single unit or a number of units of a product service.
- Standard costing is a method of preparation of standards and their uses for comparison with actual costs by variance analysis.
- All standards are established on the basis of absorption costing system.
- Application of Standard Cost for:
  - Effective planning and controlling costs
  - Pricing decisions including submission of quotations, answering tenders etc
  - Identification and measurement of variances from standards
  - Designing performance measurement systems
- Types of various standards are basic, current, expected, normal, ideal.
- Standard costing system provides standard cost for budgeting purpose to plan future performance.

- Valuation, planning, controlling are the main function of standard costing system.
- Variance is the difference between standard cost and actual cost incurred.
- The examination of variances in detail and evaluation of them is known as variance analysis.
- Variance can be divided into two part:
  - Variance related to cost
  - Variance related to sales.
- Variance Related to Cost :- Cost can be divided into three part i.e. Material cost, Labour cost & Overhead cost. So every business set standards for these three type of cost and analysis difference from standard established by them to actual cost incurred.
- Favourable variance is that variance which effect profit in a favourable manner which may be due to reduction in cost.
- Material cost variance is the difference between standard cost of direct material specified for output achieved and the actual cost of direct material used. . formulas of MCV as under:
  - $MCV = (SQ \times SP) - (AQ \times AP)$
  - $MPV = AQ (SP - AP)$
  - $MUV = SP (AQ - SQ)$
  - $MMV = SP (RS - AQ)$
  - $MYV = SC \text{ p.u. } (AY - SY)$
  - For calculating the MYV actual yield (AY) will never change whereas standard yield may be changed
- Labour cost variance is the difference between the standard direct wages specified for the activity achieved and the actual direct wages paid. formulas of LCV as under:
  - $LCV = (SH \times SR) - (AH \times AR)$
  - $LRV = AH \times (SR - AR)$
  - $LEV = SR \times (SH - AHW)$
  - $LITV = \text{Idle hours} \times SR$
  - $LMV = (RSH - AHW) \times SR$
  - $LYV = SC \text{ p.u. } (AY - SY)$
- The total overhead cost variance is the difference between the standard cost of overhead allowed for the actual output achieved and the actual overhead cost incurred. Formula as under:
  - $[\text{Standard Hours for Actual Output} \times \text{Standard Overhead Rate Per Hour}] - \text{Actual Overhead Cost}$
- Overhead cost variances can be classified as:
  - Variable overhead variance
  - Fixed overhead variance
- Variable Overhead Variance (VOV) is the difference between the standard variable overhead cost allowed for the actual output achieved and the actual variable overheads.
  - $VOV = (\text{Standard Rate} \times \text{Actual output}) - (\text{Actual Rate} \times \text{Actual output})$
  - $VOExV = (\text{Actual Hours} \times \text{Standard Variable Overhead Rate per Hour}) - \text{Actual Variable Overhead}$
  - $VOEfV = \text{Recovered Overheads} - \text{Standard Overheads}$

- It is better to compute variance related to variable overhead on the basis of hours rather than on the basis of units.
- Actual item represents actual figure of a particular period.
- Budgeted item represents level of activity which business wants to achieve.
- Standard item represents budgeted data which changes according to the level of actual activity or actual output.
- Fixed overhead variance is the difference between the standard costs of fixed overhead allowed for the actual output achieved and the actual fixed overhead cost incurred.
  - $FOCV = \text{Recovered fixed overhead} - \text{Actual fixed Overhead}$
  - $FOExV = \text{Budgeted fixed overhead} - \text{Actual fixed Overhead}$
  - $FOVV = \text{Standard rate (Actual output - Standard output)}$
  - $FOEFV = \text{Standard Fixed Overhead Rate per hour [Standard Production - Actual Production]}$
  - $\text{FO Capacity variance} = \text{Standard rate ( Standard quantity - Budgeted quantity)}$
  - $FORCV = \text{Standard rate ( Standard quantity - Revised Budgeted quantity)}$
  - $\text{FO Capacity variance} = \text{Standard rate (Revised budgeted hours - Budgeted hours)}$

### SELF-TEST QUESTIONS

1. Define 'Standard Cost' and 'Standard Costing'.
2. What are the applications of standard costing?
3. Discuss the importance and limitations of standard costing.
4. Discuss the various types of standards.
5. Explain the meaning, causes and disposal of labour variances.
6. Define 'Variance analysis'. What are the ways of disposing of cost variances?
7. Variance analysis is an integral part of standard costing system.
8. The following information was obtained from the records of a manufacturing unit using standard costing system :

<i>Particulars</i>	<i>Standards</i>	<i>Actual</i>
Production	12000 units	11400 units
Working days	20	21
Fixed overheads	₹ 1,20,000	₹ 1,17,000
Variable overheads	₹ 12,000	₹ 12,000

Calculate :

- (a) Variable overhead variance;
  - (b) Fixed overhead expenditure variance;
  - (c) Fixed overhead volume variance;
  - (d) Fixed overhead efficiency variance;
  - (e) Fixed overhead calendar variance.
9. Sharda Courier Ltd. started trading on 1st April 2012, manufacturing and selling one product. The standard cost per unit was:

Direct material: Standard price ₹ 10 per kilogram

Standard quantity: 20 kilogram per unit

Direct labour: Standard rate of pay ₹ 5.50 per hour

Standard time allowance: 12 hours per unit

Production overhead costs, all classified as fixed, were budgeted at ₹ 9,00,000 per annum.

The standard time for producing one unit is 12 machine hours and normal capacity is 60,000 machine hours per annum. Production overhead is absorbed on machine hours. For the year ended 31st March 2013 the costs incurred and other relevant information is given below :

Direct material used— 1,00,000 kilograms at a cost of ₹ 10,50,000

Direct wages paid— ₹ 3,10,000 for 62,000 hours

Production overhead— ₹ 9,26,000

Machine capacity used— 60,000 hours

Actual output— 4,800 units

Assuming no stocks of work-in-progress or finished goods at year end.

You are required to:

Show the standard product cost for one unit.

Calculate variances for material (usage and price), labour (rate and efficiency) and overhead.

10. The following information is available from the cost records of Sushma & Co.. For the month of March, 2013:

Material purchased 24,000 kg ₹1,05,600

Material consumed 22,800 kg

Actual wages paid for 5,940 hours ₹29,700

Unit produced 2160 units.

Standard rates and prices are:

Direct material rate is ₹4.00 per unit

Direct labour rate is ₹4.00 per hour

Standard input is 10 kg. for one unit

Standard requirement is 2.5 hours per unit.

Calculate all material and labour variances for the month of March, 2013.

11. Write short note on the following:

- (i) Idle Time Variance
- (ii) Overhead Variance
- (iii) Material Mix Variance
- (iv) Labour Yield Variance

# Lesson 10

## BUDGET, BUDGETING AND BUDGETARY CONTROL

### LESSON OUTLINE

- Budget
- Budgeting
- Budgetary Control
- Forecast and Budget
- Objectives of Budgetary Control
- Advantages of Budgetary Control
- Limitations of Budgetary Control
- Preliminaries for the Adoption of a System of Budgetary Control
- **Installation of Budgetary Control System**
  - *Organisation Chart*
  - *Budget Centre*
  - *Budget Manual*
  - *Budget Controller*
  - *Budget Committee*
  - *Budget Period*
  - *Budget Key Factor*
  - *Budget Reports*
- **Preparation & Monitoring of Various Types of Budgets:**
  - Functional Budget
  - Master Budget
  - Fixed Budget
  - Flexible Budget
  - Basic Budget
  - Current Budget
  - Long Period
  - Short Period
- Zero Base Budgeting
- PROGRAMME Budgeting
- Performance Budgeting
- Lesson Round Up
- Self Test Question

### LEARNING OBJECTIVES

Budget is a precise statement of financial and quantitative implications of the course of actions that management has decided to follow in the immediate next period of time.

Budget is a basis for the Management to see how the organization has been functioning i.e. whether the targets are set by management have been achieved or not. It is a very effective control tool.

After studying the lesson one should be capable to-

1. Understand Budgeting process, benefits of Budgeting, advantage of Budgetary control, limitations of budget.
2. Prepare different types of Budget i.e. Cash Budget, Flexible Budget etc.
3. Comparison of budgeted and actual expenses.
4. Understand the meaning of zero base budgeting, its benefits and limitations
5. Understand about Budget Manual, Budget Period, Budget Period.

A budget fixes a target in terms of money or quantities against which the actual performance is measured.

## BUDGET

In "A Dictionary for Accountants", Kohler defines budget as:

1. Any financial plan serving as an estimate of and a control over future operations.
2. Hence, any estimate of future costs.
3. Any systematic plan for the utilisation of manpower, material or other resources.

**The Chartered Institute of Management Accountants, London,** (terminology) defines a budget as

"A plan expressed in money. It is prepared and approved prior to the budget period and may show income, expenditure and the capital to be employed. May be drawn up showing incremental effects on former budgeted or actual figures, or be compiled by zero-based budgeting."

A budget is a precise statement of the financial and quantitative implications of the course of action that management has decided to follow in the immediate next period of time (usually a year).

Thus the essential features of a budget are as follows:

- (i) It is a statement expressed in monetary and/or physical units prepared for the implementation of policy formulated by the management.
- (ii) It is laid down prior to the budget period during which it is followed.
- (iii) It is prepared for the definite future period.
- (iv) The policy to be followed to attain the given objective must be laid before the budget is prepared.

## BUDGETING

Budgeting is the complete process of designing, implementing and operating budgets. The main emphasis in this is short-term budgeting process involving the provision of resources to support plans which are being implemented.

## BUDGETARY CONTROL

Budgetary control is intimately connected with budgets. The Chartered Institute of Management Accountants, London defines Budgetary control as "the establishment of budgets, relating the responsibilities of executive to the requirements of a policy and the continuous comparison of actual with budgeted results either to secure by individual action the objectives of that policy or to provide a firm basis for its revision". A budgetary control system secures control over performance and costs in the different parts of a business:

- (i) by establishing budgets
- (ii) by comparing actual attainments against the budgets; and
- (iii) by taking corrective action and remedial measures or revision of the budgets, if necessary.

The budget is a blue-print of the projected plan of action expressed in quantitative terms and for a specified period of time. The budgets put the plan in a concrete form and follow up action to see that plan is adhere to complete the system of control. In other words, while budgeting is the art of planning, budgetary control is the act of adhering to the plan. In fact, budgetary control involves continuous comparison of actual results with the budgets and taking appropriate remedial action promptly.

It is well recognised that a control system involves fixing of targets (in the form of specific tasks), collection of information regarding actuals and continuous comparison of actuals with the targets with a view to reporting for action. A budgetary control system, in this sense is also a control system. It is an excellent system for decentralisation of authority without losing control over the operations of the firm.

One should not consider (budgets or) budgetary control as something rigid or strait-jacket. It is one of the system whereby dynamism is infused into an organisation through the process of targets, the achievement of which will mean progress; of allowing a good deal of freedom of action within the delegated field of executives and of seeing to it that all concerned will work in a concerted manner for achieving the firm's objectives. There is always a good scope for initiative and drive but not for recklessness or too much caution. De Paula has put the main idea of budgetary control through an analogy thus "the position may be linked to the navigation of a ship across the sea. The log is kept written regarding happenings and position of the ship from hour to hour and valuable lessons are to be learnt by the captain from a study of the factor that caused the misadventures in the past. But to navigate his ship safely over the seven seas the captain requires his navigating officer to work out the course ahead and constantly to check his ship's position against the predetermined one. If the ship is off its course, the navigating officer must report immediately so that the captain may take prompt action to regain his correct course".

"Exactly so it is with the industrial ship; the past records represent the log and the auditor is responsible for verifying so far as he can that those records are correct and reveal a true and fair view of the financial position of the concern. But what modern management requires for day-to-day operating purposes is forecasts showing in detail anticipated course of business for (say) the coming year. During the course of the years' operations the management requires immediate reports of any material variance from the predetermined course together with explanation of the reasons for variations".

In short, budgetary control means laying down in momentary and quantitative term what exactly has to be done and how exactly it has to be done over the coming period and then to ensure that actual results do not diverge from the planned course more than necessary. The word "necessary" is not to be loosely interpreted. Divergence due to inefficiency is not necessary.

**Rowland and William in their book entitled Budgeting for Management Control has given the difference between budget, budgeting and budgetary control as follows:**

"Budgets are the individual objectives of a department, etc. whereas budgeting may be said to be the act of building budgets. Budgetary Control embraces all this and in addition include the science of planning the budgets themselves and the utilisation of such budgets to effect an overall management tool for the business planning and control".

Thus, a budget is a financial plan and budgetary control results from the administration of the financial plan.

## FORECAST AND BUDGET

A forecast is an assessment of probable future events. Budget is an operating and financial plan of a business enterprise. At planning stage it is necessary to prepare forecasts of probable course of action for the business in future. Budget is a sort of commitment or a target which the management seek to attain on the basis of the forecasts made. Forecasts are made regarding sales, production cost and financial requirements of the business. A forecast denotes some degree of flexibility while a budget denotes a definite target.

The following points of distinction can be noted between forecast and budget:

	<i>Forecast</i>	<i>Budget</i>
(i)	Forecast is a mere estimate of what is likely to happen. It is a statement of probable events which are likely to happen under anticipated conditions during a specified period of time.	Budget shows that policy and programme to be followed in a future period under planned conditions.
(ii)	Forecasts, being statements of future events, do not connote any sense of control.	A budget is a tool of control since it represents actions which can be shaped according to will so that it can be suited to the conditions which may or may not happen.
(iii)	Forecasting is a preliminary step for budgeting. It ends with the forecast of likely events.	It begins when forecasting ends. Forecasts are converted into budgets.
(iv)	Forecasts have wider scope, since it can be made in those spheres also where budgets can not interfere.	Budgets have limited scope. It can be made of phenomenon non capable of being expressed quantitatively.

### **OBJECTIVES OF BUDGETARY CONTROL**

The objectives of budgetary control are the following :

- (1) To use different levels of management in a co-operative endeavour for achievement of the objectives of the firm.
- (2) To facilitate centralised control with delegated authority and responsibility.
- (3) To achieve maximum profitability by planning income and expenditure through optimum use of the available resources.
- (4) To ensure adequate working capital in other resources for efficient operation of business.
- (5) To reduce losses and wastes to the minimum.
- (6) To bring out clearly where effort is needed to remedy the situation.
- (7) To see that the firm is not deflected from marching towards its long-term objectives without being overwhelmed by emergencies.
- (8) Various activities like production, sales, purchase of materials etc. are co-ordinated with the help of budgetary control.

### **ADVANTAGES OF BUDGETARY CONTROL**

Budgetary control makes all the differences between drifting in an unchartered sea and following a well plotted course towards a predetermined distinction. It serves as a valuable aid to management through planning, co-ordination and control.

The principal advantages of a budgetary control system are enumerated below:

- (1) Budgetary control aims at maximisation of profits through effective planning and control of income and expenditure - directing capital and resources to the best and most profitable channel.
- (2) There is a planned approach to expenditure and financing of the business so that economy is affected in the utilisation of funds to the optimum benefit of the concern.



- (3) It provides a clear definition of the objective and policies of the concern and a tool for objecting these policies to periodic examination.
- (4) The task of managerial co-ordination is facilitated through budgetary control.
- (5) Since each level of management is aware of the task and is fully conscious as to the best way by which it is to be performed, maximum effective utilisation of men, materials and resources can be attained.
- (6) Reports are furnished under the principles of management or control by exception. Only deviations from budgets which point out the weak spots and inefficiencies are properly looked into.
- (7) It cultivates in the management the habit of thinking ahead - making careful study of the problems in advance before taking decisions.
- (8) A budgetary control system assists delegation of authority and is a powerful tool of responsibility accounting.
- (9) Budgets are the fore-runners of standard costs in the sense that they create necessary conditions to suit setting up of standard costs.
- (10) The method of evaluating performance against budgets provides a suitable basis for establishing incentive system of remuneration by results as also spotting people with exceptional qualities of leadership and management.
- (11) Since it involves foreseeing difficulties of various types, it will lead to their removal in time.

#### **LIMITATIONS OF BUDGETARY CONTROL**

- (1) Budgetary control starts with the formulation of budgets which are mere estimates. Therefore, the adequacy or otherwise of budgetary control system, to a very large extent, depends upon the adequacy or accuracy with which estimates are made.
- (2) Budgets are meant to deal with business conditions which are constantly changing. Therefore, budgets estimates lose much of their usefulness under changing conditions because of their rigidity. It is necessary that budgetary control system should be kept adequately flexible.
- (3) The system of budgetary control is based on quantitative data and represent only an impersonal appraisal to the conduct of business activity unless it is supported by proper management of personal administration.
- (4) It has often been found that in practice the organisation of budgetary control system become top heavy and, therefore, costly specially from the point of view of small concern.
- (5) Budgets and budgetary control have given rise to a very unhealthy tendency to be regarded as the solvent of all business problems. This has resulted in a very luke-warm human effort to deal with such problems and ultimately results in failure of budgetary control system.
- (6) It is a part of human nature that all controls are resented to. Budgetary control which places restrictions on the authority of executive is also resented by the employees.

The limitations stated above merely point to the need of maintaining the budgetary control system on a realistic and dynamic basis rather than as a routine.

## PRELIMINARIES FOR THE ADOPTION OF A SYSTEM OF BUDGETARY CONTROL

For the successful implementation of a system of budgetary control certain pre-requisites are to be fulfilled. They are summarised below:

- (1) There should be an organisation chart laying out in clear terms the responsibilities and duties of each level of executives and the delegation of authority to the various levels.
- (2) The objectives, plans, and policies of the business should be defined in clear cut and unambiguous terms.
- (3) The budget factor or the key factor(s) which will be the starting point of the preparation of the various budgets should be indicated.
- (4) For formulation and efficient execution of the plan, a Budget Committee should be set up.
- (5) There should be an efficient system of accounting to record and provide data in line with the budgetary control system.
- (6) There should be a proper system of communication and reporting between the various levels of management.
- (7) There should be a Budget Manual wherein all details regarding the plan and its procedure of operation are given as also the length of the budget period.
- (8) The budgets should primarily be prepared by those who are responsible for performance.
- (9) The budgets should be comprehensive, complete, continuous and realistic to attain.
- (10) There should be an assurance from the top management executives for co-operation and acceptance of the budgetary control system.
- (11) For the success of a budgetary control system, it is essential that there should be a sound organisation for budget preparation, budget maintenance, and budget administration. The budgetary control organisation is usually headed by a top executive who is known variously as the Budget Controller, Budget Director, or Budget Officer, who may have under him a Budget Committee constituted with the representatives of various departments like purchases, sales, production, development, administration and accounts.

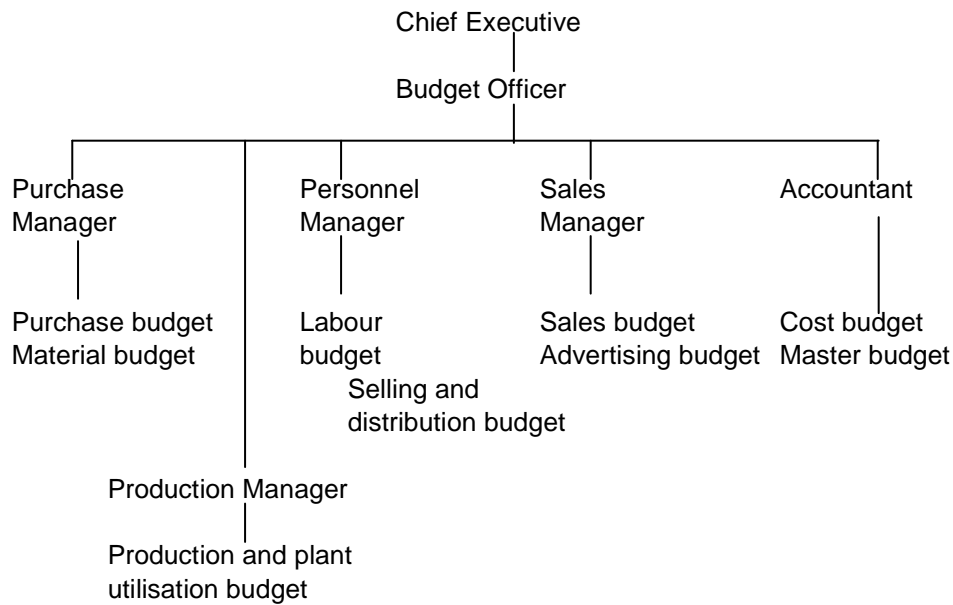
Unless the philosophy of budgeting and budgetary control is accepted by everyone in authority, the system may work only haphazardly. The full and frank and active cooperation of all is required while framing budgets. Then only they will feel committed to the achievements of targets set for them.

## INSTALLATION OF BUDGETARY CONTROL SYSTEM

The following steps should be considered in detail for sound budgets and for successful implementation of the budgetary control system.

**(i) Organisation Chart:** An organisational chart is a statement defining functional representatives of executives responsible for accomplishment of organisational objectives. This chart shows:

- (i) Functional responsibility of a particular executive.
- (ii) Delegation of authority to various levels.
- (iii) Relative position of a functional head with heads of other functions. An organisation chart for budgetary control may be as follows:



**(ii) Budget Centre:** A budget centre is a section of the organisation of the undertaking defined for the purpose of budget control. Budget centre should be established for cost control and all the budgets should be related to cost centres. Budget centres will disclose the sections of the organisation where planned performance is not achieved. Budget centre must be separately delimited because a separate budget has to be set with the help of the head of the department concerned. To illustrate, production manager has to be consulted for the preparation of production budget and finance manager for cash budget.

**(iii) Budget Manual:** A budget manual is a document which sets outstanding instructions governing the responsibilities of persons and the procedures, forms and records relating to the preparation and use of budgets and it is a booklet containing standing instructions regarding the procedures to be followed and the time schedules to be observed. The following are some important matters dealt with in the budget manual:

- (i) the dates by which preliminary forecasts and plans are to be submitted;
- (ii) the form in which these are to be submitted and the persons to whom these are to be forwarded;
- (iii) the important factors that must be considered for each forecast or plan;
- (iv) the categorisation of expenses, e.g., variable and fixed, and the manner in which each category is to be estimated and dealt with;
- (v) the manner of scrutiny and the personnel to carry it out;
- (vi) the matters which must be settled only with the consent of the managing director, departmental manager, etc.;
- (vii) the finalisation of the functional budgets and their compilation into the master budget;
- (viii) the form in which the various reports are to be made out, their periodicity and dates, the persons to whom these and their copies are to be sent;
- (ix) the reporting of the remedial action;
- (x) the manner in which budgets, after acceptance and issuance, are to be revised or amended; and

- (xi) the matters, included in budgets, on which action may be taken only with the approval of top management.

The main idea behind the budget manual is to inform line executives beforehand about procedures to be followed rather than issuing frequent instructions from the controller's office regarding procedures and forms to be used. Such frequent instructions can be a source of friction between the line and staff management.

**(iv) Budget Controller:** To line up the various functions of Budget Committee, to bring them together and to co-ordinate their efforts in the matter of preparation of target figures, there should be a person usually designated as the Budget Controller, who can provide ready data relating to all the functions. He is more or less the secretary to the budget committee. The Budget Controller does not control; he is staff man; he advises but does not issue instructions. His duties will comprise mainly of:

- (1) Helping in preparation of the various budgets and their coordination and compilation into the master budget;
- (2) Compiling of information about actual performance on a continuous basis comparing it against the budget figures, ascertaining causes of deviation and preparing reports based thereon and sending them to the appropriate executive;
- (3) Bringing to the notice of the management the need for revision of budgets and assisting them in the task; and
- (4) Compiling information of all types for the purposes of efficient preparation of budgets and proper reporting.

**(v) Budget Committee:** The budget committee is a group of representatives of various functions in an organisation. As all functions are inter-related and as any change in one's target will have its impact on that of the other, it is necessary to discuss the targets so that a mutually agreed programme is determined. This is the co-ordination in budget making. It is a powerful force in knitting together the various activities of the business and enforcing real control over operations. The budget manual should specify the responsibilities and duties of the budget committee, which should include the following:

- (1) Receive and review budget estimates from the respective divisions or departments and make recommendations.
- (2) Recommend decisions or budget matters where there may be conflicts between departments or divisions.
- (3) Recommend changes and approval of the revised budget.
- (4) Receive, study and analyse periodic reports comparing the budget with actual performance. Consider policies with respect to follow-up procedures.
- (5) Consider and make recommendations for revision of the budget when conditions warrant.
- (6) Consider recommendations for changes in budget policies and procedures.
- (7) Make recommendations for the budget manual.

**(vi) Budget Period:** CIMA defines budget period as “**the period for which a budget is prepared and used, which may then be sub-divided into control periods**”. It refers to the period of time covered by a budget. The broad classification in this regard has already been stated as “long-term budget” and “short-term budget”.

The short-term budget itself could be bifurcated into yearly and quarterly budgets. Long-term budgets provide the perspective, since one would be able to have a view of what is likely to be achieved and what the

chief problems are likely to be, such as, competition from new products. Short-term budgets, say, for a year are quite exact and those for a quarter even more so. These are particularly suitable for control purposes. A short-term budget need not necessarily be for one year. It is generally long enough to cover one season or business year.

In determining the length of the budget period the following factors should be considered:

- (i) The budget period should be long enough to complete production of the various products.
- (ii) For the business of a seasonal nature the budget period should cover at least one entire seasonal cycle.
- (iii) The budget period should be long enough to allow for the financing of production well in advance of actual needs.
- (iv) Major operations and drastic changes in plant lay-out or manufacturing methods must be planned far in advance to determine financial requirements.
- (v) The budget period should coincide with the financial accounting period to compare actual results with budgeted estimates.

A budget period should be distinguished from “control period”. The latter indicates the periodicity with which reports are sent to the various levels of management. It need not be the same as the budget period. Reports are sent usually at shorter intervals so that corrective action may be taken within the budget period. This would ensure that the overall variation between budget and actual is minimised. The periodicity of the reports is also dependent upon the urgency and significance of the matter under report.

**(vii) Budget Key Factor:** A budget key factor or principal budget factor is described by the **CIMA London** terminology as: “**a factor which will limit the activities of an undertaking and which is taken into account in preparing budgets**”. The limiting factor is usually the level of demand for the products or services of the undertaking but it could be a shortage of one of the productive resources, e.g. skilled labour, raw material or machine capacity. In order to ensure that the functional budgets are reasonably capable of fulfilment the extent of the influence of this factor must first be assessed. As noted already all the functions in all organisations are interlinked. The target of one has influence on that of the other. If the sales department could sell only 50,000 units, it is no use of producing 1,00,000 units. If the production department has the capacity for 50,000 units, sales potential of 1,00,000 units is not of much consequence. Deliberations in the budget committee would lead to a decision regarding steps to get over a limiting factor. If one limiting factor is got over, another may creep up. Thus, there is a possibility of varying limiting factors under different circumstances. Decision will have to be taken resulting in optimum production keeping in view the different limiting factors. The basic issue is an enquiry into the future. All probabilities under different circumstances are to be worked out to fix the target at the optimum level. This may sometimes involve lengthy mathematical calculations.

The following is a list of principal budget factors which will influence the targets: (a) customer demand, (b) plant capacity (c) availability of raw material, skilled labour and capital, (d) availability of accommodation for plant, raw materials and finished goods and (e) governmental restrictions.

If a limiting factor cannot be got over by any means, then the whole budget involving all functions will have to be built around that factor. For instance, if the production capacity is 50,000 units and it cannot be increased in the short run, all budgets, say, the sales budget and raw materials purchase budget, will have to be based on the production of 50,000 units. To achieve maximum profitability, a key factor must be overcome, if not, at least efforts should be made to minimise its adverse effect.

**(viii) Budget Reports:** Performance evaluation and reporting of variances is an integral part of all control systems. Establishing budgets in itself is of no use unless a comparison is made regularly between the actual expenditure and the budgeted allowances, and the results reported to the management. For this purpose, budget reports showing the comparison between the actual and budgeted expenditure should be presented periodically and promptly. The reports should be prepared in such a manner that they reveal the responsibility of a department or an executive and give full reasons for the variances so that proper corrective action may be taken. The reporting should be on the principle of exception and both favourable and unfavourable variances should be shown and commented upon. In brief, a budget report is a comparison of the actuals with the budgets both for the month and cumulative up to the current month. The variations from budgets are worked out in respect of each items of expenses so as to locate the responsibility and facilitate corrective action.

A budget report, to be effective in the purpose, must be:

- (i) Simple in its form so as to be easily intelligible to the recipient concerned: It should bear a suitable heading and make the period in which it relates;
- (ii) Regularly and promptly presented;
- (iii) Designed to give only the essential information required and avoid unnecessary details;
- (iv) Expressed as far as possible in direct figures;
- (v) Correlated to a "money value" wherever possible;
- (vi) Free from personal bias of the person preparing it; and
- (vii) Dated and signed by those who prepare and check it.

Every budget report should be followed up till the finally desired results are achieved. This follow-up would require either a discussion with the individual responsible for taking the necessary action or whose action alone can prevent recurrence of such variations; or revision in the budget itself arising out of errors of changes in policy.

A specimen budget report for expenses is given below:

#### BUDGET REPORT

Department.....

Period.....

Expense	<i>Budgeted</i>	<i>Actual</i>	<i>Difference</i>		<i>Cumulative</i>	<i>Reasons</i>
	₹	₹	<i>Increase</i>	<i>Decrease</i>	<i>variance</i>	₹
			₹	₹	₹	

#### A. Controllable

Repairs  
Mach. Maintenance  
Elect. Maintenance  
Power  
Lighting  
Lubrication etc.

#### B. Non-controllable

Expense

Floorspace  
General  
Prorated

---

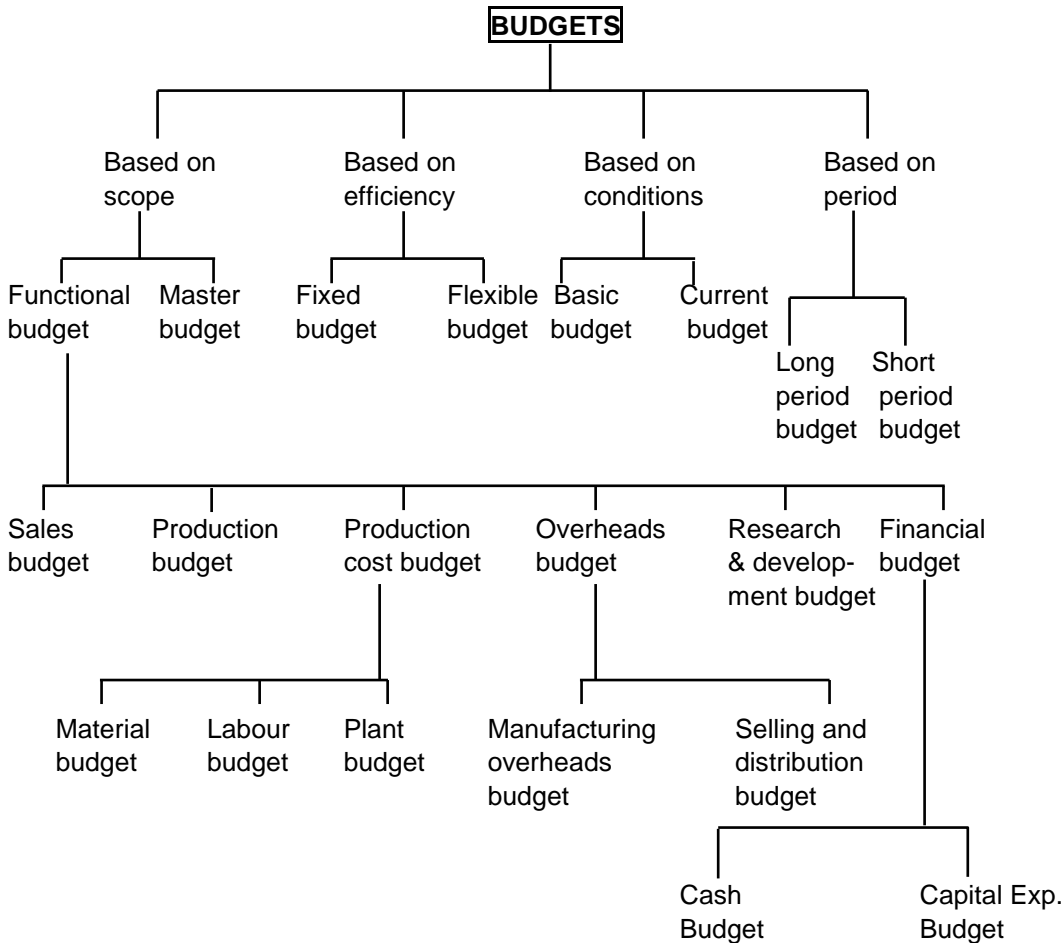
Total

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Date of preparation.....	Copies to:
Prepared by.....	1.....
Checked by.....	2.....
Submitted by.....	3.....

**PREPARATION & MONITORING OF VARIOUS TYPES OF BUDGETS**

Depending upon the various bases adopted, budgets may be classified into different categories. Budgets may be classified on the basis of (i) the coverage or scope they encompass (ii) the capacity or efficiency to which they are related (iii) the conditions on which they are based and (iv) the periods which they cover. This is clearly shown with the help of the following diagram:



**1. FUNCTIONAL BUDGETS**

Budgets for a period are really classified according to the various activities in the organisation. All activities are interrelated. The forecasts for individual activities are prepared and co-ordinated with those of other

activities and then consolidated to show the total effect of all the activities as a whole. Approved targets for individual functions are known as “functional budgets”. The consolidation of all functional budgets is known as the “Master Budget”. This is nothing but the targeted profit and loss statement and balance sheet of the organisation.

Principal functional budgets are:

**(1.1) Sales Budget:** The sales budget is a forecast of total sales, expressed in terms of money and quantity. The first step in the preparation of the sales budget is to forecast as accurately as possible the sales anticipated during the budget period. Sales forecasts are influenced by a variety of factors, external as well as internal. External factors include general business conditions, Government policy, etc. Internal factors consist of sales-prices, sales trend, new-products, etc. The sales-budget is based on sales forecasting which is the responsibility of the sales manager and market research staff. The sales budget is regarded as the keystone of budgeting.

**(1.2) Production Budget:** The production budget is a forecast of the production for budget period. It is prepared in two parts, viz., production value budget for the physical units of the products to be manufactured and the cost of manufacturing budget detailing the budgeted costs. The main steps involving in the preparation of a production budget are production planning; consideration of capacity; integration with sales forecasts, inventory-policies, management’s overall policies. The operation of a production budget results in various advantages, main being: optimum utilisation of productive resources of the enterprise, production of goods according to schedule enabling the concern to adhere to delivery dates, proper scheduling of factors of production.

**(1.3) Production Cost Budget:** It may be further classified as under:

**(1.3.1) Materials Budget:** Materials requirement budget, commonly known as materials budget, assist the purchase department in suitably planning the purchases, fixing the maximum and minimum levels of materials, components etc. The timing and amount of funds which will be needed to make purchases are also known with the help of the materials budget.

**(1.3.2) Labour Budget:** The labour content of each item of production as per the production budget is determined in terms of grades and trades of the workers required and the labour time for each job, operation and process. The rates of pay, allowances, bonus, etc., of each category are then considered and labour cost to be set for each budget centre is calculated by multiplying the wage rate with the labour hours for the number of units of products budgeted.

**(1.3.3) Plant Utilisation Budget:** *Plant Utilisation Budget* is prepared for the estimation of plant capacity to meet the budgeted production during the budgeted period. It is a forecast of plant capacities available for fulfilling production requirements as specified in the production budget. This budget is expressed in working hours or other convenient units.

Followings are the features of Plant Utilisation Budget:

1. It will be base for the requirement of machine for sale and production department.
2. It will provide the base of reasonable depreciation so that machine can be replaced in future.
3. It may be base for the new inventions in the context of plant & machinery.
4. It will indicate the budgeted machine load on departments or machines.
5. It reveals that overloading on some departments, so that sales volume may be increased by providing after-sales service, advertisement campaign reducing selling price.



**(1.4) Overhead Budget:** It may be further classified as under:

**(1.4.1) Manufacturing Overhead Budget:** The following steps are required to be taken up to prepare the manufacturing overhead budget:

- (i) Classification of expenditure into fixed, variable and semi-variable and collection thereof in accordance with a schedule of standing order numbers;
- (ii) Departmentalisation of expenditure;
- (iii) Determining the level of activity for setting the overhead rates; and level of activity may be actual, budgeted level or normal capacity; and
- (iv) Establishing the variable overhead rates per unit of production or productive hour.

**(1.4.2) Selling and Distribution Budget:** The selling expenses include all items of expenditure on the promotion, maintenance and distribution of finished products. This budget which is closely related to the sales budget is the forecast of the cost of selling and distribution, for the budgeted period. Selling and distribution expenses may be fixed or variable with regard to the volume of sales; separate budgets are usually established for fixed or variable selling and distribution expenses.

**(1.5) Research and Development Budget:** This depends mostly on management decisions regarding the research and development effort - the projects already in hand and the proposed projects.

**(1.6) Financial Budget:** It may be further classified as under

**(1.6.1) Cash Budget:** Cash forecast precedes a cash budget. A cash forecast is an estimate showing the amount of cash which would be available in a future period. This budget usually of two parts giving detailed estimates of (i) cash receipts and (ii) cash disbursements. Estimates of cash-receipts are prepared on a monthly basis and depend upon estimated cash-sales, collections from debtors and anticipated receipts from other sources such as sale of assets, borrowings etc. Estimates of cash disbursements are based on estimated cash purchases, payment to creditors, employees remuneration, bonus, advances to suppliers, budgeted capital expenditure for expansion etc.

The main objectives of preparing cash budget are as follows:

- (i) The probable cash position as a result of planned operation is indicated and thus the excess or shortage of cash is known. This helps in arranging short term borrowings in advance to meet the situations of shortage of cash or making investments in times of cash in excess.
- (ii) Cash can be co-ordinated in relation to total working capital, sales investment and debt.
- (iii) A sound basis for credit for current control of cash position is established.
- (iv) The effect of sudden and seasonal requirements, large stocks, delay in collection of receipts etc. on the cash position of the organisation is revealed.

**A cash budget can be prepared by any of the following methods:**

- (i) Receipts and payments method**
- (ii) Adjusted profit and loss account method**
- (iii) Balance sheet method.**

**(i) Receipts and Payments Method:** In this method the cash receipts from various sources and cash payments to various agencies are estimated. Delay in cash receipts and lag in payments are taken into

account for making estimates. Since this method is based on the concept of cash accounting, accruals and adjustments obviously cannot find place in the preparation of cash budgets. The opening balance of cash of a period and the estimated cash receipts are added and from this, the total of estimated cash payments are deducted to find out the closing balance.

### Illustration 1

Prepare a cash budget of M/s Novan Television & Co. on the basis of the following information for the first six months of 2012:

- (a) Cost and prices unchanged.
- (b) Cash sales - 25% and credit sales - 75%.
- (c) 60% of credit sales are collected in the month after sales, 30% in the second month and 10% in the third. No bad debts are anticipated.
- (d) Sales forecasts are as follows:

	₹		₹
October 2011	12,00,000	March 2012	8,00,000
November 2011	14,00,000	April 2012	12,00,000
December 2011	16,00,000	May 2012	10,00,000
January 2012	6,00,000	June 2012	8,00,000
February 2012	8,00,000	July 2012	12,00,000

- (e) Gross profit margin 20%.
- (f) Anticipated purchases:

	₹
January 2012	6,40,000
February 2012	6,40,000
March 2012	9,60,000
April 2012	8,00,000
May 2012	6,40,000
June 2012	9,60,000

- (g) Wages and Salaries to be paid:

January 2012	1,20,000
February 2012	1,60,000
March 2012	2,00,000
April 2012	2,00,000
May 2012	1,60,000
June 2012	1,40,000

- (h) Interest on ₹10,00,000 @ 12% on debentures is due by the end of March and June.
- (i) Excise deposit due in April ₹2,00,000.
- (j) Capital expenditure on plant and machinery planned for June ₹1,20,000.
- (k) Company has a cash balance of ₹4,00,000 at 31.12.2009.
- (l) Company can borrow on monthly basis.
- (m) Rent is ₹8,000 per month.

**Solution:**

**M/s Novan Television Company**  
**Cash Budget for six months, January to June, 2012**

	January ₹	February ₹	March ₹	April ₹	May ₹	June ₹
<b>Receipts:</b>						
Cash sales	1,50,000	2,00,000	2,00,000	3,00,000	2,50,000	2,00,000
Collections from debtors	<u>11,25,000</u>	<u>7,35,000</u>	<u>6,15,000</u>	<u>5,85,000</u>	<u>7,80,000</u>	<u>7,80,000</u>
<b>Total Receipts (A)</b>	<u>12,75,000</u>	<u>9,35,000</u>	<u>8,15,000</u>	<u>8,85,000</u>	<u>10,30,000</u>	<u>9,80,000</u>
<b>Payments:</b>						
Purchases	6,40,000	6,40,000	9,60,000	8,00,000	6,40,000	9,60,000
Rent	8,000	8,000	8,000	8,000	8,000	8,000
Wages and Salaries	1,20,000	1,60,000	2,00,000	2,00,000	1,60,000	1,40,000
Excise Deposit	—	—	—	2,00,000	—	—
Capital Expenditure	—	—	—	—	—	1,20,000
Interest	—	—	<u>30,000</u>	—	—	<u>30,000</u>
<b>Total Payment (B)</b>	<u>7,68,000</u>	<u>8,08,000</u>	<u>11,98,000</u>	<u>12,08,000</u>	<u>8,08,000</u>	<u>12,58,000</u>
<b>Balance:</b>						
<b>Net Cash Receipts (A - B)</b>	5,07,000	1,27,000	(3,83,000)	(3,23,000)	2,22,000	(2,78,000)
Cash balance at the beginning of the month	<u>4,00,000</u>	<u>9,07,000</u>	<u>10,34,000</u>	<u>6,51,000</u>	<u>4,00,000</u>	<u>5,50,000</u>
Total	9,07,000	10,34,000	6,51,000	3,28,000	6,22,000	2,72,000
Borrowing/(Surplus)	—	—	—	72,000	(72,000)	1,28,000
Cash balance at the close of the month	<u>9,07,000</u>	<u>10,34,000</u>	<u>6,51,000</u>	<u>4,00,000</u>	<u>5,50,000</u>	<u>4,00,000</u>

**Note:** It is assumed that the company will maintain cash balance of ₹4,00,000 as in the beginning of the budget period, resorting to borrowing, if necessary. The company could also place substantial amounts on short duration deposits, of 15 to 30 days during the first three months.

**Working Note:**

	Oct. 2011	Nov. 2011	Dec. 2011	Jan. 2012	Feb. 2012	March 2012	April 2012	May 2012	June 2012
	₹	₹	₹	₹	₹	₹	₹	₹	₹
Total Sales	12,00,000	14,00,000	16,00,000	6,00,000	8,00,000	8,00,000	12,00,000	10,00,000	8,00,000
Credit Sales	<u>9,00,000</u>	<u>10,50,000</u>	<u>12,00,000</u>	<u>4,50,000</u>	<u>6,00,000</u>	<u>6,00,000</u>	<u>9,00,000</u>	<u>7,50,000</u>	<u>6,00,000</u>
Collections:									
1st month, 60%				7,20,000	2,70,000	3,60,000	3,60,000	5,40,000	4,50,000
2nd month, 30%				3,15,000	3,60,000	1,35,000	1,80,000	1,80,000	2,70,000
3rd month, 10%				90,000	1,05,000	1,20,000	45,000	60,000	60,000
				<u>*11,25,000</u>	<u>7,35,000</u>	<u>6,15,000</u>	<u>5,85,000</u>	<u>7,80,000</u>	<u>7,80,000</u>

\* For example: 60% of credit sales in December 2011;  
 30% of credit sales in November 2011; and  
 10% of credit sales in October 2011.

**(ii) Adjusted Profit and Loss Account Method:** In this method the opening balance is adjusted with the anticipated increases or decreases in current assets and liabilities, provision for depreciation, special receipts and the net profit for the year before taxation and appropriations. From the aggregate amount of these, the estimated taxation and dividends payable, expenditure on fixed assets and special payments if any are deducted. The resulting balance is the estimated cash in hand at the end of the budget period.

The vital point of difference between receipts and payments method and adjusted profit and loss method is that the former takes into account only cash transactions while the latter considers non cash items as it reverses all accruals. Further, adjusted profit and loss method gives only a broad idea of the cash position but receipts and payments method furnishes the maximum possible details.

**Illustration 2**

Following are the Balance Sheets of Metal Engineering Limited one actual as on 31st December, 2009 and other forecast as on 31st December, 2010:

	2009 (Actuals) ₹	2010 (Forecast) ₹
Cash	18,400	1,36,800
Debtors	49,000	83,200
Stock	61,900	92,500
Investments	1,00,000	90,000
Plant (at cost)	<u>2,20,000</u>	<u>2,40,000</u>
	<u>4,49,300</u>	<u>6,42,500</u>
Accounts Payable	67,300	1,00,000
Debentures	73,500	50,000
Accumulated Depreciation	50,000	30,000
Equity Share Capital	1,25,000	1,75,000
Profit and Loss Account	<u>1,33,500</u>	<u>2,87,500</u>
	<u>4,49,300</u>	<u>6,42,500</u>

The forecast Profit and Loss Account in a summarised form for the budget year ended 31st December, 2010 is as follows:

	₹.		₹
To Accumulated depreciation	22,000	By Gross profit	2,00,000
“ Administration and selling expenses	10,000	” Profit on the sale of investments	2,000
“ Income-tax	5,000	” Interest	10,000
“ Interest charges	3,000		
“ Loss on sale of plant	8,000		
“ Net profit	<u>1,64,000</u>		
	2,12,000		<u>2,12,000</u>
To Dividend (including CDT)	10,000	By Net profit	1,64,000
“ Balance c/d	<u>1,54,000</u>		
	<u>1,64,000</u>		<u>1,64,000</u>

Additional information:

- (i) New plant costing ₹80,000 was purchased during the year.

- (ii) An old plant, costing ₹60,000 and with accumulated depreciation of ₹ 42,000 was sold for ₹10,000.  
 (iii) Investments costing ₹10,000 were sold for ₹12,000.

Prepare a cash budget for the management of the company by Adjusted Profit and Loss method.

Solution:

**Cash Budget (Adjusted Profit and Loss)**  
 (for the Budget period ended 31st December 2010)

	₹	₹
Opening Balance of Cash		18,400
<i>Add: Additions to Cash:</i>		
Issue of share capital	50,000	
Sale of plant	10,000	
Sale of investments	12,000	
Depreciation written back	22,000	
Loss on sale of plant	8,000	
Increase in creditors	32,700	
Profit of the year	<u>1,64,000</u>	<u>2,98,700</u>
		3,17,100
<i>Less: Reduction in Cash:</i>		
Redemption of debentures	23,500	
Purchase of plant	80,000	
Payment of dividend (including CDT)	10,000	
Profit on sale of investments taken back	2,000	
Increase in stock	30,600	
Increase in debtors	<u>34,200</u>	<u>1,80,300</u>
Closing balance of cash		<u><b>1,36,800</b></u>

**(iii) Balance Sheet Method:** Under this method of preparing cash budget a forecast balance sheet is prepared as at the end of the budget period with all items of assets and liabilities except cash balance which is arrived at as a balancing figure. The magnitude of the two sides of the balance sheet excluding cash balance would determine whether the bank account would show a debit or credit balance i.e. cash balance at bank or bank overdraft.

**(1.6.2) Capital Expenditure Budget:** Capital expenditure budget is the plan of the proposed outlay on fixed assets and is very closely related to the cash budget. Capital expenditure forecasting is a continuous process and by nature it is a long-term function. Capital forecasts should be made for a number of years. Alongwith the long-term forecast, there should also be a short-term forecast to cover the general budget period under consideration. It is also essential that the capital expenditure budget be properly co-ordinated with all the operational budgets of the concern so as to form an integral part of the overall plan.

## 2. MASTER BUDGET

Master budget is a consolidated summary of the various functional budgets. A master budget is the summary budget incorporating its component functional budget and which is finally approved, adopted and employed. It is the culmination of the preparation of all other budgets like the sales budget, production budget, purchase budget etc. It consists in reality of the budgeted profit and loss account, the balance sheet and the budgeted funds flow statement.

The master budget is prepared by the budget committee on the basis of co-ordinated functional budgets and becomes the target of the company during the budget period when it is finally approved. This budget acts as the company's individualised key to successful financial planning and control. It provides the basis of computing the effect of any changes in any phase of operations, such as sales volume, product mix, prices, labour costs, material costs or change in facilities. It segregates income, costs and profits by areas of responsibility. Master budget presents all this information to the depth appropriate for the top management action.

In the master budget, costs are classified and summarised by types of expenses as well as by departments. This information extends the range of usefulness of master budget. It is considered as the best mode of understanding the company's micro- economic position relating to the forthcoming budget period. Master Budget is not merely a compendium of theoretical calculations. The figures that it contains, are the reflection of the actual intentions of the company relating to different areas for the forthcoming budget period.

### 3. FIXED BUDGETS

A budget may be established either as a fixed budget or a flexible budget. A fixed budget is a budget designed to remain unchanged irrespective of the level of activity actually attained. A fixed budget is one which is designed for a specific planned output level and is not adjusted to the level of activity attained at the time of comparison between the budgeted and actual costs. Obviously, fixed budgets can be established only for a small period of time when the actual output is not anticipated to differ much from the budgeted output. However, a fixed budget is liable to revision if due to business conditions undergoing a basic change or due to other reasons, actual operations differ widely from those planned in the fixed budget. These budgets are most suited for fixed expenses but they have only a limited application and is ineffective as a tool for cost control.

### 4. FLEXIBLE BUDGETS

The Chartered Institute of Management Accountants, London defines flexible budget as a budget which by recognising different cost behaviour patterns, is designed to change as volume of output changes. It is a budget prepared in a manner so as to give the budgeted cost for any level of activity. It is a budget which by recognising the difference between fixed, semi-fixed and variable cost is designed to change in relation to the activity attained. It is designed to furnish budgeted cost at any level of activity attained. Flexible budgeting is desirable in the following cases:

- (i) Where the level of activity during the year varies from period to period, either due to the seasonal nature of the industry or to variation in demand.
- (ii) Where the business is a new one and is difficult to foresee the demand.
- (iii) Where the undertaking is suffering from shortage of a factor of production such as materials, labour, plant capacity, etc.

The main characteristic of flexible budget is that it shows the expenditure appropriate to various levels of output. If the volume changes the expenditure appropriate to it can be established from the flexible budget for comparison with actual expenditure as a means of control. It provides a logical comparison of budget allowances with actual cost. When flexible budget is prepared, actual cost at actual activity is compared with budgeted cost at actual activity i.e. two things to a like base. For preparation of flexible budget, items of cost have to be analysed individually to determine how different items of cost behave to change in volume. Therefore, in-depth cost analysis and cost identification is required for preparation of flexible budget. Following are the striking features of flexible budgets:

- (i) They are prepared for a range of activity instead of a single level.

- (ii) They provide a very dynamic basis for comparison because they are automatically geared to changes in volume.
- (iii) They provide a tailor-made budget for a particular volume.
- (iv) These are based upon adequate knowledge of cost behaviour pattern.

Flexible budgets may be prepared in the following method:

- (i) Tabular method or multi-activity method
- (ii) Formula method or ratio method and
- (iii) Graphic method.

### Illustration 3

Following information is available from the records of Jay Ltd. for the year end 31st March 2013.

	₹ (lakhs)
<b>Fixed Expenses</b>	
Wages and salaries	9.5
Rent, rates and taxes	6.6
Depreciation	7.4
Sundry administrative expenses	6.5
<b>Semi-Variable Expenses</b>	
(at 50% of capacity)	
Maintenance and repairs	3.5
Indirect labour	7.9
Sales department salaries	3.8
Sundry administrative expenses	2.8
<b>Variable Expenses</b>	
(at 50% of capacity)	
Materials	21.7
Labour	20.4
Other expenses	<u>7.9</u>
	<u>98.0</u>

Assuming that the fixed expenses remain constant for all levels of production, semi-variable expenses remain constant between 45% and 65% of capacity increasing by 10% between 65% and 80% and by 20% between 80% and 100%.

Sales at various levels are :

	₹ (lakhs)
50% capacity	100
60%    "	120
75%    "	150
90%    "	180
100%   "	200

Prepare a flexible budget for the year and forecast the profits at 60%, 75%, 90% and 100% of capacity.



**Solution:**

**Flexible Budget**

Period.....

	50%	60%	75%	90%	100%
	₹	₹	₹	₹	₹
	(lakhs)	(lakhs)	(lakhs)	(lakhs)	(lakhs)
Sales	100	120	150	180	200
<b>Variable expenses</b>					
Materials	21.70	26.04	32.55	39.06	43.40
Labour	20.40	24.48	30.60	36.72	40.80
Other expenses	7.90	9.48	11.85	14.22	15.80
<b>Semi-variable expenses</b>					
Maintenance and repairs	3.50	3.50	3.85	4.20	4.20
Indirect labour	7.90	7.90	8.69	9.48	9.48
Sales Deptt. salary, etc.	3.80	3.80	4.18	4.56	4.56
Sundry administrative expenses	2.80	2.80	3.08	3.36	3.36
<b>Fixed expenses</b>					
Wages and salaries	9.50	9.50	9.50	9.50	9.50
Rent, rates and taxes	6.60	6.60	6.60	6.60	6.60
Depreciation	7.40	7.40	7.40	7.40	7.40
Sundry administrative Expenses	6.50	6.50	6.50	6.50	6.50
Total	<u>98.00</u>	<u>108.00</u>	<u>124.80</u>	<u>141.60</u>	<u>152.60</u>
Profit	2.00	12.00	25.20	38.40	47.40

**Illustration 4**

A firm at present operates at 60% of its capacity. At this level and at the level of 50% utilisation of capacity, the figures relating to its operations could be summarised as stated below:

	50%	60%
	₹	₹
Materials	10,00,000	12,00,000
Labour	8,00,000	9,00,000
Manufacturing overheads	6,00,000	6,60,000
Administrative overheads	3,50,000	3,50,000
Selling and distribution overheads	4,50,000	5,00,000
Research and development	<u>1,50,000</u>	<u>2,00,000</u>
Total	33,50,000	38,10,000
Profit	<u>1,50,000</u>	<u>3,90,000</u>
Sales	35,00,000	42,00,000

Draw up the budget at 80% utilisation of capacity assuming that -

- (i) sales at this level can be maintained only by a flat 5% reduction in the selling price;

- (ii) economy in purchase of material will equal to 2-1/2% of the current amounts;  
 (iii) the research and development expenditure will be pegged at ₹2,50,000 per annum; and  
 (iv) administrative overheads will require 10% increase.

**Solution:****Budget at 80% capacity utilisation**

	60%	80%
	₹	₹
Materials	12,00,000	15,60,000
Labour	9,00,000	11,00,000
Manufacturing overheads	6,60,000	7,80,000
Administrative overheads	3,50,000	3,85,000
Selling and distribution overheads	5,00,000	6,00,000
Research and development	<u>2,00,000</u>	<u>2,50,000</u>
Total	38,10,000	46,75,000
Profit	<u>3,90,000</u>	<u>6,45,000</u>
Sales	<u>42,00,000</u>	<u>53,20,000</u>

**Working Notes:**

	₹	₹
(1) Materials at 60% capacity	12,00,000	
at 80% capacity	16,00,000	
Less: 2-1/2%	<u>40,000</u>	15,60,000

## (2) Variable fixed portions of various expenses

	50%	60%	Increase for 10% (variable)	Total variable	Fixed
	₹	₹			
Labour 8,00,000	9,00,000	1,00,000	6,00,000	3,00,000	
Mfg. overhead	6,00,000	6,60,000	60,000	3,60,000	3,00,000
Selling overheads	4,50,000	5,00,000	50,000	3,00,000	2,00,000

## (3) At 80% Capacity:

Labour: Fixed	3,00,000	
Variable (₹1,00,000 for every 10%)	<u>8,00,000</u>	11,00,000
Mfg. overheads: Fixed	3,00,000	
Variable (₹60,000 for every 10%)	<u>4,80,000</u>	7,80,000
Selling overheads: Fixed	2,00,000	
Variable (₹50,000 for every 10%)	<u>4,00,000</u>	6,00,000

(4) Sales: at 60% Capacity  
at 80% Capacity  
Less: 5%

at 60% Capacity	42,00,000	
at 80% Capacity	56,00,000	
Less: 5%	<u>2,80,000</u>	53,20,000

**Illustration 5**

ABC Ltd. produces and sells a single product. Sales budget for the calendar year 2012 for each quarter is as under:

<i>Quarter</i>	<i>No. of Units to be Sold</i>
I	12,000
II	15,000
III	16,500
IV	18,000

The year 2012 is expected to open with an inventory of 4,000 units of finished product and close with an inventory of 6,500 units. Production is customarily scheduled to provide for two-thirds of the current quarter's demand plus one-third of the following quarter's demand. Thus production anticipates sales volume by about one month. The standard cost details for one unit of the product is as follows:

- Direct materials 10 Kgs. @ 50 paise per kg.
- Direct labour 1 hour 30 minutes @ ₹4 per hour.
- Variable overheads 1 hour 30 minutes @ ₹1 per hour.
- Fixed overheads 1 hour 30 minutes @ ₹2 per hour based on a budgeted production volume of 90,000 direct labour hours for the year.

Answer the following:

- (i) Prepare a production budget for the year 2012 by quarters, showing the number of units to be produced.
- (ii) If the budgeted selling price per unit is ₹17, what would be the budgeted profit for the year as a whole?
- (iii) In which quarter of the year the company is expected to break-even?

**Solution:**

Number of units to be sold during the year 2012

Quarter I	12,000 units
Quarter II	15,000 units
Quarter III	16,500 units
Quarter IV	<u>18,000 units</u>
Sales during the year	<u>61,500 units</u>

**(i) Production Budget (for the year 2012 by quarters)**

	<i>Quarter I Units</i>	<i>Quarter II Units</i>	<i>Quarter III Units</i>	<i>Quarter IV Units</i>	<i>Total Units</i>
Units to be produced in each quarter :					

2/3rd of the current quarter's sales demand	8,000 $\left(\frac{2}{3} \times 12,000\right)$	10,000 $\left(\frac{2}{3} \times 15,000\right)$	11,000 $\left(\frac{2}{3} \times 16,500\right)$	12,000 $\left(\frac{2}{3} \times 18,000\right)$	41,000
Add : 1/3 of the following quarter's sales demand in first 3 quarters and closing inventory in the 4th quarter	5,000 $\left(\frac{1}{3} \times 15,000\right)$	5,500 $\left(\frac{1}{3} \times 16,500\right)$	6,000 $\left(\frac{1}{3} \times 18,000\right)$	6,500 $\left(\frac{1}{3} \times 19,500\right)$	23,000
<b>Total</b>	<b>13,000</b>	<b>15,500</b>	<b>17,000</b>	<b>18,500</b>	<b>64,000</b>

(1) Variable Cost per unit

		₹	₹
Direct Material :	10 kgs. @ 50 paise per kg.	5.00	
Direct labour :	1-½ hours @ ₹4 per hour	6.00	
Variable overheads:	1-½ hours @ ₹1 per hour	<u>1.50</u>	12.50
(2) Fixed overhead per annum: 90,000 hrs. @ ₹2 =		₹1,80,000	

**(ii) Statement of Budgeted Profit for the year (as a whole)**

Total Sales : 61,500 units @ ₹17 per unit	₹ 10,45,000
Less : Total Variable Cost : 61,500 units @ 12.50 per unit	7,68,750
Contribution	2,76,750
Less : Fixed cost for the year	1,80,000
Profit for the year 2011 as a whole	96,750

$$(iii) \text{ Break Even Point} = \frac{\text{Fixed Overheads}}{\text{Selling Price per unit} - \text{Variable Cost per unit}}$$

$$= \frac{₹1,80,000}{(₹17 - ₹12.50)} = 40,000 \text{ units.}$$

Total sales (in units) by the end of 3rd quarter will be 43,500 (i.e. 12,000 + 15,000 + 16,500).

Therefore, the company will break-even in the later part of the 3rd quarter.

## 5. BASIC BUDGETS

Basic budget has been defined as a budget which is prepared for use unaltered over a long period of time. This does not take into consideration current conditions and can be attainable under standard conditions.

## 6. CURRENT BUDGETS

A current budget can be defined as a budget which is related to the current conditions and is prepared for use over a short period of time. This budget is more useful than basic budget, as the target it lays down will be corrected to current conditions.

## 7. LONG-TERM BUDGETS

A long-term budget can be defined as a budget which is prepared for periods longer than a year'. These budgets help in business forecasting and forward planning. Capital expenditure budgets and research developments budgets are just examples of long-term budgets.

## 8. SHORT-TERM BUDGETS

This budget is defined as a budget which is prepared for a period less than a year and is very useful to lower levels of management for control purposes. In an ideal situation a short-term budget should perfectly fit into a long-term budget.

## ZERO BASE BUDGETING

Zero base budgeting is a revolutionary concept of planning the future activities and there is a sharp contradiction from conventional budgeting. Zero base budgeting, may be better termed as “De nova budgeting” or budgeting from the beginning without any reference to any base-past budgets and actual happening. Zero base budgeting may be defined as “a planning and budgeting process which requires each manager to justify his entire budget request in detail from scratch (hence zero base) and shifts the burden of proof to each manager to justify why he should spend any money at all. The approach requires that all activities be analysed in decision packages which are evaluated by systematic analysis and ranked in order of importance”.

**CIMA defines zero base budgeting as “a method of budgeting whereby all activities are re-evaluated each time a budget is set. Discrete levels of each activity are valued and a combination chosen to match funds available.”**

It is a technique which complements and links the existing planning, budgeting and review processes. It identifies alternative and efficient methods of utilising limited resources in effective attainment of selected benefits. It is a flexible management approach which provides a credible rationale for reallocating resources by focusing on systematic review and justification of the funding and performance levels of current programmes of activities.

The concept of zero base budgeting was developed in U.S.A. Under zero-base budgeting, each programme and each of its constituent part is challenged for its very inclusion in each years budget. Programme objectives are also re-examined with a view to start things afresh. It requires review analysis and evaluation of each programme in order to justify its inclusion or exclusion from final budget. Following steps are usually involved:

- (i) Describing and analysing all current or proposed programmes usually called “decision packages”. This consists of identification, analysis and formulation assists an evaluation in terms of purposes, consequence, performance measures, alternatives and cause and benefits. Decision units are the lowest level programmes or organisational entity for which budgets are prepared.
- (ii) Ranking of decision packages alongwith documents in support of these packages.
- (iii) The sources are allocated in accordance with the ranking.

Zero-base budgeting is based on the premise that every rupee of expenditure requires justification. The traditional budgeting approach includes expenditures of previous year which are automatically incorporated in new budget proposals and only increments are subjected to debate. Zero base budgeting assumes that a responsibility centre manager has had no previous expenditure. Important features of zero-base budgeting are:

- (i) Concentration of efforts is not simply on “how much” a unit will spend but “why” it needs to spend.

- (ii) Choices are made on the basis of what each unit can offer for a specific cost.
- (iii) Individual unit's objects are linked to corporate targets.
- (iv) Quick budget adjustments can be made if, during the operating year costs are required to maintain expenditure level.
- (v) Alternative ways are considered.
- (vi) Participation of all levels in decision-making.

#### **Difference between Traditional Budgeting and Zero Base Budgeting**

- (i) Traditional budgeting is accounting-oriented. Main stress happens to be on previous level of expenditure. Zero base budgeting makes a decision oriented approach.
- (ii) In traditional budgeting, first reference is made to past level of spending and then demand is made for inflation and new programmes. In zero base budgeting a decision unit is broken into understandable decision packages which are ranked according to importance to enable top management to focus attention only on decision packages which enjoy priority to others.
- (iii) In traditional budgeting, some managers deliberately inflate their budget request so that after the cuts they still get what they want. In zero base budgeting, a rational analysis of budget proposal is attempted.
- (iv) Traditional budgeting is not as clear and responsive as zero base budgeting.
- (v) In traditional budgeting, it is for top management to decide why a particular amount should be spent on a particular decision unit. In zero base budgeting this responsibility is shifted from top management to the manager of decision unit.
- (vi) Traditional budgeting makes a routing approach while zero base budgeting makes a very straight-forward approach and immediately spotlights the decisions packages enjoying priority over others.

#### **Advantages of Zero Base Budgeting:**

- (i) Zero base budgeting is not based on incremental approach, so it promotes operational efficiency because it require managers to review and justify their activities or the fund requested.
- (ii) Since this system requires participation of all managers, preparation of budgets, responsibility of all levels at management in successful execution of budgetary system can be ensured.
- (iii) This technique is relatively elastic because budgets are prepared every year on a zero base. This system makes it obligatory to develop financial planning and management information system.
- (iv) This system weeds out inefficiency and reduces the cost of production because every budget proposal is evaluated on the basis of cost benefit analysis.
- (v) It provides the organisation with a systematic way to evaluate different operations and programmes undertaken by the management. It enables management to allocate resources according to priority of the programmes.
- (vi) It is helpful to the management in making optimum allocation of scarce resources because a unique aspect of zero base budgeting is the evaluation of both current and proposed expenditure and placing it some order of priority.

Criticism against zero base budgeting:

- (1) Defining the decision units and decision packages is rather difficult.
- (2) Zero base budgeting requires a lot of training for managers.
- (3) Cost of preparing the various packages may be very high in large firms involving large number of decision packages.
- (4) It may lay more emphasis on short term benefits to the detriment of long-term objectives of the organisation.
- (5) It will lead to enormous increase in paper work created by the decision packages. The assumptions about costs and benefits in each package must be continually up dated and new packages developed as soon as new activities emerge.
- (6) Where objectives are very difficult to quantify as in research and development, zero base budgeting does not offer any significant control advantage.

### **PROGRAMME BUDGETING**

A program budget is a budget designed for a specific activity or program. This budget includes only revenue and expenses for a specific program. Program budgets are used in many organizations including businesses and schools. Establishing a budget by grouping expenditures and revenues into functional activities, or programs. Rather than having a budget item for capital equipment that might be spread over many different programs (as is done in line-item budgeting), a program budget would include only proposed capital expenditures for a specific program.

The program budget allocates money to major program areas, focusing on the expected results of services and activities to be carried out. Program areas often utilized by government entities include public safety, public works, human services, leisure services, and general government. The emphasis of program project's is on the attainment of long-term local community goals.

### **PERFORMANCE BUDGETING**

The concept of performance budgeting relates to greater management efficiency specially in government work. With a view to introducing a system's approach, the concept of performance budgeting was developed and as such there was a shift from financial classification to 'cost' or 'objective' classification. Performance budgeting, is therefore, looked upon as a budget based on functions, activities and projects and is linked to the budgetary system based on objective classification of expenditure.

According to National Institute of Bank Management, Bombay performance budgeting technique is, the process of analysing identifying, simplifying and crystallising specific performance objectives of a job to be achieved over a period in the frame work of the organisational objectives, the purpose and objectives of the job. The technique is characterised by its specific direction towards the business objectives of the organisation. Thus, performance budgeting lays immediate stress on the achievement of specific goals over a period of time. It requires preparation of periodic performance reports. Such reports compare budget and actual data and show any existing variances.

The purpose of performance budgeting is to focus attention upon the work to be done, services to be rendered rather than things to be spent for or acquired. In performance budgeting, emphasis is shifted from control of inputs to efficient and economic management of functions and objectives. Performance budgeting takes a system view of activities by trying to associate the inputs of the expenditure with the output of accomplishment in terms of services, benefits etc. In performance budgeting, the objectives of the budget

makers and setting the task and sub-task for accomplishment of the defined objectives are to be clearly decided well in advance before budgetary allocations of inputs are made. Each homogenous function is broken down into a number of subordinate functions.

The main purposes of performance budgeting are:

1. To review at every stage, and at every level of the organisation, so as to measure progress towards the short-term and long-term objectives.
2. To inter-relate physical and financial aspects of every programme, project or activity.
3. To facilitate more effective performance audit.
4. To assess the effects of the decision-making of supervisor to the middle and top-managers.
5. To bring annual plans and budgets in line with the short and long-term plan objectives.
6. To present a comprehensive operational document showing the complete planning fabric of the programmes and prospectus their objectives inter-woven with the financial and physical aspects.

A performance budget presents estimate for expenditure and earnings in terms of functions, programmes, activities and projects. For introducing performance budgeting financial requirements are put up in relation to:

- (a) Programmes and outlay indicating the range of work to be done by each categorised agency.
- (b) Object-wise classification showing objects of expenditure, e.g. office establishment, etc. is usually shown in the conventional budgets.
- (c) Sources of financing.

However, performance budgeting has certain limitations such as difficulty in classifying programmes and activities, problems of evaluation of various schemes, relegation to the background of important programmes. Moreover, the technique enables only quantitative evaluation scheme and sometimes the needed results cannot be measured.

### **LESSON ROUND UP**

- A budget is a precise statement of the financial and quantitative implications of the course of action that management has decided to follow in the immediate next period of time (usually a year).
- Budgetary control is the establishment of budgets, relating the responsibilities of executive to the requirements of a policy and the continuous comparison of actual with budgeted results either to secure by individual action the objectives of that policy or to provide a firm basis for its revision.
- Budget manual is a document which sets out the responsibilities of the persons engaged in the routine of and the forms and records required for budgetary control.
- Budget key factor also known as limiting factor, governing factor or principal budget means the factor which limits the size of output. It is the factor the extent whose influence must first be assessed in order to ensure that functional budgets are capable of fulfillment. The influencing factors are: (a) customer demand, (b) plant capacity (c) availability of raw material, skilled labour and capital, (d) availability of accommodation for plant, raw materials and finished goods and (e) governmental restrictions, etc.
- Fixed budget is a budget designed to remain unchanged irrespective of the level of activity actually attained.
- A flexible budget is a budget which is designed to change in relation to the level of activity attained.
- Zero base budgeting is a method of budgeting whereby all activities are re-evaluated each time a budget is set.



Discrete levels of each activity are valued and a combination chosen to match funds available. It is a system whereby each budget item, regardless of whether it is new or existing must be justified in its entirety each time a new budget is prepared.

- Performance budgeting involves evaluation of performance of an organization in the context of both specific as well as overall objectives of the organization. Performance budgeting lays emphasis on achievement of physical targets.

### SELF TEST QUESTIONS

1. What is budgetary control? Discuss the various preliminaries required for adoption of a system of budgetary control.
2. What are the main steps in budgetary control? State the main objectives of budgetary control.
3. What factors generally determine a budget period? Give examples?
4. Distinguish between 'fixed budget' and 'flexible budget'.
5. What do you understand by master budget? Into what sections is it usually divided, and what are the purposes of the divisions?
6. Name the different types of budgets that are built up for effective control.
7. What is a budget report? State the matters that should be incorporated in a good report. How does it assist the management?
8. What is a principal budget factor? Give a list of such 'principal budget factors' and state the effect of the existence of two or more budget factors in a business.
9. Write a note on (i) zero base budget and (ii) performance budget.
10. ABC Ltd. a newly started company wishes to prepare cash budget from January. Prepare a cash budget for the first six months from the following estimated revenue and expenses.

Month	Total Sales ₹	Materials ₹	Wages ₹	Overheads	
				Production ₹	Selling & Distribution ₹
Jan.	20,000	20,000	4,000	3,200	800
Feb.	22,000	14,000	4,400	3,300	900
March	28,000	14,000	4,600	3,400	900
April	36,000	22,000	4,600	3,500	1,000
May	30,000	20,000	4,000	3,200	900
June	40,000	25,000	5,000	3,600	1,200

Cash balance on 1st January was ₹10,000. New machinery is to be installed at ₹20,000 on credit, to be repaid by two equal instalments in March and April.

Sales commission at @ 5% on total sales is to be paid within a month following actual sales.

₹10,000 being the amount of 2nd call may be received in March. Share premium amounting to ₹2,000 is also obtainable with the 2nd call.

Period of credit allowed by suppliers	-	2 months
Period of credit allowed to customers	-	1 month

Delay in payment of overheads	-	1 month
Delay in payment of wages	-	1/2 month

Assume cash sales to be 50% of total sales.

[Ans. Closing balances: Jan. ₹18,000; Feb. ₹29,800; March ₹27,000; April ₹24,700; May ₹33,100; June ₹36,000].

11. The cost of an article at capacity level of 5,000 units is given under A below. For a variation of 25% in capacity above or below this level, the individual expenses vary as indicated under B below:

	A	B
	₹	
Material cost	25,000	(100% varying)
Labour cost	15,000	(100% varying)
Power	1,250	(80% varying)
Repairs and maintenance	2,000	(75% varying)
Stores	1,000	(100% varying)
Inspection	500	(20% varying)
Depreciation	10,000	(100% fixed)
Administration overheads	5,000	(25% varying)
Selling overheads	3,000	(50% varying)
	62,750	
Cost per unit	12.55	

Find the unit cost of the product under each individual expense at production levels of 4,000 units and 6,000 units.

[Ans. Total cost per unit - 4,000 units - ₹13.37; 5,000 units ₹12.55; 6,000 units - ₹12].

12. **Case Study**

X is an employee of Zero Financial Corporation Ltd. He has been assigned the task of preparing budget for the company. He observed that in previous year budget was prepared on the basis of previous year figures and in various cases either the budgeted amount was lying unutilized or it fell short. He wants to avoid such a situation in future Budgetary Process.

**Explain** the reason of over budgeting/short fall in the above listed case. Which of the budgetary technique should be used by 'X' so as to avoid Over Budgeting/Short Budgeting.

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# Lesson 11

## COST ACCOUNTING RECORDS AND COST AUDIT

### LESSON OUTLINE

- Cost audit
- Provisions of Companies Act, 1956 pertaining to cost accounting records
- Provisions of Companies Act, 1956 pertaining to cost audit
- Purpose of cost audit
- Scope of cost audit
- Advantages of cost audit
- Appointment of cost auditor
- Rights and responsibilities of cost auditor
- Implementing authorities of cost audit
- Cost audit techniques
- Cost audit programme.
- Cost audit report
- Lesson Round Up
- Self-Test Questions

### LEARNING OBJECTIVES

Section 209 (1) (d) of the Companies Act contains the provisions relating to maintenance of cost accounting records and Section 233B of the Act contains the provisions relating to Cost Audit. Introducing statutory requirement of maintenance of cost accounting records and audit thereof as applicable by a qualified cost accountant, the Government has the objectives and reasons for ensuring that the companies keep proper records was to inculcate a culture of cost consciousness among industries for better resource management, to make the efficiency audit possible, and to make cost data available to the Government.

The objectives of this lesson are to enable the student to understand the meaning of cost accounting records, the purposes for which cost records are being maintained, meaning of cost audit, various techniques used in cost audit etc. The study of this lesson will help one to understand the nature, scope and utility of cost accounting records and cost audit.

Cost audit is an independent examination of cost records and other related information of an entity including a non - profit entity, when such an examination is conducted with a view to expressing an opinion thereon.

*(As per definition of CAAS 101)*

## **COST AUDIT**

Cost audit is an independent examination of cost records and other related information of an entity including a non-profit entity, when such an examination is conducted with a view to expressing an opinion thereon.

Cost audit comprises of the followings:

- (a) Verification of the cost accounting records for the accuracy of the cost accounts, cost reports, cost statements and cost data and
- (b) Examination of these records to ensure that they adhere to the cost accounting principles, plans, procedures and objectives.

It, therefore, means that the cost auditors' approach should be to ensure that the cost accounting plan is in consonance with the objectives set by the organisation and the system of accounting is geared towards the attainment of these objectives. The cost auditor should also establish the correctness or otherwise of the figures by the processes of vouching verification, reconciliation etc.

## **PROVISIONS OF COMPANIES ACT, 1956 PERTAINING TO COST ACCOUNTING RECORDS**

Section 209 of the Companies Act 1956 deals with the books of account to be maintained by a body corporate. The section provides as follows:

- (1) Every company shall keep at its registered office proper books of account with respect to-
  - (a) All sums of money received and expended by the company and the matters in respect of which the receipt and expenditure take place;
  - (b) All sales and purchases of goods by the company;
  - (c) The assets and liabilities of the company; and
  - (d) In the case of a company pertaining to any class of companies engaged in production, processing, manufacturing or mining activities, such particulars relating to utilization of material or labour or to other items of cost as may be prescribed, if such class of companies is required by the Central Government to include such particular in the books of account.

Provided that all or any of the books of account aforesaid may be kept at such other place in India as the Board of Directors may decide and when the Board of Directors so decides, the company shall, within seven days of decision, file with the Registrar a notice in writing giving the full address of that other place.

In exercise of powers conferred by section 642(1) read with section 209(1) (d) of the Companies Act, 1956, the Central Government prescribes Cost Accounting Record Rules for the maintenance of cost records relating to the utilization of materials, labour and other items of cost, in the manner as prescribed, by specified class of companies engaged in production, processing manufacturing or mining operations of the prescribed products/activities.

## **PROVISIONS OF COMPANIES ACT, 1956 PERTAINING TO COST AUDIT**

Section 233B of the Companies Act 1956 deals with the audit of Cost Accounting records. The section provides as follows:

- (1) Where in the opinion of the Central Government it is necessary so to do in relation to any company required under clause (d) of sub-section (1) of section 209 to include in its books of account the

particulars referred to therein, the Central Government may, by order, direct that an audit of cost accounts of the company shall be conducted in such manner as may be specified in the order by an auditor [who shall be a cost accountant within the meaning of the Cost and Work Accountants Act, 1959 (23 of 1959):

Provided that if the Central Government is of opinion that sufficient number of cost accountants within the meaning of the Cost and Works Accountants Act, 1959 (23 of 1959), are not available for conducting the audit of the cost accounts of companies generally, that Government may, by notification in the Official Gazette, direct that, for such period as may be specified in the said notification, such chartered accountant within the meaning of the Chartered Accountants Act, 1949 (33 of 1949), as possesses the prescribed qualifications, may also conduct the audit of the cost accounts of companies, and thereupon a chartered accountant possessing the prescribed qualifications may be appointed to audit the cost accounts of the company.]

- (2) The auditor under this section shall be appointed by the Board of directors of the company in accordance with the provisions of sub-section (1B) of section 224 and with the previous approval of the Central Government:

Provided that before the appointment of an auditor is made by the Board, a written certificate shall be obtained by the Board from the auditor proposed to be so appointed to the effect that the appointment, if made, will be in accordance with the provisions of sub-section (1B) of section 224.]

- (3) An audit conducted by an auditor under this section shall be in addition to an audit conducted by an auditor appointed under section 224.
- (4) An auditor shall have the same powers and duties in relation to an audit conducted by him under this section as an auditor of a company has under sub-section (1) of section 227 and such auditor shall make his report to the Central Government in such form and within such time as may be prescribed and shall also at the same time forward a copy of the report to the company.]
- (5) (a) A person referred to in sub-section (3) or sub-section (4) of section 226 shall not be appointed or re-appointed for conducting the audit of the cost accounts of a company.
- (b) A person appointed, under section 224, as an auditor of a company, shall not be appointed or re-appointed for conducting the audit of the cost accounts of that company.
- (c) If a person, appointed for conducting the audit of cost accounts of a company, becomes subject, after his appointment, to any of the disqualifications specified in clause (a) or clause (b) of this sub-section, he shall, on and from the date on which he becomes so subject, cease to conduct the audit of the cost accounts of the company.
- (6) Upon receipt of an order under sub-section (1) it shall be the duty of the company to give all facilities and assistance to the person appointed for conducting the audit of the cost accounts of the company.
- (7) The company shall, within thirty days from the date of receipt of a copy of the report referred to in sub-section (4) furnish the Central Government with full information and explanations on every reservation or qualification contained in such report.
- (8) If, after considering the report referred to in sub-section (4) and the information and explanations furnished by the company under sub-section (7), the Central Government is of opinion that any further information or explanation is necessary, that Government may call for such further

information and explanation and thereupon the company shall furnish the same within such time as may be specified by that Government.

- (9) On receipt of the report referred to in sub-section (4) and the informations and explanations furnished by the company under sub-section (7) and sub-section (8), the Central Government may take such action on the report, in accordance with the provisions of this Act or any other law for the time being in force, as it may consider necessary.
- (10) The Central Government may direct the company whose cost accounts have been audited under this section to circulate to its members, along with the notice of the annual general meeting to be held for the first time after the submission of such report the whole or such portion of the said report as it may specify in this behalf.
- (11) If default is made in complying with the provisions of this section, the company shall be liable to be punished with fine which may extend to five thousand rupees, and every officer of the company who is in default shall be liable to be punished with imprisonment for a term which may extend to three years, or with fine which may extend to fifty thousand rupees, or with both.]

### **PURPOSE OF COST AUDIT**

The primary purpose of Cost audit is to express an opinion on the cost accounts of the company whether these have been properly maintained and compiled according to the cost accounting system followed by the enterprise or not. However the purposes of cost audit may be segregated into general and social objectives. The general objectives can be described to include the following:

- (1) Verification of cost accounts with a view to ascertaining that these have been properly maintained and compiled according to the cost accounting system followed by the enterprise.
- (2) Ensuring that the prescribed procedures of cost accounting records rules are duly adhered to.
- (3) Detection of errors and fraud.
- (4) Verification of the cost of each "cost unit" and "cost centre" to ensure that these have been properly ascertained.
- (5) Determination of inventory valuation.
- (6) Facilitating the fixation of prices of goods and services.
- (7) Periodical reconciliation between cost accounts and financial accounts.
- (8) Ensuring optimum utilization of human, physical and financial resources of the enterprise.
- (9) Detection and correction of abnormal loss.
- (10) Inculcation of cost consciousness.
- (11) Advising management, on the basis of inter-firm comparison of cost records, as regards the areas where performance calls for improvement.
- (12) Promoting corporate governance through various operational disclosures.

### **Social purposes of cost audit**

The following deserve special mention

1. Facilitate in fixation of reasonable prices of goods and services produced by the enterprise.

2. Improvement in productivity of human, physical and financial resources of the enterprise.
3. Channelise enterprise resources to most optimum, productive and profitable areas.
4. Availability of audited cost data as regards contracts containing escalation clauses.
5. Facilitate in settlement of bills in the case of cost-plus contracts entered into by the Government.
6. Pinpointing areas of inefficiency and mismanagement, if any for the benefit of shareholders, consumers, etc., such that necessary corrective action could be taken in time.

## SCOPE OF COST AUDIT

Section 209(1)(d) of the Companies Act, 1956 makes it obligatory for a company pertaining to any class of companies engaged in production, processing, manufacturing or mining activity to maintain such particulars relating to utilization of material or labour or other items of cost as may be prescribed, if such class of companies is required by the Central Government to include such particulars in the books of account. The rules provide that only those companies, which are covered under Section 209(1)(d) of the Companies Act and in respect of which a specific Cost Audit Order has been issued by the Cost Audit Branch of Ministry of Corporate Affairs are required to get their cost accounts audited with respect to that specific product..

The Central Government prescribes the separate cost accounting records for each class of companies i.e. companies manufacturing a particular class of product or activity like Cement, Steel, Chemicals and Electricity etc. and these are called the Cost Accounting Records Rules for that specific industry or class of companies. When cost accounting records/formats are prescribed, they apply to those companies engaged in the manufacture of a particular product or activity. In the case of companies engaged in production or processing of other products or activities also in addition to production, processing or manufacture of the specified product, the records will have to be maintained only for the manufacture of particular product for which rules are issued and not necessary for other products. A company manufacturing bulk drugs, formulation and watches need not necessarily maintain cost accounting records in respect of watch making activity if no statutory rules are prescribed for watch making activity.

The legal provisions relating to statutory cost audit are applicable only to companies registered under the provisions of Companies Act, 1956. Therefore, cost audit is not applicable to other enterprises like partnership, cooperative societies, etc. The Cost Audit is conducted by a Cost Accountant in practice within the meaning of the Cost and Works Accountants Act, 1959. The cost auditor is appointed by the Board of Directors of the company with the previous approval of the Central Government. The report of cost auditor is to rendered to the Central Government with a copy to the Company.

## ADVANTAGES OF COST AUDIT

Cost audit provides numerous benefits to the management, society, shareholders and the government. The advantages are as under:

### Advantages to Management

- (i) Management gets reliable data for its day-to-day operations like price fixing, control, decision-making, etc.
- (ii) A close and continuous check on all wastages will be kept through a proper system of reporting to management.
- (iii) Inefficiencies in the working of the company will be brought to light to facilitate corrective action.
- (iv) Management by exception becomes possible through allocation of responsibilities to individual managers.

- (v) The system of budgetary control and standard costing will be greatly facilitated.
- (vi) A reliable check on the valuation of closing stock and work-in-progress can be established.
- (vii) It helps in the detection of errors and fraud.

#### **Advantages to Society**

- (i) Cost audit is often introduced for the purpose of fixation of prices. The prices so fixed are based on the Audit Cost data and so the consumers are saved from exploitation.
- (ii) Since price increase by some industries is not allowed without proper justification like increase in cost of production, inflation through price hikes can be controlled and consumers can maintain their standard of living.

#### **Advantages to Shareholder**

Cost audit ensures that proper records are kept as to purchases and utilisation of materials and expenses incurred on wages, etc. It also makes sure that the valuation of closing stocks and work-in-progress is on a fair basis. Thus the shareholders are assured of a fair return on their investment.

#### **Advantages to Government**

- (i) Where the Government enters into a cost-plus contract, cost audit helps government to fix the price of the contract at a reasonable level.
- (ii) Cost audit helps in the fixation of ceiling prices of essential commodities and thus undue profiteering is checked.
- (iii) Cost audit enables the government to focus its attention on inefficient units.
- (iv) Cost audit enables the government to decide in favour of giving protection to certain industries.
- (v) Cost audit facilitates settlement of trade disputes brought to the government.
- (vi) Cost audit and consequent management action can create a healthy competition among the various units in an industry. This imposes an automatic check on inflation.

### **APPOINTMENT OF COST AUDITOR**

A Cost Accountant as defined in clause (b) of sub-section (1) of section 2 of the Cost and Works Accountants Act, 1959 (23 of 1959) and who holds a valid certificate of practice under sub-section (1) of section 6 of that Act and including Firm of Cost Accountants can be appointed by a Company as cost auditor. However, the cost accountant or partners of a firm of cost accountant should be in whole-time practice and not holding any other employment

The audit committee of the board is the first point of reference regarding the appointment of cost auditors. The audit committee should ensure that the cost auditor is free from any disqualifications as specified under section 233B (5) read with section 224 and Section 226 (3) or 226(4). The audit committee needs to take a certificate from the cost auditor that he is not violating the limits specified under section 224(1-B) of the Companies Act, 1956 in accepting the appointment. The audit committee will also obtain a certificate from the cost auditor certifying his/her/its independence and arm's length relationship with the company.

The Company would be required to File Form 23C with the Central Government within 90 days from the commencement of each financial year, along with the prescribed fee and other documents i.e. certified copy of board resolution proposing appointment of cost auditor and Copy of certificate from the auditor regarding



compliance of section 224(1-B). The approval would be deemed to have been granted if the Central Government does not raise any query within 30 days of filing of Form 23C.

In case the Central Government raises any query within the said period of 30 days, the company would be required to clarify the issues and re-submit the Form 23C. The period of 30 days, in this case, would run from the date of resubmission of Form 23C.

After expiry of 30 days, as the case may be the company shall issue a formal letter of appointment to the cost auditor, as approved by the board. Within 30 days of receipt of formal letter from the company, the cost auditor shall inform the central government in form 23D, along with a copy of such appointment letter.

## **RIGHTS AND RESPONSIBILITIES OF COST AUDITOR**

Section 233B (4) of the Companies Act, 1956 gives the cost auditor same powers as the financial auditor has under Section 227(1). In addition, Rule 6 of the Cost Audit Report Rules also requires the company and every officer thereof, including the persons referred to in sub-Section (6) of Section 209 of the Act to make available to the cost auditor, within 135 days from the close of the financial year of the company, such cost accounting records, cost statements, other books and documents, annexure and Proforma to the Report, duly completed as would be required for conducting the cost audit, and shall render necessary assistance to the Cost Auditor so as to enable him to complete the cost audit and submit his report within the time limit specified in rule 5. Section 233B(6) further provides that it shall be the duty of the company to give all facilities and assistance to the cost auditor so as to enable him to complete the audit and send the report within the prescribed time limit.

### **Rights of Cost Auditor**

The powers of the cost auditor under sub-Section (1) of Section 227 are as under:

- Right to access at all times the books of account and vouchers of the company, whether kept at the head office of the company or elsewhere.
- Entitled to require from the officers of the company such information and explanations as he may think necessary for the performance of his duties as an auditor.

### **Responsibilities of Cost Auditor**

The duties of the cost auditor are also similar to those of the (financial) auditor of the company has under sub-Section (1) of Section 227 (Section 223B (4)). The duties of the cost auditor inter-alia include:

- (a) To file the intimation to Central government about his/her/its appointment within 30 days of the receipt of formal letter in Form 23D along with the copy of formal letter.
- (b) To ensure that the proper books of accounts as required by Cost Accounting Records Rules have been kept by the company so far as it appears from the examination of those books and proper returns for the purpose of his audit have been received from branches not visited by him;
- (c) To ensure that the Cost Audit Report and the detailed cost statements are in the form prescribed by the Cost Audit Report Rules by following sound professional practices i.e. the report should be based on verified data and observations may be framed after the company has been afforded an opportunity to comment on them;
- (d) The underline assumptions and basis for allocation and absorption of indirect expenses are reasonable and are as per the established accounting principles;
- (e) If the auditor is not satisfied in any of the aforesaid matters, he may give a qualified report along with the reasons for the same;

- (f) Sending the Report to the Cost Audit Branch within 180 days from the end of the financial year with one copy to the company;
- (g) Sending his replies to any clarification, that may be sought by the Cost Audit Branch on his report. Sending such replies within 30 days from the date of receipt of communication calling for such clarification.

## IMPLEMENTING AUTHORITIES OF COST AUDIT

As per provisions of section 233B (2), the Board of Directors of a Company can appoint a cost auditor after obtaining prior approval of the Central Government. Under the revised procedure, the first point of reference will be the Audit Committee to ensure that the cost auditor is free from any disqualification as specified under section 233B (5) read with section 224 and sub-section (3) or sub-section (4) of section 226 of the Companies Act, 1956. The Audit Committee should also ensure that the cost auditor is independent and is at arm's length relationship with the company. After ascertaining the eligibility, the Audit Committee will recommend to the Board of Directors for appointment. In those companies where constitution of an Audit Committee is not required by law, the functions of the "Audit Committee" as per the procedure will be discharged by the "Board of Directors

## COST AUDIT TECHNIQUES

There are no specific techniques being used by cost auditor in carrying out the cost audit assignments. Techniques employed by a Cost auditor in effectively carrying out his audit are –

### (i) Accounting or economic techniques

1. Vouching.
2. Physical Verification.
3. Comparison of data with Peer.
4. Break-even analysis.
5. Budgetary control including flexible budget system.
6. Cost management techniques indicating how an organization's assets should be allocated over competing projects or to decide whether it is worth proceeding with the investment, keeping in view proportionate value of expenditure on such projects.
7. Discounted cash flow and net present value methods.
8. Cost benefit analysis.
9. Standard costing and marginal costing.
10. Activity based costing to test the relevance of cost to activities.
11. Quality analysis of company transactions.

### (ii) Scientific Techniques

- (a) *Computer Models*: There are many types of problems which can be solved on a computer e.g. decision on material mix, product mix, make or buy decisions etc.
- (b) *Network analysis*: To analyse strings of tasks to arrange them in sequential or parallel order so that the project is completed in a shortest possible time.

- (c) Mathematical Programme solving by heuristic (trial and error) techniques to determine the best material mix, best use of organization's transport fleet, the best mix of products to obtain or to maximize profits and optimum use of labour, finance, equipments, etc.

### **(iii) Statistical Techniques**

- (a) Activity Sampling: It is one of the many ways in which the present workloads can be measured to obtain controls to be exercised by management.
- (b) Monte Carlo Simulation: In this a number of variables are drawn from large statistical population which have equal choice of being selected and obtain the best sample possible.
- (c) Exponential smoothing
- (d) Inter firm comparison

### **(iv) Personnel Techniques**

- (a) Attitude survey
- (b) Ergonomic (Man-machine relationship)
- (c) Training methods
- (d) Profitability and productivity measurement

### **(v) General techniques**

- (a) Statistical theory of management is an attempt to emphasize what should be the practical approach to a problem by –
- Analyzing the problem to establish the basic difficulties and factors involved.
  - Establish management by objectives.
  - Identifying the likely ways of tackling the problems in the light of objectives to develop a solution.
  - Determine the key factors affecting management decision-making.
  - Evaluating alternative courses of action.
  - Evaluating each alternative in terms of economy, efficiency and best fit.
  - Specifying the action required to exploit the situation to the best advantage of the organization.
- (b) Brain storming
- (c) Transfer pricing
- (d) Management by objectives
- (e) Management by exception
- (f) Corporate planning
- (g) Information theory

## **COST AUDIT PROGRAMME**

Cost audit programme is an essential prerequisite for conducting an audit. It is a plan of action drawn in advance before taking up the audit, and to help the auditor to cover the entire area of his function thoroughly.

The audit programme should include all the usual broad steps that a financial auditor include in his audit programme. However, the significant things that should not be missed are: proper vouching of expenses, capital and revenue character determination, allocation of expenses, apportionment of overheads, arithmetical accuracy, the statutory requirements, examination of contracts and agreements, review of the Board's and shareholders' minute books to trace important decisions having bearing on costs, verification of title deeds and documents relating to properties and assets, etc. Cost audit, in order to be effective, should be completed at one time as far as practicable. The exact content of cost audit largely depends on the size of the organisation, range of products, production process, the existence of a well organised costing department and of a well designed costing system, and the existence of a capable internal auditing system. Other relevant considerations may be:

### **(A) Review of Cost Accounting Records**

This will include:

1. Method of costing in use - batch, process or unit.
2. Method of accounting for raw materials; stores and spares, wastages, spoilage, defectives, etc.
3. System of recording wages, salaries, overtime and spares, wastages, etc.
4. Basis of allocation of overheads to cost centres and apportionment of service department's expenses.
5. Treatment of interest, recording of royalties, research and development expenses, etc.
6. Method of accounting of depreciation.
7. Method of stock-taking and its valuation including inventory policies.
8. System of budgetary control.
9. System of internal auditing.

### **(B) Verification of cost statements and other data**

This will include the verification of:

- (i) Licensed, installed and utilised capacities.
- (ii) Financial ratios.
- (iii) Production data.
- (iv) Cost of raw material consumed, wages and salaries, stores, power and fuel, overheads, provision for depreciation etc.
- (v) Sales realisation.
- (vi) Abnormal, non-recurring and special costs.
- (vii) Reconciliation with financial books.

## **COST AUDIT REPORT**

A Cost Auditor is required to submit its report his/her/its report in the format as provided by the Cost Audit Report Rules. The Ministry of Corporate affairs has revised the Cost Audit report Rules in year 2011 vide G.S.R. 430(E) dated the 3rd June, 2011. Form-II of Cost audit report rules contains the Form of the cost auditor's report and includes auditor's observations and suggestions, and Annexure to the cost audit report and Form-III of the rules contains the Form of the performance appraisal report. The cost audit report rules

apply to every company in respect of which an audit of the cost records has been ordered by the Central Government under sub-section (1) of section 233B of the Act.

Cost audit report of a company contains 11 Annexure. The details of which is as given

1. General Information
2. Cost Accounting Policy
3. Product Group Details (for the company as a whole)
4. Quantitative Information (for each product group separately)
5. Abridged Cost Statement (for each product group separately)
6. Operating Ratio Analysis (for each product group separately)
7. Profit Reconciliation (for the company as a whole)
8. Value Addition and Distribution of Earnings (for the company as a whole)
9. Financial Position and Ratio Analysis (for the company as a whole)
10. Related Party TransactionS (for the company as a whole)
11. Reconciliation of Indirect Taxes (for the company as a whole)

### LESSON ROUND UP

- Cost audit involves-checking up the arithmetical accuracy of cost accounts and verifying whether the principles laid down have been followed or not.
- Cost audit detects and prevents errors and frauds in preparation of cost records.
- The auditing of cost accounts acts as an effective tool in the hands of management for the detection of errors, frauds, inconsistencies and irregularities.
- Audited cost accounts are helpful in making inter-firm comparison.
- Section 233 B of the Companies Act 1956 deals with the audit of Cost Accounting records.

### SELF TEST QUESTIONS

1. What do you mean by Cost Audit?
2. What are the rights and responsibilities of a Cost Auditor?
3. State the provisions of the Companies Act, 1956 with respect to Cost Accounting Records.
4. State the provisions of the Companies Act, 1956 with respect to Audit of Cost Accounts.
5. Write short notes on:
  - (a) Scope of Cost Audit
  - (b) Purpose of Cost Audit
  - (c) Advantages of Cost Audit
  - (d) Responsibilities of Cost Auditor
  - (e) Appointment of Cost Auditor
  - (f) Cost Audit Programme
  - (g) Cost Audit Report



# Lesson 12

## ANALYSIS AND INTERPRETATION OF FINANCIAL STATEMENTS

### LESSON OUTLINE

- Financial Statements and its Nature, Attributes, Objectives, Importance, Limitations
- Recent Trends in Presenting Financial Statements
- Financial Statements Analysis and its Types, Methods, Objectives and Limitations
- Ratio Analysis and its Accounting, Uses, Classification, Advantages, Limitations
- Cash Flow Statement and its Classification
- Preparation of cash flow (Direct & Indirect Method)
- Usefulness of Cash Flow Statement
- Fund Flow Statement and its Definition and features
- Steps for preparation of fund flow statement
- Difference between Cash Flow and Fund Flow Statement
- Management Reporting
- Lesson Round Up
- Self Test Question

### LEARNING OBJECTIVES

Financial statements are formal records of the financial activities of a business, person, or other entity and provide an overview of a business or person's financial condition in both short and long term. They can give an accurate picture of a company's condition and operating results in a condensed form. Financial analysis is helpful in assessing the financial position and profitability of a organization.

Ratio analysis establishes meaningful relationship between individual items or group of items which shown in the financial statements prepared by the organization. It shows the relationship between two inter-related accounting figures as current assets to current liabilities, debtors to sales, debt to equity etc.

Cash flow statement is useful in providing users of financial statements with a basis to assess the ability of the organization to generate cash and the needs of the organization to utilize those cash flows.

Fund flow statement reveals the movement of funds during the year i.e. how organization got funds and how it used its fund.

After reading this lesson, the user should be able to:

1. Understand, analyze and interpret the basic concepts of financial statements
2. Interpretate financial ratios and their significance.
3. Understand preparation of cash flow statement and fund flow statement.

“Financial Statements Analysis is largely a study of relationship among the various financial factors in a business as disclosed by a single set of statements and a study of the trend of these factors as shown in a series of statements.”

– Myer

## FINANCIAL STATEMENTS

Financial statements, as used in corporate business houses, refer to a set of reports and schedules which an accountant prepares at the end of a period of time for a business enterprise. The financial statements are the means with the help of which the accounting system performs its main function of providing summarised information about the financial affairs of the business. These statements comprise Balance Sheet or Position Statement and Statement of Profit & Loss or Income Statement. Of course to give a full view of the financial affairs of an undertaking, in addition to the above, the business may also prepare a Statement of Retained Earnings and a Cash Flow Statement. In India, every company has to present its financial statements in the form and contents as prescribed under Section 211 of the Companies Act 1956. The significance of these statements are given below:

- (i) **Balance Sheet or Position Statement:** Balance sheet is a statement showing the nature and amount of a company's assets on one side and liabilities and capital on the other. In other words, the balance sheet shows the financial position on a particular date usually at the end of one year period. Balance sheet shows how the money has been made available to the business of the company and how the money is employed in the business.
- (ii) **Statement of Profit & Loss or Income Statement:** Earning profit is the principal objective of all business enterprises and Statement of Profit & Loss or Income Statement is the document which indicates the extent of success achieved by a business in meeting this objective. Profits are of primary importance to the Board of directors in evaluating the management of a company, to shareholders or potential shareholders in making investment decisions and to banks and other creditors in judging the loan repayment capacities and abilities of the company. It is because of this that the profit and loss or income statement is regarded as the primary statement and commands a careful scrutiny by all interested parties. It is prepared for a particular period which is mentioned alongwith the title of these statements, which includes the name of the business firm also.
- (iii) **Cash Flow Statement:** This is a statement which summarises for the period, the cash available to finance the activities of an organisation and the uses to which such cash have been put. A statement of cash flow reports cash receipts and payments classified according to the organisation's major activities i.e., operating activities, investing activities and financing activities. This statement reports the net cash inflow or outflow for each activity and for the overall business. The cash flow statement is to be prepared according to the Accounting Standard 3 (Revised) "Cash Flow Statement". The details of this statement have been discussed in a separate study.

## NATURE OF FINANCIAL STATEMENTS

Financial statements are prepared for the purpose of presenting a periodical review or report on the progress by the management and deal with the (a) status of the investments in the business and (b) results achieved during the period under review. The data exhibited in these financial statements are the result of the combined effect of (i) recorded facts; (ii) accounting conventions; (iii) postulates or assumptions made to implement conventional procedures; (iv) personal judgements used in the applications of conventions and postulates and (v) accounting standards and guidance notes. These factors are explained below:

- (i) **Recorded Facts:** The term 'recorded facts' means, facts which have been recorded in the accounting books such as cash in hand, cash at bank, bills receivables, bills payable, debtors, creditors, fixed assets, sales, purchases, wages, capital and so forth. These items are listed on the



basis of historical records of the transactions and valued at the price at which such transactions took place. Facts which have not been recorded in the accounting books are not depicted in the financial statements, however, material they might be.

- (ii) **Accounting Conventions:** Accounting conventions have reference to certain fundamental accounting principles, the applications of which has been sanctified by long usage. For example, on account of the convention of conservation, provision is made for expected losses but expected profits are ignored. These conventions are applied for the valuation of inventory, allocation of expenditure between capital and revenue for the purpose of assets valuations etc.
- (iii) **Postulates:** Accountants make various assumptions for the conventions adopted. One of these assumptions or postulates is to the effect that the enterprise will continue in business beyond the period which is covered by the financial statements, i.e., business is a going concern. This assumption is referred to as the permanency postulate, and the assets of the business are valued under this assumption at cost less depreciation. In absence of this assumption, the assets may have to be valued at realisable value which may be negligible if the business is not a going concern. Another postulate which accountants make is the monetary postulate. It is the tacit assumption that the value of money, that is its purchasing power, remains constant over different periods. The accountants do not take into consideration the price-level changes while valuing various assets in different periods. Of late, however, accountants in the west have shown growing consciousness for incorporating price-level changes while preparing financial statements. A third postulate is the realisation postulate which takes cognizance of the time lag between production and sales affected. Under this postulate entire revenue is considered to be earned at the moment the sales take place and not at the time when the production took place. This postulates forms the basis for the convention of matching costs with revenues, whereunder, the costs incurred in the past period are brought forward to be accounted for against the revenues earned at a later period.
- (iv) **Personal Judgements:** It may be noted that the application of conventions, assumptions or postulates depends on the personal judgements of the accountant. For example, the choice of selecting methods of depreciation, the mode of amortisation of fictitious assets, the method of valuation of stock, calculation of provision for doubtful debts etc. depend on the personal judgements of the accountant. However, the existence of consistency principle serves as a check on the power of the accountant to use his personal judgement. Since the accountant is guided by the past practices, the area of application of his personal judgement is reduced.
- (v) **Accounting Standards and Guidance Notes:** Accountants are guided by various accounting standards and guidance notes in preparing the financial statement.

## ATTRIBUTES OF FINANCIAL STATEMENTS

Financial Statements prepared for an enterprise should possess the following attributes if they are to serve meaningfully the purpose and objectives for which they are meant:

- (a) **Relevance:** The financial statements prepared must be relevant for the purpose they are supposed to serve. While irrelevant and confusing disclosures should be avoided, nothing relevant and material should be held back from the public. The accountant so compiles such statements should be clear about relevancy and materiality or otherwise of the various information on the basis of which these statements are prepared. The Companies Act in various countries provide for non-disclosure of certain material information.
- (b) **Accuracy and Freedom from Bias:** Financial Statements should convey a full and correct idea

about the progress, position and prospects of an enterprise. For this purpose they must be accurately prepared. Inaccuracy, besides invoking legal consequences, may also defeat the objectives for which the statements are meant. It may, however, be noted that absolute accuracy is not always possible, but this does not mean that rash and inaccurate data be deliberately provided. The least one can expect is that those who prepare and present financial statements should not allow their personal prejudices to colour the facts.

- (c) **Comparability:** Comparability increases the utility of financial statements. Comparison with previous statements helps in assessing the performance and in localising the trends in the progress and position of the business enterprise. Comparisons with other similar concerns or the industry reveals the strength of the enterprise vis-a-vis other firms and industry.
- (d) **Analytical Presentation:** The financial statements should be prepared in a classified form so that a better and meaningful analysis can be made. Proper classification helps in tracing and understanding in causes of the results as shown in these statements. Detailed and classified information helps to reveal inefficient performance and wasteful activities. Such classification helps in speedier analysis of these documents.
- (e) **Promptness:** No doubt, that the preparation of financial statement is somewhat complicated, but an undue delay in their preparation would reduce the significance and utility of these statements. They should be prepared as soon as possible, after the end of the period for which they are meant. Undue delay, the time lag between the end of the period and the preparation of these statements, may present difficulty in tracing the causes of the results as disclosed by the statements. Such delays and the delayed action thereon, may do more harm than good to the enterprise.
- (f) **Generally Accepted Principles:** Since the financial statements are meant for the use of a wider clientele, they must have general acceptability and understandability. This acceptability and understandability can come only when these statements are prepared in accordance with the "Generally Accepted Accounting Principles". This also increases the reliability of these statements and adds to the confidence of the users.
- (g) **Consistency:** The financial statements for a certain period are affected by the judgment and procedural choices exercised by the accountant. Opinions and procedures other than those employed generally, might cause the statement data to differ materially. Rules of accounting require that having made a selection of procedures, the accountant must strictly follow them in successive periods, unless the situation demands otherwise. Consistency has a direct bearing upon comparability. If inventories are valued on different basis in different periods (LIFO to FIFO to Replacement Cost) the results disclosed, generate doubt and comparison becomes difficult.
- (h) **Authenticity:** The financial statements in order to be accepted as reliable must be reviewed and authenticated by an independent and capable person, generally known as auditor. Statements, duly audited and certified by recognised and established auditors are accepted at their face value and are deemed to be more reliable. Unaudited statements give room to doubt and unreliability.
- (i) **Compliance with Law:** Financial statements must meet the requirements of law, if any, in the matter of form, contents and disclosures, procedures and methods. Non-compliance with legal provisions, besides invoking penalties, impairs the confidence of the public investors. In India, companies are required to present their financial statements according to the provisions of Section 211 of the Companies Act, 1956.

## OBJECTIVES OF FINANCIAL STATEMENTS

The number and types of people interested in financial statements have changed radically in recent times. Financial statements are necessary for shareholders and potential shareholders, in addition to management and creditors.

The following groups have a direct interest in the financial statements of companies: Suppliers and potential suppliers of funds, i.e., shareholders, debentureholders, employees, customers, suppliers of goods and services on credit, tax authorities, etc. In addition, there are groups which have an indirect interest in these statements: Financial analysts and advisors, stock exchanges, academicians, lawyers, regulatory authorities, trade associations, and labour unions.

It is to be readily conceded that firstly it is not feasible to prepare sets of financial statements for the different parties interested in them and secondly, it is virtually impossible to prepare such a financial statement as will provide all the information required by all the interested parties. There has to be a compromise in the preparation of financial statements - there will be and can be only one set and it will have to be oriented towards the needs of the shareholders but it must give such significant and material information as is practicable for the benefit of the other parties specially those who have to make decisions about the future of the concerned firm, specially debenture-holders, institutional lenders, operators on the stock exchange etc. Fortunately, the needs of information may be grouped under the heads (i) profit and profitability; (ii) short-term financial position (liquidity); and (iii) long-term financial position. Every one interested in a firm directly wants to know the extent of cash flows, as far as he is interested, expected in the time-span of interest to him. For example, a shareholder wants to estimate the cash dividend that his shares will bring as well as the amount that he can realise on sale of the shares - for the dividend, his time-span is one year; a supplier of goods on credit wants whether his dues will be paid within say a month or two. These broad needs of information can well be satisfied by a single set of financial statements.

The objectives of financial statements can be summarized as follows:

1. To provide reliable financial information about economic resources and obligations of a business enterprise.
2. To provide reliable information about the net resources (resources less obligations) of an enterprise that results from its activities.
3. To provide financial information that assists in estimating the earning potentials of a business.
4. To provide other needed information about changes in economic resources or obligation.
5. To disclose, to the extent possible, other information related to the financial statements that is relevant to the needs of the users of these statements.

In order to meet the above objectives and to suit the needs of the varied users, the accountant entrusted with the task of compiling and presenting financial statements must follow a set of guidelines to ensure consistency, completeness, and fairness of the statements. These guidelines are called “generally accepted accounting principles”. In absence of these ‘generally accepted accounting principles’ statements prepared may be un-understandable and misleading for the various groups of users. In addition to this, the financial statements prepared must also be authenticated as to their accuracy and fairness so that the confidence of the users is invoked. For this purpose it is necessary that these statements be reviewed and certified by an independent reviewer, commonly known as auditor.

## IMPORTANCE OF FINANCIAL STATEMENTS

The most important objective of financial statements is to present information for the use of different categories of persons as mentioned below:

1. **The Management:** The scope of modern business and the multiplicity of factors affecting the business operations call for an increasingly scientific and analytical approach in the management of such businesses. This is possible only when up-to-date, accurate and systematic financial records are available to the management team. Financial accounts and statements are of a very great help in understanding the progress, position and prospects of the business vis-a-vis the industry. Financial statements, by helping the management to be acquainted with the causes of the business results, enable them to formulate appropriate policies and courses of action for the future. Not only such financial statements - which are generally made public, but unpublished subsidiary accounts and statements also play an important role in policy-making and planning. Such subsidiary records provide more detailed, frank and revealing information than the financial statements. A comparative analysis of financial statements should enable management to see the trends in the progress and position of the enterprise and make suitable modifications in policies to avert unfavourable situations. It is through the release of such financial statements that the managements communicate their performance to various parties and justify their existence, and activities.
2. **The Public:** Business is a social entity. Various groups of the society, though not directly connected with business, are interested in the progress, position and prospects of a business enterprise. These groups are financial analysts, lawyers, trade associations, labour unions, financial press, students and teachers, etc. It is only through the published financial statements that these people can analyse, judge and comment upon the business enterprise. It should be noted that these financial statements are available to the public in case of joint stock companies. In case of proprietorships or partnerships, and other form of ownership no such statements are published or made available to the public.
3. **The Shareholders and the Lenders:** The financial statements serve as a useful guide for the shareholders and probable shareholders, the suppliers, and the lenders and probable lenders of a company. It is through a critical examination of the financial statements that these groups can come to know about the efficiency and effectiveness of the management and position, progress and prospects of the company. For this purpose, it is necessary that the financial statements should contain accurate, complete and systematic facts and figures so that these people can get a full and accurate idea regarding the present position and future of the company. Since published financial statements are the main bases available to such group of people to judge the affairs of the company, it has been found that some managements have been resorting to 'window dressing' in the presentation of these statements, to project a "better" than "what is" the position of the company.
4. **The Labour and Trade Unions:** In India, workers are entitled to bonus under the Payment of Bonus Act, depending upon the size of the profit as disclosed by audited Statement of Profit & Loss. Thus, Statement of Profit & Loss becomes greatly important to the workers. In wage negotiations also, the size of profits and the profitability achieved are greatly relevant.
5. **The Country and Economy:** Economic progress of country is to a great extent, associated with the rise and growth of joint stock companies. The divergence between ownership and management of such companies has provided an opportunity for unscrupulous and fraudulent persons to cheat and defraud the public. Such unscrupulous acts affect the industry and people in the region in which the company operates, to a significant extent. Such fraudulent activities impair the confidence of the general public in joint stock companies as forerunner of economic progress, and thus retard

economic growth of the country. The solution lies in raising the level of business and financial morality of the promoters and managements and in imparting knowledge about financial statements to the public so that they can examine and assess the real worth of the company and avoid being cheated by unscrupulous persons. The law endeavours to raise the level of business morality by compelling the companies to draw up financial statements in a clear systematic form and disclose certain minimum information. Such provisions increase the confidence of the public in joint stock companies, thus enabling faster economic progress of the country. This has all the more greater significance in under developed and developing countries. In such countries, capital is not only scarce but also shy. Malpractices on the part of promoters and managements, only help to increase the scarcity and shyness of capital, thus blocking economic progress. Published financial statements provide an opportunity for the critical assessment of the worth of company and thus protect innocent public, increase their confidence, and help faster economic progress.

Financial statements are also valuable for the various regulatory authorities. They can judge whether the regulations are being followed in word and spirit, and also whether the regulations are producing the desired effect or not, by evaluating the financial statements submitted by the companies.

### LIMITATIONS OF FINANCIAL STATEMENTS

Financial statements are the result of the accounting process which begins with recording of transactions. Accounting process involves recording, classifying and summarising business transactions. Financial statements are the result of the third process viz. summarising. The financial statements are based on certain accounting concepts and conventions which can not be said to be foolproof.

The following are the limitations of the financial statements:

- (i) Financial statements are essentially interim reports and therefore, cannot be final because the final gain or loss can be computed only at the termination of the business. Financial statements only reflect the progress and position of the business at frequent intervals during its life. The decision regarding the period of these statements is a matter of personal judgement and it gives rise to the problem of allocating expenditures over various periods. Again the existence of contingent liabilities, deferred revenue expenditure make them more imprecise.
- (ii) Financial statements though expressed in exact monetary terms, are not absolutely final and accurate. As the balance sheet is prepared on the basis of a going concern asset valuation represents neither the realisable value nor replacement costs. Further, they depend on the judgement of the management in respect of various accounting policies.
- (iii) The values ascribed to the assets presented in the statements depend upon the standards of the persons dealing with them. For instance, the method of depreciation, mode of amortisation of fixed assets, treatment of deferred revenue expenditure, all depend on the personal judgement of the accountant. The soundness of such judgement will necessarily depend upon his competence and integrity.
- (iv) Financial statements take into consideration only the financial factors. They fail to bring out the significance of non-financial factors which may have considerable bearing on the operating results and financial conditions of an enterprise. For example, public image of the enterprise, the calibre of its management, efficiency and loyalty of its workers etc.
- (v) It is not always possible to discover false figures in financial statements. Unscrupulous managements generally resort to 'window dressing' in the preparation of such statements.
- (vi) Financial statements are prepared primarily for shareholders. Other interested parties have to generally make many adjustments before they use them profitably.

- (vii) Quite often, financial statements do not disclose current worth of the business. Only historical facts are presented and the true current worth is not reflected.
- (viii) Owing to the fact that financial statements are compiled, on the basis of historical costs, while there is a marked decline in the value of the monetary unit and resultant rise in prices, the balance sheet loses its function as an index on current economic realities. Again the financial statements contain both historical and current costs items, hence figures are distorted. It is seen that holding gains and operating gains are added together, no differentiation is made between these two.

## RECENT TRENDS IN PRESENTING FINANCIAL STATEMENTS

In India every company has to present its financial statements in the form and contents as prescribed under Section 211 of the Companies Act, 1956. Keeping in view the complications of statutory forms in the Companies Act, now-a-days it is common practice to add the Statement of Profit & Loss and balance sheet drawn in statutory forms, some voluntary supplementary information in a simple manner as would be easily understood by a layman. This voluntary information may include the following:

- (i) **Statement of Profit and Loss and Balance Sheet:** Every company registered under the Companies Act shall prepare its Balance Sheet, Statement of Profit and Loss and notes thereto in accordance with the manner prescribed in Schedule VI to the Companies Act, 1956. To harmonise the disclosure requirements with the accounting standards and to converge with the new reforms, the Ministry of Corporate Affairs on 28th February 2011 replaced the existing Schedule VI of the Companies Act, 1956 with the revised one and 30th March 2011 made the revised Schedule VI applicable to all companies for the financial year commencing from 01st April 2011. The requirements of the Revised Schedule VI however, do not apply to companies as referred to in the proviso to Section 211 (1) and Section 211 (2) of the Act, i.e., any insurance or banking company, or any company engaged in the generation or supply of electricity or to any other class of company for which a form of Balance Sheet and Statement of Profit & Loss has been specified in or under any other Act governing such class of company.
- (ii) **Highlights:** Highlights are usually shown at the beginning of the annual report so that the users may come across the important facts of the company immediately as he opens the report. It may usually cover information about sales, production, profit before and after tax, capital projects, working capital, fixed assets, share capital, important landmarks of the year, etc.
- (iii) **Cash flow statements:** The preparation of cash flow statement has become mandatory now-a-days. A statement of cash flow, reports the cash receipts, cash payments and net changes in cash resulting from operating, investing and financing activities of an enterprise during a period in a format that reconciles the beginning and ending cash balances. It reports a net cash inflow or outflow for each activity and for the overall business.
- (iv) **Provision of important accounting ratios:** Accounting ratios show the inter-relationship which exists among various accounting data. Balance sheet is substantiated by the important ratios of the current year and of the last two years.
- (v) **Disclosure of accounting policies:** Presently, progressive companies disclose accounting policies in their published accounts on the basis of which they have prepared their financial statements. This is done with a view to giving better understanding of the financial statements to the public.
- (vi) **Use of charts, graphs and diagrams:** Many companies incorporate charts, graphs and diagrams in their published accounts. It is known as graphic method of presentation of information. It attracts the attention of the users more quickly and forcibly. Recently, graphs and diagrams have been

becoming very popular because they are considered to be the most effective media for disclosing trends and making comparisons over fairly long periods within a short space. The method of presenting information can effectively depict production costs, fluctuations in output and sales, components of cost of production and income, use of divisible profits as taxes, dividends, other appropriations and retained profits etc.

- (vii) **Use of schedules:** In order to make the balance sheet and Statement of Profit & Loss as compact as possible, separate schedules for different heads (e.g. share capital, reserves and surplus, secured loans, unsecured loans, current liabilities and provisions, fixed assets, investments, current assets, loans and advances, miscellaneous expenditure, etc.) are prepared and details regarding these heads as prescribed in the Companies Act are given in these schedules. This is done to make the balance sheet and Statement of Profit & Loss manageable within limited space. These schedules are properly numbered and reference of these is given in the balance sheet and Statement of Profit & Loss.
- (viii) **Impact of price level changes:** Since prices go on changing every day, financial statements based on historical costs do not reflect the effect of price level changes on the financial position and profitability of the company. In order to accommodate the effect of price level changes in the financial statements now-a-days many companies have started showing this effects on financial statements in a supplementary statement in addition to the conventional statements prepared on historical basis.
- (ix) **Rounding off of figures:** The Sachhar Committee has recommended that companies should be given the option to round off the figures of financial statements to the nearest thousand and/or hundred or ten rupees. This recommendation has been accepted and companies are now-a-days making use of rounding off of figures.

## ANALYSIS OF FINANCIAL STATEMENTS

Published financial statements are the only source of information about the activities and affairs of a business entity available to the public, shareholders, investors and creditors, and the governments. These various groups are interested in the progress, position and prospects of such entity in various ways. But these statements howsoever, correctly and objectively prepared, by themselves do not reveal the significance, meaning and relationship of the information contained therein. For this purpose, financial statements have to be carefully studied, dispassionately analysed and intelligently interpreted. This enables a forecasting of the prospects for future earnings, ability to pay interest, debt maturities both current as well as long-term, and probability of sound financial and dividend policies. According to Myers, “financial statement analysis is largely a study of relationship among the various financial factors in business as disclosed by a single set of statements and a study of the trend of these factors as shown in a series of statements”.

Thus, analysis of financial statements refers to the treatment of information contained in the financial statement in a way so as to afford a full diagnosis of the profitability and financial position of the firm concerned.

The process of analysing financial statements involves the rearranging, comparing and measuring the significance of financial and operating data. Such a step helps to reveal the relative significance and effect of items of the data in relation to the time period and/or between two organisations.

Interpretation, which follows analysis of financial statements, is an attempt to reach to logical conclusion regarding the position and progress of the business on the basis of analysis. Thus, analysis and interpretation of financial statements are regarded as complimentary to each other.

## OBJECTIVES OF FINANCIAL STATEMENT ANALYSIS

Financial statement analysis is very much helpful in assessing the financial position and profitability of a concern. The main objectives of analysing the financial statements are as follows:

- (i) The analysis would enable the present and the future earning capacity and the profitability of the concern.
- (ii) The operational efficiency of the concern as a whole as well as department wise can be assessed. Hence the management can easily locate the areas of efficiency and inefficiency.
- (iii) The solvency of the firm, both short-term and long-term, can be determined with the help of financial statement analysis which is beneficial to trade creditors and debenture holders.
- (iv) The comparative study in regard to one firm with another firm or one department with another department is possible by the analysis of financial statements.
- (v) Analysis of past results in respects of earning and financial position of the enterprise is of great help in forecasting the future results. Hence it helps in preparing budgets.
- (vi) It facilitates the assessments of financial stability of the concern.
- (vii) The long-term liquidity position of funds can be assessed by the analysis of financial statements.

## LIMITATIONS OF FINANCIAL STATEMENT ANALYSIS

- (i) Owing to the fact that financial statements are compiled on the basis of historical costs, while there is a market decline in the value of the monetary unit and resultant rise in prices, the figures in the financial statement loses its functions as an index on current economic realities. Again the financial statements contain both items. So an analysis of financial statements can not be taken as an indicator for future forecasting and planning.
- (ii) Analysis of financial statements is a tool which can be used profitably by an expert analyst but may lead to faulty conclusions if used by unskilled analyst. So the result can not be taken as judgements or conclusions.
- (iii) Financial statements are interim reports and therefore can not be final because the final gain or loss can be computed only at the termination of the business. Financial statement reflects the progress of the position of the business so analysis of these statements will not be a conclusive evidence of the performance of the business.
- (iv) Financial statements though expressed in exact monetary terms are not absolutely final and accurate and it depends upon the judgement of the management in respect of various accounting methods. If there is change in accounting methods, the analysis may have no comparable basis and the result will be biased.
- (v) The reliability of analysis depends on the accuracy of the figures used in the financial statements. The analysis will be vitiated by manipulations in the income statement or balance sheet and accounting procedure adopted by the accountant for recording.
- (vi) The results for indications derived from analysis of financial statements may be differently interpreted by different users.
- (vii) The analysis of financial statement relating to a single year only will have limited use. Hence the analysis may be extended over a number of years so that results may be compared to arrive a meaningful conclusion.
- (viii) When different firms are adopting different accounting procedures, records, policies and different



items under similar headings in the financial statements, the comparison will be more difficult. It will not provide reliable basis to assess the performance, efficiency, profitability and financial condition of the firm as compared to industry as a whole.

- (ix) There are different tools of analysis available for the analyst. However, which tool is to be used in a particular situation depends on the skill, training, and expertise of the analyst and the result will vary accordingly.

## TYPES OF FINANCIAL STATEMENT ANALYSIS

A distinction may be drawn between various types of financial analysis either on the basis of material used for the same or according to the modus operandi or according to the objective of the analysis.

### 1. According to Nature of the Analyst

- 1.1. External Analysis:** It is made by those who do not have access to the detailed records of the company. This group, which has to depend almost entirely on published financial statements, includes investors, credit agencies and governmental agencies regulating a business in nominal way. The position of the external analyst has been improved in recent times owing to the governmental regulations requiring business undertakings to make available detailed information to the public through audited accounts.
- 1.2. Internal Analysis:** The internal analysis is accomplished by those who have access to the books of accounts and all other information related to business. While conducting this analysis, the analyst is a part of the enterprise he is analysing. Analysis for managerial purposes is an internal type of analysis and is conducted by executives and employees of the enterprise as well as governmental and court agencies which may have regulatory and other jurisdiction over the business.

### 2. According to Modus Operandi of Analysis

- 2.1. Horizontal Analysis:** When financial statements for a number of years are reviewed and analysed, the analysis is called 'horizontal analysis'. As it is based on data from year to year rather than on one date or period of time as a whole, this is also known as 'dynamic analysis'. This is very useful for long term trend analysis and planning.
- 2.2. Vertical Analysis:** It is frequently used for referring to ratios developed for one date or for one accounting period. Vertical analysis is also called 'Static Analysis'. This is not very conducive to proper analysis of the firm's financial position and its interpretation as it does not enable to study data in perspective. This can only be provided by a study conducted over a number of years so that comparisons can be effected. Therefore, vertical analysis is not very useful.

### 3. According to the Objective of the Analysis

On this basis the analysis can be long-term and short-term analysis:

- 3.1. Long-term Analysis:** This analysis is made in order to study the long-term financial stability, solvency and liquidity as well as profitability and earning capacity of a business. The objective of making such an analysis is to know whether in the long-term the concern will be able to earn a minimum amount which will be sufficient to maintain a reasonable rate of return on the investment so as to provide the funds required for modernisation, growth and development of the business.

- 3.2. Short-term Analysis:** This analysis is made to determine the short-term solvency, stability, liquidity and earning capacity of the business. The objective is to know whether in the short-run a business enterprise will have adequate funds readily available to meet its short-term requirements and sufficient borrowing capacity to meet contingencies in the near future.

## METHODS OF ANALYSING FINANCIAL STATEMENTS

The analysis of financial statements consists of a study of relationship and trends, to determine whether or not the financial position and results of operations as well as the financial progress of the company are satisfactory or unsatisfactory. The analytical methods or devices, listed below, are used to ascertain or measure the relationships among the financial statements items of a single set of statements and the changes that have taken place in these items as reflected in successive financial statements. The fundamental objective of any analytical method is to simplify or reduce the data under review to more understandable terms.

Analytical methods and devices used in analysing financial statements are as follows:

1. Comparative Statements
2. Common Size Statements
3. Trend Ratios
4. Ratio Analysis
5. Cash Flow Statements
6. Fund Flow Statement.

### 1. Comparative Statements

These financial statements are so designed as to provide time perspective to the various elements of financial position contained therein. These statements give the data for all the periods stated so as to show:

- (a) Absolute money values of each item separately for each of the periods stated.
- (b) Increase and decrease in absolute data in terms of money values.
- (c) Increase and decrease in terms of percentages.
- (d) Comparison expressed in ratios.
- (e) Percentages of totals.

Such comparative statements are necessary for the study of trends and direction of movement in the financial position and operating results. This calls for a consistency in the practice of preparing these statements, otherwise comparability may be distorted. Comparative statements enable horizontal analysis of figures.

**(a) Comparative Balance Sheet:** A comparative balance sheet shows the balance of accounts of assets and liabilities on different dates and also the extent of their increases or decreases between these dates throwing light on the trends and direction of changes in the position over the periods. This helps in predicting about the position of the business in future. A specimen of the comparative balance sheet is given below:

**Ram & Sons.**  
**Comparative Balance Sheet**  
**(as on 31st March, 2012 and 2013)**

<i>Particulars</i>	<i>31.3.2012</i>	<i>31.3.2013</i>	<i>Increase (+) or Decrease (-) in amounts</i>	<i>Increase (+) or Decrease (-) in %age</i>
	₹	₹	₹	
<b>Current Assets</b>				
Cash in hand and at bank	1,18,000	10,000	(-)1,08,000	(-) 92
Receivable on customer's accounts and bills	2,09,000	1,90,000	(-) 19,000	(-) 9
Inventory of materials, goods in process and finished stock	1,60,000	1,30,000	(-) 30,000	(-) 19
Prepaid expenses	3,000	3,000	—	—
Other current assets	<u>29,000</u>	<u>10,000</u>	<u>(-) 19,000</u>	<u>(-) 66</u>
<b>Total Current Assets</b>	<u>5,19,000</u>	<u>3,43,000</u>	<u>(-)1,76,000</u>	<u>(-) 34</u>
<b>Fixed Assets</b>				
Land and buildings	2,70,000	1,70,000	(-) 1,00,000	(-) 37
Plant and machinery	3,10,000	7,86,000	(+) 4,76,000	(+) 150
Furniture and fixtures	9,000	18,000	(+) 9,000	(+) 100
Other fixed assets	<u>20,000</u>	<u>30,000</u>	(+) 10,000	(+) 50
<b>Total Fixed Assets</b>	<u>6,09,000</u>	<u>10,04,000</u>	(+) 3,95,000	(+) 65
Investments	<u>46,000</u>	<u>59,000</u>	(+) 13,000	(+) 28
<b>Total Assets</b>	<u>11,74,000</u>	<u>14,06,000</u>	(+) 2,32,000	(+) 20
<b>Liabilities and Capital</b>				
<b>Current Liabilities</b>				
Accounts payable (sundry trade creditors and bills payable)	2,55,000	1,17,000	(-)1,38,000	(-) 54
Other short-term liabilities	<u>7,000</u>	<u>10,000</u>	(+) 3,000	(+) 43
<b>Total Current Liabilities</b>	<u>2,62,000</u>	<u>1,27,000</u>	<u>(-)1,35,000</u>	<u>(-) 52</u>
Debentures	50,000	1,00,000	(+) 50,000	(+) 100
Long-term loans on mortgage	<u>1,50,000</u>	<u>2,25,000</u>	(+) 75,000	(+) 50
<b>Total Liabilities</b>	<u>4,62,000</u>	<u>4,52,000</u>	<u>(-) 10,000</u>	<u>(-) 2</u>
<b>Capital</b>				
Equity share capital	4,00,000	6,00,000	(+)2,00,000	(+) 50
Reserve and surplus	<u>3,12,000</u>	<u>3,54,000</u>	(+) 42,000	(+) 13
<b>Total Liabilities and Capital</b>	<u>11,74,000</u>	<u>14,06,000</u>	(+)2,32,000	(+) 20

An analysis and interpretation of the above balance sheet reveals:

1. Current assets have decreased by ₹1,76,000 between 2012 and 2013, while current liabilities have

decreased only by ₹1,35,000. But this has no adverse affect on current ratio because the percentage decrease in current assets (34%) is much less than the percentage decrease in current liabilities (52%).

2. Non current assets have increased by ₹3,95,000, major increase being a plant and machinery of ₹4,76,000, which amounts to the increase in production and profit earning capacities. Increase in fixed assets appears to have been partly financed by an increase in equity capital (₹2,00,000), partly by release of working capital, and partly by increase in debentures and long-term borrowings (₹1,25,000).
3. The increase in reserves and surpluses (₹42,000) may be the result of profits retained, and has gone to account for increase in long-term loans and fixed assets.
4. There has been a drastic fall in cash balance (₹1,08,000). This reflects an adverse cash position.

**(b) Comparative Statement of Profit and Loss or Income Statement:** Comparative income statement shows the operating results for a number of accounting periods and changes in the data significantly in absolute periods and changes in the data significantly in absolute money terms as well as in relative percentage. A specimen income statement is given below:

**Ram & Sons**  
**Comparative Statement of Income**  
**(for year ended 31st March, 2012 and 2013)**

(1)	31.3.2012	31.3.2013	Amount of (+) increase or decrease (-) during 2012-13	Percentage (+) increase or decrease (-) during 2012-13
(1)	(2)	(3)	(4)	(5)
	₹	₹	₹	
Net sales	8,50,000	9,52,000	(+ 1,02,000)	(+ 12)
Cost of goods sold	<u>5,25,000</u>	<u>6,00,000</u>	<u>(+) 75,000</u>	<u>(+) 14.3</u>
Gross Profit on Sales	<u>3,25,000</u>	<u>3,52,000</u>	<u>(+) 27,000</u>	<u>(+) 8.3</u>
Operating Expenses:				
Selling Expenses				
Advertising	15,000	20,000	(+ 5,000)	(+ 33.3)
Delivery expenses	20,000	18,000	(-) 2,000	(-) 10
Salesmen salaries and Commission	1,50,000	1,53,000	(+ 3,000)	(+ 2)
Packing and freight expenses	14,000	15,000	(+ 1,000)	(+ 7)
Other selling expenses	<u>20,000</u>	<u>23,000</u>	<u>(+) 3,000</u>	<u>(+) 15</u>
Total Selling Expenses	<u>2,19,000</u>	<u>2,29,000</u>	<u>(+) 10,000</u>	<u>(+) 4.5</u>
General and Administrative Expenses				
Office salaries	58,000	63,800	(+ 5,800)	(+ 10)
Office expenses	2,000	4,000	(+ 2,000)	(+ 100)
Stationery and postage	1,000	2,000	(+ 1,000)	(+ 100)

Insurance	2,000	1,000	(-) 1,000	(-) 100
Doubtful debts	<u>3,000</u>	<u>4,000</u>	(+) 1,000	(+) 33
Total administrative and general expenses	<u>66,000</u>	<u>74,800</u>	(+) 8,800	(+) 13.3
Total Operating Expenses	<u>2,85,000</u>	<u>3,03,800</u>	(+) 18,800	(+) 6.6
Operating Profit	<u>40,000</u>	<u>48,200</u>	(+) 8,200	(+) 20.5
Other Incomes				
Interest income	12,000	12,000	-	-
Rent income	8,000	16,000	(+) 8,000	(+) 100
Discount received	<u>12,000</u>	<u>18,000</u>	(+) 6,000	(+) 50
Total Other Incomes	<u>32,000</u>	<u>46,000</u>	(+) 14,000	(+) 43.7
Total of Operating Profit and Other Income	<u>72,000</u>	<u>94,200</u>	(+) 22,200	(+) 30.8
Other Expenses				
Interest expense	26,000	17,000	(-) 9,000	(-) 34.6
Sales discount	<u>8,000</u>	<u>7,000</u>	(-) 1,000	(-) 12.5
Total Other Expenses	<u>34,000</u>	<u>24,000</u>	(-) 10,000	(-) 29.4
Income before income tax	38,000	70,200	(+) 32,200	(+) 84.7
Income tax	<u>19,000</u>	<u>31,000</u>	(+) 12,000	(-) 63.1
Income after Income Tax	<u>19,000</u>	<u>39,200</u>	(+) 20,200	(+) 106.3

A study of the income statements reveals that there has been an increase of ₹1,02,000 in sales, but at the same time cost of goods sold has also increased by ₹75,000. In relative terms sales increased by 12% while cost of goods sold by 14.3%. It means either the addition in sales has been due to lowering of sales price or the increase in cost is due to operational inefficiency. Similarly, increase in advertising has been much more (33%) than the increase in sales (12%). But in absolute terms the amount of increase is only ₹5,000. Operating profits have shown an increase of 20.5% over 2012-13 but in absolute terms profits have increased only by ₹8,200.

There has been a substantial increase in other incomes both in relative (43.7%) as well as absolute terms (₹14,000). Similarly, there has been substantial decrease in other expenses (29.4% and ₹10,000). These items have gone to increase the total income before tax for the year by ₹32,200, thus reflecting that the management has been more concerned for the other incomes than the operating profits.

## 2. Common-Size Statements

In the comparative financial statements it is difficult to comprehend the changes over the years in relation to total assets, total liabilities and capital or total net sales. This limitation of comparative statements make comparison between two or more firms of an industry impossible because there is no common base of comparison for absolute figures. Again, for an interpretation of underlying causes of changes over time period a vertical analysis is required and this is not possible with comparative statements.

Common size financial statements are those in which figures reported are converted into percentages to some common base. For this, items in the financial statements are presented as percentages or ratios to total of the items and a common base for comparison is provided. Each percentage shows the relation of the individual item to its respective total.

- (a) **Common-size Income Statement:** In a common size income statement the sales figure is assumed to be equal to 100 and all other figures of costs or expenses are expressed as percentages of sales. A comparative income statement for different periods helps to reveal the efficiency or otherwise of incurring any cost or expense. If it is being prepared for two firms, it shows the relative efficiency of each cost item for the two firms.
- (b) **Common-size Balance Sheet:** In a common size balance sheet, total of assets or liabilities is taken as 100 and all the figures are expressed as percentage of the total. Comparative common size balance sheets for different periods help to highlight the trends in different items. If it is prepared for different firms in an industry, it facilitates to judge the relative soundness and helps in understanding their financial strategy.

A comparative common-size income statement and balance sheet for two firms in an industry is illustrated below:

**Old Guards and Young Ones Companies**  
**Comparative Income Statement**  
**Period ending 31st March, 2013**

	<i>Old Guards Co.</i>		<i>Young Ones Co.</i>	
	<i>Amount</i> ₹	<i>% of</i> <i>sales</i>	<i>Amount</i> ₹	<i>% of</i> <i>sales</i>
Net sales	25,38,000	100.0	9,70,000	100.0
Cost of goods sold	<u>14,22,000</u>	<u>56.0</u>	<u>4,75,000</u>	<u>49.0</u>
Gross Profit on Sales	<u>11,16,000</u>	<u>44.0</u>	<u>4,95,000</u>	<u>51.0</u>
Selling expenses	7,20,000	28.4	2,72,000	28.0
General and administrative Expenses	<u>1,84,000</u>	<u>7.2</u>	<u>97,000</u>	<u>10.0</u>
Total Operating Expenses	<u>9,04,000</u>	<u>35.6</u>	<u>3,69,000</u>	<u>38.0</u>
Operating profit	2,12,000	8.4	1,26,000	13.0
Other income	<u>26,000</u>	<u>1.0</u>	<u>10,000</u>	<u>1.0</u>
	2,38,000	9.4	1,36,000	14.0
Other expenses	<u>40,000</u>	<u>1.6</u>	<u>29,000</u>	<u>3.0</u>
Income before tax	1,98,000	7.8	1,07,000	11.0
Income-tax	<u>68,000</u>	<u>2.7</u>	<u>28,000</u>	<u>2.9</u>
Net Income after tax	<u>1,30,000</u>	<u>5.1</u>	<u>79,000</u>	<u>8.1</u>

**Comparative Balance Sheets**  
**As on 31st March, 2013**

	<i>Old Guards Co.</i>		<i>Young Ones Co.</i>	
	<i>Amount</i> ₹	<i>% of</i> <i>total</i>	<i>Amount</i> ₹	<i>% of</i> <i>total</i>
Assets				
Current Assets:				
Cash	54,000	2.7	72,000	7.0
Sundry debtors	4,40,000	22.0	2,26,000	22.0

Trading stock	2,00,000	10.0	1,74,000	17.0
Prepaid expenses	22,000	1.0	21,000	2.0
Other current assets	<u>20,000</u>	<u>1.0</u>	<u>21,000</u>	<u>2.0</u>
Total Current Assets	7,36,000	36.7	5,14,000	50.0
Fixed Assets (less accumulated depreciation)	<u>12,70,000</u>	<u>63.3</u>	<u>5,13,000</u>	<u>50.0</u>
Total	<u>20,06,000</u>	<u>100.0</u>	<u>10,27,000</u>	<u>100.0</u>
Liabilities and Capital:				
Current Liabilities:				
Sundry creditors	84,000	4.2	1,34,000	13.0
Other current liabilities	<u>1,56,000</u>	<u>7.8</u>	<u>62,000</u>	<u>6.0</u>
Total Current Liabilities	2,40,000	12.0	1,96,000	19.0
Mortgage debentures	<u>4,50,000</u>	<u>22.4</u>	<u>3,18,000</u>	<u>31.0</u>
Total Liabilities	6,90,000	34.4	5,14,000	50.0
Capital and reserves	<u>13,16,000</u>	<u>65.6</u>	<u>5,13,000</u>	<u>50.0</u>
Total Liabilities and Capital	<u>20,06,000</u>	<u>100.0</u>	<u>10,27,000</u>	<u>100.0</u>

The following conclusions can be drawn from a careful analysis of the above financial statements:

- (1) Old Guards company has a better and efficient credit and collection system because its debtors and trading stock amounts to 32% of total assets as compared to 39% in case of Young Ones Company.
- (2) The cash position of Young Ones Company (7% of total assets) compares favourably with that of Old Guards (2.7%).
- (3) The turnover of Old Guards is larger (₹25,38,000) than Young Ones Company (₹9,70,000), but the cost of goods absorbs a larger i.e. 56% of net sales compared to 49% in case of Young Ones Company. This reflects a better pricing mark-up by Young Ones.
- (4) The selling, and administrative and general expenses are 35.6% of net sales in case of Old Guards while 38% in case of Young Ones. Administration costs in Young Ones is higher as compared to Old Guards, reflecting a highly paid or over staffed administrative function.
- (5) Old Guards appear to be more traditionally financed with shareholders equity of 65.6% of total liabilities as against 50% in case of Young Ones. This reflects the financial value ability of Young Ones.
- (6) The fixed assets of Old Guards company is larger (₹12,70,000) than of Young Ones Company (₹5,13,000). But, if this is compared with turnover that of the two companies, we find that Old Guards has a lower asset turnover (50%) than that of Young Ones Company (53%). This reflects a better asset utilisation by Young Ones Company.

### 3. Trend Ratios

Trend ratios can be defined as index numbers of the movements of the various financial items in the financial statements for a number of periods. It is a statistical device applied in the analysis of financial statements to reveal the trend of the items with the passage of time. Trend ratios show the nature and rate of movements in various financial factors. They provide a horizontal analysis of comparative statements and reflect the behaviour of various items with the passage of time. Trend ratios can be graphically presented for a better

understanding by the management. They are very useful in predicting the behaviour of the various financial factors in future. However, it should be noted that conclusions should not be drawn on the basis of a single trend. Trends of related items should be carefully studied, before any meaningful conclusion is arrived at. Since trends are sometimes significantly affected by externalities, i.e. reasons extraneous to the organisations, the analyst must give due weightage to such extraneous factors like government policies, economic conditions, changes in income and its distribution, etc.

**Computation of Trend Percentages:** For calculation of the trend of data shown in the financial statements, it is necessary to have statements for a number of years, and then proceed as under:

- (1) Take one of the statements as the base with reference to which all other statements are to be studied. In selection of the best statement, it should be noted that it belongs to a 'normal' year of business activities. Statement relating to an 'abnormal' year should not be selected as base, otherwise the trend calculated will be meaningless.
- (2) Every item in the base statement is stated as 100.
- (3) Trend percentage of each item in other statement is calculated with reference to same item in the base statement by using the following formula:

$$\frac{\text{Absolute Value of item (say cash) in other statements}}{\text{Absolute Value of same item (cash) in base statement}} \times 100$$

**Limitations of Trend Ratios:** It should be noted that trend ratios are not calculated for all items. They are calculated only for logically connected items enabling meaningful analysis. For example, trend ratios of sales become more revealing when compared with the trend ratios of fixed assets, cost of goods sold and operating expenses. Trend ratios have the following limitations:

- (a) If the accounting practices have not been consistently followed year after year, these ratios become incomparable and thus misleading.
- (b) Trend ratios do not take into consideration the price level changes. An increasing trend in sales might not be the result of larger sales volume, but may be because of increased sales price due to inflation. In order to avoid this limitation, figures of the current year should be first adjusted for price level changes from the base year and then the trend ratios be calculated.
- (c) Trend ratios must be always read with absolute data on which they are based, otherwise the conclusions drawn may be misleading. It may be that a 100% change in trend ratio may represent an absolute change of ₹1,000 only in one item, while a 20% change in another item may mean an absolute change of ₹1,00,000.
- (d) The trend ratios have to be interpreted in the light of certain non-financial factors like economic conditions, government policies, management policies etc.

### Illustration 1

From the following information extracted from the Balance Sheets of Star Ltd. for four previous financial years, calculate the trend percentages taking 2009-10 as the base year:

	2009-10	2010-11	2011-12	2012-13
			(₹ in lakhs)	
Current Assets:				
Cash	200	240	400	220
Bank	260	300	200	240



Debtors	400	600	1,000	1,600
Stock	800	1,200	1,800	2,000
Non-Current Assets:				
Building	1,000	1,200	1,200	1,200
Plant and Machinery	<u>2,000</u>	<u>2,400</u>	<u>2,400</u>	<u>2,800</u>
	<u>4,660</u>	<u>5,940</u>	<u>7,000</u>	<u>8,060</u>

**Solution:****Trend Percentages**

	2009-10	2010-11	2011-12	2012-13	2009-10	2010-11	2011-12	2012-13
	(₹ in lakhs)				(Trend percentage)			
<b>Current assets:</b>								
Cash	200	240	400	220	100	120.00	200.00	110.00
Bank	260	300	200	240	100	115.38	76.92	92.30
Debtors	400	600	1,000	1,600	100	150.00	250.00	400.00
Stock	800	1,200	1,800	2,000	100	150.00	225.00	250.00
<b>Fixed Assets:</b>								
Building	1,000	1,200	1,200	1,200	100	120.00	120.00	120.00
Plant and Machinery	<u>2,000</u>	<u>2,400</u>	<u>2,400</u>	<u>2,800</u>	<u>100</u>	<u>120.00</u>	<u>120.00</u>	<u>140.00</u>
	<u>4,660</u>	<u>5,940</u>	<u>7,000</u>	<u>8,060</u>	<u>100</u>	<u>127.46</u>	<u>150.21</u>	<u>172.96</u>

**4. RATIO ANALYSIS**

Ratio analysis is used to evaluate relationships among financial statement items. The ratios are used to identify trends over time for one organisation or to compare two or more organisations at one point in time. Ratio analysis focuses on three key aspects of a business: liquidity, profitability, and solvency.

Ratio Analysis is a important tool for any business organisation. The computation of ratios facilitates the comparison of firms which differ in size. Ratios can be used to compare a firm's financial performance with industry averages. In addition, ratios can be used in a form of trend analysis to identify areas where performance has improved or deteriorated over time.

Ratio are the symptoms like the blood pressure, the pulse or the temperature of an individual. Just as in the case of an individual, a doctor or a valid by reading the pulse of a patient or by studying the blood pressure or the temperature of a patient can diagnose the cause of his ailment, so also a financial analyst through ration analysis of the employment of resources and its overall financial position. Just as in medical science the symptoms are passive factors, to diagnose them properly depends upon the efficiency and the expertise of the doctor, so also to derive right conclusions from ratio analysis will depend upon the efficiency and depth of understanding of the financial analyst.

**ACCOUNTING RATIOS**

An absolute figure often does not convey much meaning. Generally, it is only in the light of other information that significance of a figure is realised. A weighs 70 kg. Is he fat? One cannot answer this question unless one knows A's age and height. Similarly, a company's profitability cannot be known unless together with the

amount of profit and the amount of capital employed. The relationship between the two figures expressed arithmetically is called a ratio. The ratio between 4 and 10 is 0.4 or 40% or 2:5. "0.4", "40%" and "2:5" are ratios. Accounting ratios are relationships, expressed in arithmetical terms, between figures which have a cause and effect relationship or which are connected with each other in some other manner.

Accounting ratios are a very useful tool for grasping the true message of the financial statements and understanding them. Ratios naturally should be worked out between figures that are significantly related to one another. Obviously no purpose will be served by working out ratios between two entirely unrelated figures, such as discount on debentures and sales. Ratios may be worked out on the basis of figures contained in the financial statements.

Ratios provide clues and symptoms of underlying conditions. They act as indicators of financial soundness, strength, position and status of an enterprise.

Interpretation of ratios form the core part of ratio analysis. The computation of ratio is simply a clerical work but the interpretation is a taste requiring art and skill. The usefulness of ratios dependent on the judicious interpretations.

## USES OF RATIO ANALYSIS

A comparative study of the relationship, between various items of financial statements, expressed as ratios, reveals the profitability, liquidity, solvency as well as the overall financial position of the enterprises.

Ratio analysis helps to analyse and understand the financial health and trend of a business, its past performance makes it possible to have forecast about future state of affairs of the business. Interfirm comparison and intrafirm comparison becomes easier through the analysis. Past performance and future projections could be reviewed through the ratio analysis easily. Management uses the ratio analysis in exercising control in various areas viz. budgetary control, inventory control, financial control etc. and fixing the accountability and responsibility of different departmental heads for accelerated and planned performance. It is useful for all the constituents of the company as discussed under:

1. **Management:** Management is interested in ratios because they help in the formulation of policies, decision-making and evaluating the performances and trends of the business and its various segments.
2. **Shareholders:** With the application of ratio analysis to financial statements, shareholders can understand not only the working and operational efficiency of their company, but also the likely effect of such efficiency on the net worth and consequently the price of their shares in the Stock Exchange. With the help of such analysis, they can form opinion regarding the effectiveness or otherwise of the management functions.
3. **Investors:** Investors are interested in the operational efficiency, earning capacities and 'financial health' of the business. Ratios regarding profitability, debt-equity, fixed assets to net worth, assets turnover, etc., are some measures useful for the investors in making decisions regarding the type of security and industry in which they should invest.
4. **Creditors:** Creditors can reasonably assure themselves about the solvency and liquidity position of the business by using ratio-analysis. Such analysis helps to throw light on the repayment policy and capability of an enterprise.
5. **Government:** The Government is interested in the 'financial health' of the business. Carefully worked ratios will reflect the policy of the management and its consistency or otherwise with the

overall regional and national economic policies. Such ratios help in better understanding of cost-structures and may justify price controls by the Government to save the consumers.

6. **Analysts:** Ratio analysis is the most important technique available to the financial analysis to study the financial statements to compare the progress and position of various firms with each other and vis-a-vis the industry.

## CLASSIFICATION OF RATIOS

Different ratios calculated from different financial figures carry different significance for different purposes. For example, for the creditors liquidity and solvency ratios are more significant than the profitability ratios, which are of prime importance for an investor. This means that ratios can be grouped on different basis depending upon their significance. The classification is rather crude and unsuitable to determine the profitability or financial position of the business. In general, accounting ratios may be classified on the following basis leading to overlap in many cases.

### 1. ACCORDING TO THE STATEMENT UPON WHICH THEY ARE BASED

Ratios can be classified into three groups according to the statements from which they are calculated:

- 1.1 **Balance Sheet Ratios:** They deal with relationship between two items appearing in the balance sheet, e.g., current assets to current liability or current ratio. These ratios are also known as financial position ratios since they reflect the financial position of the business.
- 1.2 **Operating Ratios or Profit and Loss Ratios:** These ratios express the relationship between two individual or group of items appearing in the income or profit and loss statement. Since they reflect the operating conditions of a business, they are also known as operating ratios, e.g., gross profit to sales, cost of goods sold to sales, etc.
- 1.3 **Combined Ratios:** These ratios express the relationship between two items, each appearing in different statements, i.e., one appearing in balance sheet while the other in income statement, e.g., return on investment (net profit to capital employed); Assets turnover (sales) ratio, etc. Since both the statements are involved in the calculation of each of these ratios, they are also known as inter-statement ratios.

Since the balance sheet figures refer to one point of time, while the income statement figures refer to events over a period of time, care must be taken while calculating combined or inter-statement ratios. For example while computing assets turnover ratio, average assets should be taken on the basis of opening and ending balance sheets.

### 2. CLASSIFICATION ACCORDING TO "IMPORTANCE"

This classification has been recommended by the British Institute of Management for inter-firm comparisons. It is based on the fact that some ratios are more relevant and important than others in the process of comparisons and decision-making. Therefore, ratios may be treated as primary or secondary.

- 2.1 **Primary Ratio:** Since profit is primary consideration in all business activities, the ratio of profit to capital employed is termed as 'Primary Ratio'. In business world this ratio is known as "Return on Investment". It is the ratio which reflects the validity or otherwise of the existence and continuation of the business unit. In case if this ratio is not satisfactory over long period, the business unit cannot justify its existence and hence, should be closed down. Because of its importance for the very existence of the business unit it is called 'Primary Ratio'.

**2.2 Secondary Ratios:** These are ratios which help to analyse the factors affecting “Primary Ratio”. These may be sub-classified as under:

**2.2.1 Supporting Ratios:** These are ratios which reflect the profit-earning capacities of the business and thus support the “Primary Ratio”. For example sales to operating profit ratio reflects the capacity of contribution of sales to the profits of the business. Similarly, sales to assets employed reflects the effectiveness in the use of assets for making sales, and consequently profits.

**2.2.2 Explanatory Ratios:** These are ratios which analyse and explain the factors responsible for the size of profit earned. Gross profit to sales, cost of goods sold to sales, stock-turnover, debtors turnover are some of the ratios which can explain the size of the profits earned. Where these ratios are calculated to highlight the effect of specific activity, they are termed as ‘Specific Explanatory Ratios’. For example, the effect of credit and collection policy is reflected by debtors turnover ratio.

### 3. FUNCTIONAL CLASSIFICATION

The classification of ratios according to the purpose of its computation is known as functional classification. On this basis ratios are categorised as follows:

- 3.1 Profitability Ratios:** Profitability ratios gives some yardstick to measure the profit in relative terms with reference to sales, assets or capital employed. These ratios highlight the end result of business activities. The main objective is to judge the efficiency of the business.
- 3.2 Turnover Ratios or Activity Ratios:** These ratios are used to measure the effectiveness of the use of capital/assets in the business. These ratios are usually calculated on the basis of sales or cost of goods sold and are expressed in integers rather than as percentages.
- 3.3 Financial Ratios or Solvency Ratios:** These ratios are calculated to judge the financial position of the organisation from short-term as well as long-term solvency point of view. Thus, it can be sub-divided into: (a) Short-term Solvency Ratios (Liquidity Ratios) and (b) Long-term Solvency Ratios (Capital Structure Ratios).
- 3.4 Market Test Ratios:** These are of course, some profitability ratios, having a bearing on the market value of the shares.

The classification of the structure of ratio analysis cuts across the various bases on which it has been made. The determination of activity and profitability ratios are drawn partly from the balance sheet and partly from the Statement of Profit & Loss. Ratios satisfying the test of liquidity or solvency partake the items of both the balance sheet and income statement, some activity ratios coincide with those satisfying the test of liquidity, some leverage ratios belong to the category of income statement. This clearly indicates that one basis of classification crosses into other category. However, for the purpose of consideration of individual ratios, a classification of ratio on functional basis is discussed hereunder:

#### 3.1 Profitability Ratios

A measure of ‘profitability’ is the overall measure of efficiency. In general terms efficiency of business is measured by the input-output analysis. By measuring the output as a proportion of the input, and comparing result of similar other firms or periods the relative change in its profitability can be established.

The income (output) as compared to the capital employed (input) indicates profitability of a firm. Thus the chief profitability ratio is:

$$\frac{\text{Operating Profit (net margin)}}{\text{Operating Capital Employed}} \times 100$$

Once this is known, the analyst compares the same with the profitability ratio of other firms or periods. Then, when he finds some contrast, he would like to have details of the reasons. These questions are sought to be answered by working out relevant ratios. The main profitability ratio and all the other sub-ratios are collectively known as 'profitability ratios'.

Profitability ratio can be determined on the basis of either investments or sales. Profitability in relation to investments is measured by return on capital employed, return on shareholders' funds and return on assets. The profitability in relation to sales are profit margin (gross and net) and expenses ratio or operating ratio.

### 3.1.1 Return on Investment

This ratio is also known as overall profitability ratio or return on capital employed. The income (output) as compared to the capital employed (input) indicates the return on investment. It shows how much the company is earning on its investment. This ratio is calculated as follows:

$$\text{Return on Investment} = \frac{\text{Net Operating Profit}}{\text{Capital Employed}} \times 100$$

**Operating profit means profit before interest and tax.** In arriving at the profit, interest on loans is treated as part of profit (but not the interest on bank overdraft or other short-term finance) because loans themselves are part of the input, i.e., the capital employed and hence, the interest on loans should also be part of the output. All non-business income or rather income not related to normal operations of the company should be excluded. Thus net operating profit figure shall be IBIT, i.e., Income Before Interest and Taxation (excluding non-business income).

The income figure is reckoned before taxation because the amount of tax has no relevance to the operational efficiency. Both interest and taxation are appropriations of profit and do not reflect operational efficiency. Moreover, to compare the profitability of two different organisations having different sources of finance and different tax burden, the profit before interest and taxation is the best measure.

**Capital employed comprises share capital and reserves and surplus, long-term loans minus non-operating assets and fictitious assets. It can also be represented as net fixed assets plus working capital (i.e. current assets minus current liabilities).**

$$\text{Capital employed} = \text{Share Capital} + \text{Reserve and Surplus} + \text{Long-term Loans} - \text{Non-Operating Assets} - \text{Fictitious Assets}$$

OR

$$\text{Capital employed} = \text{Net fixed assets} + \text{working capital}$$

In using overall profitability ratio as the chief measure of profitability, the following two notes of caution should be kept in mind. First, the figure of operating profit shows the profit earned throughout a period. The figure of capital employed on the other hand refers to the values of assets as on a balance sheet date. As the values of assets go on changing throughout a business period it may be advisable to take the average

assets throughout a period, so that the profits are compared against average capital employed during a period.

Secondly, in making comparison between two different units on the basis of the overall profitability ratio, the time of incorporation of the two units should be taken care off. If a company incorporated in 2000 is compared with that incorporated in 2010, the first company’s assets will be appearing at a much lower figure than those of second company. Thus the former will show a lower capital base and if profits of both the companies are the same, the former will show a higher rate of return. This does not indicate higher efficiency; only the capital employed is lower because of the reason that it started 10 years earlier. Hence, in such cases the present value of the fixed assets should be considered for calculating the capital employed.

“Return on capital employed” should be used cautiously with clear understanding of its limitations. The ‘profits’ and “capital employed” figures are the result of a number of approximations (example, depreciation) and human judgement (valuation of assets). Therefore, the purpose of calculation of the ratio should be kept in view and appropriate figures should be selected having regard to impact of changing price levels.

Suppose a company has the following items on the liabilities side and it shows underwriting commission of ₹1,00,000 on the assets side:

	₹
13% Preference capital	10,00,000
Equity capital	30,00,000
Reserves	26,00,000
Loans @ 15%	30,00,000
Current Liabilities	15,00,000

Its profit, after paying tax @ 50% is ₹14,00,000. Profit before interest and tax will be ₹32,50,000 which can be calculated as shown below:

	₹
Profit after tax	14,00,000
Tax	14,00,000
Interest @ 15% on ₹30,00,000	<u>4,50,000</u>
	<u>32,50,000</u>

The operating capital employed is ₹95,00,000 i.e. total of all the items on liabilities side (excluding current liabilities) less ₹1,00,000, a fictitious asset (underwriting commission).

The ROI comes to

$$= \frac{32,50,000}{95,00,000} \times 100 \text{ or } 34.21\%$$

The overall profitability ratio has two components. These are the net profit ratio (operating profit/sales x 100) multiplied by turnover ratio (sales/capital employed). Therefore, ROI, in terms of percentage:

$$\begin{aligned} & \frac{\text{Operating Profit}}{\text{Capital Employed}} \times 100 \\ & = 100 \times \frac{\text{Operating Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Capital Employed}} \end{aligned}$$

If a management wants to maximize its profitability, it could do so by improving its net profit ratio and turnover ratio. The former refers to the margin made in each sale in terms of percentage whereas, the latter shows the utilization, i.e., rotation of the capital in making the sale. If the selling price of an article is ₹10 whose cost is ₹6, there is a margin of ₹4 or 40%. This shows the gap between selling price and cost price in the percentage form. The overall profitability is also dependent upon the effectiveness of employment of capital. If in this case, sales ₹200 were made with a capital of ₹100 then the rotation, i.e. the turnover is 200/100 or 2 times. Thus the business has earned a total profit of ₹80 with a capital of ₹100, profitability ratio being 80%, i.e., Net profit ratio x Turnover ratio = 40% x 2 = 80%.

### Illustration 2

Determine which company is more profitable:

	X Ltd.	Z Ltd.
Net Profit Ratio	3%	4%
Sales/Capital Employed	5 times	3 times

### Solution:

Judging from the net margin ratio Z Ltd. appears to be more profitable. But the criteria for determining profitability is return on capital employed which in this case works out to 15% and 12% respectively for X Ltd. and Z Ltd. Hence X Ltd. is undoubtedly more profitable.

Return on investment is a good measure of profitability in as much as it is an extension of the input-output analysis. Moreover, it aids in comparing the performance efficiency of dissimilar enterprises.

### 3.1.2 Return on Shareholders' Funds

It is also referred to as return on net worth. In this case it is desired to work out the profitability of the company from the shareholders' point of view and it is computed as follows:

$$\frac{\text{Net Profit after Interest and Tax}}{\text{Shareholders' Funds}} \times 100$$

Modifications of the 'return on capital employed' can be made to adopt it to various circumstances. Thus if it is required to work out the profitability from the shareholders' point of view, then the profit figure should be after interest and taxation and the capital employed should be after deducting the long-term loans. This ratio would reflect the profitability for the shareholders. To extend the idea further, the profitability from equity shareholders' point of view can also be worked out by taking the profits after preference dividend and comparing against capital employed after deducting both long-term loans and preference capital.

### 3.1.3 Return on Assets

Here the profitability is measured in terms of the relationship between net profits and assets. It shows whether the assets are being properly utilised or not. It is calculated as:

$$\frac{\text{Net Profit after Tax}}{\text{Total Assets}} \times 100$$

This ratio is a measure of the profitability of the total funds or investment of the organisation.

### 3.1.4 Profit Ratios

#### 3.1.4.1 Gross Profit Ratio or Gross Margin

Gross profit ratio expresses the relationship of gross profit to net sales or turnover. Gross profit is the excess of the proceeds of goods sold and services rendered during a period over their cost, before taking into account administration, selling and distribution and financing charges. Gross profit ratio is expressed as follows:

$$\frac{\text{Gross Profit}}{\text{Net Sales}} \times 100$$

This ratio is important to determine general profitability since it is expected that the ratio would be quite high so as to cover not only the remaining costs but also to allow proper returns to owners.

Any fluctuation in the gross profit ratio is the result of a change either in 'sales' or the 'cost of goods sold' or both. The rise or fall in the selling price may be an external factor over which the management may have little control, specially when prices are controlled. The management, however, must try to keep the other end of the margin (i.e., cost) at least steady, if not reduce it. If the gross profit ratio is lower than what it was previously, when the selling price has remained steady, it can be reasonably concluded that there is an increase in the manufacturing cost. Since manufacturing overheads include a fixed element as well, a fall in the volume of sales will also lower the rate of gross profit and vice-versa.

#### 3.1.4.2 Net Profit Ratio

One of the components of return on capital employed is the net profit ratio (or the margin on sales) calculated as:

$$\text{Net Profit Ratio} = \frac{\text{Operating Profit}}{\text{Sales}} \times 100$$

It indicates the net margin earned in a sale of ₹100. Net profit is arrived at from gross profit after deducting administration, selling and distribution expenses; non-operating incomes, such as dividends received and non-operating expenses are ignored, since they do not affect efficiency of operations.

#### 3.1.4.3 Operating Ratio

The ratio of all operating expenses (i.e., materials used, labour, factory overheads, office and selling expenses) to sales is the operating ratio.

A comparison of the operating ratio would indicate whether the cost content is high or low in the figure of sales. If the annual comparison shows that the sales has increased, the management would be naturally interested and concerned to know as to which element of the cost has gone up.

It is not necessary that the management should be concerned only when the operating ratio goes up. If the operating ratio has fallen, though the unit selling price has remained the same, still the position needs analysis as it may be the sum total of efficiency in certain departments and inefficiency in others. A dynamic management should be interested in making a fuller analysis.

It is, therefore, necessary to break up the operating ratio into various cost ratios. The major components of



cost are: material, labour and overheads. Therefore, it is worthwhile to classify the cost ratio as:

Material cost ratio	$= \frac{\text{Material consumed}}{\text{Sales}} \times 100$
Labour cost ratio	$= \frac{\text{Labour cost}}{\text{Sales}} \times 100$
Factory overheads cost ratio	$= \frac{\text{Overheads cost}}{\text{Sales}} \times 100$
Administrative expenses ratio	$= \frac{\text{Administrative expenses}}{\text{Sales}} \times 100$
Selling and distribution expenses ratio	$= \frac{\text{Selling and distribution expenses}}{\text{Sales}} \times 100$

Generally all these ratios are expressed in terms of percentage. They total upto the Operating Ratio. This, deducted from 100 will be equal to the Net Profit Ratio.

If possible, the total expenditure for effecting sales should be divided into two categories, viz., fixed and variable-and then ratios should be worked out. The ratio of variable expenses to sales will be generally constant; that of fixed expenses should fall if sales increase; it will increase if sales fall.

### 3.2 Activity Ratios or Turnover Ratios

The ratios used to measure the effectiveness of the employment of resources are termed as activity ratios. Since these ratios relate to the use of assets for generation of income through turnover they are also known as turnover ratios, as we have seen already, the overall profitability of the business depends on two factors i.e. (i) the rate of return on sales and (ii) the rate of return on capital employed i.e. the speed at which the capital employed in the business relates. More efficient the operations of an undertaking, the quicker and more number of times the rotation is. Thus the overall profitability ratio is calculated as - Net Profit Ratio x Turnover Ratio. The net profit ratio has already been discussed. Now the important turnover ratios as regards capital employed and assets are discussed below:

#### 3.2.1 Capital Turnover (Sales to Capital Employed) Ratio

This ratio shows the efficiency of capital employed in the business and is calculated as follows:

$$\text{Capital Turnover Ratio} = \frac{\text{Net Sales}}{\text{Capital Employed}}$$

The higher the ratio the greater are the profits.

#### 3.2.2 Total Assets Turnover Ratio

This ratio is ascertained by dividing the net sales by the value of total assets. Thus,

$$\text{Total Assets Turnover Ratio} = \frac{\text{Net Sales}}{\text{Total Assets}}$$

A high ratio is an indicator of overtrading of total assets while a low ratio reveals idle capacity. The total Assets Turnover Ratio can be segregated into:

### 3.2.2.1 Fixed Assets Turnover Ratio

This ratio indicates the number of times fixed assets are being turned over in a stated period. It is calculated as:

$$\text{Fixed Assets Turnover Ratio} = \frac{\text{Net Sales}}{\text{Fixed Assets}}$$

This ratio is an indicator of the extent to which investment in fixed assets contributes to generate sales. The fixed assets are to be taken net of depreciation. The higher is the ratio the better is the performance.

### 3.2.2.2 Working Capital Turnover Ratio

This ratio shows the number of times working capital is turned-over in a stated period. This ratio is calculated as:

$$\text{Working Capital Turnover Ratio} = \frac{\text{Net Sales}}{\text{Working Capital}}$$

It indicates to what extent the working capital funds have been employed in the business towards sales.

### 3.2.3 Stock Turnover Ratio (Inventory Turnover Ratio)

This ratio is an indicator of the efficiency of the use of investment in stock. It is calculated as:

$$\text{Stock Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}} \text{ or } \frac{\text{Sales}}{\text{Average Inventory}}$$

Mostly opening and closing stock figures are given and these should be averaged. If monthly figures are available, then these figures should be averaged. In case stock level fluctuates violently, then monthly average should be calculated as under:

$$\frac{\text{Opening stock} + 12 \text{ months figures} - \text{Closing stock}}{12}$$

In this case stock turnover ratio should be as under:

$$\frac{\text{Cost of goods sold}}{\text{Average stock}}$$

Too large an inventory will depress the ratio; control over inventories and active sales promotion will increase the ratio. If desired this ratio may be split into two ratios, for raw materials and for finished goods:

- (i)  $\frac{\text{Material consumed}}{\text{Average raw material stocks}}$ ; and
- (ii)  $\frac{\text{Sale or Cost of goods sold}}{\text{Average stocks of finished goods}}$

This analysis will throw a better light on the inventory position.

Average inventory is calculated on the basis of the average inventory at the beginning and at the end of the accounting period.

### 3.2.4 Debtors Turnover Ratio (Debtors' Velocity)

These days some amount of sales always locked up in the form of book debts. Efficient credit control and prompt collection of amounts due will mean lower investments in book debts. This ratio measures the net credit sales of a firm to the recorded trade debtors thereby indicating the rate at which cash is generated by turnover of receivable or debtors. This ratio is calculated as:

$$\text{Debtors Turnover Ratio} = \frac{\text{Net Sales}}{\text{Average Debtors}}$$

Average debtors refer to the average of opening and closing balance of debtors for the period. Debtors include bills receivables but exclude debts which arise on account of transactions other than sale of goods. While calculating debtors turnover, it is important to note that provision for bad and doubtful debts are not deducted from total debtors in order to avoid the impression that a larger amount of receivables have been collected.

**Debt Collection Period:** This ratio indicates the extent to which the debts have been collected in time. This ratio is infact, interrelated with and dependent upon the debtors turnover ratio. It is calculated by dividing the days in a year by the debtors turnover. This ratio can be computed as follows:

$$(i) \frac{\text{Months / Days in a Year}}{\text{Debtors Turnover}}$$

OR

$$\frac{\text{Average Debtors} \times \text{Months / Days in a Year}}{\text{Net Credit Sales for the Year}}$$

OR

$$\frac{\text{Average Debtors}}{\text{Average Monthly / Daily Credit Sales}}$$

Debtors' collection period shows the quality of debtors since it measures the speed with which money is collected from them. It is rather difficult to specify a standard collection period for debtors. It depends upon the nature of the industry, seasonal character of the business and credit policy of the firm etc.

#### Illustration 3

From the following information, calculate, debtors turnover ratio and average collection period.

	₹
Total debtors (opening balance)	2,00,000
Cash sales	1,50,000
Credit sales	10,00,000
Cash collected	7,80,000
Sales returns	60,000
Bad debts	40,000
Discount allowed	20,000
Provision for bad debts	25,000
No. of days in a year – 360	

**Solution:**

<b>Total Debtors Account</b>			
Dr.			Cr.
	₹		₹
To Balance b/d	2,00,000	By Cash	7,80,000
To Credit sales	10,00,000	By Sales returns	60,000
		By Bad debts	40,000
		By Discount allowed	20,000
		By Balance c/d	<u>3,00,000</u>
	<u>12,00,000</u>		<u>12,00,000</u>

$$\begin{aligned} \text{Debtors Turnover Ratio} &= \frac{\text{Credit Sales}}{\text{Average Debtors}} \\ \text{Average Debtors} &= \frac{\text{Opening Debtors} + \text{Closing Debtors}}{2} \\ &= \frac{\text{₹ 2,00,000} + \text{₹ 3,00,000}}{2} \\ &= \text{₹ 2,50,000} \\ \text{Debtors Turnover Ratio} &= \frac{\text{₹ 10,00,000}}{\text{₹ 2,50,000}} = 4 \text{ times} \\ \text{Average Collection Period} &= \frac{\text{Days in the Year}}{\text{Debtors Turnover Ratio}} \\ &= \frac{360}{4} = 90 \text{ days.} \end{aligned}$$

**3.2.5 Creditors Turnover Ratio (Creditors' Velocity)**

Like debtors' turnover ratio, this ratio indicates the speed at which the payments for credit purchases are made to creditors. This ratio is computed as follows:

$$\text{Creditors Turnover Ratio} = \frac{\text{Credit Purchases}}{\text{Average Creditors}}$$

The term 'creditors' include, trade creditors and bills payable. In case the details regarding credit purchases, opening and closing balances of creditors are not available, then instead of credit purchases, total purchases may be taken and in place of average creditors, the balance available may be substituted.

*Debt Payment Period:* This ratio gives the average credit period enjoyed from the creditors. It can be computed as under:

$$\frac{\text{Months / Days in a Year}}{\text{Creditors Turnover}}$$

OR

$$\frac{\text{Average Creditors} \times \text{Months / Days in a Year}}{\text{Credit Purchases in the Year}}$$

OR

$$\frac{\text{Average Creditors}}{\text{Average Monthly / Daily Credit Purchases}}$$

Both above ratios determine the average age of payables, on the basis of which it can be compensated as to how prompt or otherwise the company is making payments for credit purchases effected by it. A high creditors' turnover ratio or a low debt payment period shows that creditors are being paid promptly, hence enhancing the credit worthiness of the company. However, a very favourable ratio to this effect also shows that the business is not taking full advantage of credit facilities allowed by the creditors.

### 3.3 Financial Ratios

Financial statements of a firm are analysed for ascertaining its profitability as well as financial position. A firm is said to be financially sound provided if it is capable of meeting its commitments both short-term and long-term. Accordingly, the ratios to be computed for judging the financial position are also known as solvency ratios and those ratios which are computed for short-term solvency are known as liquidity ratios.

#### 3.3.1 Liquidity Ratio

In a short period, a firm should be able to meet all its short-term obligations i.e. current liabilities and provisions. It is current assets that yield funds in the short period - current assets are those assets which the firm can convert into cash within one year or in short run. Current assets should not only yield sufficient funds to meet current liabilities as they fall due but also enable the firm to carry on its day to day activities. The ratios to test the short-term solvency or liquidity position of an enterprise are mainly the following:

##### 3.3.1.1 Current Ratio

**Current ratio also known as the working capital ratio**, is the most widely used ratio. It is the ratio of total current assets to current liabilities and is calculated by dividing the current assets by current liabilities.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Current assets are those assets which can be converted into cash in the short-run or within one year. Likewise, current liabilities are those which are to be paid off in the short run. Current assets normally include cash in hand or at bank, inventories, sundry debtors, loans and advances, marketable securities, pre-paid expenses, etc. while current liabilities consist of sundry creditors, bills payable, outstanding and accrued expenses, provisions for taxation, proposed and un-claimed dividend, bank overdraft etc.

Current ratio indicates the firms' commitment to meet its short-term obligations. It is a measure of testing short-term solvency or in other words, it is an index of the short-term financial stability of an enterprise because it shows the margin available after paying off current liabilities.

**Generally 2:1 ratio is considered ideal for a concern.** If the current assets are two times of the current liabilities, there will be no adverse effect on the business operations when the payment of liabilities is made. In fact a ratio much higher than 2:1 may be unsatisfactory from the angle of profitability, though satisfactory

from the point of view of short-term solvency. A high current ratio may be taken as adverse on account of the following reasons:

- (i) The stock might be piling up because of poor sales.
- (ii) The amount might be looked up in debtors due to slack collection policy.
- (iii) The cash or bank balances might be lying idle because of no proper investment.

### 3.3.1.2 Liquid Ratio

**This ratio is also known as Quick Ratio or Acid Test Ratio.** This ratio is calculated by relating liquid or quick assets to current liabilities. Liquid assets mean those assets which are immediately converted into cash without much loss. All current assets except inventories and prepaid expenses are categorised as liquid assets. The ratio can be computed as:

$$\text{Liquid Ratio} = \frac{\text{Liquid Assets}}{\text{Current Liabilities}}$$

Liquidity ratio may also be computed by substituting liquid liabilities in place of current liabilities. Liquid liabilities mean those liabilities which are payable within a short period. Bank overdraft and cash credit facilities, if they become a permanent mode of financing are to be excluded from current liabilities to arrive at liquid liabilities. Thus:

$$\text{Liquid Ratio} = \frac{\text{Liquid Assets}}{\text{Liquid Liabilities}}$$

This ratio is an indicator of the liquid position of an enterprise. **Generally, a liquid ratio of 1:1 is considered as ideal as the firm can easily meet all current liabilities.** The main difference in current ratio and liquid ratio is on account of inventories and therefore a comparison of two ratios leads to important conclusions regarding inventory holding up.

### 3.3.2 Long-term Solvency Ratios

Long-term sources and uses of funds form the basic input for computation of long-term solvency ratios. The investors i.e. shareholders and debenture holders both present and prospective are interested in knowing the financial status of the company so that they can take decisions for long-term investment of their funds. The following are the main ratios in this category.

#### 3.3.2.1 Debt-Equity Ratio

Debt-equity ratio is the relation between borrowed funds and owners' capital in a firm, it is also known as external-internal equity ratio. The debt-equity ratio is used to ascertain the soundness of long-term financial policies of the business. Debt means long-term loans i.e. debentures or long-term loans from financial institutions. Equity means shareholders' funds i.e., preference share capital, equity share capital, reserves less loss and fictitious assets like preliminary expenses. It is calculated in the following ways:

$$\begin{array}{l} \text{(i)} \quad \frac{\text{Debts}}{\text{Equity (Shareholders' Funds)}} \\ \text{OR} \\ \text{(ii)} \quad \frac{\text{Debts}}{\text{Long - term Funds (Shareholders' Funds + Debts)}} \end{array}$$

The main purpose of this ratio is to determine the relative stakes of outsiders and shareholders.

Normally in India an ideal debt equity ratio is considered to be 2:1 if it is calculated as (i) above or 0.67:1 if calculated as (ii) above. This means that a company may borrow upto twice the amount of its capital and reserves or it may raise two-thirds of its long-term funds by way of loans. Generally loans are very profitable for shareholders since interest at a fixed rate only is payable whereas the yield generally is much higher and income-tax authorities allow interest as a deductible expenses, thus effectively reducing the interest burden of the company. A higher proportion would be risky because loans carry with them for obligation to pay interest at a fixed rate which may become difficult if profit is reduced. However a lower proportion of long-term loans would indicate an undue conservation and unwillingness to take every normal risk. Both these affect the image of the company and the value placed by the market on shares.

### 3.3.2.2 Proprietary Ratio

This ratio is a variant of debt-equity ratio which establishes the relationship between shareholders funds and total assets. Shareholders' fund means, share capital both equity and preference and reserves and surplus less losses. This ratio is worked out as follows:

$$\text{Proprietary Ratio} = \frac{\text{Shareholders' Funds}}{\text{Total Assets}}$$

This ratio indicates the extent to which shareholders' funds have been invested in the assets.

### 3.3.2.3 Fixed Assets Ratio

The ratio of fixed assets to long-term funds is known as fixed assets ratio. It focusses on the proportion of long-term funds invested in fixed assets. The ratio is expressed as follows:

$$\text{Fixed Assets Ratio} = \frac{\text{Fixed Assets}}{\text{Long - term Funds}}$$

Fixed assets refer to net fixed assets (i.e. original cost-depreciation to date) and trade investments including shares in subsidiaries. Long-term funds include share capital, reserves and long-term loans.

This ratio should not be more than 1. It is the principle of financial management that not merely fixed assets but a part of working capital also should be financed by long-term funds. As such it is desirable to have the ratio at less than one i.e. say, 0.67 to indicate the fact that the entire fixed capital plus a portion of the working capital are financed by long-term funds.

### 3.3.2.4 Debt-Service Ratio

This ratio is also known as Fixed Charges Cover or Interest Cover. This ratio measures the debt servicing capacity of a firm in so far as fixed interest on long-term loan is concerned. It is determined by dividing the net profit before interest and taxes by the fixed charges on loans. Thus:

$$\text{Debt Service Ratio} = \frac{\text{Net Profit before Interest and Tax}}{\text{Interest Charges}}$$

This ratio is expressed as 'number of times' to indicate that profit is number of times the interest charges. It is also a measure of profitability. Since higher the ratio, higher the profitability. The ideal ratio should be 6 to 7 times.

### 3.3.2.5 Capital Gearing Ratio

The proportion between fixed interest or dividend bearing funds and non-fixed interest or dividend bearing funds in the total capital employed in the business is termed as capital gearing ratio. Debentures, long-term loans and preference share capital belong to the category of fixed interest/dividend bearing funds. Equity share capital, reserves and surplus constitute non-fixed interest or dividend bearing funds. This ratio is calculated as follows:

$$\text{Capital Gearing Ratio} = \frac{\text{Fixed Interest Bearing Funds}}{\text{Equity Shareholders' Funds}}$$

In case the fixed income bearing funds are more than the equity shareholders' funds, the company is said to be highly geared. A low capital gearing implies that equity funds are more than the amount of fixed interest bearing securities. This ratio indicates the extra residual benefits accruing to equity shareholders. Whether the concern is operating on trading on equity can be judged by this ratio.

## 3.4 Market Test Ratios

These ratios are calculated generally in case of such companies whose shares and stocks are traded in the stock exchanges. Shareholders, present and probable, are interested not only in the profits of the company but also in the appreciation of the value of their shares in the stock market. The value of shares in the stock market, besides other factors, also depends upon factors like dividends declared, earning per share, the payout policy, etc., of the companies. The following ratios reflect the effect of these factors on the market value of the shares.

### 3.4.1 Earning Per Share (EPS)

This is calculated as under:

$$\text{EPS} = \frac{\text{Net profit}}{\text{No. of equity shares}}$$

This ratio measures the profit available to the equity shareholders on a per share basis. Suppose, the net income of company after preference dividend is ₹40,000 and the number of equity shares is 6,000 then,

$$\text{EPS} = \frac{\text{₹ } 40,000}{6,000} = \text{₹}6.66 \text{ per share.}$$

It should be noted that net income here is the net income in income statement for the period, after taking into consideration operating, non-operating, and other items like income-tax. It should be remembered that if any dividend is payable to the preference shareholders, it has to be deducted before arriving at net income for this purpose. This ratio is of considerable importance in estimating the market price of the shares. A low E.P.S. means lower possible dividends and so lower market value, while a high EPS has a favourable effect on the market value of the shares.

However, the EPS alone does not reflect the effect of various financial operations of the business. Also, its calculation may be affected, to a considerable extent, by different accounting practices and policies relating to valuation of stocks, depreciation, etc. Therefore, this ratio should be cautiously interpreted.

### 3.4.2 Price Earning Ratio

This ratio establishes relationship between the market price of the shares of a company and its earning per



share (EPS). It is calculated as under:

$$\text{Price Earning Ratio (P/E)} = \frac{\text{Market value per equity share}}{\text{Earning per share}}$$

Assuming the market value of a share to be ₹40 and the EPS ₹6.66 per share as calculated in (i) above, then the PER comes to  $\frac{₹40}{6.66}$  or 6 times. This ratio helps in predicting the future market value of the shares within reasonable limits. It also helps in ascertaining the extent of under and over-valuation in the market price, thus pointing to the effect of factors generated by the company's financial position. This can be illustrated by the following illustration:

Suppose, the actual market value per share is ₹45 while on the basis of PER and EPS it should be 6 times of EPS, i.e., ₹6.66 × 6 = ₹40. The excess of ₹5 between anticipated and actual market price reflects the effect of general economic and political conditions, the image of the company, etc.... which cannot be made out from company's financial statements. A reciprocal of this ratio gives the capitalisation rate of current earnings per share.

### 3.4.3 Pay-out Ratio

This ratio expresses the relationship between what is available as earnings per share and what is actually paid in the form of dividends out of available earnings. It is a good measure of the dividend policy of the company. A higher payout ratio may mean lower retention and ploughing back of profits, a deteriorating liquidity position and little or no increase in the profit-earning capacity of the company. This ratio is calculated with the help of the following formula:

$$\text{Pay-out Ratio} = \frac{\text{Dividend per equity share}}{\text{Earnings per share}}$$

### 3.4.4 Dividend Yield Ratio

This ratio establishes the relationship between the market price and the dividend paid per share. It is expressed as a percentage and gives the rate of return on the market value of the shares and helps in the decision of investors who are more concerned about returns on their investment rather than its capital appreciation. This ratio is calculated as under:

$$\frac{\text{Dividend per share}}{\text{Market price per share}} \times 100$$

Since dividends are declared on paid-up value of shares, they do not reflect the actual rate of earning if the shares are purchased at market price, which is generally different from paid-up value. This ratio removes this ambiguity by relating the dividends to the market value of shares. For example, if a company declares 20% dividend on its share of ₹20 each, having a market value of ₹40 each, then the real rate of return is not 20% but is 10% as calculated below:

$$\begin{aligned} & \frac{\text{Dividend per share}}{\text{Market value per share}} \times 100 \\ &= \frac{4}{40} \times 100 = 10\% \end{aligned}$$

It should be noted that in the calculation of all the above four ratios (market test) preference shares are ignored and their dividend is adjusted against income, before it is considered for these ratios.

## ADVANTAGES OF RATIO ANALYSIS

Ratio analysis is a powerful tool of financial analysis. An absolute figure generally conveys no meaning. It is seen that mostly figure assumes importance only in background of other information. Ratios bring together figures which are significantly allied to one another to portray the cause and effect relationship.

From a study of the various ratios and their practical applications, the following advantages can be attributed to the technique of ratio analysis:

1. It helps to analyse and understand financial health and trend of a business, its past performance, and makes it possible to forecast the future state of affairs of the business. They diagnose the financial health by evaluating liquidity, solvency, profitability etc. This helps the management to assess the financial requirements and the capabilities of various business units. It serves as a media to link the past with the present and the future.
2. It serves as a useful tool in management control process, by making a comparison between the performance of the business and the performance of similar types of business.
3. Ratio analysis play a significant role in cost accounting, financial accounting, budgetary control and auditing.
4. It helps in the identification, tracing and fixing of the responsibilities of managerial personnel at different levels.
5. It accelerates the institutionalisation and specialisation of financial management.
6. Accounting ratios summarise and systematise the accounting figures in order to make them more understandable in a lucid form. They highlight the inter-relationship which exists between various segments of the business expressed by accounting statements.

## LIMITATIONS OF RATIO ANALYSIS

Ratio analysis is a widely used technique to evaluate the financial position and performance of a business. But these are subject to certain limitations:

- (i) Usefulness of ratios depend on the abilities and intentions of the persons who handle them. It will be affected considerably by the bias of such persons.
- (ii) Ratios are worked out on the basis of money-values only. They do not take into account the real values of various items involved. Thus, the technique is not realistic in its approach.
- (iii) Historical values (specially in balance sheet ratios) are considered in working out the various ratios. Effects of changes in the price levels of various items are ignored and to that extent the comparisons and evaluations of performance through ratios become unrealistic and unreliable.
- (iv) One particular ratio, in isolation is not sufficient to review the whole business. A group of ratios are to be considered simultaneously to arrive at any meaningful and worthwhile opinion about the affairs of the business.
- (v) Since management and financial policies and practices differ from concern to concern, similar ratios may not reflect similar state of affairs of different concerns. Thus, comparisons of performance on the basis of ratios may be confusing.
- (vi) Ratio analysis is only a technique for making judgements and not a substitute for judgement.
- (vii) Since ratios are calculated on the basis of financial statements which are themselves affected

greatly by the firm's accounting policies and changes therein, the ratios may not be able to bring out the real situations.

- (viii) Ratios are at best, only symptoms; they may indicate what is to be investigated - only a careful investigation will bring out the correct position.
- (ix) Ratios are only as accurate as the accounts on the basis of which these are established. Therefore, unless the accounts are prepared accurately by applying correct values to assets and liabilities, the statements prepared therefrom would not be correct and the relationship established on that basis would not be reliable.

#### Illustration 4

From the following statements, calculate the various ratios:

#### Condensed Income Statement of Juliet & Company for year ending March 31, 2013

	(in ₹ '000)	
	₹	% sales
Net Sales	600	100.0
Less: Cost of goods sold	<u>360</u>	<u>60.0</u>
Gross Profit	240	40.0
Operating expenses	<u>156</u>	<u>26.0</u>
Operating Profit	84	14.0
Interest	<u>8</u>	<u>1.3</u>
Income before tax	76	12.7
Income tax provision	<u>38</u>	<u>6.4</u>
Net Income after tax for the year	<u>38</u>	<u>6.3</u>

#### Balance Sheet of Juliet & Co. (as on March 31, 2012 and 2013)

	(in ₹ '000)	
	March 31, 2012	March 31, 2013
<b>Assets:</b>		
<u>Current Assets:</u>		
Cash	60	80
Account receivables (net)	60	60
Inventories	100	120
Pre-paid expenses	<u>20</u>	<u>20</u>
Total Current Assets	<u>240</u>	<u>280</u>
<u>Fixed Assets:</u>		
Land	60	60
Building and structures	240	240
Less: Accumulated depreciation	<u>120</u>	<u>140</u>
Net Buildings structures	<u>120</u>	<u>100</u>
Total Fixed Assets	<u>180</u>	<u>160</u>

Other Assets:

Goodwill and patents	—	20
Total Assets	<u>420</u>	<u>460</u>

**Liabilities and Equities**Current Liabilities:

Accounts payable	50	60
Wages and taxes outstanding	30	20
Income-tax payable	<u>20</u>	<u>40</u>
Total Current Liabilities	<u>100</u>	<u>120</u>

Long-term Liabilities:

10% Mortgage Debentures	<u>80</u>	<u>80</u>
Total Liabilities	<u>180</u>	<u>200</u>

Shareholders' Equity:

Share capital (6,000 shares of ₹20 each fully paid)	120	120
Retained earnings	<u>120</u>	<u>140</u>
Total Shareholders' Equity	<u>240</u>	<u>260</u>
Total Liabilities and Equities	<u>420</u>	<u>460</u>

**Solution:**

$$(i) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$2011-12 = \frac{₹2,40,000}{₹1,00,000}$$

$$= 2.4:1$$

$$2012-13 = \frac{₹2,80,000}{₹1,20,000}$$

$$= 2.3:1$$

It is clear from the above calculations that liquidity has slightly deteriorated in 2012-13. However, it is still above the ideal current ratio which is suggested as 2:1.

*(ii) Debt-Equity Ratio (Debt/Equity)*

$$2011-12 = \frac{₹80,000}{₹2,40,000}$$

$$= 0.33$$

$$2012-13 = \frac{₹80,000}{₹2,60,000}$$

$$= 0.31$$

The position has improved.

*(iii) Acid Test Ratio or Quick Ratio*

$$= \frac{\text{Liquid or Quick Assets}}{\text{Current Liabilities}}$$

$$2011-12 = \frac{₹1,20,000}{₹1,00,000}$$

$$= 1.2$$

$$2012-13 = \frac{₹1,40,000}{₹1,20,000}$$

$$= 1.17$$

This means that there has been a slight change in the quick ratio for the two periods. The ideal or standard acid test ratio is often taken to be 1:1 (or 100%) for a safe current financial position.

*(iv) Debtors' Turnover Ratio*

$$= \frac{\text{Net Sales}}{\text{Average Debtors}}$$

$$= \frac{₹6,00,000}{₹60,000}$$

$$= 10 \text{ times}$$

It means that 10% of sales effected always remain to be realised.

Debt Collection Period:

$$= \frac{\text{Average Debtors} \times \text{Days in a year}}{\text{Net Credit Sales}}$$

$$= \frac{₹60,000 \times 365}{₹6,00,000} = 36.5 \text{ days}$$

This shows that the company's debts are collected after an average of 36.5 days.

*(v) Inventory Turnover Ratio*

This ratio is an important indication of the speed with which inventories are converted into sales. In other words, it reflects the degree of liquidity of inventories and their relationship with the turnover. It is calculated as:

$$\frac{\text{Cost of Goods Sold}}{\text{Average Inventory at Cost}}$$

Average inventory is calculated by adding opening and closing inventory figures and dividing the total by 2. Thus, inventory turnover for 2012-13.

$$\frac{₹3,60,000}{₹1,10,000} = 3.27 \text{ times.}$$

*(vi) Sales Ratios*

- (i) Sales to fixed assets or fixed assets turnover ratio:

$$\frac{\text{Net Sales}}{\text{Net Fixed Assets}}$$

$$\frac{\text{₹6,00,000}}{\text{₹1,60,000}} = 3.75 \text{ times.}$$

- (ii) Sales to net worth:

$$\frac{\text{Sales}}{\text{Capital Net Worth}}$$

$$\frac{\text{₹6,00,000}}{\text{₹2,60,000}} = 2.3 \text{ times.}$$

- (iii) Sales to working capital or working capital turnover ratio:

$$\frac{\text{Sales}}{\text{Working Capital}}$$

$$\frac{\text{₹6,00,000}}{\text{₹1,60,000}} = 3.75 \text{ times.}$$

*(vii) Operating Ratio*

$$\text{Operating Ratio} = \frac{\text{Cost of Goods Sold} + \text{Operating Expenses}}{\text{Sales}} \times 100$$

$$\frac{\text{₹3,60,000} + \text{₹1,56,000}}{\text{₹6,00,000}} \times 100 = 86\%.$$

*(viii) Profit Ratios*

$$(i) \text{ Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 = \frac{\text{₹2,40,000}}{\text{₹6,00,000}} \times 100 = 40\%$$

$$(ii) \text{ Net Profit Ratio} = \frac{\text{Net Operating Profit}}{\text{Net Sales}} \times 100 = \frac{\text{₹84,000}}{\text{₹6,00,000}} \times 100 = 14\%$$

It should be noted that fixed interest charges are not considered as a charge against net operating profits. Some writers calculate this ratio with net income (including non-operating items). In both cases income-tax is ignored.

**Illustration 5**

You are given the following figures:

Current ratio	2.5
Liquidity ratio	1.5

Net working capital	₹3,00,000
Fixed assets turnover ratio (on cost of sales)	2 times
Average debt collection period	2 months
Stock turnover ratio (cost of sales/closing stock)	6 times
Gross profit ratio	20%
Fixed assets/shareholders net worth	0.80
Reserve and surplus/capital	0.50

Draw up the balance sheet of the company.

**Solution:**

**Balance Sheet as on.....**

	₹		₹
Share capital	5,00,000	Fixed assets	6,00,000
Reserves and surplus	2,50,000	Stock	2,00,000
Long-term borrowings (balancing figure)	1,50,000	Debtors	2,50,000
Current liabilities	<u>2,00,000</u>	Bank	<u>50,000</u>
	<u>11,00,000</u>		<u>11,00,000</u>

**Workings**

If current liabilities	=	1
Current assets	=	2.5
It means the difference or working capital	=	1.5
Working capital or 1.5	=	₹3,00,000
∴ Current assets	=	₹5,00,000
Current liabilities	=	₹2,00,000
Liquidity ratio	=	1.5
And current liabilities	=	₹2,00,000
Liquid assets (bank and debtors) (2,00,000 x 1.5)	=	₹3,00,000
Stock (5,00,000 - 3,00,000, i.e.		
current assets - liquid assets)	=	₹2,00,000
Cost of sales (as stock turnover ratio is 6)	=	₹12,00,000
Sales as G.P. ratio is 20%,		
$\left(12,00,000 + \frac{20}{80} \times 12,00,000\right)$	=	₹15,00,000
Fixed assets, $\frac{₹12,00,000}{2}$ as fixed assets turnover is 6	=	₹6,00,000
Debtors, $\frac{₹15,00,000}{2}$ Debt collection period		
being 2 months	=	₹2,50,000

Shareholders' net worth, $\frac{₹6,00,000 \times 1}{0.80}$	=	₹7,50,000
Out of shareholders' net worth, reserves and surplus	=	₹2,50,000
Share capital	=	₹5,00,000

**Illustration 6**

From the following information prepare balance sheet:

	₹		₹
Current ratio	2.5	Working capital	60,000
Liquidity ratio	1.5	Reserves and surplus	40,000
Proprietary ratio (fixed assets/proprietary fund)	0.75	Bank overdraft	10,000

There is no long-term loan or fictitious asset.

**Solution:****Working Notes:**

$$(1) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = 2.5$$

$$\text{Current Asset} = 2.5 (\text{Current liabilities})$$

$$\text{Working Capital} = \text{Current assets} - \text{Current liabilities}$$

$$₹60,000 = 2.5 (\text{Current liabilities}) - \text{Current liabilities}$$

$$₹60,000 = 1.5 (\text{Current liabilities})$$

$$\text{Current liabilities} = ₹40,000$$

$$\text{Therefore, Current assets} = ₹1,00,000$$

$$(2) \text{ Proprietary funds} + \text{Current liabilities} = \text{Current assets} + \text{Fixed assets}$$

$$\frac{\text{Fixed Assets}}{\text{Proprietary Funds}} = 0.75 (\text{Given})$$

$$\text{Fixed assets} = 0.75 (\text{Proprietary funds})$$

Substituting in the equation above

$$\text{Proprietary funds} + ₹40,000 = ₹1,00,000 + 0.75 (\text{Proprietary funds})$$

$$0.25 \text{ Proprietary funds} = ₹60,000$$

$$\text{Proprietary funds} = ₹2,40,000$$

Hence,

$$\text{Fixed assets} = 0.75 (2,40,000)$$

$$\text{Fixed assets} = ₹1,80,000$$

$$\text{Share capital} = \text{Proprietary funds} - \text{Reserve and surplus}$$

$$= ₹2,40,000 - ₹40,000 = ₹2,00,000$$



$$(3) \text{ Liquid ratio} = \frac{\text{Liquid Assets}}{\text{Current Liabilities}} = 1.5$$

Liquid assets = ₹60,000 i.e. 1.5 (Current liabilities)

Therefore, stock = ₹1,00,000 – ₹60,000 = ₹40,000

(i.e. Stock = Current assets – Liquid assets)

**Balance Sheet as at.....**

<i>Liabilities</i>	₹	<i>Assets</i>	₹
Capital	2,00,000	Fixed assets	1,80,000
Reserves and surplus	40,000	Stock	40,000
Bank overdraft	10,000	Other current assets	60,000
Other current liabilities	<u>30,000</u>		
	<u>2,80,000</u>		<u>2,80,000</u>

Note: \*Alternatively liquid ratio can be interpreted as:

$$\text{Liquid ratio} = \frac{(\text{Current assets} - \text{Stocks})}{(\text{Current liabilities} - \text{Bank overdraft})}$$

Then the value of stock and other current assets will be changed accordingly.

**Illustration 7**

From the final accounts of Prudent Ltd. given below, calculate the following:

- (i) gross profit ratio;      (ii) current ratio;
- (iii) liquid ratio; and      (iv) return on investment ratio.

**Trading and Profit & Loss Account  
for the year ended 31st March, 2011**

		₹			₹
To Material consumed:			By Sales		8,50,000
Opening stock	90,500		By Profit		6,000
Purchases	<u>5,45,250</u>		By Interest on investment		3,000
	6,35,750				
Less: Closing stock	<u>1,40,000</u>	4,95,750			
To Carriage inwards		14,250			
To Office expenses		1,50,000			
To Sales expenses		30,000			
To Financial expenses		15,000			
To Loss on sales of fixed assets		4,000			
To Net profit		<u>1,50,000</u>			
		<u>8,59,000</u>			<u>8,59,000</u>

## Balance Sheet as on 31st March, 2011

Liabilities	₹	Assets	₹
Share capital:		Fixed assets:	
20,000 equity shares of ₹10 each, fully paid	2,00,000	Buildings	1,50,000
General reserve	90,000	Plant	<u>80,000</u>
Profit & Loss Account	60,000		2,30,000
Bank overdraft	30,000	Current assets:	
Sundry creditors		Stock-in-trade	1,40,000
For expenses	20,000	Debtors	70,000
For others	<u>80,000</u>	Bills receivable	10,000
	<u>1,00,000</u>	Bank balance	<u>30,000</u>
	<u>4,80,000</u>		<u>2,50,000</u>
			<u>4,80,000</u>

**Solution:**

$$(i) \text{ Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Sales}} \times 100$$

$$\begin{aligned} \text{Gross Profit} &= \text{Sales} - \text{Material consumed} - \text{Carriage inwards} \\ &= ₹8,50,000 - ₹4,95,750 - ₹14,250 \\ &= ₹3,40,000 \end{aligned}$$

$$\text{Sales} = ₹8,50,000$$

$$\text{Gross Profit Ratio} = \frac{₹3,40,000}{₹8,50,000} \times 100 = 40\%$$

$$(ii) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$\begin{aligned} \text{Current Assets} &= \text{Stock} + \text{Debtors} + \text{Bills Receivable} + \text{Bank Balance} \\ &= ₹(1,40,000 + 70,000 + 10,000 + 30,000) \\ &= ₹2,50,000 \end{aligned}$$

$$\begin{aligned} \text{Current Liabilities} &= \text{Sundry Creditors} + \text{Bank Overdraft} \\ &= ₹(1,00,000 + 30,000) \\ &= ₹1,30,000 \end{aligned}$$

$$\text{Current Ratio} = \frac{₹2,50,000}{₹1,30,000} = 1.92 : 1$$

$$(iii) \text{ Liquid Ratio} = \frac{\text{Liquid Assets}}{\text{Current Liabilities}}$$

$$\begin{aligned} \text{Liquid Assets} &= \text{Debtors} + \text{Bills Receivable} + \text{Bank Balance} \\ &= ₹(70,000 + 10,000 + 30,000) \\ &= ₹1,10,000 \end{aligned}$$

$$\begin{aligned}\text{Current Liabilities} &= \text{Sundry Creditors} + \text{Bank Overdraft} \\ &= ₹(1,00,000 + 30,000) \\ &= ₹1,30,000\end{aligned}$$

$$\text{Liquid Ratio} = \frac{₹1,10,000}{₹1,30,000} = 0.84 : 1$$

**N.B.** Bank overdraft is treated as current liability.

(iv) Return on Investment

$$\text{Ratio} = \frac{\text{Operating Profit} \times 100}{\text{Capital Employed}}$$

$$\begin{aligned}\text{Operating Profit} &= \text{Net Profit} + \text{Non-operating expense/loss} - \text{Non-operating income} \\ &= \text{Net Profit} + \text{Loss on sale of fixed assets} + \text{Financial expenses} - (\text{Profit} + \text{Interest on investment}) \\ &= 150,000 + 4,000 + 15,000 - 9,000 = ₹160,000\end{aligned}$$

$$\begin{aligned}\text{Capital Employed} &= \text{Share Capital} + \text{General Reserve} + \text{Profit \& Loss Account} \\ &= (2,00,000 + 90,000 + 60,000) = ₹3,50,000\end{aligned}$$

$$= \frac{₹1,60,000}{₹3,50,000} \times 100 = 45.71\%$$

**Note:** Its assumed that 'profit' ₹6,000 as an item of non-operating income and financial expenses' as an item of non-operating expense. Since details are not given, these two items are excluded while calculating operating profit.

### Illustration 8

Syntex Limited's financial statements contain the following information:

	31.3.2010	31.3.2011
Cash	2,00,000	1,60,000
Sundry debtors	3,20,000	4,00,000
Temporary investments	2,00,000	3,20,000
Stock	18,40,000	21,60,000
Prepaid expenses	28,000	12,000
Total current assets	25,88,000	30,52,000
Total assets	56,00,000	64,00,000
Current liabilities	6,40,000	8,00,000
10% debentures	16,00,000	16,00,000
Equity share capital	20,00,000	20,00,000
Retained earnings	4,68,000	8,12,000

### Statement of Profit for the year ended 31st March, 2011

Sales	₹ 40,00,000
Less: Cost of goods sold	– 28,00,000

Less: Interest	– 1,60,000
Net profit	10,40,000
Less: Taxes @ 50%	<u>– 5,20,000</u>
Profit after taxes	5,20,000
Dividends declared on equity shares	2,20,000

From the above, appraise the financial position of the company from the points of view of: (i) liquidity, (ii) solvency, (iii) profitability, and (iv) activity.

### **Solution:**

2009-2010                      2010-11

(i) *Liquidity ratios:*

(a) Current ratio:

$$\frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{₹25,88,000}{₹6,40,000} = 4.04 \quad \frac{₹30,52,000}{₹8,00,000} = 3.81$$

(b) Acid test ratio:

$$\frac{\text{Quick Assets}}{\text{Current Liabilities}} = \frac{₹7,20,000}{₹6,40,000} = 1.13 \quad \frac{₹8,80,000}{₹8,00,000} = 1.10$$

(ii) *Solvency ratios:*

(a) Debt equity ratio:

$$(i) \frac{\text{Total outsiders' debts}}{\text{Equity funds}} = \frac{₹22,40,000}{₹24,68,000} = 0.91 \quad \frac{₹24,00,000}{₹28,12,000} = 0.85$$

$$(ii) \frac{\text{Long - term debts}}{\text{Equity funds}} = \frac{₹16,00,000}{₹24,68,000} = 0.65 \quad \frac{₹16,00,000}{₹28,12,000} = 0.57$$

(b) Interest coverage ratio:

$$\frac{\text{EBIT}}{\text{Interest charges}} = \frac{₹12,00,000}{₹1,60,000} = 7.5 \text{ times}$$

(iii) *Profitability ratios:*

$$(a) \text{ Gross profit ratio} = \frac{\text{Gross Profit} \times 100}{\text{Sales}}$$

$$= \frac{₹12,00,000 \times 100}{₹40,00,000} = 30\%$$

$$(b) \text{ Net profit ratio} = \frac{\text{Net Profit} \times 100}{\text{Sales}}$$

$$= \frac{₹5,20,000 \times 100}{₹40,00,000} = 13\%$$

$$\begin{aligned} \text{(c) Return on total assets} &= \frac{\text{Net Profit} \times 100}{\text{Sales}} \\ &= \frac{₹5,20,000 \times 100}{₹64,00,000} = 8.13\% \end{aligned}$$

$$\text{(d) Return on capital employed} = \frac{\text{Net profit before interest and taxes} \times 100}{\text{Total capital employed}}$$

Capital Employed:

	₹
Equity Capital	20,00,000
Retained Earnings	8,12,000
10% Debentures	<u>16,00,000</u>
	<u>44,12,000</u>

$$= \frac{₹12,00,000 \times 100}{₹44,12,000} = 27.2\%$$

$$\begin{aligned} \text{(e) Return on equity funds} &= \frac{\text{Net profit after taxes} \times 100}{\text{Equity funds}} \end{aligned}$$

$$= \frac{₹5,20,000 \times 100}{₹28,12,000} = 18.5\%$$

(iv) Activity ratios:

$$\begin{aligned} \text{(a) Debtors turnover ratio} &= \frac{\text{Credit sales}}{\text{Average accounts receivable}} \end{aligned}$$

$$= \frac{₹40,00,000}{₹3,60,000} = 13\% = 11.11 \text{ times}$$

*Note:* In the absence of any information, all sales have been treated as credit sales.

(b) Stock turnover ratio

$$\begin{aligned} &= \frac{\text{Cost of sales}}{\text{Average Stock}} \\ &= \frac{₹28,00,000}{₹20,00,000} = 1.4 \text{ times} \end{aligned}$$

(c) Total asset-turnover ratio

$$\begin{aligned} &= \frac{\text{Cost of goods sold}^*}{\text{Total assets}} \\ &= \frac{₹28,00,000}{₹64,00,000} = 0.4375 \text{ times} \end{aligned}$$

(\*The sales figure can also be used).

The company's position is quite sound from the point of view of liquidity, solvency and profitability. However, its activity ratios particularly in terms of the utilisation of total assets and holding of stock do not seem to be adequate.

### Illustration 9

The balance sheet of Major Ltd. as on 31st March, 2010 is as under:

Liabilities	₹	Assets	₹
Share capital:		Fixed assets:	
2,000 equity shares of ₹100 each fully paid	2,00,000	At cost	5,00,000
8% preference shares	1,00,000	Less: Depreciation	<u>1,60,000</u>
General reserve	60,000		3,40,000
12% debentures	60,000	Current assets:	
Current liabilities:		Stock	60,000
Sundry creditors	<u>80,000</u>	Debtors	80,000
	<u>5,00,000</u>	Bank	<u>20,000</u>
			<u>5,00,000</u>

The company wishes to forecast balance sheet as on 31st March, 2011. The following additional particulars are available:

- (i) Fixed assets costing ₹1,00,000 have been installed on 1st April, 2010 but the payment will be made on 31st March, 2011.
- (ii) The fixed assets turnover ratio on the basis of gross value of fixed assets would be 1.5.
- (iii) The stock turnover ratio would be 14.4 (calculated on the basis of average stock).
- (iv) The break up of cost and profit would be as follows:

Material	40%
Labour	25%
Manufacturing expenses	10%
Office and selling expenses	10%
Depreciation	5%
Profit	<u>10%</u>
	<u>100%</u>

The profit is subject to interest and taxation at 50%.

- (v) Debtors would be 1/9 of sales.
- (vi) Creditors would be 1/5 of material consumed.
- (vii) In March 2011 a dividend @ 10% on equity capital would be paid.
- (viii) 12% debentures for ₹25,000 have been issued on 1st April, 2010.

Prepare the forecast balance sheet as on 31st March, 2011 and show the following resultant ratios:

- (a) Current ratio;
- (b) Fixed assets/net worth ratio; and
- (c) Debt equity ratio.

**Solution:****Forecast Balance Sheet of Major Ltd. as on 31.3.2011**

<i>Liabilities</i>	₹	<i>Assets</i>	₹
Share Capital:		Fixed Assets:	
2,000 Equity shares of ₹100 each	2,00,000	Cost	6,00,000
7-1/2% preference shares	1,00,000	Less: Depreciation	<u>2,05,000</u>
Reserves and Surplus:		Current Assets:	
General Reserve	60,000	Stock	40,000
Profit & Loss A/c	7,700	Debtors	1,00,000
Secured Loans:		Cash at bank	29,600
12% Debentures	85,000		
Current Liabilities and Provisions:			
Sundry creditors	72,000		
Provision for taxation	<u>39,900</u>		
	<u>5,64,600</u>		<u>5,64,600</u>

*Ratios:*

$$(a) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{₹ 1,70,300}{₹ 1,11,900} = 1.52$$

$$(b) \text{ Fixed Assets/Net Worth Ratio} = \frac{\text{Fixed Assets}}{\text{Net Worth}} = \frac{₹ 3,95,000}{₹ 3,68,400} = 1.07$$

$$(c) \text{ Debt/Equity Ratio} = \frac{\text{Debts}}{\text{Equity}} = \frac{₹ 85,000}{₹ 3,68,400} = 0.23$$

$$(OR) = \frac{\text{Debt}}{\text{Debt + Equity}} = \frac{₹ 85,000}{₹ 4,53,400} = 0.19$$

*Working Notes:*

(1) Fixed Assets as on 31.3.2011

	₹	₹
Balance as on 31.3.2010	5,00,000	
Additions during the year	<u>1,00,000</u>	6,00,000

(2) Sales = Fixed assets x Fixed assets turnover ratio

$$\text{Sales} = ₹6,00,000 \times 1.5 \text{ (turnover stands for sales)} \quad \text{9,00,000}$$

(3) Cost of goods sold:

Material	40%	3,60,000	
Labour	25%	2,25,000	
Manufacturing expenses	10%	90,000	
Depreciation	5%	<u>45,000</u>	7,20,000

## (4) Total Depreciation

Opening ₹1,60,000 + ₹45,000 = 2,05,000

(for the year)

$$(5) \text{ Average Stock} = \frac{\text{Cost of goods sold}}{\text{Stock turnover ratio}}$$

$$= \frac{₹7,20,000}{14.4} = ₹50,000$$

$$(6) \text{ Stock as on 31.3.2011} = (2 \times \text{Average stock}) - \text{Opening stock}$$

$$= (2 \times 50,000) - 60,000 = ₹40,000$$

$$(7) \text{ Debtors on 31.3.2011} = 1/9\text{th of sales} = \frac{₹9,00,000}{9} = ₹1,00,000$$

$$(8) \text{ Creditors on 31.3.2011} = 1/5\text{th of material consumed}$$

$$= \frac{₹3,60,000}{5} = ₹72,000$$

## (9) Cash and Bank Balance

**Cash and Bank Account**

Dr.	₹	Cr.	₹
To Opening Balance	20,000	By Debtors (increase)	20,000
“ Debentures	25,000	” Creditors (decrease)	8,000
“ Profit - 15% on sale before depreciation		” Interest-debentures	10,200
(Depreciation 45,000)		“ Fixed assets	1,00,000
Profit <u>90,000</u> )	1,35,000	“ Preference-dividend	8,000
“ Stock (decrease)	20,000	“ Equity-dividend	20,000
		“ Tax on distributed profit (@15%)	4,200
	<u>2,00,000</u>	“ Closing balance (balancing figure)	<u>29,600</u>
			<u>2,00,000</u>

## (10) Provision for Taxation:

	₹	₹
Profit - 10% of Sales	90,000	
Less: Debenture interest	<u>10,200</u>	
	<u>79,800</u>	
Provision @ 50%	<u>39,900</u>	

## (11) Profit and Loss A/c:

Profit - 10% of Sales		90,000
Less: Debenture interest	10,200	
Provision for tax	39,900	
10% dividend on equity shares	20,000	
8% Dividend on preference shares	8,000	
Tax on distributed profit @ 15%	<u>4,200</u>	<u>82,300</u>
Net profit to Balance Sheet		<u>7,700</u>



Note:

- (i) Stock turnover ratio has been calculated with reference to cost of goods sold.
- (ii) Debenture interest has been assumed to be paid.
- (iii) Tax on distributed profit has been assumed to be paid @ 15% on dividend paid.

**Illustration 10**

From the following information, prepare the projected trading and Profit & Loss Account for the next financial year ending 31st March, 2011 and the projected balance sheet as on that date:

Gross profit ratio	25%
Net profit to equity capital	10%
Stock turnover ratio	5 times
Average debt collection period	2 months
Creditors velocity	3 months
Current ratio	2
Proprietary ratio (Fixed assets to capital employed)	80%
Capital gearing ratio (Preference shares and debentures to total long-term funds)	30%
General reserve and profit and loss to equity shareholders' fund	20%
Preference share capital to debentures	2

Cost of sales consists of 40% for materials and balance for wages and overheads. Gross profit is ₹6,00,000.

**Solution:**

**Projected Trading and Profit & Loss Account for the year ending March 31, 2011**

<i>Dr.</i>		<i>Cr.</i>	
<i>Particulars</i>	₹	<i>Particulars</i>	₹
To Material used	7,20,000	By Sales	24,00,000
To Wages and overheads	10,80,000		
To Gross profit c/d	<u>6,00,000</u>		
	<u>24,00,000</u>		<u>24,00,000</u>
To Expenses (balancing figure)	4,93,600	By Gross profit b/d	6,00,000
To Net profit	<u>1,06,400</u>		
	6,00,000		6,00,000

**Projected Balance Sheet as on March 31, 2011**

<i>Liabilities</i>	₹	<i>Assets</i>	₹
Share Capital :		Fixed Assets	15,20,000
Equity Share Capital	10,64,000	Current Assets :	
Preference Share Capital	3,80,000	Stock	3,60,000
Reserves and Surplus :		Debtors	4,00,000
General Reserve	1,59,600		
Profit & Loss a/c	1,06,400		
Secured Loans :			
Debentures	1,90,000		
Current Liabilities :			
Trade Creditors	1,80,000		
Bank Overdraft	<u>2,00,000</u>		
	<u>22,80,000</u>		<u>22,80,000</u>

**Working Notes :**

₹

- (i) Gross Profit 6,00,000  
 Gross Profit being 25% of sales  
 Sales = 6,00,000 x 100/25 = ₹**24,00,000**
- (ii) Cost of Sales = Sales – Gross profit  
 = 24,00,000 – 6,00,000 = ₹**18,00,000**
- (iii) Material used = 40% of Cost of sales  
 = 40/100 x 18,00,000 = ₹**7,20,000**
- (iv) Wages and overheads = 18,00,000 – 7,20,000 = ₹**10,80,000**
- (v) Stock = Cost of sales / Stock turnover ratio = 18,00,000 / 5 = ₹**3,60,000**
- (vi) Debtors = Sales for 2 months = 24,00,000 x 2/12 = ₹**4,00,000**
- (vii) As current ratio is 2, Current liabilities are half of current assets  
 Hence, current liabilities =  $\frac{1}{2}$  x (3,60,000 + 4,00,000) = ₹**3,80,000**
- (viii) Trade Creditors = 3 months of material consumed  
 = 7,20,000 x 3/12 = ₹**1,80,000**
- (ix) Bank overdraft = ₹3,80,000 – 1,80,000 = ₹**2,00,000**
- (x) Fixed assets to capital employed = 80%  
 Hence, working capital to capital employed = 20%  
 Working Capital = Current assets – Current liabilities  
 = (3,60,000 + 4,00,000) – 3,80,000 = ₹**3,80,000**  
 Fixed assets = 3,80,000 x 80/20 = ₹**15,20,000**
- (xi) Total long term funds = Fixed Assets + Working Capital  
 = 15,20,000 + 3,80,000 = ₹**19,00,000**
- (xii) Capital gearing ratio being 30% (Preference share capital plus debentures to Total Long Term Funds)  
 = 30% of 19,00,000 = ₹**5,70,000**  
 Preference share capital = 5,70,000 x 2/3 = ₹**3,80,000**
- (xiii) Debentures = 5,70,000 x 1/3 = ₹**1,90,000**
- (xiv) Equity Shareholders' Fund = 19,00,000 – 5,70,000 = ₹**13,30,000**  
 General reserve and Profit & Loss Account  
 = 20% of equity shareholders' fund = 20% of 13,30,000 = ₹**2,66,000**  
 Equity share capital = 13,30,000 – 2,66,000 = ₹**10,64,000**
- (xv) Net profit = 10% of Equity share capital = ₹**1,06,400**
- (xvi) General Reserve = ₹2,66,000 – 1,06,400 = ₹**1,59,600**

**Illustration 11:**

From the following information on 31st March, 2010 prepare balance sheet of Zebra Ltd.

(i) Current Ratio	2.5
(ii) Liquid Ratio	1.5
(iii) Proprietary Ratio	0.75
(iv) Working Capital	₹60,000
(v) Reserves and surplus	₹40,000
(vi) Bank overdraft	₹10,000

There are no long term loan or fixed assets.

**Solution:****Zebra Ltd.****Balance Sheet as at 31<sup>st</sup> March, 2010**

<i>Liabilities</i>	₹	<i>Assets</i>	₹
Capital	2,00,000	Fixed assets	1,80,000
Reserves and surplus	40,000	Stock	40,000
Bank overdraft	10,000	Other current assets	60,000
Other current liabilities	<u>30,000</u>		
	<u>2,80,000</u>		<u>2,80,000</u>

*Working Notes:*

$$(1) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = 2.5$$

$$\text{Current Asset} = 2.5 (\text{Current liabilities})$$

$$\text{Working Capital} = \text{Current assets} - \text{Current liabilities}$$

$$₹60,000 = 2.5 (\text{Current liabilities}) - \text{Current liabilities}$$

$$₹60,000 = 1.5 (\text{Current liabilities})$$

$$\text{Current liabilities} = ₹40,000$$

$$\text{Therefore, Current assets} = ₹1,00,000$$

$$\text{Other current Liabilities} = ₹40,000 - \text{Bank overdraft} = ₹30,000$$

$$(2) \text{ Proprietary funds} + \text{Current liabilities} = \text{Current assets} + \text{Fixed assets}$$

$$\frac{\text{Fixed Assets}}{\text{Proprietary Funds}} = 0.75 (\text{Given})$$

$$\text{Fixed assets} = 0.75 (\text{Proprietary funds})$$

Substituting in the equation above

$$\text{Proprietary funds} + ₹40,000 = ₹1,00,000 + 0.75 (\text{Proprietary funds})$$

$$0.25 \text{ Proprietary funds} = ₹60,000$$

Proprietary funds = ₹2, 40,000

Hence,

Fixed assets = 0.75 (2, 40,000)

Fixed assets = ₹1, 80,000

Share capital = Proprietary funds – Reserve and surplus

= ₹2, 40,000 – ₹40,000 = ₹2, 00,000

$$(3) \text{ Liquid ratio} = \frac{\text{Liquid Assets}}{\text{Current Liabilities}} = 1.5$$

Liquid assets = ₹60,000 i.e. 1.5 (Current liabilities)

Therefore, stock = ₹1,00,000 – ₹60,000 = ₹40,000

(i.e. Stock = Current assets – Liquid assets)

*Note:* Alternatively liquid ratio can be interpreted as:

$$\text{Liquid ratio} = \frac{(\text{Current assets} - \text{Stocks})}{(\text{Current liabilities} - \text{Bank overdraft})}$$

Then the value of stock and other current assets will be changed accordingly.

## 5. CASH FLOW STATEMENT

When it is desired to explain to management the sources of cash and its uses during a particular period of time, a statement known as cash flow statement is prepared. A statement of cash flows reports the inflows (receipts) and outflows (payments) of cash and its equivalents of an organisation during a particular period. It provides important information that compliments Statement of Profit & Loss and balance sheet. A statement of cash flow reports cash receipts and payments classified according to the entities' major activities - operating, investing and financing during the period. This statement reports a net cash inflow or net cash outflow for each activity and for the overall business. It also reports from where cash has come and how it has been spent. It explains the causes for the changes in the cash balance. In substance, the cash flow statement summarises a myriad of specific cash transactions into a few categories for a business entity. The statement of cash flows reports the cash receipts, cash payments, and net changes in cash resulting from operating, investing and financing activities of an enterprise during a period in a format that reconciles the beginning and ending cash balances.

In view of the significant contribution of the statement of cash flows, the Institute of Chartered Accountants of India has issued in March, 1997 Accounting Standard-3 (Revised) (AS-3 Revised) 'Cash Flow Statements' in suppression of Accounting Standard-3 "Changes in Financial Position" issued in June 1981. It is in tune with the trends in other countries where cash flow statement has replaced the "Statement of Changes in Financial Position". As such cash flow statement should be prepared in line with the stipulations given in AS-3 (Revised). According to the revised Accounting Standard-3, an organisation should prepare a cash flow statement and should present it for each period.

Meaning of certain terms used in this context:

**Cash:** Cash comprises cash in hand and demand deposits with banks. Demand deposits mean those deposits which are repayable by bank on demand by the depositor.

**Cash equivalents:** Cash equivalents are short term, highly liquid investments that are readily convertible into known amounts of cash and which are subject to an insignificant risk of changes in value. Cash

equivalents are held for the purpose of meeting short term cash commitments rather than for investments or other purposes. Examples of cash equivalents are treasury bills, commercial paper etc. Investments in shares are excluded from cash equivalents unless they are in substance cash equivalents, for example preference shares of a company acquired shortly before their specified redemption date (provided there is only an insignificant risk of failure of the company to repay the amount at maturity).

**Cash flows:** Cash flows are inflows and outflows of cash and cash equivalents. It means the movement of cash into the organisation and movement of cash out of the organisation. The difference between the cash inflows and outflows is known as net cash flow which can be either net cash inflow or net cash outflow. Cash flows exclude movements between items that constitute cash or cash equivalents because these components are part of the cash management of an enterprise rather than part of its operating, investing and financing activities. Cash management includes the investment of excess cash in cash equivalents.

## CLASSIFICATION OF CASH FLOWS STATEMENT

The cash flow statement during a period is classified into three main categories of cash inflows and cash outflows i.e. operating, investing and financing activities.

### (i) Cash Flows from Operating Activities

Operating activities are the principal revenue-producing activities of the enterprise and other activities that are not investing and financing activities. Operating activities include cash effects of those transactions and events that enter into the determination of net profit or loss.

A business's normal operations result in both cash receipts and cash payments. Cash receipts result from selling goods and providing services. The cost of goods sold and other operative expenses result in cash disbursements. The revenues and expenses reported in the income statement, however, do not coincide with the cash receipts and payments as we prepare the income statement on an accrual basis. The receipts and payments of cash for these revenues and expenses may occur in either an earlier or later period than the period we report the revenues and expenses.

Following are examples of cash flows from operating activities:

- (a) cash receipts from the sale of goods and the rendering of services;
- (b) cash receipts from royalties, fees, commissions, and other revenues;
- (c) cash payments to suppliers for goods and services;
- (d) cash payments to and on behalf of employees;
- (e) cash receipts and payments of an insurance enterprise for premiums and claims, annuities and other policy benefits;
- (f) cash payments or refunds of income taxes unless they can be specifically identified with financing and investing activities; and
- (g) cash receipts and payments relating to future contracts, forward contracts, option contracts, and swap contracts when the contracts are held for dealing or trading purposes.

### (ii) Cash Flows from Investing Activities

Investing activities are the acquisition and disposal of long term assets and other investments not included in cash equivalents. In other words, investing activities include transactions and events that involve the purchase and sale of long-term productive assets (e.g. land, building, plant and machinery etc.) not held for

resale and other investments. The following are examples of cash flows arising from investing activities:

- (a) cash payments to acquire fixed assets (including intangibles). These payments include those relating to capitalised research and development costs and self-constructed fixed assets;
- (b) cash receipts from disposal of fixed assets (including intangibles);
- (c) cash payments to acquire shares, warrants, or debt instruments of other enterprises and interests in joint ventures (other than payments for those instruments considered to be cash equivalents and those held for dealing or trading purposes);
- (d) cash receipts from disposal of shares, warrants, or debt instruments of other enterprises and interests in joint ventures (other than receipts from those instruments considered to be cash equivalents and those held for dealing or trading purposes);
- (e) cash advances and loans made to third parties (other than advances and loans made by a financial enterprise);
- (f) cash receipts from the repayment of advances and loans made to third parties (other than advances and loans of a financial enterprise);
- (g) cash receipts and payments relating to future contracts, forward contracts, option contracts, and swap contracts except when the contracts are held for dealing or trading purposes, or the transactions are classified as financing activities.

### **(iii) Cash Flows from Financing Activities**

Financing activities are activities that result in changes in the size and composition of the owners' capital (including preference share capital in the case of a company) and borrowings of the enterprise. Following are the examples of cash flows arising from financing activities:

- (a) cash proceeds from issuing shares or other similar instruments;
- (b) cash proceeds from issuing debentures, loans notes, bonds and other short term borrowing.
- (c) cash repayments of amounts borrowed i.e. redemption of debentures, bonds etc.
- (d) cash payments to redeem preference shares.
- (e) payment of dividend.

### **SPECIAL ITEMS**

In addition to the general classification of three types of cash flows, Accounting Standard-3 (Revised) provides for the treatment of the cash flows of certain special items as under:

#### **(a) Foreign Currency Cash Flows**

Cash flows arising from transactions in a foreign currency should be recorded in an enterprise's reporting currency by applying to the foreign currency amount the exchange rate between the reporting currency and foreign currency at the date of cash flow. A rate that approximates actual rate may be used if the result is substantially the same as would arise if the rates at the date of cash flows were used. Unrealised gains and losses arising from changes in foreign exchange rates are not cash flows. However, the effect of exchange rate changes on cash and cash equivalents held or due in foreign currency is reported in the cash flow statement in order to reconcile cash and cash equivalents at the beginning and the end of the period. This amount is presented separately from cash flows from operating, investing and financing activities and includes the differences, if any, had those cash flows been reported at the end of period exchange rates.

**(b) Extraordinary Items**

The cash flows associated with extra-ordinary items such as bad debts recovered, claims from insurance companies, winning of a law suit or lottery etc. are disclosed separately as arising from operating, investing or financing activities as the case may be, in the cash flow statement.

**(c) Interest and Dividends**

According to Accounting Standard-3 (Revised), the treatment of interest and dividends, received and paid, depends upon the nature of the enterprise, that is, financial enterprises and other enterprises.

- (i) In the case of financial enterprises: Cash flows arising from interest paid and interest and dividends received, should be classified as cash flows from operating activities.
- (ii) In the case of other enterprises:
  - cash flows arising from interest paid should be classified as cash flows from financing activities.
  - cash flows arising from interest and dividends received should be classified as cash flows from investing activities;
  - dividends paid should be classified as cash flows from financing activities.

In all cases, cash flows from interest and dividends received and paid should be disclosed separately. Also the total amount of interest paid during the period is disclosed in the cash flow statement whether it has been recognised as an expense in the Statement of Profit & Loss or capitalised in accordance with AS-10, Accounting for Fixed Assets.

**(d) Taxes on Income**

Cash flows arising from taxes on income should be separately disclosed and should be classified as cash flows from operating activities unless they can be specifically identified with financing and investing activities. Taxes on income arise on transactions that give rise to cash flows that are classified as operating, investing or financing activities in a cash flow statement. While tax expense may be readily identifiable with investing or financing activities, the related tax cash flows are often impracticable to identify and may arise in a different period from the cash flows of the underlying transactions. Therefore taxes paid are usually treated as cash flows from operating activities. However, in case it is possible to identify the tax cash flow with an individual transaction that gives rise to cash flows that are classified as investing or financing activities, it is appropriate to classify the tax cash flow as an investing or financing activity.

**(e) Acquisition and Disposals of Subsidiaries and other Business Units**

The aggregate cash flows arising from acquisitions and from disposals of subsidiaries or other business units should be presented separately and classified as investing activities.

**(f) Non-cash Transactions**

Investing and financing transactions that do not require the use of cash or cash equivalents should be excluded from a cash flow statement. Such transactions should be disclosed elsewhere in the financial statements in a way that provides all the relevant information about these investing and financing activities. The exclusion of non-cash transactions from the cash flow statement is consistent with the objective of a cash flow statement as these do not involve cash flows in the current period. Following are examples of non-cash transactions:

- (i) the acquisition of assets by assuming directly related liabilities.

- (ii) the acquisition of an enterprise by means of issue of shares.
- (iii) conversion of debt into equity.

## PREPARATION OF A CASH FLOW STATEMENT

The following basic informations are required for the preparation of a cash flow statement:

- (i) **Comparative Balance Sheets:** Balance sheets at the beginning and at the end of the accounting period indicate the amount of changes that have taken place in assets, liabilities and capital.
- (ii) **Statement of Profit & Loss:** The Statement of Profit & Loss of the current period enables to determine the amount of cash provided by or used in operations during the accounting period after making adjustments for non-cash, current assets and current liabilities.
- (iii) **Additional data:** In additions to the above statements additional data are collected to determine how cash has been provided or used e.g. sale or purchase of assets for cash.

The following procedure may be used for the preparation of a cash flow statement:

- (i) Calculation of net increase (decrease) in cash and cash equivalents accounts. The difference between cash and cash equivalents for the period may be computed by comparing these accounts given in the comparative balance sheets. The results will be cash receipts and payments during the period responsible for the increase or decrease in cash and cash equivalent items.
- (ii) Calculation of the net cash provided (used) by operating activities. It is by the analysis of Statement of Profit & Loss, comparative balance sheet and selected additional information.
- (iii) Calculation of the net cash provided (used) by investing and financing activities. All other changes in the balance sheet item must be analysed taking into account the additional information and effect on cash may be grouped under the investing and financing activities.
- (iv) Preparation of a cash flow statement. It may be prepared by classifying all cash inflows and outflows in terms of operating, investing and financing activities. The net cash flow provided by (used) in each of the three activities may be highlighted.
- (v) Ensure that the aggregate of net cash flows from operating, investing and financing activities is equal to net increase (decrease) in cash and cash equivalents.
- (vi) Report any significant investing/financing transactions that did not involve cash or cash equivalents in a separate schedule to the cash flow statement.

## REPORTING OF CASH FLOWS FROM OPERATING ACTIVITIES

Net profit/loss as reported in the Statement of Profit & Loss is different from the net cash flow from operating activities as the financial statements are generally prepared on accrual basis of accounting under which the net income will not indicate the net cash provided by or net loss will not indicate the net cash used in operating activities. In order to calculate the net cash flows in operating activities, it is necessary to replace revenues and expenses with actual receipts and payments in cash. This is done by eliminating the non-cash revenues and non-cash expenses from given earned revenues and incurred expenses. There are two methods of converting net profit into net cash flows from operating activities:

- (i) Direct method, and
- (ii) Indirect method.



## 1. Direct Method

Under direct method, cash receipts from operating revenues and cash payments for operating expenses are arranged and presented in the cash flow statement. The difference between cash receipts and cash payments is the net cash flow from operating activities. It is in effect a cash basis Statement of Profit & Loss. In this case each cash transaction is analysed separately and the total cash receipts and payments for the period is determined. The summarised data for revenue and expenses can be obtained from the financial statements and additional information. We may convert accrual basis of revenue and expenses to equivalent cash receipts and payments. Make sure that a uniform procedure is adopted for converting accrual base items to cash base items.

The following are some examples of usual cash receipts and cash payments resulting from operating activities:

- (i) Cash sales of goods and services;
- (ii) Cash collected from debtors (customers);
- (iii) Cash receipts of interest or dividends;
- (iv) Cash receipts of royalties, fees, commission and other revenues;
- (v) Cash payments to suppliers (creditors);
- (vi) Cash payments for various operating expenses i.e. rent, rates, power etc.
- (vii) Cash payments for wages and salaries to employees;
- (viii) Cash payments for income tax etc.

Under direct method, information about major classes of gross cash receipts and gross cash payments may be obtained either:

- (a) from the accounting records of the enterprise; or
- (b) by adjusting sales, cost of sales and other items in the statement of profit and loss for:
  - Changes during the period in inventories and operating receivables and payables;
  - Other non-cash items, and
  - Other items for which the cash effects are investing or financing cash flows.

Some of the items to be shown in the cash flow statement are illustrated below:

**Collections from Customers:** If a business has only cash sales, the amount of sales revenue in the income statement is the amount of cash collected from the customers. However, when the business has credit sales we have to adjust the amount of sales revenue for changes in debtors and bills receivable. The opening balance of debtors or bills receivable represents uncollected amount from a previous period and it is presumed that cash has been collected during the current accounting period. The closing balance of debtors or bills receivable represents uncollected amount in the current accounting period. Therefore in order to calculate the cash received from debtors, the opening balance (debtors/bills receivable) should be added to the amount of credit sales and closing balance should be subtracted therefrom.

Alternatively, Cash Collected from Debtors can also be calculated as given below:

$$\text{Cash Collected from Debtors} = \text{Credit Sales} + \text{Decrease in Accounts Receivable or} - \text{Increase in Accounts Receivable.}$$

**Payment to Suppliers:** The analysis of cash payments to suppliers begins with cost of goods sold from the Statement of Profit & Loss. The amount of purchases is calculated by adding closing stock and subtracting opening stock from the cost of goods sold. The cash payment made to suppliers is calculated by making adjustments for change in sundry creditors/bills payable.

$$\begin{aligned} \text{Purchases} &= \text{Cost of Goods Sold} + \text{Closing Stock} - \text{Opening Stock} \\ &\text{OR} \\ \text{Purchases} &= \text{Cost of Goods Sold} + \text{Increase in Stock or} - \text{Decrease in Stock} \end{aligned}$$

$$\begin{aligned} \text{Cash Paid to Suppliers} &= \text{Purchases} + \text{Opening Balance of Creditors (Bills Payable)} \\ &\quad - \text{Closing Balance of Creditors (Bills Payable)}. \\ &\text{OR} \\ \text{Cash Paid to Suppliers} &= \text{Purchases} + \text{Decrease in Accounts Payable or} - \\ &\quad \text{Increase in Accounts Payable.} \end{aligned}$$

**Payment to Employees:**

$$\begin{aligned} \text{Cash Paid for Wages and Salaries} &= \text{Wages and Salaries Expenses} + \text{Opening} \\ &\quad \text{Balance of Outstanding Wages and Salaries} - \text{Closing Balance of Outstanding} \\ &\quad \text{Wages and Salaries.} \\ &\text{OR} \\ \text{Cash Paid for Wages and Salaries} &= \text{Wages and Salaries Expenses} + \text{Decrease in} \\ &\quad \text{Wages and Salaries Payable or} - \text{Increase in Wages and Salaries Payable.} \end{aligned}$$

**Rent Received:** The analysis of rent received is similar to cash collected from customers.

$$\begin{aligned} \text{Rent Received} &= \text{Rent Revenue} + \text{Opening Balance of Rent Receivable} - \\ &\quad \text{Closing Balance of Rent Receivable.} \\ &\text{OR} \\ \text{Rent Received} &= \text{Rent Revenue} + \text{Decrease in Rent Receivable or} - \\ &\quad \text{Increase in Rent Receivable.} \end{aligned}$$

**Interest Paid:** The analysis of interest paid is similar to the analysis of payments to employees.

$$\begin{aligned} \text{Interest Paid} &= \text{Interest Expenses} + \text{Opening Balance of Outstanding Interest} - \\ &\quad \text{Closing Balance of Outstanding Interest.} \\ &\text{OR} \\ \text{Interest Paid} &= \text{Interest Expenses} + \text{Decrease in Interest Payable, or} - \\ &\quad \text{Increase in Interest Payable.} \end{aligned}$$

A similar treatment is applied for various other income and expenses to find out the cash inflows or outflows.

**Insurance:** Different procedure is adopted for insurance expense because insurance is usually purchased (and recorded as an asset) before it becomes an expense. The treatment is as follows:

$$\text{Cash Paid for Insurance} = \text{Insurance Expenses} + \text{Closing Balance of Unexpired Insurance} - \text{Opening Balance of Unexpired Insurance.}$$

OR

$$\text{Cash Paid for Insurance} = \text{Insurance Expenses} + \text{Increase in Unexpired Insurance} \\ \text{or} - \text{Decrease in Unexpired Insurance.}$$

A similar treatment is applied for other prepaid expenses also.

**In direct method of calculating cash flow from operations, the following points should be noted:**

- (i) The necessary adjustments should be made for bad debts, sales returns, purchases returns, discount allowed, discount received etc. while calculating the amount received from the customers or paid to suppliers, as the case may be.
- (ii) Items like depreciation, amortisation of intangible assets (such as goodwill, patent, trade mark etc.) or of debenture discount, preliminary expenses, premium on redemption of debentures and preference shares are ignored from the cash flow statement since the method analyses and includes only cash transactions and therefore, non-cash items are omitted from a statement of cash flows.
- (iii) No adjustment is made for loss or gain on the sale of fixed assets and investments since operating cash receipts and payments are reported directly on the cash flow statement.

## 2. Indirect Method

In this method the net profit (loss) is used as the base to calculate net cash provided by or used in operating activities. Non-cash and non-operating charges in the Statement of Profit & Loss are added back to the net profit while non-cash and non-operating credits are deducted to calculate operating profit before working capital changes. It is a partial conversion of accrual basis profit to cash basis profit. Then necessary adjustments are made for increase/decrease in current assets and current liabilities to obtain net cash from operating activities.

**A summary of adjustments required to convert the net profit to net cash flow from operating activities through indirect method is as follows:**

**A. Net profit before tax and extraordinary item**

**B. Adjustments for non-cash and non-operating items:**

*Add:* Amount written off in respect of depreciation, goodwill, preliminary expenses, underwriting commission etc.

*Add/Less:* Other non-operating items

**C. Adjustment for gains and losses on sale of fixed assets and investments:**

*Add:* Loss on sale of fixed assets/investments

*Less:* Profit on sale of fixed assets/investments

**D. Adjustments for changes in current assets (except cash and cash equivalents) and current liabilities (except bank overdraft)**

*Add:* Decrease in accounts of current assets e.g. debtors, bill receivable, stock, prepaid expenses etc.

*Less:* Increase in accounts of current assets.

*Add:* Increase in accounts of current liabilities; e.g., creditors, bills payable, outstanding expenses, etc.

*Less:* Decrease in accounts of current liabilities.

**E. Cash generated from operations**

Less: Income tax paid.

**F. Adjustments for extra-ordinary items if any****G. Net cash from (used in) operating activities**

The computation of net cash inflow or cash outflow from operating activities by the indirect method takes a path that is very different from the computation by the direct method. However, the two methods arrive at the same amount of net cash flow from operations.

**The logic behind the treatment of various items are explained as follows:**

***Adjustment for Depreciation and other Non-cash and Non-operating items***

Depreciation, depletion and amortisation of expenses (amortisation of goodwill, preliminary expenses, premium on redemption of debentures, underwriting commission, etc.) do not affect cash and thus should be added back to the net profit in the cash flow statement. When depreciation is provided it has no effect on cash. However, depreciation is deducted from revenues for the computation of income. Therefore, in going from net profit to cash flow from operations, we add depreciation back to net profit. Likewise, all expenses with no cash effects are added back to net profit in the cash flow statement. In the same manner, revenues that do not provide cash are subtracted from net profit.

***Adjustment for Gains and Losses on Sale of Fixed Assets/Investments***

When fixed assets or investments are sold, there may be either profit or loss on sale. Such profit or loss affects the amount of net profit. For instance, when fixed assets, with a book value of ₹75,000 was sold for ₹90,000 the actual inflow of cash is ₹90,000 which would be reflected in the cash flow statement including a profit of ₹15,000. But this profit on sale of fixed asset has already increased the net profit indicating an inflow of cash from operating activities. In order to avoid this duplication, this profit of ₹15,000 must be deducted from the net profit. Moreover sale of fixed assets is an investing activity and therefore effect of this profit on sale must be removed from cash flow from operations. Likewise, a loss on sale of fixed assets or investment also require an adjustment to the net profit in the cash flow from operations. This loss is added back to the net profit to compute cash flow from operations.

***Changes in Current Assets and Liabilities***

Most current assets and current liabilities result from operating activities. Sundry debtors and bills receivable result from sales, inventory generates revenues and prepaid expenses are used in operations. On the liabilities side sundry creditors and bills payable are ordinarily incurred to buy inventory and outstanding liabilities relate to salaries, utilities and other expenses. Changes in these current assets and liabilities are reported as adjustments to net profit on the cash flows statement. The following rules apply:

- (a) An increase in current assets other than cash is deducted from net profit to calculate cash flow from operations: For example, when sundry debtors (net) increase during the year, this means that revenues on accrual basis are higher than revenues on cash basis since goods sold on credit are treated as revenues on accrual basis. In other words, the business operations in the period covered resulted in more revenues but not all these revenues resulted in corresponding increase in cash. Some of the revenues resulted in an increase in debtors only. In order to convert the net profit to net cash provided by operating activities the increase in debtors must be deducted from the reported net profit. However, a decrease in current assets has opposite effect and has to be added back to net profit to determine cash provided for the period.

- (b) An increase in current liability is added to net profit to arrive at the cash from operation. For example when, sundry creditors increase during the period covered, it means that expenses on accrual basis are more than they are on cash basis because expenses are incurred for which no payment has been made. So this increase must be added to net profit. However, a decrease in a current liability is subtracted from net profit, since more cash has been paid than the expenses recorded on accrual basis.

## FORMAT OF CASH FLOW STATEMENT

Accounting Standard-3 (Revised) has not provided any specific format for the preparation of cash flow statements, but a general idea can be had from the illustration appearing thereof. There seems to be flexibility in the presentation of cash flow statements. However, a widely accepted format under direct method and indirect method is given below:

### Cash Flow Statement (Direct Method)

#### **A. Cash flows from operating activities**

Cash receipts from customers

Cash paid to suppliers and employees

Cash generated from operations

Income taxes paid

Cash flow before extraordinary item

Proceeds from earthquake disaster settlement

*Net Cash from Operating Activities*

#### **B. Cash flows from investing activities**

Purchase of fixed assets

Proceeds from sale of equipment

Interest received

Dividend received

*Net Cash from Investing Activities*

#### **C. Cash flows from financing activities**

Proceeds from issuance of share capital

Proceeds from long-term borrowings

Repayments of long-term borrowings

Interest paid

Dividend paid

*Net Cash from Financing Activities*

Net Increase (Decrease) in Cash and Cash Equivalents (A + B + C)

Cash and Cash Equivalents at Beginning of Period

Cash and Cash Equivalents at End of Period

**Cash Flow Statement (Indirect Method)**

**A. Cash flows from operating activities**

Net profit before tax and extraordinary items

Adjustments for:

Depreciation

Foreign exchange

Investments

Gain or loss on sale of fixed assets

Interest/dividend

Operating profit before working capital changes.

Adjustments for:

Trade & other receivables

Inventories

Trade payables

Cash generation from operations

Interest paid

Direct taxes

Cash before extraordinary items

Deferred revenue

*Net Cash from Operating Activities.*

**B. Cash flows from investing activities**

Purchase of fixed assets

Sale of fixed assets

Sale of investments

Purchase of investments

Interest received

Dividend received

Loans to subsidiaries

*Net Cash from Investing Activities*

**C. Cash flows from financing activities**

Proceeds from issue of share capital

Proceeds from long term borrowings

Repayment to finance/lease liabilities

Dividend paid

*Net Cash from Financing Activities*

Net Increase (Decrease) in Cash and Cash Equivalents (A + B + C)

Cash and Cash Equivalents at the Beginning of the Period

Cash and Cash Equivalents at the End of the Period

**Alternatively the Cash Flows from Operating Activities (Indirect Method) may be summarised as below:**

Net profit before tax and extra-ordinary items

**Adjustments for non-cash and non-operating items**

(+) Depreciation

(+) Amortization of intangible assets, preliminary expenses, debenture discount and the like.

(+) or (–) Other non-cash and non-operating items included in net profit

**Adjustments for gains and losses on sale of fixed assets and investments**

(–) Gains on sale of fixed assets and investments

(+) Loss on sale of fixed assets and investments

**Adjustments for changes in current assets and current liabilities**

(–) Increases in current assets

(+) Decreases in current assets

(+) Increases in current liabilities

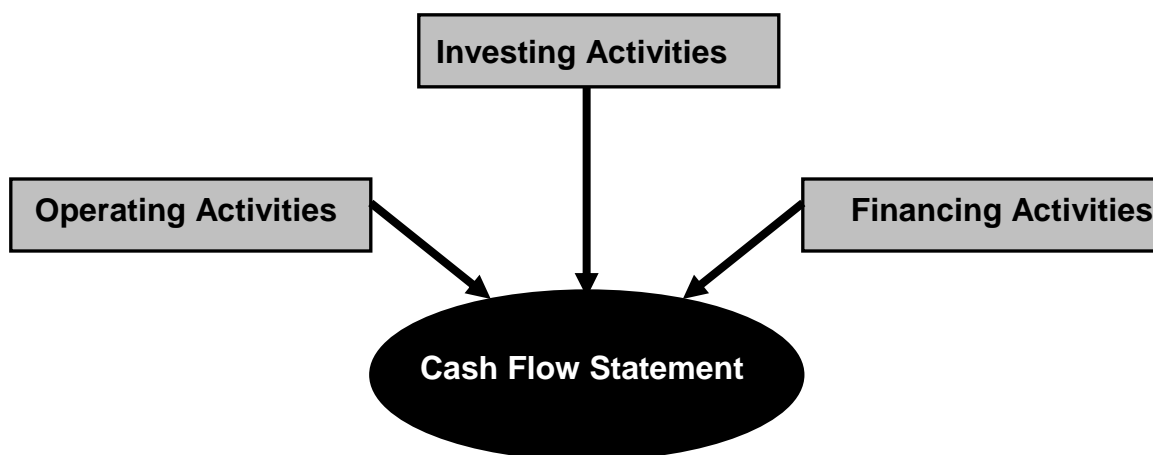
(–) Decreases in current liabilities

(–) Income-tax paid

(–) Extraordinary items

*Net Cash Flows from Operating activities*

**We can summarize the all activities while preparing the cash flow as under:**



## USEFULNESS OF CASH FLOW STATEMENT

The purpose of cash flow statement is to provide information about the cash flows associated with the periods of operations and also about the entity's investing and financing activities during the period. This information is important to shareholders, part of whose investment return (dividends) is dependent on cash flows and to lenders, whose interest payment and principal repayment require the use of cash. The welfare of other constituents of a company including its employees, its suppliers, and the local bodies that may levy taxes on it, depends to varying degrees on the company's activity to generate adequate cash flows to fulfil its

financial obligations. The usefulness of cash flow statement can be summarised as follows:

- (i) **Predict future cash flows:** The cash flow statement makes it possible to predict the amounts, timing and uncertainty of future cash flows on the basis of what has happened in the past. This approach is better than accrual basis data presented by Statement of Profit & Loss and the balance sheet.
- (ii) **Determine the ability to pay dividends and other commitments:** A cash flow statement indicates the sources and uses of cash under suitable headings such as operating, investing and financing activities. Shareholders are interested in receiving dividends on their investments in the shares. Creditors want to receive their interest and principal amount on time. The statement of cash flows helps investors and creditors to predict whether the business can make these payments.
- (iii) **Show the relationship of net income to changes in the business cash:** Usually cash and net income move together. High levels of income tend to lead to increase in cash and vice-versa. However, a company's cash balance can decrease when its net income is high, and cash can increase when income is low. The users want to know the difference between the net profit and net cash provided by operations. The net profit shows the progress of the business during the year while cash flow relates more to the liquidity of the business. The users can assess the reliability of net profit with the help of cash flow statement.
- (iv) **Efficiency in cash management:** Cash flow analysis helps in evaluating financial policies and cash position. It facilitates the management to plan and co-ordinate the financial operations properly. The management can estimate how much funds are needed, from which source they will be derived, how much can be generated internally and how much should be arranged from outside.
- (v) **Discloses the movement of cash:** A comparison of cash flow statement for the previous year with the budget for that year would indicate to what extent the resources of the enterprise were raised and applied. A comparison of the original forecast with actual result may highlight trend of movement that might otherwise remain undetected.
- (vi) **Discloses success or failure of cash planning:** A success or failure of cash planning can be known by comparing the projected cash flow statement with the actual cash flow statement and necessary remedial measures can be taken. Moreover it provides a better measure for inter-period and inter-firm comparison.
- (vii) **Evaluate management decisions:** The statement of cash flows reports the companies' investing and financing activities and thus gives the investors and creditors about cash flow information for evaluating managers' decisions.

### Illustration 12.

From the information as contained in the income statement and the balance sheet of Ashok Ltd., you are required to prepare a cash flow statement using (i) Direct Method and (ii) Indirect Method.

#### A. Income Statement and Reconciliation of Earnings for the year ended 31.3.2011

		₹
Net Sales		25,20,000
Less: Cost of sales	19,80,000	
Depreciation	60,000	
Salaries and wages	2,40,000	
Operating expenses	80,000	
Provision for taxation	<u>88,000</u>	<u>24,48,000</u>



Net operating profit	72,000
Non-recurring income:	
Profit on sale of equipment	<u>12,000</u>
	84,000
Retained earnings (balance in Profit & Loss Account brought forward)	<u>1,51,800</u>
	2,35,800
Dividend declared and paid during the year	<u>72,000</u>
Profit & Loss Account balance as on 31.3.2011	<u>1,63,800</u>

### B. Comparative Balance Sheets

	As at 31.3.2010 ₹	As at 31.3.2011 ₹
Capital	3,60,000	4,44,000
Surplus in profit and loss A/c	1,51,800	1,63,800
Sundry creditors	2,40,000	2,34,000
Outstanding expenses	24,000	48,000
Income tax payable	12,000	13,200
Accumulated depreciation on building and equipments	<u>1,20,000</u>	<u>1,32,000</u>
	<u>9,07,800</u>	<u>10,35,000</u>
Fixed assets		
Land	48,000	96,000
Building and equipments	3,60,000	5,76,000
Current assets		
Cash	60,000	72,000
Debtors	1,68,000	1,86,000
Stock	2,64,000	96,000
Advances	<u>7,800</u>	<u>9,000</u>
	<u>9,07,800</u>	<u>10,35,000</u>

Cost of equipment sold was ₹72,000.

### Solution:

#### Direct Method

#### Ashok Limited Cash Flow Statement for the year ended 31.3.2011

	₹	₹
Cash Flows from Operating Activities:		
Cash receipts from customers	25,02,000	
Cash paid to suppliers and employees	<u>21,15,200</u>	
Cash generated from operations	3,86,800	
Income tax paid	<u>(86,800)</u>	
Net Cash from Operating Activities		3,00,000
Cash Flows from Investing Activities:		
Purchase of land	(48,000)	

Purchase of building and equipment	(2,88,000)	
Sale of equipment	<u>36,000</u>	
Net Cash used in Investing Activities		(3,00,000)
Cash Flows from Financing Activities:		
Issue of share capital	84,000	
Dividend paid	<u>(72,000)</u>	
Net Cash from Financing Activities		<u>12,000</u>
Net Increase in Cash and Cash Equivalents		12,000
Cash and Cash Equivalents at the beginning		<u>60,000</u>
Cash and Cash Equivalents at the end		<u>72,000</u>

---

**Working Notes:***(i) Cash receipts from customers:*

		₹
Sales revenue		25,20,000
Add: Debtors at the beginning		<u>1,68,000</u>
		26,88,000
Less: Debtors at the end		<u>1,86,000</u>
		<u>25,02,000</u>

*(ii) Cash paid to suppliers and employees:*

Cost of goods sold		19,80,000
Add: Operating expenses		80,000
Salaries and wages		<u>2,40,000</u>
		23,00,000
Add: Creditors at the beginning	2,40,000	
Stock at the end	96,000	
Advances at the end	9,000	
Outstanding expenses at the beginning	<u>24,000</u>	<u>3,69,000</u>
		26,69,000
Less: Creditors at the end	2,34,000	
Stock at the beginning	2,64,000	
Advances at the beginning	7,800	
Outstanding expenses at the end	<u>48,000</u>	<u>5,53,800</u>
		<u>21,15,200</u>

*(iii) Income tax paid*

Tax payable at the beginning		12,000
Add: Provision for taxation		<u>88,000</u>
		1,00,000
Less: Tax payable at the end		<u>13,200</u>
Tax paid during the year		<u>86,800</u>

*(iv) Accumulated depreciation written off on equipments (sold)*

Accumulated depreciation at the beginning	1,20,000
Add: Depreciation for the year	<u>60,000</u>
	1,80,000
Less: Accumulated depreciation at the end	<u>1,32,000</u>
	<u>48,000</u>

*(v) Sale price of equipment*

Cost price	72,000
Less: Accumulated depreciation	<u>48,000</u>
	24,000
Add: Profit on sale	<u>12,000</u>
	<u>36,000</u>

*(vi) Purchase of building and equipments*

Balance at the beginning	3,60,000
Less: Cost of equipment sold	<u>72,000</u>
Balance	2,88,000
Balance at the end	<u>5,76,000</u>
Purchased during the year	<u>2,88,000</u>

**Indirect Method**

**Ashok Limited**  
**Cash flow statement for the year ended 31.3.2011**

	₹	₹
<i>Cash Flows from Operating Activities:</i>		
Net profit before taxation and extra-ordinary item	1,60,000	
Adjustments for:		
Depreciation	<u>60,000</u>	
Operating profit before working capital changes	2,20,000	
Increase in debtors	(18,000)	
Decrease in stock	1,68,000	
Increase in advances	(1,200)	
Decrease in creditors	(6,000)	
Increase in outstanding expenses	<u>24,000</u>	
Cash generated from operation	3,86,800	
Income tax paid	<u>(86,800)</u>	
Net Cash from Operating Activities		3,00,000
<i>Cash Flows from Investing Activities:</i>		
Purchase of land	(48,000)	
Purchase of building and equipments	(2,88,000)	
Sale of equipment	<u>36,000</u>	
Net Cash Used in Investing Activities		(3,00,000)

*Cash Flows from Financing Activities:*

Issue of share capital	84,000	
Dividend paid	<u>(72,000)</u>	
Net Cash from Financing Activities		<u>12,000</u>
Net Increase in Cash and Cash Equivalents		12,000
Cash and Cash Equivalents at the beginning		<u>60,000</u>
Cash and Cash Equivalents at the end		<u>72,000</u>

**Illustration 13**

From the following information of XYZ Ltd., for the year ended 31st March, 2010 and 2011, prepare a cash flow statement.

	31.3.2010		31.3.2011
	₹		₹
Equity Share of ₹20 each	3,00,000		4,00,000
Share premium	—		10,000
Profit and loss appropriation A/c	1,00,000		1,00,000
Profit for the year	—		2,00,000
6% Debentures	1,50,000		1,00,000
Profit on Redemption of Debentures	—		2,000
Sundry creditors	1,40,000		1,10,000
Provision for taxation	50,000		1,00,000
Proposed dividend	<u>15,000</u>		<u>20,000</u>
	7,55,000		10,42,000
Property	2,00,000		2,50,000
Plant and machinery	4,00,000	4,50,000	
Less: Depreciation	<u>1,40,000</u>	<u>1,50,000</u>	3,00,000
Loans to subsidiary Co.	—		15,000
Share in subsidiary Co.	20,000		20,000
Stock in trade	1,40,000		1,50,000
Debtors	1,00,000		1,50,000
Bank	<u>35,000</u>		<u>1,57,000</u>
	<u>7,55,000</u>		<u>10,42,000</u>

*Additional information:*

During the year plant costing ₹50,000 was sold for ₹10,000. Accumulated depreciation on this plant was ₹30,000. Loss on sale of plant was charged to Profit & Loss Account. Income-tax paid during the year was ₹60,000.

**Solution:**

**XYZ Limited**  
**Cash Flow Statement for the year ended 31.3.2011**

*Cash Flows from Operating Activities*

	₹
Net profit before tax and extraordinary items	2,00,000

Adjustments for:	
Depreciation	40,000
Provision for taxation	1,10,000
Proposed dividend	20,000
Loss on sale of machinery	<u>10,000</u>
Operating profit before working capital changes	3,80,000
Adjustments for:	
Increase in debtors	(50,000)
Increase in stock-in-trade	(10,000)
Decrease in creditors	<u>(30,000)</u>
Cash generated from operations	2,90,000
Tax paid	<u>(60,000)</u>
Net Cash from Operating Activities	<u>2,30,000</u>
<i>Cash Flows from Investing Activities</i>	
Purchase of property	(50,000)
Sale of plant	10,000
Purchase of machinery	(1,00,000)
Loans to subsidiaries	<u>(15,000)</u>
Net Cash used in Investing activities	<u>(1,55,000)</u>
<i>Cash Flows from Financing Activities</i>	
Issue of equity share capital at premium	1,10,000
Redemption of debentures	(48,000)
Dividends paid	<u>(15,000)</u>
Net Cash from Financing Activities	<u>47,000</u>
Net Increase in Cash and Cash Equivalents	
(₹2,30,000 – ₹1,55,000 + ₹47,000)	1,22,000
Cash and Cash Equivalents at the beginning of the year	<u>35,000</u>
Cash and Cash Equivalents at the end of the year	<u>1,57,000</u>

**Working Notes:**

<b>Property Account</b>		Cr.
Dr.	₹	₹
To Balance b/d	2,00,000	By Balance c/d
To Bank (purchases)		2,50,000
(balancing figure)	<u>50,000</u>	
	<u>2,50,000</u>	<u>2,50,000</u>

**Plant and Machinery Account**

₹		₹	
To Balance b/d	4,00,000	By Bank (plant sold)	10,000
To Bank (purchases) (balancing figure)	1,00,000	By Accumulated depreciation (on plant sold)	30,000
		By Loss on plant sold	10,000
		By Balance c/d	<u>4,50,000</u>
	<u>5,00,000</u>		<u>5,00,000</u>

**Accumulated Depreciation Account**

₹		₹	
To Plant and machinery A/c (on plant sold)	30,000	By Balance b/d	1,40,000
To Balance c/d	<u>1,50,000</u>	By Dep. for the year (balancing figure)	40,000
	<u>1,80,000</u>		<u>1,80,000</u>

**Loans to Subsidiary Account**

₹		₹	
To Bank (balancing figure)	<u>15,000</u>	By Balance c/d (closing)	<u>15,000</u>
	15,000		15,000

**Equity Share Capital Account**

₹		₹	
To Balance c/d	4,00,000	By Balance b/d	3,00,000
		By Bank (balancing figure)	<u>1,00,000</u>
	<u>4,00,000</u>		<u>4,00,000</u>

**Share Premium Account**

₹		₹	
To Balance c/d	<u>10,000</u>	By Bank (balancing figure)	<u>10,000</u>
	10,000		10,000

**6% Debentures Account**

Dr.	₹		Cr.
To Bank (balancing figure)	48,000	By Balance b/d	1,50,000
To Profit on redemption A/c	2,000		
To Balance c/d	<u>1,00,000</u>		
	<u>1,50,000</u>		<u>1,50,000</u>

**Profit on Redemption Account**

₹		₹	
To Balance c/d	<u>2,000</u>	By 6% Debentures A/c	<u>2,000</u>
	2,000		2,000

## Provision for Taxation

	₹		₹
To Bank (tax paid)	60,000	By Balance b/d	50,000
To Balance c/d	<u>1,00,000</u>	By Transfer from P & L A/c	<u>1,10,000</u>
	<u>1,60,000</u>		<u>1,60,000</u>

## Proposed Dividend

	₹		₹
To Bank (dividends paid)	15,000	By Balance b/d	15,000
To Balance c/d	<u>20,000</u>	By Transfer from P & L A/c	<u>20,000</u>
	<u>35,000</u>		<u>35,000</u>

**Illustration 14**

From following information of Mahendra Ltd. prepare cash flow statement for the year ended 31.3.2011 by Indirect Method.

	31.3.2010 ₹	31.3.2011 ₹
Equity share capital	3,00,000	4,00,000
8% Preference shares	1,50,000	1,00,000
Capital reserve	—	20,000
General reserve	40,000	50,000
Profit & Loss Account	30,000	48,000
Proposed dividend	42,000	50,000
Sundry creditors	25,000	47,000
Bills payable	20,000	16,000
Liability for expenses	30,000	36,000
Provision for taxation	<u>40,000</u>	<u>50,000</u>
	<u>6,77,000</u>	<u>8,17,000</u>
Goodwill	1,00,000	80,000
Land and building	2,00,000	1,70,000
Plant	80,000	2,00,000
Investment	20,000	30,000
Sundry debtors	1,40,000	1,70,000
Stock	77,000	1,09,000
Bills receivable	20,000	30,000
Cash in hand	15,000	10,000
Cash at bank	10,000	8,000
Preliminary expenses	<u>15,000</u>	<u>10,000</u>
	<u>6,77,000</u>	<u>8,17,000</u>

*Additional informations:*

- (i) A piece of land has been sold during the year and the profit on sale has been credited to capital reserve. Depreciation charged on building during the year is ₹5,000; no additions under this head during the year.
- (ii) A machine was sold for ₹10,000. The written down value of the machine was ₹12,000. Depreciation of ₹10,000 is charged on plant in 2010-11.
- (iii) Investments are trade investments. ₹3,000 by way of dividend is received including ₹1,000 from pre-acquisition profit which has been credited to investment account.
- (iv) An interim dividend of ₹20,000 has been paid in 2010-11.

**Solution:**

**Mahendra Limited**  
**Cash Flow Statement for the year ended 31.3.2011**

*Cash Flows from Operating Activities:*

	₹
Net profit before tax and extraordinary items	1,08,000
Adjustments for:	
Depreciation:	
Building	5,000
Plant & Machinery	<u>10,000</u>
Preliminary expenses	5,000
Loss on sale of plant	2,000
Goodwill written off	20,000
Dividend received	<u>(2,000)</u>
Operating profit before working capital changes	1,48,000
Adjustments for:	
Increase in debtors	(30,000)
Increase in stock	(32,000)
Increase in bills receivable	(10,000)
Decrease in bills payable	(4,000)
Increase in sundry creditors	22,000
Increase in liability for expenses	<u>6,000</u>
Net Cash from Operating Activities	<u>1,00,000</u>

*Cash Flows from Investing Activities:*

Sale of proceeds of land	45,000
Sale proceeds of machine	10,000
Purchase of plant	(1,42,000)
Purchase of investment	(11,000)
Dividend received	<u>3,000</u>
Net Cash Used in Investing Activities	<u>(95,000)</u>



*Cash Flows from Financing Activities:*

Issue of share capital	1,00,000
Redemption of preference shares	(50,000)
Interim dividend paid	(20,000)
Dividend paid (assumed)	<u>(42,000)</u>
Net Cash Used in Financing Activities	<u>(12,000)</u>
Net Increase in Cash and Cash Equivalents	(7,000)
Cash and Cash Equivalents on 31.3.2010 (Opening balance)	<u>25,000</u>
Cash and Cash Equivalents on 31.3.2011 (Closing balance)	<u>18,000</u>

**Working Notes:***(i) Net profit before tax and extra-ordinary items:*

Profit & Loss Account as on 31.3.2011	48,000
Less: Profit & Loss Account as on 31.3.2010	30,000
Profit earned during the year after appropriation and provision for tax	18,000
Add: Transfer to general reserve	10,000
Proposed dividend	50,000
Interim dividend	20,000
Provision for taxation	<u>10,000</u>
Profit before tax and extraordinary items	<u>1,08,000</u>

*(ii) Land and Building Account*

₹		₹	
To Balance b/d	2,00,000	By Depreciation A/c	5,000
To Capital reserve	20,000	By Bank (purchases)	
(balancing figure)	<u>45,000</u>	By Balance c/d	<u>1,70,000</u>
	<u>2,20,000</u>		<u>2,20,000</u>

*(iii) Plant and Machinery Account*

₹		₹	
To Balance b/d	80,000	By Bank (sales)	10,000
To Bank (purchases)	1,42,000	By Profit & Loss Account (loss)	2,000
		By Depreciation	10,000
		By Balance c/d	<u>2,00,000</u>
	<u>2,22,000</u>		<u>2,22,000</u>

*(iv) Investment Account*

₹		₹	
To Balance b/d	20,000	By Dividend	1,000
To Bank (purchases)	<u>11,000</u>	By Balance c/d	<u>30,000</u>
	<u>31,000</u>		<u>31,000</u>

**Illustration 15**

The following are the summary of cash transactions extracted from the books of Happy Ltd.:

	(₹ in '000)
Balance as on 1st April, 2012	140
Receipts from customers	11,132
Issue of shares	1,200
Sale of fixed assets	<u>512</u>
	<u>12,984</u>
Payments to suppliers	8,188
Payments for fixed assets	920
Payments for overheads	460
Wages and salaries	276
Taxation	972
Dividends	320
Repayment of bank loans	<u>1,000</u>
	<u>12,136</u>
Balance as on 31st March, 2013	848

You are required to prepare a cash flow statement of the company for the period ended 31st March, 2013 in accordance with the Accounting Standard- 3 (Revised).

**Solution:**

**In the books of Happy Limited**  
**Cash Flow Statement for the period ending 31st March, 2013**

	(₹ in '000s)
<b>A. Cash Flow from Operating Activities</b>	
Receipts from customers	11,132
Payment to suppliers	(8,188)
Payment of Wages and Salaries	(276)
Payment of Overheads	(460)
Payment of Taxes	<u>(972)</u>
Net Cash from Operating Activities(A)	<u>1236</u>
<b>B Cash Flow from Investing Activities</b>	
Proceeds on sale of fixed assets	512
Acquisition of (payments) fixed assets	<u>(920)</u>
Net Cash Used in Investing Activities (B)	<u>(408)</u>
<b>C Cash Flow from Financing Activities</b>	
Proceeds on issue of shares	1200
Payments of dividends	(320)
Repayments of bank loans	<u>(1000)</u>
Net Cash Used in Investing Activities (C)	<u>(120)</u>
Net increase in cash and cash equivalents (A)+(B)+(C)	708
Cash and cash equivalents at the beginning of the period	<u>140</u>
Cash and cash equivalents at the end of the period	<u>848</u>

## FUND FLOW STATEMENT



Fund flow statement also referred to as statement of “source and application of funds” presents the movement of funds and helps to understand the changes in the structure of assets, liabilities and equity capital. Whereas the balance sheet provides only a summary of the assets and liabilities at a particular point of time. It reveals the financial state of any organisation the assets side of a balance sheet shows the deployment of resources while the liabilities side indicates its obligations. The statement of profit and loss shows the operating result of the business during a specified period. Both the statement provide the essential basic information on the financial activities of the business, but their usefulness is limited for analysis and planning process. From the management point of view, the usefulness of information provided by these income statements functions effectively and efficiently. In the true sense they do not disclose the nature of all transactions. Management, Creditors and Investors etc. want to determine or evaluate the sources and application of funds employed by the firm for the future course of action. Based on these backgrounds, it is essential to analyse the movement of assets, liabilities, funds from operations and capital between the components of two year financial statements. The analysis of financial statements helps to the management by providing additional information in a meaningful manner. The information required for the preparation of funds flow statement is drawn from the basic financial statements such as the Balance Sheet and statement of profit and loss .The most commonly accepted form of fund flow is the one prepared on working capital basis.

### Meaning of Fund

Fund means working capital. If current assets of company is more than current liability of business, it is called working capital and working capital's other name is Fund.

$$\text{Fund} = \text{Working capital} = \text{Current assets} - \text{Current liability}$$

### Meaning of Flow of Funds

Flow of funds include both “inflow” and “outflow”. The term “ flow of funds” means “Transfer of economic values from one assets to another and one liability to another.” Flow of fund takes place whenever there is change in working capital. This change may be either inflow or outflow of funds.

If fixed assets are converted into current asset or fixed liability is converted into current liabilities, these are the flow of fund. But if current assets are changed with current assets or current assets are changed into current liabilities, then, there is no flow of fund because there is no change working capital. Suppose, we get the money from debtor, this is not flow of fund because, working capital is not changed. Both items of current assets and when current assets change into current assets, there will not be change in working capital.

Flow of Fund =

Fixed asset changes into current asset or current asset changes into fixed assets

Or

Fixed liability changes into current liability or current liability changes into fixed liability.

Or

Any transaction which attract one current account and one non-current account then it is only flow of fund.

*For example:*

Machinery a/c Dr. (Non-current)  
 To share capital a/c (Non-current)  
 (Machinery purchase in consideration of share)

In the above transaction both accounts are non current accounts which do not affect working capital and same will remain unaffected i.e. there will be no flow of fund.

Machinery a/c Dr. (Non-current)  
 To Bank a/c (Current)  
 (Machinery purchase in cash)

In the above transaction one account is non-current and other is current which effect working capital i.e. there will be flow of fund.

There are a few examples of inflow and outflow of funds:

#### **Inflow of Funds**

- Issue of Equity Share Capital
- Issue of Preference Share Capital
- Issue of Debentures/Long term Loans
- Premium on issue of shares/debentures
- Sale of Investments
- Sale of Fixed Assets

#### **Outflow of Funds**

- Redemption of Preference Share Capital
- Redemption of Debentures
- Repayment of Long term Loans
- Premium on redemption of preference shares/debentures
- Purchase of Investments/Fixed Assets
- Dividend Paid
- Taxes Paid
- Drawings by proprietor/partner

### **MEANING AND DEFINITION OF FUNDS FLOW STATEMENT**

“Funds flow statement is a method by which we study changes in the financial position of a business enterprise between beginning and ending financial statement dates. It is a statement showing sources and uses of funds for a period of time.”

#### **Definition**

“A statement of sources and application of funds is a technical device designed to analyses the changes in the financial condition of a business enterprise between two dates.” —By Foulke

“The funds flow statement describes the sources from which additional funds were derived and the use to which these sources were put”. —By Anthony

**Features of funds flow statement are as under:**

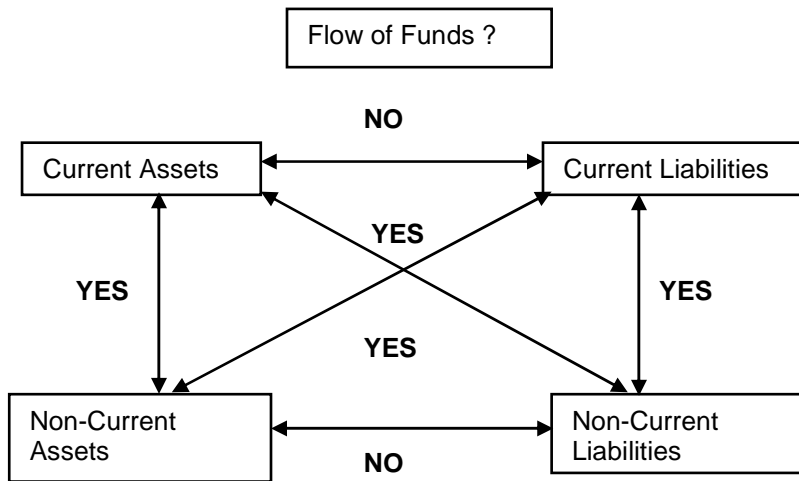
- Shows sources of funds during a specified period.
- Shows uses of that funds during a specified period.
- “funds” used here means working capital, i.e. the excess of current assets over current liabilities.
- It is also known as
  - Sources and Application of funds;
  - statement of changes in financial position:
  - sources and uses of funds:
  - summary of financial operations:
  - where got, where gone statement

**Professor Anthony in his book “Management Accounting-Text and Cases” has explained the fund flow by way of ‘where got where gone statement’.**

Where got = Sources of fund

Where gone = Application of fund

*So we can say fund flow item will be summarized as under:*



**STEPS FOR PREPARATION OF FUND FLOW STATEMENT**

**FIRST STEP**

***To prepare statement of Changes of Working Capital***

It is very necessary to make statement of changes of working capital. Because net increase in working capital is use of fund and net decrease in working capital is source of fund.

We take two balance sheets, one is current year balance sheet and other is previous year balance sheet. Then we separate current assets and current liabilities.

If current assets are more than previous year current assets, it means increase in working capital.

If current assets are less than previous year current assets, it means decrease in working capital. Because relationship between current assets and working capital is positive and if any changes in current assets, working capital will change in same direction.

If current liabilities are more than previous year current liabilities, it means decrease in working capital.

If current liabilities are less than previous year current liabilities, it means increase in working capital.

Relationship between working capital and current liabilities are inverse.

We can summarise the above as under:

<i>Working Capital increase/decrease when</i>	<i>Change in current assets or current liabilities</i>
<ul style="list-style-type: none"> <li>Increase working capital</li> </ul>	<ul style="list-style-type: none"> <li>Increase in current assets</li> <li>Decrease in current liabilities</li> </ul>
<ul style="list-style-type: none"> <li>Decrease in working capital</li> </ul>	<ul style="list-style-type: none"> <li>Decrease in current assets</li> <li>Increase in current liabilities</li> </ul>
<ul style="list-style-type: none"> <li>No change in working capital</li> </ul>	<ul style="list-style-type: none"> <li>Realisation from debtors/Bills Receivable</li> <li>Payment to creditors/Bills Payable</li> <li>Goods sold on credit</li> <li>Goods purchased on credit</li> </ul>

Net working capital increase or decrease when a transaction involves a current account and non-current account.

#### Statement or schedule of changes in working capital

<i>Particulars</i>	<i>Previous Year</i> ₹	<i>Current Year</i> ₹	<i>Effect on working capital</i>	
			<i>Increase</i> ₹	<i>Decrease</i> ₹
<b>(a) CURRENT ASSETS</b>				
Cash in hand				
Debtor				
Inventory				
Bills Receivable				
Total Current Assets (A)				
<b>(b) CURRENT LIABILITIES</b>				
Trade Creditors				
Bills Payable				
<b>(c) Total Current Liabilities (B)</b>				
Total Working Capital (A-B)				
<b>(d) Change in Working Capital</b>				

**SECOND STEP****Ascertain the funds from operation**

Funds from the operation may be ascertained from following two methods as under:

- (i) In statement form
- (ii) In account form

Fund from operation is required for preparation of fund flow statement for source of fund side. It can be shown on application of fund side when there is negative fund from operation. Operation means business activity and fund from operation means profit from business activity.

**Statement of fund from operations**

The fund flow statement is prepared as per the following proforma:

**Statement of Funds from operations for the \_\_\_\_\_**

<i>Particulars</i>	₹	₹
Net Profit after tax for the year		XXX
<i>Add: Non-Current/Non-Operating Expenses (E.G.)</i>		
Depreciation	XX	
Loss on Sale of Fixed Assets	XX	
Interest on Debentures	XX	
Goodwill Written Off	XX	
Provision for Tax	XX	
Proposed Dividend	XX	
Interim Dividend	XX	
Transfer from Statement of Profit & Loss (Profit & Loss Account)	XX	
Other Non-Current & Non-Operating items debited	XX	XXX
<i>Less: Non-Current &amp; Non Operating Incomes (e.g.)</i>		
Interest on Investment	XX	
Dividend Received	XX	
Profit on Sale of Fixed Assets	XX	
Interest on Bank Deposit	XX	
Refund of Tax	XX	
Other Non-Current & Non-Operating items credited	XX	XXX
<b>Net Fund Flow From Operation</b>		XXX

**Fund Flow Statement in Account Form****Adjusted Profit & Loss Account for the period \_\_\_\_\_**

Dr.

Cr.

<i>Particulars</i>	<i>Amount ₹</i>	<i>Particulars</i>	<i>Amount ₹</i>
To Non-Current & Non-Operating Items Charged:		By Balance b/d	XX
Transfer to General Reserve	XX	By Non-Current & Non-Operating Items credited	

Proposed Dividend	XX	Profit on Sale of Fixed Assets	XX
Goodwill Written Off	XX	Income from Investment	XX
Preliminary Expenses	XX	Other Non-Current & Non Operating Items	XX
Depreciation	XX	By Net Fund Flow from Operation (Balancing Figure)	XX
Provision for Taxation	XX		
Other Non-Current & Non Operating Items	XX		
To Balance c/d	XX		

**Illustration 16**

Form the following details prepare a statement showing changes in working capital during 2012:

**Balance sheet of Surya as on 31st December**

<i>Liabilities</i>	2011 ₹	2012 ₹	<i>Assets</i>	2011 ₹	2012 ₹
Share capital	5,00,000	6,00,000	Fixed assets	10,00,000	11,20,000
Reserves	1,50,000	1,80,000	Less: Depreciation	<u>3,70,000</u>	<u>4,60,000</u>
Profit and Loss A/c	40,000	65,000		6,30,000	6,60,000
Debentures	3,00,000	2,50,000	Stock	2,40,000	3,70,000
Creditors for goods	1,70,000	1,60,000	Book Debts	2,50,000	2,30,000
Provision for tax	60,000	80,000	Cash in hand	80,000	65,000
			Preliminary expenses	<u>20,000</u>	<u>15,000</u>
	<u>12,20,000</u>	<u>13,35,000</u>		<u>12,20,000</u>	<u>13,35,000</u>

**Solution:**

The first step is to prepare the schedule of changes in working capital.

**Schedule of changes in working capital**

	2011 ₹	2012 ₹	Increase in working capital ₹	Decrease in working capital ₹
<b>Current Asset:</b>				
Stock	2,40,000	3,70,000	1,30,000	—
Book debts	2,50,000	2,30,000	—	20,000
Cash in hand	<u>80,000</u>	<u>60,000</u>	—	20,000
(A)	<u>5,70,000</u>	<u>6,60,000</u>	1,30,000	40,000
<b>Current Liability:</b>				
Creditors for goods	(B) <u>1,70,000</u>	<u>1,60,000</u>	<u>10,000</u>	—
Working capital	(A – B) 4,00,000	5,00,000	1,40,000	40,000
Increase in working capital	<u>1,00,000</u>	—	—	<u>1,00,000</u>
	<u>5,00,000</u>	<u>5,00,000</u>	<u>1,40,000</u>	<u>1,40,000</u>



**Illustration 17**

From the following two balance sheet of M/s Ram Traders as at December 31, 2011 and 2012. Prepare the statement of sources and uses of funds.

	2011 ₹	2012 ₹	2011 ₹	2012 ₹
<b>Liabilities</b>				
Share capital	80,000	90,000		
Trade creditors	20,000	46,000		
Profit & Loss a/c	4,60,000	5,00,000		
<b>Assets</b>				
Cash			60,000	94,000
Debtors			2,40,000	2,30,000
Stock in trade			1,60,000	1,80,000
Land			<u>1,00,000</u>	<u>1,32,000</u>
	<u>5,60,000</u>	<u>6,36,000</u>	<u>5,60,000</u>	<u>6,36,000</u>

**Solution:**

The first step is to prepare the schedule of changes in working capital.

**Schedule of changes in working capital**

	2011 ₹	2012 ₹	Increase in working capital ₹	Decrease in working capital ₹
<b>Current Asset:</b>				
Cash	60,000	94,000	34,000	—
Debtors	2,40,000	2,30,000	—	10,000
Stock in trade	<u>1,60,000</u>	<u>1,80,000</u>	20,000	—
(A)	<u>4,60,000</u>	<u>5,04,000</u>	—	—
<b>Current Liability:</b>				
Trade creditors	<u>20,000</u>	<u>46,000</u>	—	26,000
Working capital	(A – B) <u>4,40,000</u>	<u>4,58,000</u>	54,000	36,000
Increase in working capital	<u>18,000</u>	—	—	<u>18,000</u>
	<u>4,58,000</u>	<u>4,58,000</u>	<u>54,000</u>	<u>54,000</u>

The next step is to prepare the non current accounts of the firm.

**Land ACCOUNT**

Dr.	₹	₹	Cr.
To Balance b/d	1,00,000	By Balance c/d	1,32,000
To Cash(Purchase) balancing figure	<u>32,000</u>		
	<u>1,32,000</u>		<u>1,32,000</u>

**Share capital Account**

Dr.	₹	₹	Cr.
To Balance c/d	90,000	By Cash (Issue of shares)	10,000
		By Balance b/d	<u>80,000</u>
	<u>90,000</u>		<u>90,000</u>

**Adjusted Profit & Loss Account**

Dr.	₹	₹	Cr.
To Balance c/d	5,00,000	By Balance b/d	4,60,000
		By Funds from operation	40,000
	<u>5,00,000</u>	By Balancing figure	<u>5,00,000</u>

**Fund flow statement**

Sources	₹	Applications	₹
Issue of Shares	10,000	Purchase of Land	32,000
Funds from operation	<u>40,000</u>	Increase in working capital	<u>18,000</u>
	<u>50,000</u>		<u>50,000</u>

**Illustration 18**

From the following relating to Relox Limited, prepare funds flow statement.

**Balance sheet of Relox Limited as on 31st December**

Liabilities	2009	2010	Assets	2009	2010
	₹	₹		₹	₹
Share capital	6,00,000	8,00,000	Fixed assets	3,80,000	4,20,000
Reserves	2,00,000	1,00,000	Accounts receivable	2,10,000	3,00,000
Retained earnings	60,000	1,20,000	Stock	3,00,000	3,90,000
Accounts payable	<u>90,000</u>	<u>2,70,000</u>	Cash	<u>60,000</u>	<u>1,80,000</u>
	<u>9,50,000</u>	<u>12,90,000</u>		<u>9,50,000</u>	<u>12,90,000</u>

**Additional information:**

- The company issued bonus shares for ₹1,00,000 and for cash ₹1,00,000
- Depreciation written off during the year ₹30,000

**Solution****Schedule of changes in working capital**

	2009	2010	Increase in working capital	Decrease in working capital
	₹	₹	₹	₹
<b>Current Asset:</b>				
Cash	60,000	1,80,000	1,20,000	—
Stock in trade	3,00,000	3,90,000	90,000	—
Accounts receivable	<u>2,10,000</u>	<u>3,00,000</u>	90,000	—
(A)	<u>5,70,000</u>	<u>8,70,000</u>		
<b>Current Liability:</b>				
Accounts payable	(B) <u>90,000</u>	<u>2,70,000</u>	—	<u>1,80,000</u>
Working capital	(A – B) 4,80,000	6,00,000	3,00,000	1,80,000
Increase in working capital	<u>1,20,000</u>	—	—	<u>1,20,000</u>
	<u>6,00,000</u>	<u>6,00,000</u>	<u>3,00,000</u>	<u>3,00,000</u>

**Fixed Assets Account**

Dr.		Cr.	
	₹	₹	
To Balance b/d	3,80,000	By Depreciation (Adjusted Profit & Loss A/c)	30,000
To Cash (Purchase)	70,000	By Balance c/d	4,20,000
Balancing figure	<u>4,50,000</u>		<u>4,50,000</u>

**Share Capital Account**

Dr.		Cr.	
	₹	₹	
To Balance c/d	8,00,000	By Balance b/d	6,00,000
		By Cash (Issue of shares)	1,00,000
		By General reserve	<u>1,00,000</u>
	<u>8,00,000</u>		<u>8,00,000</u>

**General Reserve Account**

Dr.		Cr.	
	₹	₹	
To Share capital	1,00,000	By Balance b/d	2,00,000
To Balance c/d	<u>1,00,000</u>		<u>2,00,000</u>
	<u>2,00,000</u>		<u>2,00,000</u>

**Adjusted Profit & Loss Account**

Dr.	₹	₹	Cr.
To (Fixed Assets) depreciation	30,000	By Balance b/d (Retained Earnings)	60,000
To Balance c/d	1,20,000	By Funds from operation	90,000
	<u>1,50,000</u>	Balancing figure	<u>1,50,000</u>

**Fund flow statement**

Dr.	₹	₹	Cr.
Sources		Applications	
Issue of Shares	1,00,000	Purchase of Land	70,000
Funds from operation	<u>90,000</u>	Increase in working capital	<u>1,20,000</u>
	<u>1,90,000</u>		<u>1,90,000</u>

**Illustration 19**

Balance sheets of M/s Black and White as on 1-1-2012 and 31-12-2012 were as follows:

Liabilities	1-1-12 ₹	31-12-12 ₹	Assets	1-1-12 ₹	31-12-12 ₹
Creditors	40,000	44,000	Cash	10,000	7,000
Mrs. Whites' Loan	25,000	—	Debtors	30,000	50,000
Loan from P.N. B. Bank	40,000	50,000	Stock	35,000	25,000
Capital	1,25,000	1,53,000	Machinery	80,000	55,000
			Land	40,000	50,000
			Building	<u>35,000</u>	<u>60,000</u>
	<u>2,30,000</u>	<u>2,47,000</u>		<u>2,30,000</u>	<u>2,47,000</u>

**Additional information**

During the year machine costing ₹10,000 (accumulated depreciation ₹3,000) was sold for ₹5,000. The provision for depreciation against machinery as on 1-1-2012 was ₹25,000 and on 31-12-2012 ₹40,000 Net profit for the year 2012 amounted to ₹45,000. You are required to prepare funds flow statement.

**Solution:**

Changes in working capital in between the various current assets and current liabilities are as follows:

**Statement of changes in working capital**

	1-1-2012 ₹	31-12-2012 ₹	Increase in working capital ₹	Decrease in working capital ₹
<b>Current Asset:</b>				
Cash	10,000	7,000	—	3,000
Debtors	30,000	50,000	20,000	—

Stock		<u>35,000</u>	<u>25,000</u>	—	10,000
	(A)	<u>75,000</u>	<u>82,000</u>	—	—
<b>Current Liability:</b>					
Sundry creditors	(B)	<u>40,000</u>	<u>44,000</u>	—	<u>4,000</u>
Working capital	(A – B)	35,000	38,000	20,000	17,000
Increase in working capital		<u>3,000</u>	<u>—</u>	<u>—</u>	<u>3,000</u>
		<u>38,000</u>	<u>38,000</u>	<u>20,000</u>	<u>20,000</u>

The next step is to determine the cost of the machinery before the charge of depreciation i.e., to find out the Gross value of the assets, in other words Original cost of the assets to be found out at the moment of purchase.

	1-1-2012 ₹	31-12-2012 ₹
Written down value of the machinery extracted from the balance sheet as on dated	₹ 80,000	₹ 55,000
Add: Accumulated depreciation or Provision for depreciation	<u>25,000</u>	<u>40,000</u>
Original Cost of Machinery	<u>1,05,000</u>	<u>95,000</u>

The ultimate aim is to find out the original cost of the machinery for the preparation of the machinery account: Before preparing the Machinery account, the worth of the sale transaction of the machinery should be found out.

Original cost of the Machinery	₹10,000
(–) Depreciation	<u>₹ 3,000</u>
Machinery worth for sale	₹ 7,000
(–) Machinery sold	<u>₹ 5,000</u>
Loss on sale of the portion of the machinery sold	<u>₹ 2,000</u>

#### Machinery Account

<i>Dr.</i>		<i>Cr.</i>
	₹	₹
To Balance b/d	1,05,000	By Cash (Sales)
		By Provision for depreciation
		By Loss on sale (Adjusted profit and loss account)
		By Balance c/d
	<u>1,05,000</u>	<u>95,000</u>
		<u>1,05,000</u>

#### Provision for Depreciation Account

<i>Dr.</i>		<i>Cr.</i>
	₹	₹
To Machinery A/c	3,000	By Balance b/d
To Balance c/d	40,000	By Adjusted Profit and Loss A/c
		(Depreciation of Current Year)
	<u>43,000</u>	<u>18,000</u>
		<u>43,000</u>

**Capital Account**

<i>Dr.</i>	₹		₹	<i>Cr.</i>
To Drawings (Balancing figure)	17,000	By Balance b/d		1,25,000
To Balance c/d	<u>1,53,000</u>	By Net profit		<u>45,000</u>
	<u>1,70,000</u>			<u>1,70,000</u>

**Loan from P.N. B. Bank Account**

<i>Dr.</i>	₹		₹	<i>Cr.</i>
To Balance c/d	50,000	By Balance b/d		40,000
	<u>50,000</u>	By Cash (Balancing figure)		<u>10,000</u>
				<u>50,000</u>

**Mrs. White's Loan Account**

<i>Dr.</i>	₹		₹	<i>Cr.</i>
To Cash (Loan paid)	25,000	By Balance b/d		25,000
	<u>25,000</u>			<u>25,000</u>

**Adjusted Profit & Loss Account**

<i>Dr.</i>	₹		₹	<i>Cr.</i>
To Machinery (Loss on sale)	2,000	By Balance b/d		—
To Provision for depreciation	18,000	By Fund from operations		65,000
To Balance c/d (Net profit)	<u>45,000</u>			<u>65,000</u>
	<u>65,000</u>			<u>65,000</u>

**Fund flow statement**

<i>Dr.</i>	₹	<i>Applications</i>	₹	<i>Cr.</i>
<i>Sources</i>				
Sale of machinery	5,000	Purchase of land (50,000 – 40,000)		10,000
Loan from P.N. B. Bank	10,000	Purchase of Building (60,000 – 35,000)		25,000
Fund from operation	65,000	Drawings		17,000
		Repayment of Mrs. White's Loan		25,000
		Increase working capital		<u>3,000</u>
	<u>80,000</u>			<u>80,000</u>

**Illustration 20**

From the following balance sheets of A on 31st December 2011 and 2012, you are required to prepare Fund flow statement.

The followings are additional information has also been given:

- Depreciation charged on plant was Rs.4,000 and on building Rs.4,000
- Provision for taxation of Rs.19,000 was made during the year 2012
- Interim Dividend of Rs.8,000 was paid during the year 2012

#### Balance sheet

<i>Liabilities</i>	<i>2011</i>	<i>2012</i>	<i>Assets</i>	<i>2011</i>	<i>2012</i>
	₹	₹		₹	₹
Share capital	1,00,000	1,00,000	Goodwill	12,000	12,000
General Reserve	14,000	18,000	Building	40,000	36,000
Profit & Loss A/c	16,000	13,000	Plant	37,000	36,000
Sundry creditors	8,000	5,400	Investments	10,000	11,000
Bills payable	1,200	800	Stock	30,000	23,400
Provision for taxation	16,000	18,000	Bills receivable	2,000	3,200
Provision for doubtful debts	400	600	Debtors	18,000	19,000
			Cash	6,600	15,200
	<u>1,55,600</u>	<u>1,55,800</u>		<u>1,55,600</u>	<u>1,55,800</u>

#### Solution:

#### Statement of changes in working capital

	<i>2011</i>	<i>2012</i>	<i>Increase in working capital</i>	<i>Decrease in working capital</i>
	₹	₹	₹	₹
<b>Current Asset:</b>				
Stock	30,000	23,400	—	6,600
Bills receivable	2,000	3,200	1,200	—
Debtors	18,000	19,000	1,000	—
Cash	<u>6,600</u>	<u>15,200</u>	8,600	—
(A)	<u>56,600</u>	<u>60,800</u>		
<b>Current liability</b>				
Sundry creditors	8,000	5,400	2,600	—
Bills payable	1,200	800	400	—
Provision for doubtful debts	<u>400</u>	<u>600</u>	—	200
(B)	<u>9,600</u>	<u>6,800</u>		
Working capital	(A – B)	47,000	54,000	13,800
Increase in working capital		<u>7,000</u>		<u>7,000</u>
		<u>54,000</u>	<u>54,000</u>	<u>13,800</u>

**Building Account**

<i>Dr.</i>			<i>Cr.</i>
	₹		₹
To Balance b/d	40,000	By (Depreciation) Adjusted Profit & Loss A/c	4,000
	<u>          </u>	By Balance c/d	<u>36,000</u>
	<u>40,000</u>		<u>40,000</u>

**Plant Account**

<i>Dr.</i>			<i>Cr.</i>
	₹		₹
To Balance b/d	37,000	By (Depreciation) Adjusted Profit & Loss A/c	4,000
To Cash (Purchase) balancing figure	<u>3,000</u>	By Balance c/d	<u>36,000</u>
	<u>40,000</u>		<u>40,000</u>

**Investments Account**

<i>Dr.</i>			<i>Cr.</i>
	₹		₹
To Balance b/d	10,000	By Balance c/d	11,000
To Cash (purchase) Balancing figure	<u>1,000</u>		<u>          </u>
	<u>11,000</u>		<u>11,000</u>

**General Reserve Account**

<i>Dr.</i>			<i>Cr.</i>
	₹		₹
To Balance b/d	18,000	By Balance b/d	14,000
	<u>          </u>	By Adjusted Profit and Loss A/c (Profit transferred during the current year)	4,000
	<u>18,000</u>		<u>18,000</u>

**Provision for Taxation Account**

<i>Dr.</i>			<i>Cr.</i>
	₹		₹
To Cash (Tax paid previous year taxation) Balancing figure	17,000	By Balance b/d	16,000
To Balance b/d	18,000	By Adjusted Profit & Loss A/c (provision for taxation made during the year)	19,000
	<u>          </u>		<u>          </u>
	<u>35,000</u>		<u>35,000</u>



**Adjusted Profit & Loss Account**

	₹		₹
To Depreciation on Building	4,000	By Balance b/d	16,000
To Depreciation on Plant	4,000	By Funds from operations	36,000
To Transfer to General Reserve	4,000		
To Provision for taxation	19,000		
To Interim dividend	8,000		
To Balance c/d	<u>13,000</u>		
	<u>52,000</u>		<u>52,000</u>

The next step is to prepare the fund flow statement.

**Fund Flow Statement**

<i>Sources</i>	₹	<i>Applications</i>	₹
Funds from operations	36,000	Purchase of the plant	3,000
		Purchase of the Investment	1,000
		Increase working capital	7,000
		Tax paid	17,000
		Interim dividend	<u>8,000</u>
	<u>36,000</u>		<u>36,000</u>

**DIFFERENCE BETWEEN CASH FLOW AND FUND FLOW**

<b>Cash Flow</b>	<b>Fund Flow</b>
Cash flow statement based on narrow concept of funds, which considers changes in cash.	Funds flow statement is based on the concept of working capital
It does not contain any opening and closing balance.	It contains opening as well as closing balances of cash and cash equivalents.
Cash flow statement is prepared on cash basis.	Funds flow statement is prepared on accrual basis.
Cash flow statement is more useful in short term analysis and cash planning	Funds flow statement is more useful in long-term analysis of financial planning.
In cash flow statement cash from the operations are calculated after adjusting the increases and decreases in current assets and liabilities.	In funds flow statement such changes in current items are adjusted in the changes of working capital.
Classification of current and non-current is not relevant.	Such classification is required in this case.

**MANAGEMENT REPORTING**

Accounting is an information system and attempts to communicate information in the form of reports, statements, charts and graphs to help the management in taking appropriate decisions. Reporting acts as a 'media' to helps the management to take its decision accordingly. Management reporting is that part of management control system which provides various information to the management in the form of report and statement at regular interval. Management reporting is the instrument for making control and decision effective.

It is difficult to list out the reports which will be suitable for every one. The reporting system suitable for a business should be framed according to its individual requirements. Thus reporting system will vary in different businesses according to their different requirements.

### **Management Information System (MIS)**

The concept of the MIS has evolved over a period of time comprising many different facets of the organizational function. MIS is a necessity of all the organizations.

Management Information System is a systematic process of providing relevant information in right time in right format to all levels of users in the organization for effective decision making. MIS is also defined to be system of collection, processing, retrieving and transmission of data to meet the information requirement of different levels of managers in an organization.

According to **CIMA** MIS is a set of procedures designed to provide managers at different levels in the organization with information for decision making, and for control of those parts of the business for which they are responsible.

MIS is a necessity of all the organizations. The initial concept of MIS was to process data from the organization but presently it is required for the reports at regular intervals. The system was largely capable of handling the data from collection to processing. It was more impersonal, requiring each individual to pick and choose the processed data and use it for his requirements. This concept was further modified when a distinction was made between data and information. The information is a product of an analysis of data. This concept is similar to a raw material and the finished product. What are needed are information and not a mass of data. However, the data can be analyzed in a number of ways, producing different shades and specifications of the information as a product.

The system should present information in such a form and format that it creates an impact on its user, provoking a decision or an investigation. It was later realized then even though such an impact was a welcome modification, some sort of selective approach was necessary in the analysis and reporting.

### **Feature of MIS**

1. The MIS is a system which provides information support for decision making in the organization.
2. The MIS is an integrated system of man and machine for providing the information to support the operations, the management and the decision making function in the organization.
3. The MIS is a system based on the database of the organization evolved for the purpose of providing information to the people in the organization.
4. The MIS is a Computer based Information System.

### **ROLE OF THE MANAGEMENT INFORMATION SYSTEM**

The role of the MIS in an organization can be compared to the role of heart in the body. The information is the blood and MIS is the heart. In the body the heart plays the role of supplying pure blood to all the elements of the body including the brain. The heart works faster and supplies more blood when needed. It regulates and controls the incoming impure blood, processes it and sends it to the destination in the quantity needed. It fulfills the needs of blood supply to human body in normal course and also in crisis.

The MIS plays exactly the same role in the organization. The system ensures that an appropriate data is collected from the various sources, processed, and sent further to all the needy destinations. The system is

expected to fulfill the information needs of an individual, a group of individuals, the management functionaries: the managers and the top management.

The MIS satisfies the diverse needs through a variety of systems such as Query Systems, Analysis Systems, and Decision Support Systems the

MIS helps in Strategic Planning, Management Control, Operational Control and Transaction Processing.

### LESSON ROUND-UP

- Financial statements generally refer to balance sheet or position statement and Statement of Profit and Loss or income statement. Of course, a business may also prepare a statement of retained earnings and a cash flow statement.
- Financial statements are prepared on the basis of (i) recorded facts; (ii) accounting conventions; (iii) postulates; (iv) personal judgements, and (v) accounting standards and guidance notes.
- Attributes of financial statements cover – relevance, accuracy and freedom from bias, comparability, analytical presentation, promptness, generally accepted principles, consistency, authenticity and compliance with laws.
- Financial statements are very much relevant to – the management, the public, the shareholders and the lenders, the labour and trade unions, the country and economy.
- In addition to the statutory requirements, the recent trends in presenting financial statements may include - summarised Statement of Profit and Loss and balance sheet, highlights, cash flow statements, important accounting ratios, disclosure of accounting policies, charts, graphs and diagrams, schedules, impact of price level changes, rounding off of figures, etc.
- According to modus operandi of analysis financial statement, analysis may be horizontal and vertical.
- According to the objective of the analysis financial statement, analysis can be long-term and short-term.
- Analytical methods and devices used in analysing financial statements include - comparative statements, common size statements, trend ratios, ratio analysis and cash flow statements.
- Accounting ratios are relationships, expressed in arithmetical terms, between figures which have a cause and effect relationship or which are connected with each other in some other manner.
- Ratios may be classified according to the statement upon which they are based, function and importance.
- The functional ratios can be further classified into - profitability ratios, turnover ratios or activity ratios, financial ratios or solvency ratios and market test ratios.
- Fund flow statement also referred to as statement of “source and application of funds”
- $\text{Fund} = \text{Working capital} = \text{Current assets} - \text{Current liability}$
- Flow of funds include both “inflow” and “outflow”.
- Where got, where gone statement

### SELF-TEST QUESTIONS

1. Explain the concept of interpretation and criticism of financial statements?
2. What are the objectives of financial statements?
3. Discuss the limitations of financial statements and point out how these limitations can be removed through management accounting.
4. Explain the various ways of presentation of financial statements.

5. How will you interpret and analyse financial statement presented to you?
6. What is the common size balance sheet and income statement? Explain the technique of preparing common size balance sheet.
7. What are the trend ratios? Explain the technique of computing trend ratios.
8. Explain the significance of ratio analysis in financial management.
9. Explain briefly the different ratios that are commonly used and show how they are useful in financial analysis.
10. Explain different ratios coming under:
  - (a) Profitability ratios
  - (b) Overall measure of efficiency ratio
11.
  - (a) Explain the uses of ratio analysis.
  - (b) What are the limitations of ratio analysis?
  - (c) What are the steps involved in the process of fund flow statement.
  - (d) What is fund?
  - (e) What is flow?
  - (f) What is fund flow?
12. Write short notes on:
  - (a) Liquidity test ratio
  - (b) Acid test ratio
  - (c) Profitability test ratios
  - (d) Turnover ratios.
13. "Inter-firm comparison is carried out with the help of ratios although they are not exclusive and conclusive indicators of performance". Examine.
14. Prepare a proforma income statement for the month of April, May and June for Eastern Ltd. from the following informations:
  - (i) Sales are projected at ₹4,50,000, ₹4,80,000 and ₹4,30,000 for April, May and June respectively.
  - (ii) Cost of goods sold is ₹1,00,000 plus 30% of selling price per month.
  - (iii) Selling expenses are 4% of sales.
  - (iv) Rent ₹15,000 per month.
  - (v) Administrative expenses for April are expected to be ₹1,20,000 but are expected to rise 2% per month over the previous month's expenses.
  - (vi) The company has ₹5,00,000 of 12% loan, interest payable monthly.
  - (vii) Corporate tax expected is 40%.
15. The Newman Company Ltd. is in the midst of a promotional campaign to boost sales. In 2012-13 an additional ₹70,000 was spent on advertising. Presented below are revenue and expense data for

the company.

	2012-13	2011-12
	₹	₹
Sales	8,16,000	6,56,500
Sales returns and allowances	16,000	6,500
Cost of goods sold	4,00,000	3,12,000
Selling expenses	2,00,000	1,30,000
General expenses	1,20,000	78,000
Miscellaneous income	6,400	6,500
Income-tax	32,000	67,600

You are required to prepare a comparative statement for the year 2012-13 and 2011-12 for the company. Also comment on the relationships revealed in the comparative income statements.

16. On the basis of the following figures derived from the accounts of a company, prepare a report on the level of efficiency of financial and operational management of the company:

Years	Capital Turnover	Net Profit on Sales Ratio	ROI (%)	Current Ratio (%)
1	1.0	8	8	6.0
2	2.0	10	20	4.0
3	3.0	11.5	34.5	2.0
4	5.0	13	65	0.5

17. The profit and loss account and balance sheet of Happy Ltd. is given below:

**Profit and Loss Account for the year ended 31st March, 2011**

₹		₹	
To Opening stock	90,000	By Sales	9,00,000
To Purchases	5,60,000	By Closing stock	90,000
To Wages	2,14,000		
To Gross profit	<u>1,26,000</u>		
	<u>9,90,000</u>		<u>9,90,000</u>
To Salaries	16,000	By Gross profit	1,26,000
To Electricity	10,000		
To Miscellaneous expenses	10,000		
To Depreciation	30,000		
To Net profit	<u>60,000</u>		
	<u>1,26,000</u>		<u>1,26,000</u>

**Balance Sheet as on 31.3.2011**

₹		₹	
Share capital:		Fixed assets	5,40,000
Equity shares	1,80,000	Less: Depreciation	<u>1,50,000</u>
Reserve and surplus	1,20,000		3,90,000
Secured loans	2,10,000	Current assets:	
Stock	90,000	Sundry debtors	1,05,000

Current liabilities:		Cash	<u>15,000</u>	2,10,000
Sundry creditors	<u>90,000</u>			<u>6,00,000</u>
	<u>6,00,000</u>			<u>6,00,000</u>

Discuss under the following important functional groupings the usual ratios and comment on the financial strength of the company:

- (i) Liquidity and solvency test ratios;
- (ii) Profitability test ratios; and
- (iii) Overall measures ratios.

18. Prepare Balance Sheet and Profit and Loss Account from the following information:

	₹
Capital	4,00,000
Working capital	1,80,000
Bank overdraft	30,000

There is no fictitious asset. Current assets contain only stock, debtors and cash. The following additional data is also available:

- (i) Closing stock is 20% higher than opening stock
  - (ii) Current ratio - 2.5
  - (iii) Quick ratio - 2.0
  - (iv) Proprietary ratio - 0.6 (Fixed assets: Proprietary fund)
  - (v) Gross profit ratio - 20% (of sales)
  - (vi) Stock velocity - 5
  - (vii) Debtor's velocity - 73 days
  - (viii) Net profit ratio - 10% (to average capital employed).
19. The following are the summarised Profit & Loss Account and balance sheet of Waldo Company Ltd., for the year ending 31st March, 2011.

#### Profit & Loss Account

	₹		₹
To Opening stock	9,950	By Sales	85,000
To Purchases	54,525	By Closing stock	14,900
To Incidental expenses	1,425		
To Gross profit	<u>34,000</u>		
	<u>99,900</u>		<u>99,900</u>
To Operating expenses:		By Gross profit	34,000
Selling and distribution	3,000	By Non-operating	
Administration	16,500	income-interest	300
To Non-operating expenses:		By Profit on sale of shares	600
Loss on sale of assets	400		
To Net profit	<u>15,000</u>		
	<u>34,900</u>		<u>34,900</u>

**Balance Sheet**

Issued Capital		Land and building	15,000
2,000 equity shares of ₹10 each	20,000	Plant and machinery	8,000
Reserves	9,000	Stock in trade	14,900
Profit & Loss Account	6,000	Sundry debtors	7,100
Current liabilities	<u>13,000</u>	Cash and bank balance	<u>3,000</u>
	<u>48,000</u>		<u>48,000</u>

You are required to calculate:

- Current ratio
  - Operating ratio
  - Stock turnover ratio
  - Return on total resources
  - Turnover of fixed assets.
20. From the following information you are required to calculate- (i) Sales; (ii) Sundry Debtors; (iii) Sundry Creditors; (iv) Closing stock;

Debtors velocity ratio	3 months
Stock velocity ratio	6 months
Creditors velocity ratio	2 months
Gross profit ratio	25%

The gross profit for the year ended 31st March 2013 was ₹5,00,000. Stock for the same period was ₹20,000 more than it was in the beginning of the year. Bills receivable and bills payable were ₹1,50,000 and ₹83,333 respectively.

21. Calculate working capital turnover ratio from the following information:

Current ratio	= 5:3
Quick ratio	= 3:5
Inventory turnover ratio	= 5 times
Closing Stock was ₹1,92,000 less than opening stock	
Gross profit	= 25% on cost
Average debt collection period	= 3 months
Cash sales	= 25% of Total sales
Opening debtors	= ₹2,80,000
Closing debtors	= ₹3,20,000

22. The following Balance Sheets of X and Y Ltd. for the year 2010 and 2011, you are required to prepare (a) Funds from Operations (b) Statement of Changes in Working Capital and (c) Funds Flow Statement:

**Balance Sheet**

Liabilities	2010	2011	Assets	2010	2011
	₹	₹		₹	₹
Share Capital	50,000	50,000	Good will	6,000	6,000
General Reserve	7,000	9,000	Buildings	20,000	18,000
Profit & Loss A/c	8,000	6,500	Machinery	18,500	18,000





EXECUTIVE PROGRAMME  
COST AND MANAGEMENT ACCOUNTING

**EP-CMA/2013**

TEST PAPERS

This Test Paper set contains three test papers. Test Paper 1/2013, 2/2013 and 3/2013. The maximum time allowed to attempt each test paper is 3 hours.

Students are advised to attempt atleast **one Test Paper from Test Papers 1/2013 or 2/2013 or 3/2013** and send the response sheet for evaluation to make him/her eligible for Coaching Completion Certificate. However, students may, if they so desire, are encouraged to send more response sheets for evaluation.

While writing answers, students should take care not to copy from the study material, text books or other publications. Instances of deliberate copying from any source will be viewed very seriously.

**WHILE WRITING THE RESPONSE SHEETS TO THE TEST PAPERS GIVEN AT END OF THIS STUDY MATERIAL, THE STUDENTS SHOULD KEEP IN VIEW THE FOLLOWING WARNING AND DESIST FROM COPYING.**

### **W A R N I N G**

Time and again, it is brought to our notice by the examiners evaluating response sheets that some students use unfair means in completing postal coaching by way of copying the answers of students who have successfully completed the postal coaching or from the suggested answers/study material supplied by the Institute. A few cases of impersonation by handwriting while answering the response sheets have also been brought to the Institute's notice. The Training and Educational Facilities Committee has viewed seriously such instances of using unfair means to complete postal coaching. The students are, therefore, strongly advised to write response sheets personally in their own hand-writing without copying from any original source. It is also brought to the notice of all students that use of any malpractice in undergoing postal or oral coaching is a misconduct as provided in the explanation to Regulation 27 and accordingly the studentship registration of such students is liable to be cancelled or terminated. The text of regulation 27 is reproduced below for information :

***"27. Suspension and cancellation of examination results or registration***

In the event of any misconduct by a registered student or a candidate enrolled for any examination conducted by the Institute, the Council or the Committee concerned may suo motu or on receipt of a complaint, if it is satisfied that, the misconduct is proved after such investigation as it may deem necessary and after giving such student or candidate an opportunity to state his case, suspend or debar the person from appearing in any one or more examinations, cancel his examination result, or studentship registration, or debar him from future registration as a student, as the case may be.

*Explanation* - Misconduct for the purpose of this regulation shall mean and include behaviour in a disorderly manner in relation to the Institute or in or near an Examination premises/centre, breach of any regulation, condition, guideline or direction laid down by the Institute, malpractices with regard to postal or oral tuition or resorting to or attempting to resort to unfair means in connection with the writing of any examination conducted by the Institute".

EXECUTIVE PROGRAMME  
**COST AND MANAGEMENT ACCOUNTING**

TEST PAPER 1/2013

Time allowed: 3 hours

Maximum marks : 100

[Answer Question No.1 which is **COMPULSORY** and **ANY FIVE** of the rest from this part.]

1. (a) Define costing and discuss its objectives. **(5 marks)**
- (b) G Ltd. produces a product which has a monthly demand of 4,000 units. The product requires a component X which is purchased at ₹ 20. For every finished product, one unit of component is required. The ordering cost is ₹ 120 per order and the holding cost is 10 per cent per annum. You are required to calculate:
- (i) Economic order quantity.
- (ii) If the minimum lot size to be supplied is 4,000 units, what is the extra cost the company has to incur?
- (iii) What is the minimum carrying cost, the company has to incur? **(5 marks)**
- (c) Calculate the estimated cost of production of by-products X and Y at the point of separation from the main product. By Product X By Product Y

Selling price per unit	₹ 12	₹ 24
Cost per unit after separation from the main product	₹ 3	₹ 5
Units produced	500	200

Selling expenses amount to 25 per cent of the total works cost, that is, including both pre-separation and post-separation works cost.

Selling prices are arrived at by adding 20 per cent of the total of all costs, that is, the sum of works costs and selling expenses. **(5 marks)**

- (d) What do you mean by master budget? How is it prepared? **(5 marks)**
- (e) What is 'Fund Flow Statement'? How is it prepared? **(5 marks)**
2. (a) What do you mean by labour turnover? What remedial steps do you suggest to minimize its occurrence? **(5 marks)**
- (b) Real Enterprises undertakes three different jobs A, B and C. All of them require the use of a special machine and also the use of a computer. The computer is hired and the hire charges work out to ₹ 4,20,000 per annum. The expenses regarding the machine are estimated as follows:

Rent for the quarter		₹ 17,500
Depreciation per annum		2,00,000
Indirect charges per annum		1,50,000

During the first month of operation, the following details were taken from the job register:

<i>Job</i>	<i>A</i>	<i>B</i>	<i>C</i>
Number of hours the machine was used:			
(a) Without the use of the computer	600	400	900
(b) With the use of the computer	600	—	1,000

You are required to compute the machine hour rate:

- (i) For the firm as a whole for the month when the computer was used and when the computer was not used.
  - (ii) For the individual jobs A, B and C. **(10 marks)**
3. (a) Explain the scope and limitations of management accounting. **(5 marks)**
- (b) What is inventory control? Explain various objectives of inventory control. **(5 marks)**
- (c) Compute the fixed assets turnover from the following figures along with your comments

	2012 ₹	2013 ₹
Fixed assets	40,00,000	60,00,000
Accumulated Depreciation	20,00,000	30,00,000
Sales less Return	1,00,00,000	1,20,00,000

**(5 marks)**

4. (a) What is Activity Based Costing (ABC)? Describe the evolution of ABC. **(5 marks)**
- (b) Prepare a contract account for the year ending 31st March 2013 from the following particulars of the M/s Abacus Constructions. The contract is for erecting a sewer plant for a total value of ₹24 lakhs. Contract is 100% complete.

<i>Particulars</i>	<i>₹</i>
Wages	6,00,000
Special Plants	2,00,000
Materials	3,00,000
Overheads	1,20,000
Materials lying on site	40,000
Depreciation to be charged on plant	10%
Work certified	16,00,000
Amount received in cash of certified work	80%

5% of the value of materials issued and 6% of wages may be taken to have incurred for the portion of work completed but not yet certified. Overheads are charged as a percentage of direct wages. Ascertain the amount to be transferred to profit and loss account on the basis of realized profit. **(10 marks)**

5. (a) Describe the provisions of Companies Act, 1956 pertaining to cost accounting records.

**(5 Marks)**

(b) Surya Ltd. provides you the following information for the year ended 31st March, 2011:

- (i) Sales for the year amounted to ₹ 1,20,00,000, the company sells goods for cash only.
- (ii) Cost of goods sold was 60% of sales. Closing inventory was higher than opening inventory by ₹ 53,750. Trade creditors on 31st March, 2011 exceeds those on 31st March, 2010 by ₹28,750.
- (iii) Net profit before tax was ₹ 17,25,000. Tax paid amounted to ₹ 8,75,000. Depreciation on fixed assets for the year was ₹ 3,93,750. Whereas other expenses totalled ₹ 26,81,250. Outstanding expenses on 31st March, 2010 and on 31st March, 2011 totalled to ₹ 1,02,500 and ₹ 1,13,750 respectively.
- (iv) New machinery and furniture costing ₹ 12,84,375 in all were purchased.
- (v) A rights issue was made of 2,500 equity shares of ₹ 250 each at a premium of ₹ 75. The entire money was received with applications.
- (vi) Dividends and dividend distribution tax totaling ₹ 5,08,750 were paid.
- (vii) Cash in hand and at bank as on 31st March, 2010 totalled ₹ 2,67,250.

Prepare cash flow statement as per Accounting Standard – 3 (Revised). **(10 marks)**

6. (a) What are the methods of distribution of service department overheads to production departments? **(5 marks)**

(b) A Chinese soft drink company is planning to establish a subsidiary company in India to produce mineral water. Based on the estimated annual sales of 40,000 bottles of the mineral water, cost studies produced the following estimates for the Indian subsidiary:

	<i>Total Annual Costs</i>	<i>Percent of Total Annual Cost which is variable</i>
Material	2,10,000	100%
Labour	1,50,000	80%
Factory Overheads	92,000	60%
Administration Expenses	40,000	35%

The Indian production will be sold by manufacturer's representatives who will receive a commission of 8% of the selling price. No portion of the Japanese office expenses is to be allocated to the Indian subsidiary.

You are required to:

- Compute the selling price per bottle to enable the management to realize an estimated 10% profit on sale proceeds in India.
- Calculate the break-even point in Rupee sales as also in number of bottles for the Indian subsidiary on the assumption that the selling price is ₹ 14 per bottle. **(10 marks)**

7. (a) Distinguish between absorption costing and marginal costing. **(5 marks)**

(b) Chemical-X is produced by using two basic raw materials. Standard requirements for raw materials are as follows:

Material	Opening Stock (kgs.)	Closing Stock (kgs.)	Purchase During the Period		
			Qty. (kgs.)	Rate per kg. (₹)	Cost (₹)
A	100	200	1,000	6.50	6,500
B	150	200	1,150	6.00	6,900

The standard loss is 10% of input. 1,890 kgs. of Chemical-X was produced during a particular period. Details pertaining to the material for the relevant period are as under:

Material	Standard Mix	Standard Price Per Kg. (₹)
A	40%	6
B	60%	5

The opening stock is valued at standard price.

Compute the following:

- (i) Material cost variance and material price variance, when:
  - (a) Variance is calculated at the point of issue on 'first-in-first-out' basis; and
  - (b) Variance is calculated at the point of issue on 'last-in-first out' basis.
- (ii) Material usage variance.
- (iii) Material mix variance. **(10 marks)**

8. Write Short Note on:

- (a) Budget Manual
  - (b) Escalation Clause
  - (c) Variance Reporting to Management
  - (d) Debtor Turnover Ratio
  - (e) Cost Auditor **(3 marks each)**
-

TEST PAPER 2/2013

Time allowed: 3 hours

Maximum marks : 100

[Answer Question No.1 which is **COMPULSORY** and **ANY FIVE** of the rest from this part.]

1. (a) Management accounting is nothing but presentation and analysis of accounting information which is useful to management. Discuss. **(5 marks)**
- (b) There is generally a divergence between financial profits and cost profits. Explain this statement and give reasons for such divergence. **(5 marks)**
- (c) What are the components of total cost shown in the cost sheet? Give the uses of the cost sheet. **(5 marks)**
- (d) The following data is available for a company:

	₹
Selling price	20 per unit
Variable manufacturing costs	11 per unit
Variable selling costs	3 per unit
Fixed factory overheads	5,40,000 per year
Fixed selling costs	2,52,000 per year

You are required to compute:

- (i) Break-even point expressed in amount of sales in rupees;
  - (ii) Number of units that must be sold to earn a profit of ₹ 60,000 per year;
  - (iii) How many units must be sold to earn a net income of 10% of sales? **(5 marks)**
  - (e) What is cost audit? State the purpose and scope of cost audit. **(5 marks)**
2. (a) The following information is obtained from the books of Erox Fibre Limited.:

Standard hours per unit (hours)	3
Variable overhead per hour (₹)	10

The actual data for the month of March, 2013 are as follows:

Actual variable overhead incurred	₹ 5,40,000
Actual output	20,000 units
Actual hours worked	56,000

You are required to calculate—

- (i) total variable overhead variance;
  - (ii) variable overhead budget variance; and
  - (iii) variable overhead efficiency variance. **(5 marks)**
- (b) Working Capital of GAMA Ltd., is ₹ 1,35,000 and Current Ratio is 2.5, Liquid ratio is 1.5 and the proprietary ratio 0.75. Bank Overdraft is ₹ 30,000. There are no long-term loans and fictitious

assets. Reserve and surplus amount to ₹ 90,000 and the gearing ratio (Equity Capital/ Preference Capital) is 2.

You are required to:

From the above ascertain current assets, current liabilities, net block, proprietary fund, quick liabilities, quick assets, stock, preference and equity capital.

Also draw the statement of proprietary fund. **(10 marks)**

3. Differentiate between the following:

- (a) Traditional Costing V/s Activity Based Costing
- (b) Job and Contract Costing
- (c) Cash Flow and Fund Flow Statement

**(5 marks each)**

4. (a) The following figures have been extracted from the Books of Alpha Ltd., for the year ended 31st March, 2013. You are required to prepare a cash flow statement.

- (i) Net profit before taking into account Income Tax and Income from law suits but after taking into account the following items was Rs 20 lakhs;
  - (a) Depreciation on Fixed Assets ₹ 5 lakhs
  - (b) Discount on issue of Debentures written off ₹ 30,000.
  - (c) Interest on Debentures paid ₹ 3,50,000.
  - (d) Book value of investments ₹ 3 lakhs (Sale of Investments for ₹ 3,20,000).
  - (e) Interest received on investments ₹ 60,000.
  - (f) Compensation received ₹ 90,000 by the company in a suit filed.
- (ii) Income tax paid during the year ₹ 10,50,000.
- (iii) 15,000, 10% preference shares of ₹ 100 each were redeemed on 31st March, 2013 at a premium of 5%. Further the company issued 50,000 equity shares of ₹ 10 each at a premium of 20% on 2.4.2013. Dividend on preference shares were paid at the time of redemption.
- (iv) Dividends paid for the year 2011-12, ₹ 5 lakhs and Interim dividend paid ₹ 3 lakhs for the year 2012-13.
- (v) Land was purchased on 2.4.2013 for ₹ 2,40,000 for which the company issued 20,000 equity shares of ₹ 10 each at a premium of 20% to the land owner as consideration.
- (vi) Current assets and Current Liabilities in the beginning and at the end of the years were as detailed below:

	31.3.2012	31.3.2013
	₹	₹
Stock	12,00,000	13,18,000
Sundry Debtors	2,08,000	2,13,100
Cash in hand	1,96,000	35,300
Bills receivable	50,000	40,000



Bills payable	45,000	40,000
Sundry Creditors	1,66,000	1,71,300
Outstanding expenses	75,000	81,800

(10 marks)

(b) "High wages do not necessarily mean high labour cost". Explain. (5 marks)

5. (a) Delight Chemicals Ltd., electrolyses common salt to obtain three joint products—

caustic soda, chlorine and hydrogen. During a costing period, the expenditure relating to the inputs for the common process amounted to ₹ 3,50,000. After separation, expenses amounting to ₹ 1,60,000; ₹ 75,000 and ₹ 10,000 were incurred for caustic soda, chlorine and hydrogen respectively. Entire production was sold and ₹ 3,75,000; ₹ 2,50,000; and 60,000 were realized for caustic soda, chlorine and hydrogen respectively. The selling expenses were estimated @ 5% of sales. Profits @15%, 10% and 5% are expected from sale of caustic soda, chlorine and hydrogen respectively.

Draw a columnar statement showing the apportionment of joint costs and the profitability of each product. (10 marks)

(b) Describe in brief different methods of analyzing financial statements? (5 marks)

6. (a) Discuss the influence of fixed cost, variable cost and selling price on profit volume (P/V) ratio, break even point and profit. (3 marks)

(b) The following is the Trading and Profit and Loss Account of Bright Limited for the year ended 31st March, 2011.

<i>Particulars</i>	₹	<i>Particulars</i>	₹
To Materials consumed	7,08,000	By Sales — 30,000 units	15,00,000
To Direct wages	3,71,000	By Finished Stock—1,000 units	40,000
To Works overheads	2,13,000	By Work-in-progress:	
To Administration overheads	95,500	Materials 17,000	
To Selling and distribution overheads	1,13,500	Wages 8,000	
To Net profit	<u>69,000</u>	Works overheads <u>5,000</u>	30,000
	<u>15,70,000</u>		<u>15,70,000</u>

Manufacturing a standard unit, the company's cost records show that:

- (i) Works overheads have been charged to work-in-progress at 20% on prime cost.
- (ii) Administration overheads have been recovered at ₹ 3 per finished unit.
- (iii) Selling and distribution overheads have been recovered at ₹4 per unit sold.
- (iv) The under-absorbed or over-absorbed overheads have not been adjusted into costing profit and loss account.

You are required to prepare (i) Costing profit and loss account indicating net profit, (ii) A statement reconciling the profit as disclosed by cost accounts and that shown in financial accounts. (7 marks)

(c) A Kitchen Care Ltd. manufactures pressure cookers the selling price of which is ₹600 per unit. Currently the capacity utilization is 60% with a sales turnover of ₹36 lakhs. The company

proposes to reduce the selling price by 20% but desires to maintain the same profit position by increasing the output. Assuming that the increased output could be made and sold, determine the level at which the company should operate to achieve the desired objective.

The following data are also available:

- (i) Variable cost per unit ₹120.
- (ii) Semi-variable cost (including a variable element of ₹20 per unit) ₹3,60,000.
- (iii) Fixed cost ₹6,00,000 will remain constant upto 80% level. Beyond this an additional amount of ₹1, 20,000 will be incurred. **(5 marks)**

7. (a) Discuss the nature of financial statements. **(5 marks)**

(b) The monthly budgets for manufacturing overheads of a concern for two levels of activity were as under :

Capacity	60%	100%
Budgeted production (units)	300	500
Insurance (₹)	3,000	3,000
Wages (₹)	3,600	6,000
Consumable stores (₹)	4,500	7,500
Depreciation (₹)	12,000	12,000
Maintenance (₹)	3,300	4,500
Power and fuel (₹)	4,000	5,000

- (i) Prepare a budget for 75% capacity; and
  - (ii) Find the total cost segregated into fixed and variable; per unit of output at 60%, 75% and 100% capacity. **(10 marks)**
8. (a) Calculate the machine hour rate for a machine for the year from the following information related to five machines of similar type in a shop.

Rent and rates for the shop	₹ 2400
Depreciation each machine	₹ 250
Repairs & maintenance for 5 machines	₹ 500
Electric charges for light in the shop	₹ 270
Two attendants for 5 machines	₹ 30 per month
One supervisor for 5 machines	₹ 125 per month
Sundry supplies for the shop	₹ 225

Each machine uses 10 units of power per hour. **(7 marks)**

(b) What do you mean by under/over absorption of overheads? How is it treated in cost accounts?

**(5 marks)**

(c) Following information is given:

Cost of placing a purchase order	₹ 20
No. of units to be purchased during the year	5,000 Nos.
Purchase price per unit inclusive of transport cost	₹ 50

Annual storage cost per unit ₹ 5

Details of lead time :

– Average 10 days

– Maximum 15 days

– Minimum 6 days

– For emergency purchase 4 days

Rate of consumption per day :

– Average 15 units

– Maximum 20 units

Calculate — (i) re-ordering level; (ii) re-order quantity; (iii) maximum level; (iv) minimum level; and (v) danger level. **(3 marks)**



## TEST PAPER 3/2013

Time allowed: 3 hours

Maximum marks : 100

[Answer Question No.1 which is **COMPULSORY** and **ANY FIVE** of the rest from this part.]

1. (i) State with reasons in brief, whether the following statements are true or false.
- Bin card shows the value of material at any moment of time.
  - If a labour saves half of time of the standard time, the incentive amount under Halsey Plan and Rowan Plan will be equal.
  - Loss of material due to fire is treated as overhead and included for calculating cost of production.
  - Cost reduction is cost control.
  - A firm is said to be financially sound if it is not able to meet its long term commitments.
- (2 marks each)**
- (ii) Re-write the following sentences after filling-up the blank space with appropriate word(s) so as to convey the correct meaning :
- Profit volume ratio is logical extension of \_\_\_\_\_
  - Debt equity ratio is the relation between \_\_\_\_\_ and \_\_\_\_\_ in a firm.
  - Break even is the point where total \_\_\_\_\_ equals the\_\_\_\_\_.
  - \_\_\_\_\_ is a summary of all functional budgets in a capsule form.
  - All indirect costs are collectively called \_\_\_\_\_.
- (1 mark each)**
- (iii) Comment on **any two** of the following:
- "Management accounting is an extension of managerial aspects of financial accounting and cost accounting".
  - "Costing system has become an essential tool in the hands of management".
  - "Preparation of break -even chart depends on various assumptions".
- (5 marks each)**
2. (a) BizBag has just entered the luggage market and has decided to produce two different briefcases: nylon and leather. They are deciding whether to use job-order costing or activity based costing. based on next year's budget, two cost pools have been developed with the following information:

	<i>Nylon</i>	<i>Leather</i>	<i>Overhead Assigned</i>
Direct labor costs	₹50,000	₹100,000	₹0
Sewing machine hours	1,000	1,000	₹200,000
Machine setup hours	100	400	₹100,000

Required:

- Compute the plant-wide overhead rate if overhead is applied on the basis of direct labour costs.
- Compute the overhead rates using activity based costing.

- (iii) Determine the difference in the amount of overhead allocated to each product between the two methods. **(8 marks)**
- (b) Lookahead Ltd. produces and sells a single product. Sales budget for the calendar year 2013 for each quarter is as under :

Quarter	No. of Units to be Sold
I	12,000
II	15,000
III	16,500
IV	18,000

The year 2013 is expected to open with an inventory of 4,000 units of finished product and close with an inventory of 6,500 units.

Production is customarily scheduled to provide for two-thirds of the current quarter's demand plus one-third of the following quarter's demand. Thus production anticipates sales volume by about one month. The standard cost details for one unit of the product is as follows :

- Direct materials 10 Kgs. @ 50 paise per kg.
- Direct labour 1 hour 30 minutes @ ₹4 per hour.
- Variable overheads 1 hour 30 minutes @ ₹1 per hour.
- Fixed overheads 1 hour 30 minutes @ ₹2 per hour based on a budgeted production volume of 90,000 direct labour hours for the year.

Answer the following —

- (i) Prepare a production budget for the year 2013 by quarters, showing the number of units to be produced. **(3 marks)**
- (ii) If the budgeted selling price per unit is ₹17, what would be the budgeted profit for the year as a whole? **(2 marks)**
- (iii) In which quarter of the year the company is expected to break-even? Which one is more beneficial to workers? **(2 marks)**
3. (a) Differentiate between 'Halsey wage plan' and 'Rowan wage plan'. **(5 marks)**
- (b) On 1st July, 2012, Delux Ltd. undertook a contract for ₹5,00,000. On 30th June, 2013 when the accounts were closed, the following details about the contract were gathered :

	₹
Material purchased	1,00,000
Wages paid	45,000
General expenses	10,000
Plant purchased	50,000
Materials on hand (30.6.2012)	25,000
Wages accrued (30.6.2013)	5,000
Work certified	2,00,000
Cash received	1,50,000
Work uncertified	15,000
Depreciation of plant	5,000

The above contract has an escalation clause which reads as follows:

“In the event of prices of materials and rates of wages increase by more than 5%, the contract price would be increased accordingly by 25% of the rise in the cost of materials and wages beyond 5% in each case.”

It was found that since the date of signing the agreement, the prices of materials and wage rates increased by 25%. The value of the work certified does not take into account the effect of the above clause.

Prepare the contract account.

**(10 marks)**

4. (a) X Limited has the following balances as on 1st April, 2012 :

	₹
Fixed Assets	11,40,000
Less: Depreciation	<u>(3,99,000)</u>
	7,41,000
Stocks and Debtors	4,75,000
Bank Balance	66,500
Creditors	1,14,000
Bills Payable	76,000
Capital (Shares of ₹ 100 each)	5,70,000

The company made the following estimates for Financial Year 2012-13:

- (i) The company will pay a free of tax dividend of 10%. The rate of tax being 25%.
- (ii) The company will acquire fixed assets costing ₹ 1,90,000 after selling one machine for ₹38,000 costing ₹ 95,000 and on which depreciation provide amounted to ₹ 66,500.
- (iii) Stocks and Debtors, Creditors and Bills payables at the end of financial year are expected to be ₹ 5,60,500, ₹ 1,48,200 and ₹ 98,800 respectively.
- (iv) The profit would be ₹ 1,04,500 after depreciation of ₹1,14,000.

You are required to:

Prepare the Projected Cash Flow Statement and ascertain the bank balance of X Ltd. at the end of Financial Year 2012-13.

**(10 marks)**

- (b) Distinguish between fixed and flexible budget. **(5 marks)**
5. (a) Standard output in 10 hrs. is 240 units; actual output in 10 hours is 264 units. Wages rate is ₹10 per hour. Calculate the amount of bonus and total wages under Emerson Plan. **(5 marks)**
- (b) Following particulars are available for the year 2013 in respect of a product manufactured by GAMMA Ltd.
    - monthly demand : 2000 units
    - ordering cost : ₹ 200
    - Annual carrying cost per unit : 6½% of unit price
    - Purchase price of one input unit : ₹ 200
    - Usage : Minimum : 50 units per week  
Maximum : 150 units per week
    - Re-order period : 8 to 12 weeks

Compute following from the above details:

- (a) Re-order quantity
- (b) Re-order level
- (c) Minimum level
- (d) Average stock level
- (e) Total cost p.a. if order size is of EOQ.

(10 marks)

6. (a) Discuss the usefulness of preparing cash flow statement.

(5 marks)

(b) A product passes through three processes—A, B and C. The details of expenses incurred on the three processes during the year 2012-13 were as under:

Particulars	Process A	Process B	Process C
Units issued (units)	1,000	—	—
Cost per unit (₹)	500	—	—
Sundry materials (₹)	10,000	15,000	5,000
Labour (₹)	26,000	80,000	63,920
Direct expenses (₹)	6,000	18,150	27,200
Sale price of output per unit (₹)	700	1,000	2,000

Actual output of the three processes was — Process A 930 units; Process B 540 units and Process C 210 units. Two-third of output of Process-A and one-half of output of Process-B was passed on to the next process and the balance was sold.

The entire output of Process-C was sold.

The normal loss of the three processes, calculated on the input of every process was: Process – A: 5%; Process – B 15% and Process – C 20%. The loss of Process–A was sold at ₹10 per unit, that of Process-B at ₹30 per unit, and that of Process-C at ₹60 per unit. Selling and distribution expenses during the year were ₹90, 000. These are not allocable to the processes but to be considered while drawing the income statement.

Prepare the three processes accounts and a statement of income.

(10 marks)

7. (a) What do you mean by trend ratios? Explain the technique of computing trend ratios. (5 marks)

(b) Ashok Ltd. manufacturers a single product with a capacity of 1,50,000 units per annum. The summarized income statement for the year ended 31st March, 2011 is as under :

	₹	₹
Sales : 1,00,000 units @ ₹15 per unit		15,00,000
Cost of sales :		
Direct materials	3,00,000	
Direct labour	2,00,000	
Production overhead:		
Variable	60,000	
Fixed	3,00,000	
Administration overheads (fixed)	1,50,000	
Selling and distribution overheads:		
Variable	90,000	
Fixed	1,50,000	12,50,000
Profit		<u>2,50,000</u>

You are required to evaluate the following options :

- (i) What will be the amount of sales required to earn a target profit of 25% on sales, if the packing is improved at a cost of ₹1 per unit?
- (ii) There is an offer from a retailer for purchasing 30,000 units per annum, subject to providing a packing with a different brand name at a cost of ₹ 2 per unit. However, in this case there will be no selling and distribution expenses. Also, this will not, in any way, affect the company's existing business. What will be the break-even price from this additional offer?
- (iii) If an expenditure of ₹ 3,00,000 is made on advertising, the sales would increase from the present level of 1,00,000 units to 1,20,000 units at a price of ₹18 per unit. Will that expenditure be justified?
- (iv) If the selling price is reduced by ₹ 2 per unit, there will be 100% capacity utilization. Will the reduction in selling price be justified? **(10 marks)**

8. Write short note on:

- (a) Applications of Marginal Costing
- (b) Various Types of Standards
- (c) Cost Audit Report
- (d) Reconciliation of Cost and Financial Accounts
- (e) Cost Accounting Standards

**(3 marks each)**

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