

**THE TAMIL NADU
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COST AND MANAGEMENT ACCOUNTING STUDY MATERIAL

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PREFACE

Finance and accounting have assumed 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. This emphasizes 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 useful for optimum utilization of existing resources. These are branches of accounting and had been developed due to limitations of financial accounting. It is indispensable discipline for corporate management, as the information collected and presented to management based on cost and management accounting techniques helps managements to solve specific problems and 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 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.

In this material, efforts have been made to give a comprehensive coverage of all the topics relevant to the subject and also 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. In fact, this being a practical paper, students need to have good theoretical knowledge and practice to attain the requisite proficiency and confidence. In order to supplement the contents given in the course material, students are advised to refer to the suggested readings mentioned in the study material.

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UNIT I – COST ACCOUNTING

Definition, Meaning and objectives - Distinction between cost and financial accounting – Elements of Cost and Preparation of cost sheets and Tender – Management accounting – Definition and objectives – Distinction between Management and Financial accounting.

1. Cost Accounting

Cost Accounting is a branch of accounting and has been developed due to limitations of financial accounting. Financial accounting is primarily concerned with record keeping directed towards the preparation of Profit and Loss Account and Balance Sheet. It provides information regarding the profit and loss that the business enterprise is making and also its financial position on a particular date. The financial accounting reports help the management to control in a general way the various functions of the business but it fails to give detailed reports on the efficiency of various divisions.

The limitations of Financial Accounting which led to the development of cost accounting are as follows.

Limitations of Financial Accounting

- ❖ **No clear idea of operating efficiency:** Sometimes profits in an organization may be less or more because of inflation or trade depression and not due to efficiency or inefficiency. But financial accounting does not give a clear reason for profit or loss.
- ❖ **Weakness not spotted out by collective results:** Financial Accounting shows the net result of an organization. When the profit and loss account of an organization, shows less profit or a loss, it does not give the reason for it or it does not show where the weakness lies.
- ❖ **Does not help in fixing the price:** Financial Accounting provides the total cost of production but it does not aid in determining prices of the products, services, production order and lines of products.
- ❖ **No classification of expenses and accounts:** In Financial Accounting, we don't get data relating to costs incurred by departments, processes separately or per unit cost of product lines, or cost incurred in various sales territories. Further expenses are not classified as direct or indirect, controllable and uncontrollable overheads and the value added in each process is not reported.
- ❖ **No data for comparison and decision making:** It does not supply useful data to management for comparison with previous period and for taking various financial decisions as introduction of new products, replacement of labour by machines, price in normal or special circumstances, producing a part in the factory or buying it from outside market, production of a product to be continued or given up, priority accorded to different products, investment to be made in new products or not etc.
- ❖ **No control on cost:** Financial Accounting does not help to control materials, supplies, wages, labour and overhead costs.
- ❖ **Does not provide standards to assess the performance:** Financial Accounting does not help in developing standards to assess the performance of various persons or departments. It also does not help in checking that costs do not exceed a reasonable limit for a given quantum of work of the requisite quality.

- ❖ **Provides only historical information:** Financial Accounting records only the historical costs incurred. It does not provide day-to-day cost information to the management for making effective plans for the future.
- ❖ **No analysis of losses:** It does not provide complete analysis of losses due to defective material, idle time, idle plant and equipment etc.. In other words, no distinction is made between avoidable and unavoidable wastage.
- ❖ **Inadequate information for reports:** It does not provide adequate information for reports to outside agencies such as banks, government, insurance companies and trade associations.
- ❖ **No answer for certain questions:** Financial Accounting will not help to answer questions like:-
 - (a) Should an attempt be made to sell more products or is the factory operating to capacity?
 - (b) If an order or contract is accepted, is the price obtainable sufficient to show a profit?
 - (c) If the manufacture or sale of product A were discontinued and efforts made to increase the sale of B, what would be the effect on the net profit?
 - (d) Why the profit of last year is of such a small amount despite the fact that output was increased substantially? Etc.

1.1. Introduction(Development of Cost Accounting)

For a business person, who manufactures goods or services, cost accountancy is a useful aid. It is an extension of financial accounting and it was developed on account of limitations of financial accounting to meet over growing needs of the management.

Rapid development in cost accounting has taken place after 1914 with the growth of heavy industry and large scale production.

Cost Accounting in India:

The development of cost accounting in India is recent origin and it is given importance after independence, when provision for cost audit under sec-233(B) of companies Act was made. Vivian Bose enquiry committee revealed the malpractices of manufacturing companies. Therefore, under the Companies Act 1956, the government was given the power to order for cost audit. This has given impetus to the development of cost accounting in India.

Meaning of cost accounting:

Cost accounting is concerned with, recording, classifying and summarizing costs for determination of cost of products or services. Planning, controlling and reducing such costs and furnishing of information to management for decision making.

Definition of Cost, Costing, Cost Accounting and Cost Accountancy:

Cost: The term 'cost' has to be studied in relation to its purpose and conditions, as per the definition given by Institutions of Costs and Management Accountants (ICMA).

- Cost is the value of economic resources – W.M.Harper.

Costing: The ICMA London has defined costing, “as the ascertainment of costs”.

Cost Accounting: it is “the method of accounting for cost”. The process of recording and accounting for all the elements of cost is called cost accounting.

Cost Accountancy: It is an aid to “management for decision making”.

General Principles of Cost Accounting

The following may be considered as the General Principles of Cost Accounting:

- ❖ **A cost should be related to its causes:** Cost should be related as closely as possible to their causes so that cost will be shared only among the cost units that pass thorough the department of which the expenses are related.
- ❖ **A cost should be charged only after it has been incurred:** While determining the cost of individual units those costs which have actually been incurred should be considered. For example, a cost unit should not be charged to the selling costs, while it is still in the factory. Selling costs can be charged with the products which are sold.
- ❖ **The convention of prudence should be ignored:** Usually accountants believe in historical costs and while determining cost, they always attach importance to historical cost. In Cost Accounting this convention must be ignored, otherwise, the management appraisal of the profitability of the projects may be vitiated. According to W.M. Harper, “a cost statement should, as far as possible, give facts with no known bias. If a contingency needs to be taken into consideration it should be shown separately and distinctly”.
- ❖ **Abnormal costs should be excluded from cost accounts:** Costs which are of abnormal nature (eg. Accident, negligence etc.) should be ignored while computing the cost, otherwise, it will distort costs figures and mislead management as to working results of their undertaking under normal conditions.
- ❖ **Past costs not to be charged to future period:** Costs which could not be recovered or charged in full during the concerned period should not be taken to a future period, for recovery. If past costs are included in the future period, they are likely to influence the future period and future results are likely to be distorted.
- ❖ **Principles of double entry should be applied wherever necessary:** Costing requires a greater use of cost sheets and cost statements for the purpose of cost ascertainment and cost control, but cost ledger and cost control accounts should be kept on double entry principle as far as possible.

1.2 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 organization. Information regarding cost of each product or service would enable the management to know where to economize on costs, how to fix prices, how to maximize profits and so on. Thus, the main objectives of cost accounting are the following.

- To analyse and classify all expenditure with reference to the cost of products and operations.
- To arrive at the cost of production of every unit, job, operation, process, department or service and to develop cost standard.

- 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.
- 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 accounts.
- 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 constructive action.
- To provide actual figures of costs 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.
- 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.
- To present comparative cost data for different periods and various volume of output and to provide guidance in the development of business. This is also helpful in budgetary control.
- To record the relative production results of each unit of plant and machinery in use as a basis for examining its efficiency. A comparison with the performance of other types of machines may suggest the necessity for replacement.
- 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.
- Providing 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.

1.3. Cost Accounting and Financial 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 localization, the unit costs and profits and losses of different product lines. The main difference between financial accounting and cost accounting are summarized below.

S.NO	FINANCIAL ACCOUNTING	COST ACCOUNTING
Purposes	The purposes of financial accounting are to show the results of the business. It provides information regarding the profit and loss as well as the financial position to owners and outsiders.	The purpose of cost accounting is to provide information to the management for decision making, planning and control.
Form of accounts	These accounts are kept in such a way as to meet the requirement of companies act and income tax act.	Cost accounts are maintained to fulfill the internal requirements of the management as per conventional guide lines.
Classification of transactions	Financial accounting classifies records and analyses transactions in a subjective manner i.e., according to nature of expenses.	Cost accounting records and analyses expenditure in an objective manner i.e., according to purpose for which costs are incurred.
Stock valuation	In financial accounts, stocks are valued at cost or realizable value, whichever is lesser.	In cost accounts stocks are valued at cost.
Analysis of profit and cost	In financial accounts, the profit or loss of the entire enterprises is disclosed.	Cost accounts reveals profit or loss of different departments separately.
Accounting period	Financial reports are prepared annually.	Cost reports are continuous process and are prepared as per the requirement of management, may be daily, weekly, Monthly, quarterly or annually.
Emphasis	Emphasis is laid on the recording of transactions and control aspects are not given importance.	Cost accounting gives emphasis on ascertainment of cost control.
Nature	Financial accounts are maintained on the basis of historical records.	Cost accounts lay emphasis on both historical and predetermined data.
Information	Monetary information is only used(i.e., only monetary transactions are recorded)	It deals with monetary as well as non monetary information.
Figures	Financial accounts deals mainly with actual facts and figures.	Cost accounts deal partly with facts and figures and partly with estimates.

1.4 Importance of Cost Accounting

The limitations of financial accounting have made the management to realize 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 utilized 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 organization 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 organization 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:

- ❖ **Cost accounting helps in periods of trade depression and trade competition.** In periods of trade depression, the organization cannot afford to have wastages which pass unchecked. The management must know areas where economies may be sought, waste eliminated and efficiency increased. The organization must 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.
- ❖ **Cost accounting aids price fixation.** Although the law of supply and demand determines the price of the product, 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.
- ❖ **Cost accounting helps in making estimates.** Adequate costing records provide a reliable basis for making estimates and quoting tenders.
- ❖ **Cost accounting helps in channelizing production on right lines.** Proper costing information makes it possible for the management to distinguish between profitable and non-profitable activities; profits can be maximized by concentrating on profitable operations and eliminating non-profitable ones.
- ❖ **Cost accounting eliminates wastages.** As cost accounting is concerned with detailed breakup of costs, it is possible to check various forms of wastages or losses.
- ❖ **Cost accounting makes comparisons possible.** Proper maintenance of costing records provides various costing data for comparisons which in turn helps the management in formulating future lines of action.
- ❖ **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.
- ❖ **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, cost controlled and various steps can be taken to increase the efficiency.

❖ **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 are therefore benefitted 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 benefitted by a number of ways by the installation of an efficient system of costing. They are benefitted, 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 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 of 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.

1.5 Cost Units

The Chartered Institute of Management Accountants, London, defines a unit of cost as "a unit of quantity of product, service or time in relation to which costs may be ascertained or expressed". The forms of measurement used as cost units are usually the units of physical measurements like number, weight, area, length, value, time etc.

Following are some examples of cost unit:

Industry/product Cost unit basis

- Automobile Numbers
- Brick works per 1000 bricks
- Cement per Tonne
- Chemicals Litre, gallon, kilogram, ton
- Steel Tonne
- Sugar Tonne
- Transport Passenger-kilometre, tonne kilo meter

Cost Centre— According to Chartered Institute of Management Accountants, London, cost centre means "a location, person or item of equipment (or group of these) for which costs may be ascertained and used for the purpose of cost control". Cost centre is the smallest organizational sub unit for which separate cost collection is attempted. Thus cost centre refers to one of the convenient unit into which the whole factory organization 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. Some times each assembly line is regarded as a separate cost centre with its own assistant foreman.

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.

1. Organization of the factory
2. Conditions of incidence of cost
3. Requirements of the costing system ie. Suitability of the units or centres for cost purposes.
4. Availability of information
5. Management policy regarding making a particular choice from several alternatives.

Profit Centre– A profit centre is that segment of activity of a business which is responsible for both revenue and expenses and discloses the profit of a particular segment of activity. Profit centres are created to delegate responsibility to individuals and measure their performance.

Difference between Profit Centre and Cost Centre

The various points of difference between Profit centre and cost centre are as follows. Cost centre is the smallest unit of activity or area of responsibility for which costs are collected whereas a profit centre is that segment of activity of a business which is responsible for both revenue and expenses.

- (i) Cost centres are created for accounting conveniences of costs and their control whereas as a profit centre is created because of decentralization of operations i.e., to delegate responsibility to individuals who have greater knowledge of local conditions etc.
- (ii) Cost centers are not autonomous whereas profit centres are autonomous.
- (iii) A cost centre does not have target cost but efforts are made to minimize costs, but each profit centre has a profit target and enjoys authority to adopt such policies as are necessary to achieve its targets.
- (iv) There may be a number of cost centres in a profit centre in a profit centre as production or service cost centres or personal or impersonal but a profit centre may be a subsidiary company within a group or division in a company.

1.6 Cost classification

Costs can be classified or grouped according to their common characteristics. Proper classification of costs is very important for identifying the costs with the cost centers or cost units. The same costs are classified according to different ways of costing depending upon the purpose to be achieved and requirements of a particular concern. The important ways of classification are:

I. By Nature or Elements. According to this classification the costs are classified into three categories i.e., Materials, Labour and Expenses. Materials can further be sub-classified as raw materials components, spare parts, consumable stores, packing materials etc. This helps in finding the total cost of production and the percentage of materials (labour or other expenses) constituted in the total cost. It also helps in valuation of work-in-progress.

II. By Functions: This classification is on the basis of costs incurred in various functions of an organization ie. Production, administration, selling and distribution. According to this classification, costs are divided into Manufacturing and Production Costs and Commercial costs. **Manufacturing and Production Costs** are costs involved in manufacture, construction and fabrication of products. **Commercial Costs** are (a) administration costs (b) selling and distribution costs.

III. By Degree of Traceability to the Product : According to this, costs are divided into direct costs and indirect costs. **Direct Costs** are those costs which are incurred for a particular product and can be identified with a particular cost centre or cost unit. Eg:- Materials, Labour. **Indirect Costs** are those costs which are incurred for the benefit of a number of cost centre or cost units and cannot be conveniently identified with a particular cost centre or cost unit. Eg:- Rent of Building, electricity charges, salary of staff etc.

IV. By Changes in Activity or Volume: According to this costs are classified according to their behavior in relation to changes in the level of activity or volume of production. They are fixed, variable and semi-variable.

Fixed Costs are those costs which remain fixed in total amount with increase or decrease in the volume of the output or productive activity for a given period of time. Fixed Costs per unit decreases as production increases and vice versa. Eg:- rent, insurance of factory building, factory manager's salary etc.

Variable Costs are those costs which vary in direct proportion to the volume of output. These costs fluctuate in total but remain constant per unit as production activity changes. Eg:- direct material costs, direct labour costs, power, repairs etc.

Semi-variable Costs are those which are partly fixed and partly variable. For example; Depreciation, 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.

V. Association with the Product: Cost can be classified as product costs and period costs. Product costs are those which are traceable to the product and included in inventory cost, thus product cost is full factory cost. Period costs are incurred on the basis of time such as rent, salaries etc. thus it includes all selling and administration costs. These costs are incurred for a period and are treated as expenses.

VI. By Controllability: The CIMA defines controllable cost as "a cost which can be influenced by the action of a specified member of an undertaking" and a non-controllable cost as "a cost which cannot be influenced by the action of a specified member of an undertaking".

VII. By Normality: There are normal costs and abnormal costs. Normal costs are the costs which are normally incurred at a given level of output under normal conditions. Abnormal costs are costs incurred under abnormal conditions which are not normally incurred in the normal course of production. Eg:- damaged goods due to machine break down, extra expenses due to disruption of electricity, inefficiency of workers etc.

VIII. By Relationship with Accounting Period: There are capital and revenue expenses depending on the length of the period for which it is incurred. The cost which is incurred in purchasing an asset either to earn income or increasing the earning capacity of the business is called capital cost, for example, the cost of a machine in a factory. Such cost is incurred at one point of time but the benefits accruing from it are spread over a number of accounting years. The cost which is incurred for maintaining an asset or running a business is revenue expenditure. Eg:- cost of materials, salary and wages paid, depreciation, repairs and maintenance, selling and distribution.

IX. By Time..Costs can be classified as 1) Historical cost and 2) Predetermined Costs. The costs which are ascertained and recorded after it has been incurred is called historical costs. They are based on recorded facts hence they can be verified and are always supported by evidences. Predetermined costs are also known as estimated costs as they are computed in advance of production taking into consideration the previous periods' costs and the factors affecting such costs. Predetermined costs when calculated scientifically become standard costs.

Standard costs are used to prepare budgets and then the actual cost incurred is later-on compared with such predetermined cost and the variance is studied for future correction.

1.7.Types, Methods and Techniques 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. Basically, there are two principal methods of costing, namely (i) Job Costing, and (ii) Process costing.

I. **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 Process, Automobile Garages, Repair Shops, Ship building, House building, Engine and Machine construction, etc. Job Costing includes the following methods of costing:

(a) **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.

(b) **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.

(c) **Terminal Costing:** This method is also a type of job costing. This method emphasizes the essential nature of job costing, ie, the cost can be properly terminated at some point and related to a particular job.

(d) **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 undertaking, it is frequently necessary to ascertain the cost of various operations.

II. **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, etc.

III. **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 the 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 eg. Bicycle.

IV. **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 services is arrived at. This method is employed in Railways, Road Transport, Water supply undertakings, Telephone services, Electricity companies, Hospital services, Municipal services, etc.

V. Multiple or Complete 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.

VI. Uniform Costing: It is not a distinct method of costing by itself. It is the name given to a common system of costing followed by a number of firms in the same industry. This helps in comparing performance of one firm with that of another.

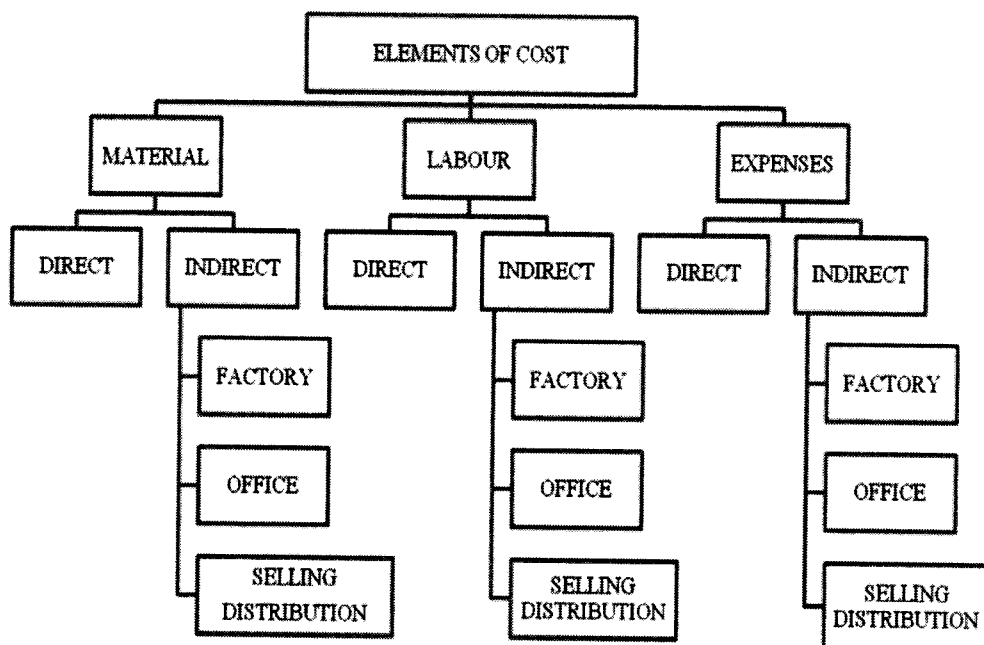
VII. Departmental Costing: When costs are ascertained department by department, the method is called "Departmental Costing". Usually, for ascertaining the cost of various goods or services produced by the department, the total costs will have to be analysed, say, by the use of job costing or unit costing.

VIII. In addition to the above methods of costing, mention can be made of the following techniques of costing which can be applied to any one of the above method of costing for special purposes of cost control and policy making:

- a) Standard or Predetermined Costs.
- b) Marginal Costs

1.8 Elements of Cost

The management of an organization needs necessary data to analyze and classify costs for proper control and for taking decisions for future course of action. Hence the total cost is analyzed by elements of costs i.e. by the nature of expenses. The elements of costs are three and they are materials, labour and other expenses. These can be further analysed as follows



By grouping the above elements of cost, the following divisions of cost are obtained.

- o Prime cost = Direct Materials + Direct Labour+ Direct Expenses
- o Works or Factory Cost = Prime Cost + Works or Factory Overheads
- o Cost of Production = Works Cost + Administration Overheads
- o Total Cost or Cost of Sales = Cost of Production + Selling and Distribution Overheads

The difference between the cost of sales and selling price represents profit or loss.

The above elements of cost are explained below;

Materials: The material cost is the cost of commodities supplied to an undertaking – ICMA.

Materials cost is of two types. That is (i) Direct Material Cost and (ii) Indirect Material Cost.

- o **Direct Material Cost** – Materials which can be identified with units of output or service are known as direct materials. (Eg. cotton used in production of cloth)
- o **Indirect Material Cost** – Material used for the product other than the direct materials are called indirect materials. (Eg. Small tools, office stationary, materials used in maintenance of plant and machinery)

Labour: Labour is the remuneration paid for physical or mental effort expended in production and distribution.

Labour cost is the cost of remuneration (wages, salaries, commissions and bonus etc.) of the employees of an undertaking – ICMA.

Labour cost is also divided into two types;

- **Direct Labour Cost** – it is also called Direct Wages. Direct labour cost is the cost of labour directly engaged in production operations. (Eg. Workmen engaged in assembling parts)
- **Indirect Labour Cost** – Indirect labour cost is the remuneration paid for labour engaged to help the production operations. (Eg. Supervisors, watchmen, sweepers, storekeepers etc)

Expenses: Expenses, other than material cost and labour cost comes under this category. It is third elements of cost. Expenses are two types (i) Direct expenses and (ii) Indirect expenses.

- **Direct Expenses** – The expenses which can be directly identified with a unit of output. The direct expenses are also known as chargeable expenses. (eg. Hire charges for plant and royalty on products)
- **Indirect Expenses** – Indirect expenses are expenses other than indirect material and indirect labour. Which cannot be directly identified with units of output. (eg. Rent, power, lighting, advertising etc)

Prime Cost

This is also called direct cost. It is the aggregate of direct materials, direct labour and direct expenses. Prime cost deals with all the direct charges relating to production.

Overheads:

Overheads are the total of all indirect expenses. The aggregate of indirect materials, indirect wages and indirect expenses.

Classification of overheads:

On the basis of functions, overhead is classified as (i) Factory Overhead (ii) Office and Administration Overhead (iii) Selling and Distribution Overhead.

- **Factory Overheads; (works overheads)** It is the aggregate of indirect material, indirect wages and indirect expenses incurred in the factory. (eg. Factory rent, power, lighting and heating etc.)
- **Office and Administration Overheads:** All the indirect administration expenses comes under this categories. (eg. Salaries, director's fees and office rent for buildings, stationery expenses etc.)
- **Selling and Distribution Overheads:** This type of expenses is spending for the products are sold and finally dispatched to the customers. (eg. Salaries of salesmen, selling commission, advertising, warehouse rent etc)

Expenses excluded from cost sheet:

There are certain items which are included in financial accounts but not in cost accounts. These items fall into three categories:-

Appropriation of profits

- Appropriation to sinking funds.
- Dividends paid
- Taxes on income and profits
- Transfers to general reserves
- Excess provision for depreciation of buildings, plant etc. and for bad debts
- Amount written off – goodwill, preliminary expenses, underwriting commission, discount on debentures issued; expenses of capital issue etc.
- Capital expenditures specifically charged to revenue
- Capital cost and capital losses – purchases of fixed assets, loss on sale of fixed assets, preliminary expenses etc.
- Charitable donation

Matters of pure finance

- **(a)Purely financial charges:-**
 - (i) Losses on sale of investments, buildings, etc.
 - (ii) Expenses on transfer of company's office
 - (iii) Interest on bank loan, debentures, mortgages, etc.
 - (iv) Damages payable
 - (v) Penalties and fines
 - (vi) Losses due to scrapping of machinery

Remuneration paid to the proprietor in excess of a fair reward for services rendered.

(b) Purely financial incomes:-

- (i) Interest received on bank deposits
- (ii) Profits made on the sale of investments, fixed assets, etc.
- (iii) Transfer fees received
- (iv) Rent receivable
- (v) Interest, dividends, etc. received on investments.
- (vi) Brokerage received

Discount, commission received

Abnormal gains and losses:-

Losses or gains on sale of fixed assets.

Loss to business property on account of theft, fire or other natural calamities.

In addition to above abnormal items (gain and losses) may also be excluded from cost accounts. Alternatively, these may be taken to costing profit and loss account.

1.9 Cost Sheet

Meaning: The expenses of a product are analysed under different heads in the form of statement. This statement is called cost sheet.

Definition: "Cost sheet is a statement showing the total cost under proper classification in a logical order".
– ICMA.

Purpose of cost sheet:

- ❖ It provides details of total cost under logical classification.
- ❖ It provides cost per unit in different stages.
- ❖ It helps in comparison and control of cost.
- ❖ Cost sheet is helpful in estimation of cost for preparation of tender and quotations.
- ❖ It acts as basis for fixation of selling price.

Cost Sheet – Vs – Production Statement:

Cost Sheet: The cost of output can be ascertained from the statement known as cost sheet. The items of various costs are extracted from financial books presented in logical order.

Production statement: when sales, stocks and profits are included in the cost sheet. It is called production statement.

SPECIMEN FORM OF SIMPLE COST SHEET (Without stocks)

Particulars	Total Rs.	Cost per unit Rs.
Direct material	xxxxx	xxx
Direct labour / wages	xxxxx	xxx
Direct expenses/ chargeable expenses	xxxxx	xxx
PRME COST	xxxxx	xxx
Add: production/ factory/ works overheads	xxxxx	xxx
FACTORY COST	xxxxx	xxx
Add: office and administration overheads	xxxxx	xxx
COST OF PRODUCTION	xxxxx	xxx
Add: selling and distribution overheads	xxxxx	xxx
COST OF SALES OR TOTAL COST	xxxxx	xxx
PROFIT / LOSS	xxxxx	xxx
SALES	xxxxx	xxx

SPECIMEN OF COST SHEET (With Stocks)

Cost sheet of for the month of Dec 00-00-0000.

Particulars	Rs	Rs
Raw materials:		
Opening Stock of Raw Materials (Direct Materials)		
ADD: Purchase of Raw Materials		
(Expenses, taxes and duties on materials purchased)		
ADD: Carriage Inwards (or) Carriage on Purchase		
LESS: Closing Stock of Raw Materials		
LESS: Direct Material Scrap Sold		
Cost of Materials Consumed		
Direct Wages:		
(Direct wages (or) Direct Labour)		
Direct Expenses:		
(Direct Expenses (or) Direct Charges)		

Particulars	Rs	Rs
<p>PRIME COST</p> <p>ADD: Factory Overhead: (Works Overheads) / (Manufacturing Overheads)</p> <p>Indirect Materials</p> <p>Indirect Wages</p> <p>Factory Rent and Rates</p> <p>Factory Lighting and Heating</p> <p>Power, Fuel, Coal and Gas.</p> <p>Repairs and Maintenance</p> <p>Drawing Office Salary</p> <p>Depreciation on plant and Machinery</p> <p>Factory Stationery</p> <p>Haulage</p> <p>Insurance of Factory</p> <p>Factory or Works Manager Salary</p> <p>Water Consumption in Factory</p> <p>Production Manager Salary</p> <p>All other factory expenses</p> <p>Total Factory Overheads</p> <p>ADD: Opening Stock of Work-in-Progress</p> <p>LESS: Closing Stock of Work-in-Progress</p> <p>FACTORY COST / WORKS COST</p> <p>ADD: Office and Administration Overheads:</p> <p>Office Manager Salary</p> <p>Office Rent and Rates</p> <p>Office Lighting</p> <p>Office Stationery/Printing</p> <p>Office Furniture Depreciation and Repairs</p> <p>Legal Charges and Bank Commission</p> <p>Telephone Charges, Postages and Office cleaning</p>		

Particulars	Rs	Rs
Counting House Salary		
M.D's Salary		
Interest on Loan		
All Other Office and General Expenses		
COST OF PRODUCTION:		
ADD: Opening Stock of Finished Goods		
LESS: Closing Stock of Finished Goods		
COST OF GOODS SOLD:		
ADD: Selling and Distribution Overheads:		
Salesmen's Salaries		
Salesmen's Commission		
Show Room Rent		
Show Room Expenses		
Advertisement		
Sales Office Rent		
Travelling Expenses		
Warehouse Rent and Rates		
Warehouse Staff Salaries		
Repairs and Depreciation of Delivery Vans		
Carriage Outwards		
Discount Allowed		
Bad Debts		
Delivery Van Expenses		
All Other Selling And Distribution Expenses		
TOTAL COST OF SALES/ TOTAL COST:		
ADD: Profit (or) LESS: Loss		
SALES / SELLING PRICE:		

Note: (No Effect Items)

- Provision for doubtful debts.
- Income tax, advanced income tax and sales tax.
- Dividend paid and received.
- Interest from banks.
- Goodwill written off.
- Preliminary expenses written off.
- Loss on sale of assets.
- Donations etc.

Important Terms:

- **Haulage** – Carriage Expenses.
- **Drawing Office Salary** – Salary paid for blue print of the product design.
- **Counting house salary** – counting of units of output.eg. Dozens and bundles.
- **Discount:** Discount on Sales – No effect in cost sheet,
Discount allowed – effect in cost sheet and
Discount – No effect in cost sheet.

1.10.Tender (or) Quotation

While preparing tenders or quotations, manufacturers or contractors have to look into the figures pertaining to the previous year as shown in the cost sheet for that period. These figures have to be suitably modified in the light of changes expected in the prices of materials, labour, etc., and submit the tender or quotation accordingly.

- Percentage of Factory Overhead to Productive Wages:

$$\frac{\text{Factory Overheads}}{\text{Productive Wages}} \times 100$$

- Percentage of Office and Administration Overhead to Works Cost:

$$\frac{\text{Office \& Administration Overheads}}{\text{Works Costs}} \times 100$$

- Percentage of Selling and Distribution Overhead to Works Cost:

$$\frac{\text{Selling \& Distribution Overheads}}{\text{Works Costs}} \times 100$$

Treatment of certain items in the cost sheet:

(a) **Computation Of Profit:** profit may be calculated either as a Percentage of cost or selling price.

Example: profit as a percentage of cost:

Factory cost	5,700
Administration overhead	600

Total cost	6,300

Profit 10% on cost	630

Selling price	6,930

Percent ———
 So profit = cost —————
 100

Example: Profit as a percentage of selling price. Here the percentage is on Selling price. Selling price includes Cost + Profit.

Sales price	=	100
Less profit	=	10

Cost price	=	90

This profit of rs.10 is on rs.90 which is the cost price. So it is 1/9th of cost price. In the above example,

Total cost	=	6,300
Profit on 10% on SP	=	700

Selling price		7,000

Cost x percent
 So sale price = _____

$$\frac{100 - \text{percent}}{6,300 \times 100}$$

$$= \frac{100 - 10}{7,000}$$

(b) Treatment of Stock: the term 'stock' includes three items: raw materials, work in progress and finished goods. The value of raw materials is arrived at in the following manner:

Opening stock of raw material
Add purchases
Add expenses involved in the purchases of raw material
Less closing stock of raw materials

Work-in-progress represents the quantity of semi-finished goods at the time of the preparation of the cost sheet. It represents cost of materials, labour and manufacturing expenses to-date. Work-in-progress may be shown in the cost sheet either immediately after the prime cost or after the calculation of the factory overheads, as shown in the specimen cost sheet. Finally, in respect of stock of finished goods, adjustments have to be made where opening and closing stock of finished goods are given. This is done, as shown in the specimen cost sheet, by adding opening stock of finished goods to the cost of production arrived at on the basis of current figures and reducing the closing stock of finished goods from this total. Let's explore these aspects more clearly through the following illustrations:

Illustration 1. Find the Prime Cost, Works Cost, Cost of production, total Cost and profit from the following:-

Direct Materials Rs.20000; Direct Labour Rs. 10000; Factory Expenses Rs. 7000; Administration Expenses Rs. 5000; Selling Expenses Rs. 7000 and Sales Rs.60,000.

Solution:

Prime Cost = Direct Materials + Direct Labour = Rs.20,000 + Rs.10,000 = Rs.30,000.

Works Cost = Prime Cost + Factory Expenses = Rs.30,000 + Rs.7,000 = Rs.37,000.

Cost of Production = Works Cost + Administration Expenses = Rs.37,000 + Rs.5,000 = Rs.42,000.

Total Cost or Cost of sales = Cost of Production + Selling Expenses = Rs.42,000 + Rs.7,000 = Rs.49,000.

Profit = Sales - Total Cost = Rs.60,000 - Rs.49,000 = Rs.11,000.

Illustration 2: Calculate Prime Cost, Factory Cost, Cost of Production, Cost of Sales and profit from the following particulars:

Rs.		Rs.	
Direct Materials	1,00,000	Consumable stores	2,500
Direct Wages	30,000	Manager's Salary	5,000
Wages of Foreman	2,500	Directors' fees	1,250
Electric power	500	Office Stationery	500
Lighting: Factory	1,500a	Telephone Charges	125
Office Postage	500	Telegrams	250
Storekeeper's wages	1,000	Salesmen's salary	1,250
Oil and water	500	Travelling expenses	500
Rent: Factory	5,000	Advertising	1,250
Office	2,500	Warehouse charges	500
Repairs and Renewals: office	500	Sales	1,89,500
Factory plant	3,500	Carriage outward	375
Transfer to Reserves	1,000	Dividend	2,000
Discount on shares written off	500	Depreciation: Factory Plant	500
Office Premises	1,250		

Solution

STATEMENT OF COST AND PROFIT

Particulars	Rs	Rs
PRIME COST		
Direct Materials	100000	
Direct Wages	30000	
Prime Cost		130000
Add: Factory Overheads:		
Wages of foreman	2500	
Electric power	500	
Storekeeper's Wages	1000	
Oil and Water	500	
Factory rent	5000	
Repairs and renewals-Factory Plant	3500	
Factory lighting	1500	
Depreciation-Factory Plant	500	
Consumable stores	2500	17500
Factory Cost		147500
Add: Administration Overheads:		
Office rent	2500	
Repairs and Renewals-Office Premises	500	
Office lighting	500	
Depreciation : Office Premises	1250	
Manager's Salary	5000	
Director's fees	1250	
Office Stationery	500	
Telephone charges	125	
Postage and telegrams	250	11875
Cost of Production		159375
Add: Selling and Distribution Overheads:		
Carriage Outward	375	
Salesmen's Salaries	1250	
Travelling Expenses	500	
Advertising	1250	
Warehouse charges	500	3875
Cost of Sales		163250
Profit		26250
Sales		189500

Illustration 3:

The following particulars relate to a company for a period of Three months:

Raw materials (1-1-2012) 55,000

Raw materials (31-3-2012) 35,000

Factory wages 80,000

Materials purchased 60,000

Sales 1,54,000

Indirect expenses 10,000

Stock of finished goods (1-1-2012) NIL

Stock of finished goods (31-3-2012) 30,000

No. Of units produced during the period was 2,000.

Prepare a statement of cost for the period and compute the price to be quoted for 500 units in order to realise the same profit as for the period under review, assuming no alternation in wages and cost of materials.

Solution:**Statement of cost for the period ending 31-3-2012**

Particulars	Output 2,000 Units	
	Rs.	Amount Rs.
Opening stock of raw materials		55,000
Add: purchases		60,000
		<u>1,15,000</u>
Less: closing stock of raw materials		<u>35,000</u>
Raw materials consumed		80,000
Factory wages		80,000
Prime cost		<u>1,60,000</u>
Indirect expenses		<u>10,000</u>
Cost of production		1,70,000
Less: closing stock of finished goods		<u>30,000</u>
Cost of goods sold		1,40,000
14,000 x 100		
Profit (—————) = 10% of cost		14,000
		<u>1,40,000</u>
Sales		<u>1,54,000</u>

Tender statement showing quotations for 500 units

Particulars	Amount
	Rupees

	80,000 x 500
Materials consumed ($\frac{80,000 \times 500}{2,000}$)	20,000
	80,000 x 500
Wages ($\frac{80,000 \times 500}{2,000}$)	20,000
Prime cost	40,000
	10,000 x 500
Add: indirect expenses ($\frac{10,000 \times 500}{2,000}$)	2,500
	2,000
Cost of production	42,500
Add: profit (10% of cost of production)	4,250
	46,750
Price to be quoted	46,750

Illustration 4:

Mr. Zia furnishes the following data related to the manufacture of a standard product during the month of August 2014

Raw material consumed	-	Rs 15,000
Direct labour	-	Rs 5,000
Machine hours worked	-	Rs 900
Machine hour rate	-	Rs 5
Administration overheads	=	20% of works cost
Selling overheads	-	Rs 0.50 per unit
Unit produced	-	Rs 17,100
Unit sold	-	16,000 @ Rs 4 per unit

You are required to prepare a cost sheet from the above showing:-

(a) The cost per unit

Cost per unit sold and profit for the period

Solution Book of Zia Cost sheet (For the month of August 31, 2014)

Particulars	Rs	Rs
PRIME COST		
Direct material consumed	15,000	0.878
Direct labour	5,000	0.292
Direct expenses	4,000	0.233
	-----	-----
Prime cost	24,000	1.403
Factory overheads (900 hours @ Rs 5 per hour)	4,500	0.263
	-----	-----
Work cost	28,500	1.666
Administrative overheads @ 20% of works cost	5,700	0.333
	-----	-----
Cost of production	34,200	2,000
Less:- closing stock on August 31, 2008 (1100 units @ Rs 2 per unit)	2,200	
	-----	-----
Cost of goods sold	32,000	2.000
Selling overheads @ Rs 0.50 per unit for 16000	8,000	0.50
	-----	-----
Cost of sales	40,000	2.50
Profit	24,000	1.50
	-----	-----
Sales (1600 unit)	64,000	4.00

* Closing stock = unit produced - units sold
 = 17100-16000
 = 1100 units

Practical problems (Short Answers)

- Opening stock of raw material - Rs 15,000
 Closing stock of raw material - Rs 20,000
 Material purchased - Rs 1, 20,000
 Find raw material consumed
 (Ans. 1, 15,000)
- Raw material consumed - Rs 1, 02,000
 Raw material for consumption - Rs 1, 10,000
 Raw material purchased - Rs 1, 00,000
 Find opening & closing stock of raw material (Ans. Rs 10,000 and Rs 8,000)

3.	Prime cost	- Rs 1, 85,000
	Current manufacturing cost	- Rs 2, 22,000
	Total goods processed during the period	- Rs 2, 39,500
	Works cost	- Rs 2, 15,000
	Find factory overheads, opening and closing stock of work in progress	

(Ans. Rs 37,000, Rs 17,500 and Rs 24,000)

4.	Cost of production	- Rs 11,206
	Goods available for sales	- Rs 12,206
	Cost of goods sold	- Rs 10,831
	Cost of Sales	- Rs 11, 391
	Sales	- Rs 12,000

Find opening and closing stock of finished goods, selling expenses and profit or loss (Ans. Rs 1,000, Rs 1,375, Rs 560 and Rs 609 profit)

Practical problems (Long Answers)

1. Prepare a statement of cost showing:

- Value of materials consumed
- Total cost of production
- Cost of goods sold and
- The amount of profit

From the following details relating to a toy manufacturing concern in Rs:

Opening stock: raw materials	25,000	finished goods	20,000
Raw materials purchased	2,50,000		
Wages paid to labourers	1,00,000		
Closing stock: raw materials	20,000		
Finished goods	25,000		
Chargeable expenses	10,000		
Rent, rates and taxes (factory)	25,000		
Motive power	10,000		
Factory heating and lighting	10,000		
Factory insurance	5,000		
Experimental expenses	2,500		
Waste materials in factory	1,000		
Office salaries	20,000		
Printing and stationery	1,000		
Salesmen's salary	10,000		
Commission to travelling agents	5,000		
Sales	5,00,000		

Ans : Materials used rs.2,55,000; prime cost rs.3,65,000; works cost Rs.4,18,500; cost of production rs.4,39,500; cost of sales rs.4,49,500 and profit rs,50,500.

Prepare a cost sheet to show the total cost of production and cost per unit of goods manufactured by a company for the month of July 2011. Also find out the cost of sales.

Rs		Rs	
Stock of raw materials 1-7-1994	3,000	Factory rent & rates	3,000
Raw materials purchased	28,000	Office rent	500
Stock of raw materials 31-7-1994	4,500	General expenses	400
Manufacturing wages	7,000	Discount on sales	300
Depreciation on plant	1,500	Advertisement	600
Loss on sale of a part of plant	300	Expenses to be charged fully income tax paid	2,000

The number of units produced during July 2011 was 3,000

The stock of finished goods was 200 and 400 units on 1-7-2011 and 31-7-2011 respectively. The total cost of units on hand on 1-7-2011 was Rs 2,800. All these had been sold during the month.

(Ans. Prime cost Rs 33,500 factory cost Rs 38,000 cost of production Rs 38,900 cost of sales Rs 37416)

3. The cost of the sale of product 'X' is made up as follows:

	Rs.
Materials used in manufacturing	10,20
Materials used in packing materials	2,500
Materials used in selling the product	350
Materials used in office	75
Materials used in factory	125
Labour required in producing	2,500
Salary paid to works manager and other principal officers of the factory	450
Expenses – indirect office	250
Expenses – direct factory	1,000
Bad debts	300
Packing expenses	150
Lighting and heating charges of the factory	200
Expenses – indirect factory	125

Assuming that all the products manufactured are sold, what should be the selling price to obtain a profit of 20% on cost price?

[Ans. Prime cost Rs 16,200, works cost Rs 17,100 cost of sales Rs 18,225 sales Rs 21,870]

1.11 Management Accounting

Management accounting is not a specific system of accounting. It could be any form of accounting which enables a business to be conducted more effectively and efficiently. It is largely concerned with providing economic information to managers for achieving organizational goals. It is an extension of the horizon of cost accounting towards newer areas of management. Much management accounting information is financial in nature but has been organized in a manner relating directly to the decision on hand.

Management Accounting is comprised of two words 'Management' and 'Accounting'. It means the study of managerial aspect of accounting. The emphasis of management accounting is to redesign accounting in such a way that it is helpful to the management in formation of policy, control of execution and appreciation of effectiveness. Management accounting is of recent origin. This was first used in 1950 by a team of accountants visiting U. S. A under the auspices of Anglo-American Council on Productivity

Definition:

Anglo-American Council on Productivity defines Management Accounting as, "the presentation of accounting information in such a way as to assist management to the creation of policy and the day to day operation of an undertaking" The American Accounting Association defines Management Accounting as "the methods and concepts necessary for effective planning for choosing among alternative business actions and for control through the evaluation and interpretation of performances".

The Institute of Chartered Accountants of India defines Management Accounting as follows: "Such of its techniques and procedures by which accounting mainly seeks to aid the management collectively has come to be known as management accounting" From these definitions, it is very clear that financial data is recorded, analyzed and presented to the management in such a way that it becomes useful and helpful in planning and running business operations more systematically.

1.12 Objectives of Management Accounting:

The fundamental objective of management accounting is to enable the management to maximize profits or minimize losses. The evolution of management accounting has given a new approach to the function of accounting. The main objectives of management accounting are as follows:

i) Planning and policy formulation:

Planning involves forecasting on the basis of available information, setting goals; framing policies determining the alternative courses of action and deciding on the programme of activities. Management accounting can help greatly in this direction. It facilitates the preparation of statements in the light of past results and gives estimation for the future.

ii) Interpretation process:

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

iii) Assists in Decision-making process:

With the help of various modern techniques management accounting makes decision-making process more scientific. Data relating to cost, price, profit and savings for each of the available alternatives are collected and analyzed and provides a base for taking sound decisions.

iv) Controlling:

Management accounting is a useful for managerial control. Management accounting tools like standard costing and budgetary control are helpful in controlling performance. Cost control is effected 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.

v) Reporting:

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. The performance of various departments is regularly reported to the top management.

vi) Facilitates Organizing:

“Return on Capital Employed” is one of the tools of management accounting. Since management accounting stresses more on Responsibility Centres with a view to control costs and responsibilities, it also facilitates decentralization to a greater extent. Thus, it is helpful in setting up effective and efficiently organization frame work.

vii) Facilitates Coordination of Operations:

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

1.13 Nature and Scope of Management Accounting

Management accounting involves furnishing of accounting data to the management for basing its decisions. It helps in improving efficiency and achieving the organizational goals. The following paragraphs discuss about the nature of management accounting.

a. Provides accounting information:

Management accounting is based on accounting information. Management accounting is a service function and it provides necessary information to different levels of management. Management accounting involves the presentation of information in a way it suits managerial needs. The accounting data collected by accounting department is used for reviewing various policy decisions.

b. Cause and effect analysis.

The role of financial accounting is limited to find out the ultimate result, i.e., profit and loss; management accounting goes a step further. Management accounting discusses the cause and effect relationship. The reasons for the loss are probed and the factors directly influencing the profitability are also studied. Profits are compared to sales, different expenditures, current assets, interest payables, share capital, etc.

c. Use of special techniques and concepts.

Management accounting uses special techniques and concepts according to necessity to make accounting data more useful. The techniques usually used include financial planning and analyses, standard costing, budgetary control, marginal costing, project appraisal, control accounting, etc.

d. Taking important decisions.

It supplies necessary information to the management which may be useful for its decisions. The historical data is studied to see its possible impact on future decisions. The implications of various decisions are also taken into account.

e. Achieving of objectives.

Management accounting uses the accounting information in such a way that it helps in formatting plans and setting up objectives. Comparing actual performance with targeted figures will give an idea to the management about the performance of various departments. When there are deviations, corrective measures can be taken at once with the help of budgetary control and standard costing.

f. No fixed norms.

No specific rules are followed in management accounting as that of financial accounting. Though the tools are the same, their use differs from concern to concern. The deriving of conclusions also depends upon the intelligence of the management accountant. The presentation will be in the way which suits the concern most.

g. Increase in efficiency.

The purpose of using accounting information is to increase efficiency of the concern. The performance appraisal will enable the management to pin-point efficient and inefficient spots. Effort is made to take corrective measures so that efficiency is improved. The constant review will make the staff cost – conscious.

h. Supplies information and not decision.

Management accountant is only to guide and not to supply decisions. The data is to be used by the management for taking various decisions. 'How is the data to be utilized' will depend upon the calibre and efficiency of the management.

i. Concerned with forecasting.

The management accounting is concerned with the future. It helps the management in planning and forecasting. The historical information is used to plan future course of action. The information is supplied with the object to guide management for taking future decisions.

1.14 Distinction between Management and Financial Accounting

Though management accounting and financial accounting cannot be put in watertight compartment classification, it should be remembered that the former is only an off-shoot of the latter. Precisely, management accounting supplements the functions of financial accounting in as much as it provides the necessary accounting data and statistical information needed by the management for improving the efficiency as a whole. Despite the close inter-relationship that exists, there are certain points of difference between the two and they are discussed below:

- a. Focus:** In management accounting the main focus is on the internal details of any particular aspect of business operation, whereas in financial accounting the main focus is on the enterprise as a whole covering all the aspects of the business operation. In management accounting performance, evaluation and reports are concerned with individual departments, products, type of inventories, purchases, sales or other sub-divisions of the business enterprise. In financial accounting the balance sheet and the income statement reveal the overall performance of the enterprise as a whole for a specific period.

- b. **Nature:** Management accounting is mainly concerned with the future plans and policies, whereas financial accounting is concerned with historical records relating to the past. Management relies on the past records for formulation of future plans and hence, the interdependence of management accounting and financial accounting serves a limited purpose of throwing light on the events and results of the past. The forward looking management accounting greatly helps the management in improving the results in future through various tools and techniques of budgeting and budgetary control, standard costing, profit planning, etc.
- c. **Characteristics:** Management accounting lays emphasis on those characteristics which increase the value of information put to variety of uses, like flexibility, approximation, comparability, etc., whereas financial accounting lays emphasis on those characteristics of information like objectivity, validity, absoluteness, etc. This marked difference sometimes creates a serious doubt as to whether both the characteristics can be preserved within the same structure.
- d. **Dispatch:** Management accounting stresses on furnishing of information more quickly to facilitate the management in the decision-making process than is the case in financial accounting, since it is considered as a post-mortem of past records. In management accounting, up-to-date information and current figures provide the necessary foundation for formulation of budgets and forecasts for the improvement of the results in the future. It is well known that in financial accounting, the intervening time lag between the end of financial year and the preparation and presentation of final accounts for that year could not be reduced beyond a point.
- e. **Obligatory:** In modern times a business concern is free to install the system of management accounting. It is more or less obligatory on the part of every business concern to adopt financial accounting for disclosing the results of the business to the rightful owners.
- f. **Legal formalities:** Since a business concern is free to install the system of management accounting there is no statutory regulation fixing the norms and standards for preparation and presentation of accounting statements. Needless to state that these statements can be adapted to the changing needs of the management since they are meant for internal use, whereas, financial accounting statements are standardised and meant for external use. The provisions of the Companies Act in force govern the preparation and presentation of annual final accounts of companies.
- g. **Type of data:** Management accounting makes use of a variety of data which are highly descriptive, statistical, subjective, and relate to the future, whilst financial accounting makes use of data which are precisely quantitative, objective, and monetary and relate to the past. The end-use of management accounting is not restricted and hence, can be used to an unlimited extent by the management accordingly as necessitated by the changing circumstances and environmental factors. But it is clear that the ultimate object of financial accounting ends with the preparation and presentation of final accounts in any business concern.
- h. **Precision:** Management accounting lays no emphasis on precision as the data and particulars compiled are merely estimates and relate to the future. But in financial accounting precision is stressed greatly since the past result of the business is reflected through them.

1.15 Limitations of Management Accounting

Management Accounting is in the process of development. Hence, it suffers formally the limitations of a new discipline. Some of these limitations are:

a. **Limitations of Accounting Records:**

Management accounting derives its information from financial accounting, cost accounting and other records. It is concerned with the rearrangement or modification of data. The correctness or otherwise of the management accounting depends upon the correctness of these basic records. The limitations of these records are also the limitations of management accounting.

b. **It is only a Tool:**

Management accounting is not an alternate or substitute for management. It is a mere tool for management. Ultimate decisions are being taken by management and not by management accounting.

c. **Heavy Cost of Installation:**

The installation of management accounting system needs a very elaborate organization. This results in heavy investment which can be afforded only by big concerns.

d. **Personal Bias:**

The interpretation of financial information depends upon the capacity of interpreter as one has to make a personal judgment. Personal prejudices and bias affect the objectivity of decisions.

e. **Psychological Resistance:**

The installation of management accounting involves basic change in organization set up. New rules and regulations are also required to be framed which affect a number of personnel and hence there is a possibility of resistance from some or the other.

f. **Evolutionary stage:**

Management accounting is only in a developmental stage. Its concepts and conventions are not as exact and established as that of other branches of accounting. Therefore, its results depend to a very great extent upon the intelligent interpretation of the data of managerial use.

g. **Provides only Data:**

Management accounting provides data and not decisions. It only informs, not prescribes. This limitation should also be kept in mind while using the techniques of management accounting.

h. **Broad-based Scope:**

The scope of management accounting is wide and this creates many difficulties in the implementations process. Management requires information from both accounting as well as non-accounting sources. It leads to inexactness and subjectivity in the conclusion obtained through it.

UNIT II

MATERIALS

Stores Records – Purchase order – Goods Received – Note – Bin card – Stores Ledger – Purchase, Receipt and Inspection – Inventory control – ABC Analysis – Economic Ordering Quantity – Maximum, Minimum and Reordering levels – Methods of Pricing Issued.

The materials are a major part of the total cost of producing a product and are one of the most important assets in majority of the business enterprises. Hence the total cost of a product can be controlled and reduced by efficiently using materials. The materials are of two types, namely:

(i) **Direct materials:** The materials which can be easily identified and attributable to the individual units being manufactured are known as direct materials. These materials also form part of finished products. All costs which are incurred to obtain direct materials are known as direct material costs.

(ii) **Indirect materials:** Indirect materials, on the other hand, are those materials which are of small value such as nuts, pins, screws, etc. and do not physically form part of the finished product. Costs associated with indirect materials are known as indirect material costs. Factory supplies, office supplies and selling supplies are generally termed as stores.

2.1 Purchasing Control and Procedure

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.

Dr. Walters defines scientific purchasing as the “Procurement by purchase of the proper materials, machinery, equipment and supplies of stores used in the manufacture of a product, adapted to marketing in the proper quantity and quality at the proper time and the lowest price consistent with the quality desired”.

According to Alford and Beatty, “Purchasing is the procuring of materials, supplies, machines tools and services required for the equipment, maintenance and operation of a manufacturing plant”.

The major objectives of scientific purchasing it to purchase the right quantity at the best price, materials purchased should suit the objective, production should not be held up, unnecessarily capital should not be locked up in stores, best quality of materials should be purchased and company’s competitive position and its reputation for fairness and integrity should be safeguarded.

Only scientific purchasing will help in achieving the above objectives. With proper plans, materials can be purchased at a lower price than competitors, turnover of investment in inventories can be high, purchasing department can advise regarding substitute materials, new products, change in trends, creating goodwill etc.

2.1.1 Methods of Purchasing

Purchasing can be broadly classified as centralized and localized purchasing.

(a) **Centralized Purchasing:** In a large organization, manufacturing units are many. In such cases centralized purchasing is beneficial. The advantages of centralized purchasing are:

- Specialized and expert knowledge is available.
- Advantages arise due to bulk purchases.
- The cost of purchasing can be reduced and selling price can be lowered.

- As there is good knowledge of market conditions, greater control can be exercised.
- When materials have to be imported, it is advantageous to centralize the buying.
- Economy and ease in compilation and consultation of results.
- It can take advantage of market changes.
- Investment in inventories can be reduced.
- Other advantages include undivided responsibility, consistent buying policies.

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

(b) **Decentralization of Purchases:** The advantages of localized purchasing or decentralization of purchases are:-

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

2.1.2 Purchase Procedure: The steps usually followed for purchase of materials may be enumerated as follows:-

I. **Indenting for materials:** The stores department prepares indents for the purchase of materials for replenishment of stocks (regular indents) or for a special job(special indents) and sends it to the purchase department. 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.

XYZ Co. Ltd.					
MATERIAL PURCHASE INDENT					
Date: For the Period:					
Indent No: Demand Note No:					
Regular/Special					
Sl. No.	Description	Stores Code No	Quantity	Last Pur.Ord.No.	Special remarks
Store Keeper		For Purchase Dept. Use			
		Tender Nos			
		Issued on.			

II. 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.

INVITATION TO TENDER

Indent No: Date:	Tender No: Date:					
To XYZ Co.Ltd. -----						
----- Dear Sirs,						
<p>The stores mentioned below are required to be delivered at our works godown. The terms and conditions of supply are mentioned overleaf. The first copy of this tender should be returned to us duly filled in before.....</p> <p>A security deposit of Rs.....should also accompany your reply which will be returned if.</p> <p>We do not place an order with you.</p>						
Yours faithfully, For ABC Co.Ltd.						
Particulars of stores/ Supplies	Quantity required	Place of Delivery	Date of delivery required	Quantity which can be supplied	Rate	
					Per Unit	Price
We agree to supply the above on terms mentioned below.						
Special conditions:						
Place:				For XYZ Co. Ltd.		

III. Placing of purchase orders

Normally six copies of purchase order 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 the 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.

A.B.C. CO. LTD.

MATERIALS PURCHASE ORDER

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
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Terms of Delivery: Please send bill to:

Terms of Payment:

Special Conditions: For A.B.C. Co. Ltd.

IV. 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 inspector checks that the materials are in accordance with the quality required, standard expected, tolerances allowed etc. After inspection an inspection note is prepared in triplicate, one copy is sent to the supplier, one to the stores, and one to the inspection department.

V. 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 and sent to the supplier; stores accounting section and purchase department and one copy are retained with the stores. The supplier encloses this copy along with his bill. The stores accounting section compares the note with the purchase order.

ABC CO. Ltd. STORES RECEIPT NOTE S.R. No: P.O.No: Inspection Note No: Date: Received form M/s _____ under their delivery challan no: _____ dated _____ the following items of stores against the above purchase order:					
Stores Code No.	Description	Unit	Quantity	Price	Value
Posted in:- Bin CardStores Ledger.....Signature of Storekeeper.....					

VI. 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 eg:- freight, packing charges are verified with the purchase order. The bill is later passed for payment.

2.2 Storekeeping: Store keeping is a service function. The storekeeper is a custodian of all the items kept in the store. The stores should be maintained properly and cost minimized. The main objectives of store keeping are:-

- To protect stores against losses
- To keep goods ready for delivery/issue
- To provide maximum service at minimum cost.

The duties and functions of Store-keeper can be summarized as follows:

- i) Materials should be received, unloaded, inspected and then moved to stores. The materials have to be stored in appropriate places and records the receipts in proper books.
- ii) 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.
- iii) The stores should provide maximum protection and safety and accessibility and utilize minimum space. Suitable storage devices should be installed.
- iv) The materials should be given special covering to prevent damage due to atmospheric conditions.
- v) All issues should be properly recorded, efficiently, promptly and accurately. All issues should be duly authorized and procedures laid down should be duly followed.
- vi) The storekeeper is responsible for co-ordination with materials control according to the type of production, size of the company, the organization structure etc.
- vii) Ensure that all transactions are posted in the Bin Card see that the Bin Card is up-to date.
- viii) All items should be in its proper place.
- ix) Maintenance of stores at required levels.
- x) Neatness in stores to facilitate physical verification.
- xi) Co-ordination and supervision of staff in the stores department.
- xii) Periodical review of various scales, measuring instruments, conversion ratios etc.
- xiii) Protect stores from fires, rust, erosion, dust, theft, weather, heat, cold, moisture and deterioration etc.

Requisitioning for Stores

One of the duties of the storekeeper is to send requisitions for materials for replenishment in time so that the production is not held up due to shortage of materials. The storekeeper should also see that there is no unnecessary blocking of capital due to overstocking of materials. For this he keeps a check on the re-order level, economic ordering quantity, and the maximum and minimum quantity which he is authorized to store in respect of each kind of material.

(a) Re-ordering Level

Re-ordering level is that point of level of stock of a material where the storekeeper starts the process of initiating purchase requisition for fresh supplies of that material. This level is fixed somewhere between the maximum and minimum levels in such a way that the difference of quantity of the material between the re-ordering level and minimum level will be sufficient to meet the requirements of production until the fresh supply of the materials is received.

Re-ordering Level= Minimum Level + Consumption during the time required to get the fresh delivery

According to Wheldon, Re-ordering Level= Maximum Level x Minimum re-order period.

Here, maximum re-order period means the maximum period taken to get the material once the order for new material is placed. Wheldon has taken the maximum period and maximum consumption during that period so that factory may not stop production due to shortage of materials.

Illustration: 1. Calculate the ordering level of material A from the following particulars:

Minimum Limit 1,000 units.

Maximum Limit 5,000 units.

Daily requirement of material 200 units.

Time required for fresh delivery 10 days.

Solution

Ordering Level=Minimum limit + Consumption during the time required for fresh delivery = 1000 units+ 200 units x 10 days = 3000 units

Order for the purchase of material should be placed when the material in stock reaches 3,000 units.

Illustration: 2. Calculate the re-ordering level from the following information:

Maximum consumption = 500 units per day

Minimum consumption = 400 units per day

Re-order period = 10 to 12 days

Solution

Re-order Level = Maximum consumption x maximum re-order period

= 500 units x 12 days = 6000 units.

(b) Economic Ordering Quantity

The quantity of material to be ordered at one time is known as economic ordering quantity. This quantity is fixed in such a manner as to minimize the cost of ordering and carrying the stock. The total costs of a material usually consist of:

Total acquisition cost + total ordering cost + total carrying cost.

Since the acquisition cost per unit of material is same whatever is the quantity purchased, it is usually excluded when deciding the quantity of a material to be ordered at one time. The only costs to be taken care of are the ordering costs and carrying costs which vary with the quantity ordered.

Carrying Cost: It is the cost of holding the materials in the store and includes:

- Cost of storage space which could have been utilized for some other purpose.
- Cost of bins and racks
- Cost of maintaining the materials to avoid deterioration.
- Amount of interest payable on the amount of money locked up in the materials.
- Cost of spoilage in stores and handling.
- Transportation cost in relation to stock.
- Cost of obsolescence of materials due to change in the process or product.
- Insurance cost
- Clerical cost etc.

In India all these costs amount to 20 to 25 % of the cost of materials per year. Hence it becomes necessary to reduce such carrying cost for efficient operations.

Ordering Cost: It is the cost of placing orders for the purchase of materials and includes:

- Cost of staff posted in the purchasing department, inspection section and stores accounts department.
- Cost of stationary postage and telephone charges.

Thus, this type of costs includes cost of floating tenders, cost of comparative evaluation of quotations, cost of paper work, and postage involved in placing the order, cost of inspection and cost of accounting and making payments. In other words, the cost varies with the number of orders.

The EOQ will be determined based on the following formula;

$$\text{❖ EOQ (In Units)} = \frac{2AB}{CS} \quad (\text{OR}) \quad \text{EOQ (In Rupees)} = \frac{2AB}{S}$$

Where, EOQ = Economic Ordering quantity.

A = Annual Consumption (or) Usage of materials.

B = Buying Cost Per Order.

C = Cost Per Unit.

S = Storage and Carrying Cost.

- No of orders to be placed per year = $\frac{\text{Annual Consumption}}{\text{EOQ} \times \text{No. of days in the year}}$
- Frequency of orders in terms of days = $\frac{\text{No. of days in the year}}{\text{No. of orders per annum}}$

Illustration 3: Find out the economic ordering quantity (EOQ) from the following particulars.

Annual usage: 6000 units

Cost of material per unit: Rs. 20

Cost of Placing and receiving one order: Rs.60

Annual carrying cost of one unit: 10% of inventory value.

Solution

$$\text{EOQ} = \frac{\sqrt{2AB}}{S}$$

Where A = Annual usage of material ie 6,000 units

B = Cost of placing one order ie Rs.60

S = Annual carrying cost of one unit ie Rs. $\frac{20 \times 10}{100} = \text{Rs. } 2$

$$\text{EOQ} = \frac{\sqrt{2 \times 6000 \times 60}}{2} = \frac{\sqrt{360000}}{2} = 300 \text{ units}$$

c) **Minimum Level or Safety Stock level**

The minimum level is the minimum quantity of the material which must be maintained in hand at all times. The quantity is fixed so that the production is not held up due to shortage of the materials. In fixing this level, the following factors should be considered:

- Lead time i.e. time lag between indenting and receiving of the material. It is the time required to replenish the supply.
- Rate of consumption of the material during the lead time.
- Nature of the material. Minimum level is not required in case of a special material which is required against customer's specific order.

Formula for calculating minimum level or safety stock level given by Wheldon is as follows:

Minimum Stock Level = Re-ordering level – (Normal consumption x Normal Re-order period)

d) **Maximum Level**

It is the maximum of stock which should be held in stock at any time during the year. The quantity is fixed so as to avoid overstocking as it leads to the following disadvantages.

- Overstocking leads to increase in working capital requirement which could be profitably used somewhere else.
- Overstocking will need more godown space, so more rent will have to be paid.
- It may also lead to obsolescence on account of overstocking.
- There are chances that the quality of materials will deteriorate because large stock will require more time before they are consumed.
- There may be fear of depreciation in market values of the overstocked materials.

According to Wheldon,

Maximum Stock level = Reordering level + Re-ordering Quantity –
(Minimum consumption x Minimum re-ordering period)

e) **Danger Level**

This level means that level of stock at which normal issues of the material are stopped and issues are made only under specific instructions. The purchase officer will make special arrangements to get the materials which reach at their danger levels so that the production may not stop due to shortage of materials.

Danger Level = Average consumption x Max.re-order period for emergency purchases.

f) **Average Stock Level**

The average stock level is calculated by the following formula:

Average Stock Level = Minimum Stock Level + ½ of Re-order Quantity.

Or ½ (Minimum Stock Level + Maximum Stock Level)

Illustration 4: Calculate the minimum stock level, maximum stock level, re-ordering level and average stock level from the following information:—

- (i) Minimum consumption = 100 units per day
- (ii) Maximum consumption = 150 units per day
- (iii) Normal consumption = 120 units per day
- (iv) Re-order period = 10-15 days
- (v) Re-order quantity = 1,500 units
- (vi) Normal re-order period = 12 days

Solution

Re-ordering Level = Maximum Consumption x Maximum re-order period
 = 150 units x 15 days = 2,250 units

Minimum Stock Level = Re-ordering Level - (Normal consumption x Normal re-order period)
 = 2,250 - (120 x 12) = 810 units

Maximum Stock Level = Re-ordering Level + Re-order Quantity - (Minimum Consumption x Minimum Re-Order Period)
 = 2,250 + 1500 - (100 x 10) = 2,750 units

Average stock Level = Minimum Stock Level + 1/2 Re-order Quantity
 = 810 units + 1/2 x 1500 units = 1,560 units

2.3 Bin Card and Stores Ledger:

Bin Card: The bin card provides complete information of materials placed in the bin. It shows description, material code, and location code, receipt of material, issues and balance of quantity. The bin card is maintained by the store keeper. The storekeeper is answerable for any differences in the physical stock and balance shown in the bin card. This card is helpful for control of stock. This card has details regarding minimum, maximum and reorder stock level.

Stores Ledger: The stores ledger card is maintained in the costing department. It has similar details as contained in the bin card regarding receipts, issues and balance of materials quantity. In addition to quantity the stores ledger called contains information in terms of values also. The pricing of materials issued is done in the stores ledger account.

Bin Card – Vs – Stores Ledger:

BIN CARD	STORES LEDGER
It is maintained by stores department Bin card provides quantities received, issued and the balance in the bin. Entries are made before the transaction take place Each and every transaction is individually entered.	It is maintained by costing department Stores ledger contain both quantity and value of receipts, issues and the balances. Entries are made after the transaction takes place Transactions are summarized and entries are made periodically.

The Chartered Institute of Management Accountants, London, defines the perpetual inventory as “a system of records maintained by the controlling department, which reflects the physical movements of stocks and their current balance”. Thus this is a system in which, with the help of Bin Cards and Stores Ledger, the balance of stock is ascertained after every receipt and issue of materials. This helps in avoiding closing down of firm for physical verification.

Advantages of the Perpetual Inventory System

The following are the advantages of the perpetual inventory system:

- ❖ It avoids the disruption of production for physical checking of all items of stores at the end of the year.
- ❖ The preparation of Profit and Loss Account and Balance Sheet is possible without physical verification of stock.
- ❖ A detailed and more reliable control on the materials in store is obtained.
- ❖ As the work of recording and continuous stocktaking is carried out systematically and without undue haste, the figures are more reliable.
- ❖ Continuous stocktaking will make the storekeeper and the stores accountant more vigilant in their work and they will try to keep the records accurate and up-to-date.
- ❖ Planning of production can be done without any fear of shortage as the management is constantly informed of the stores position.
- ❖ An inbuilt system of internal check will be in operation as bin cards and the stores ledger keep a check on each other.
- ❖ Errors and shortage of stock are readily discovered and efforts are made to avoid the shortage of stock in future.
- ❖ The capital invested in the stores can be kept under control and efficiently used as stock can be compared with the minimum and maximum levels.
- ❖ It makes available correct stock figures for claim to be lodged with the insurance company for loss on account of stock destroyed by fire.

Periodic Inventory System

Periodic inventory system is a system of ascertaining the quantity and value of inventory on the basis of an actual physical count or measure or weight of all the inventory items on hand at the end of accounting period. It usually requires closing down of normal functioning for stock taking. The cost of materials issued is calculated as a residual item.

$$\text{Cost of materials issued} = \text{Opening inventory} + \text{purchase} - \text{closing inventory.}$$

Difference between Periodic Inventory System And Perpetual Inventory System.

Periodic inventory system	Perpetual inventory system
1. Inventory is ascertained on the basis of actual physical count/ measure or weight	Inventory is ascertained on the basis of records
2. Inventory is directly calculated by applying the method of valuation of inventories like FIFO, LIFO	Inventory is calculated as residual figure
3. It requires closing down of work for stock taking	It does not require closing down of work for stock taking
4. It is simple and inexpensive	It is elaborate and expensive

Difference between Perpetual Inventory System And Continuous Stock Taking.

Continuous stock taking is a physical verification of a number of items daily or at frequent intervals. It is done throughout the year.

Perpetual inventory system	Continuous system
1. It is a system of recording stores balances after every receipt and issue of materials	It is a physical verification of a number of items daily or at frequent intervals
2. Its emphasis is on recording book balances	Its emphasis is on the physical verification of recorded book balances with the actual physical balances.

Bill of materials:

It is a document listing all the materials required with quantities required for a particular job, order or process. The bill of material serves the purpose of material requisition. The bill of material is prepared for a job of non standardized type so that estimate of all materials required for the job is made by the production department before the job is started. This is helpful to estimate material cost of the job for submitting tenders or quotations.

The Techniques of Inventory Control

The various techniques of inventory control are as follows:

- ✓ ABC analysis
- ✓ Economic order quantity
- ✓ Stock levels, minimum level, maximum level, reorder levels,
- ✓ Inventory turnover ratio
- ✓ Proper purchase procedure
- ✓ Proper storage procedure
- ✓ Proper issue procedure
- ✓ Use of perpetual inventory records and continuous stock verification
- ✓ Establishment of a system of budgets

2.4 ABC Analysis

Under ABC Analysis, the materials in stock are divided into three categories for the purpose of control. Generally it is seen that the materials which constitute the least percentage of items in stock may contribute to a large percentage of value and a large percentage of items may represent a

smaller percentage of value of items consumed. Between these two items are those items, the percentage of which is more or less equal to their value in consumption. Items falling in the first category are treated as 'A' items, of the second category as 'B' items and items of the third category are taken as 'C' items. Such an analysis of material is known as ABC analysis. This technique of stock control is also known as stock control according to value method or Always Better Control method or Proportional Parts Value Analysis method. Thus, under this technique of material control, materials are listed in 'A', 'B' and 'C' categories in descending order based on money value of consumption.

ABC analysis measures the cost significance of each item of material. It concentrates on important items, so it is also known as 'Control by Importance and Exception' (CIE).

The report of the Indian Productivity Team on “Stores and Inventory Control in U.S.A., Japan and West Germany” gives the following example of ABC Analysis:

<i>Group</i>	<i>Percentage of Items</i>	<i>Percentage of Costs</i>
A	8%	75%
B	25%	20%
C	67%	5%

The significance of this analysis is that a very close control is exercised over the items of ‘A’ group which account for a high percentage of costs while less stringent control is adequate for category ‘B’ and very little control would suffice for category ‘C’ items.

2.5 Issue of materials

Materials issued from stores are debited to the jobs or work orders which received them and credited to the materials account. These jobs are debited with the value of materials issued to them.

But what is the value of materials? Theoretically the value includes the invoice price less trade discount, the freight, cartage, octroi and insurance on incoming materials, expenses of purchase, receiving, storing and record keeping and carriage from the stores up to the process plant. However, in practice, it involves minute calculations for including all these expenses and is a big task compared to the benefit derived from it.

Moreover the price changes according to the market conditions and at any given time there will be stock of materials purchased at different times at different prices. Hence the problem as to at what price the materials should be issued?

Methods of Pricing Material Issues

In the relation to the estimation of the cost of the product for pricing decisions, material issues as a key role. Material price usually refers to the price quoted and accepted in the purchase orders. Materials are issued from the stores to work orders based on the material requisition. But stock of materials consists of different consignment received at different dates and prices. There are different methods used for pricing the materials issues may be summarized in the following categories :

(A) Actual Price Method (or) Cost Price Method

- First In First Out (FIFO).
- Last In First Out (LIFO).
- Specific Price Method.
- Base Stock Method.
- Highest In First Out (HIFO).

(B) Average Cost Method

- Simple Average Method.
- Weighted Average Method.
- Periodic Simple Average Method.
- Periodic Weighted Average Method.

(C) Standard Price Method.

(D) Inflated Price Method.

(E) Market Price Method (or) Replacement Price Method.

A. ACTUAL PRICE METHOD

In this method, the materials issued are priced at their actual cost and this involves identification of each lot purchased. This method is suitable only in the case of materials purchased for a specific job. There are several methods frequently used under actual cost price method which will be discussed in details:

First In First Out (FIFO): Under this method material is first issued from the earliest consignment on hand and priced at the cost at which that consignment was placed in the stores. In other words, materials received first are issued first. The units in the opening stock of materials are treated as if they are issued first, the units from the first purchase issued next, and so on until the units left in the closing stock of materials are valued at the latest cost of purchases.

This method is most suitable in times of falling prices because the issue price of materials to jobs or work order will be high while the cost of replacement of materials will be low. But in case of rising prices this method is not suitable because the issue price of materials to production will be low while the cost of replacement of materials will be high.

Advantages

- (1) It is simple and easy to adaptability.
- (2) It is beneficial when the prices are falling.
- (3) As actual prices are issued, it reflects on profit no loss in the pricing.
- (4) This method is very useful for slow moving materials.

Disadvantages

- (1) Calculation becomes complicated due to fluctuation of material prices.
- (2) More chances of clerical errors due to complicated calculations.
- (3) Under fluctuating prices, one requisition involves more than one price.
- (4) In times of raising prices this method tends to show the production at low cost since the cost of replacing the material will be higher.

The following example will illustrate how issues of materials are valued under this method.

Illustration 5: The received side of the Stores Ledger Account shows the following particulars:

Jan. 1 Opening Balance: 500 units @ Rs.4

Jan. 5 Received from vendor: 200 units @ Rs.4.25

Jan.12 Received from vendor: 150 units @ Rs.4.10

Jan.20 Received from vendor: 300 units @ Rs.4.50

Jan.25 Received from vendor: 400 units @ Rs.4

Issues of material were as follows:

Jan. 4- 200 units; Jan.10- 400 units; Jan. 15- 100 units; Jan 19- 100 units; Jan.26- 200 units;

Jan.30- 250 units.

Issues are to be priced on the principle of "first in first out". Write the Stores Ledger Account in respect of the materials for the month of January.

Solution:

SOLUTION (Illustration 5)

STORES LEDGER ACCOUNT

Date	Particulars	Receipts			Issues			Balance		
		Quantity (Units)	Total Cost (Rs)	Unit Cost (Rs)	Quantity (units)	Total Cost (Rs)	Unit Cost (Rs)	Quantity (units)	Amount (Rs)	Per Unit (Rs)
Jan 1	Balance b/d	-	-	-	-	-	-	500	2000	4
Jan 4	Requisition slip no.	-	-	-	200	800	4	300	1200	4
Jan 5	Goods received note no.	200	850	4.25	-	-	-	300	1200	4
								200	850	4.25
Jan 10	Requisition slip no.	-	-	-	300	1200	4			
					100	425	4.25	100	425	4.25
Jan 12	Goods received note no.	150	615	4.10	-	-	-	100	425	4.25
								150	615	4.10
Jan 15	Requisition slip no.	-	-	-	100	425	4.25	150	615	4.10
Jan 19	Requisition slip no.	-	-	-	100	410	4.10	50	205	4.10
Jan 20	Goods received note no.	300	1350	4.50	-	-	-	50	205	4.10
								300	1350	4.50
Jan 25	Goods received note no.	400	1600	4.00	-	-	-	50	205	4.10
								300	1350	4.50
								400	1600	4.00
Jan 26	Requisition slip no.	-	-	-	50	205	4.10	150	675	4.50
					150	675	4.50	400	1600	4.00
Jan 30	Requisition slip no.	-	-	-	150	675	4.50	300	1200	4.00
					100	400	4.00			

Under this method, issues are priced in the reverse order of purchase i.e., the prices of the latest available consignment is taken. This method is suitable in times of rising prices because material will be issued from the latest consignment at a price which is closely related to the current price levels. Valuing material issues at the price of the latest available consignment will help the management in fixing the competitive selling prices of the products. It is just opposite to the FIFO method.

Advantages

- It is beneficial when the period of raising prices.
- Under this method, latest prices are issued thereby leading to lower reported profits hence savings in taxes.
- When there are wide fluctuations in price levels this methods tends to minimize unrealized gains or losses in inventory.

Disadvantages

- This method involves more clerical work which leads to complicated calculations.
- Under this method more than one price is to be adopted for the same issue lot of material.
- Due to wide fluctuation of prices, comparison of cost of similar jobs is very difficult.

Illustration 6: Prepare Stores Account on Last in First Out method assuming the same particulars as in Illustration 5:

SOLUTION

(Illustration 6)

LIFO Method

STORES LEDGER ACCOUNT

Date	Particulars	Receipts			Issues			Balance		
		Quantity (Units)	Total Cost (Rs)	Unit Cost (Rs)	Quantity (units)	Total Cost (Rs)	Unit Cost (Rs)	Quantity (units)	Amount (Rs)	Per Unit (Rs)
Jan 1	Balance b/d	-	-	-	-	-	-	500	2000	4
Jan 4	Requisition slip no.	-	-	-	200	800	4	300	1200	4
Jan 5	Goods received note no.	200	850	4.25	-	-	-	300 200	1200 850	4 4.25
Jan	Requisition slip no.	-	-	-	200	850	4.25			

10									
					200	850	4.00	100	400	4.00
Jan 12	Goods received note no.	150	615	4.10	-	-	-	100	400	4.00
								150	615	4.10
Jan 15	Requisition slip no.	-	-	-	100	410	4.10	100	400	4.00
								50	205	4.10
Jan 19	Requisition slip no.	-	-	-	50	205	4.10			
					50	200	4.00	50	200	4.00
Jan 20	Goods received note no.	300	1350	4.50	-	-	-	50	200	4.00
								300	1350	4.50
Jan 25	Goods received note no.	400	1600	4.00	-	-	-	50	200	4.00
								300	1350	4.50
								400	1600	4.00
Jan 26	Requisition slip no.	-	-	-	200	800	4.00	50	200	4.00
								300	1350	4.50
								200	800	4.00
Jan 30	Requisition slip no.	-	-	-	200	800	4.00	50	200	4.00
					50	225	4.50	250	1125	4.50

Specific Price Method:

Specific Price Method is one of the methods of actual price method. In this method adopted where the materials are purchased for particular job or operation and the issue is charged with the actual cost price. This method is suitable only in the case of special purpose materials are purchased for a particular job. This method has been widely used in job order industries which carry out individual jobs or contract against specific orders .

Advantages -

- This method is simple and easy to operate.
- This method is useful where the job costing is in operation.
- Under this method, the actual material cost can be easily identified.
- This method is desirable because actual cost of materials is charged to production and therefore no profit no loss.

Disadvantages

- This method involves considerable amount of clerical work.
- If the purchases and issues are numerous, it is difficult to identification of issues for a particular job.

Base Stock Method:

Under this method pricing is determined on the basis of assumption made here is that a certain minimum quantity of materials maintained in stock. This minimum quantity is known as Base Stock or Safety Stock. This quantity cannot be used unless an emergency arises. The minimum stock is in the nature of fixed assets because it is created out of the first lot of the material purchased. Therefore it always valued at the actual cost price of the first lot and is carried forward as fixed assets. This method is usually applied with FIFO or LIFO.

Illustration: 7

From the following details of stores receipts and issues of materials in a manufacturing unit, prepare the stores ledger using Base Stock Method of valuing the issues; assume base stock 200 tonnes.

1.1.2003	Purchased 500 tones at Rs. 2 per ton
10.1.2003	Purchased 300 tones at Rs. 2.10 per ton
15.1.2003	Issued 600 tons
20.1.2003	Purchased 400 tones at Rs. 2.20 per ton
25.1.2003	Issued 300 tons
27.1.2003	Purchased 500 tons at Rs. 2.10 per ton
31.1.2003	Issued 200 tons

Solution :

Stores Ledger Account (Base Stock – FIFO)									
Date	Receipt			Issues			Balance		
	Qty	Rate Rs.	Amt. Rs.	Qty	Rate Rs.	Amt. Rs.	Qty	Rate Rs.	Amt. Rs.
01-01-2003	500	2	1000				500	2	1000
10-01-2003	300	2.10	630				500	2	1000
							300	2.10	630
15-01-2003				300	2	600			
				300	2.10	630			
20-01-2003	400	2.20	880				200	2	400
							200	2	400
							400	2.20	880
				300	2.20	660	200		

Closing stock

Highest In First Out (HIFO):

This method is based on the assumption that the stock of materials should always be valued at the lowest possible price. Accordingly materials purchased at the highest price should be used for making the issue. This method is useful because issues are based on actual cost. It aims at recovering the highest cost of materials when the market is constantly fluctuating. But at the same time this method involves too many complicated calculations. And also this method has not been adopted widely.

B. AVERAGE COST METHOD

In this method, the issues to the production department are split into equal batches from each shipment at stock. It is a realistic method reflecting the price levels and stabilizing the cost price. The following various methods of averaging issue prices may be used : (1) Simple Average Method, (2) Weighted Average Method (3) Periodic Simple Average Method (4) Periodic Weighted Average Method.

Simple Average Method

In this method, price is calculated by dividing the total of the prices of the materials in the stock from which the material to be priced could be drawn by the number of the prices used in that total. This method may lead to over-recovery or under-recovery of cost of materials from production because quantity purchased in each lot is ignored. The following formula is applied for calculation of material issue price under simple average method :

Total of Unit Prices of Materials in Stock

Issue Price =

Number of Prices

Eg:- 1000 units purchased @ Rs.10 2000 units purchased @ Rs.11 3000 units purchased @ Rs.12

In this example, simple average price will be Rs.11 calculated as below:

$$\frac{\text{Rs.10} + \text{Rs.11} + \text{Rs.12}}{3} = \text{Rs.11}$$

3

Illustration: 8

From the following prepare stores ledger account using Simple Average Method for the month of

January 2003:

January	1	opening balance 500 units at Rs. 2 per unit
	3	Issued 100 units
	4	Issued 100 units
	8	Issued 100 units
	13	Purchased 400 units at Rs. 3 per unit
	14	Purchased 200 units at Re. 1 per unit
	16	Issued ISO units
	20	Purchased 400 units at Rs. 4 Per unit
	24	Issued 250 units
	25	Purchased 500 units at Rs. 5 per unit
	26	Issued 300 units
	28	Purchased 200 units at Rs. 2 per unit
	31	Purchased 200 units at Rs. 4 per unit

Solution :

Date	Receipts			Issues			Balance		
	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.
01.01.2003	500	1	1,000				500	2	1,000
03.01.2003				100	2	200	400	2	800
04.01.2003				100	2	200	300	2	600
08.01.2003				100	2	200	200	2	400
13.01.2003	400	3	1,200				200	2	400
							400	3	1,200
14.1.2003	200	1	200				200	2	400
							400	3	1,200
							200	1	200
16.01.2003				150	2	300	650		1,500
20.01.2003	400	4	1,600				1,050		3,100
24.01.2003				250	2.5	625	800		2,475
25.01.2003	500	5	2,500				1,300		4,975
26.01.2003				300	3.25	975	1,000		4,000
28.01.2003	200	4	400				1,200		4,400
31.01.2003	200	4	800				1,400		5,200

Working notes

Issue rate on 3rd, 4th and 8th at Rs. 2 per unit

$$\text{Issue rate on 16}^{\text{th}} = \frac{\text{Rs. 2} + \text{Rs. 3} + \text{Rs. 1}}{3} = \frac{\text{Rs. 6}}{3} = \text{Rs. 2}$$

$$\text{Issue rate on 24}^{\text{th}} = \frac{\text{Rs. 2} + \text{Rs. 3} + \text{Rs. 1} + \text{Rs. 4}}{4} = \frac{10}{4} = \text{Rs. 2.5}$$

$$\text{Issue rate on 26}^{\text{th}} = \frac{\text{Rs. 3} + \text{Rs. 1} + \text{Rs. 4} + \text{Rs. 5}}{4} = \frac{13}{4} = \text{Rs. 3.25}$$

Weighted Average Methods

In this method, price is calculated by dividing the total cost of materials in the stock from which the materials to be priced could be drawn by the total quantity of materials in that stock.

In the periods of heavy fluctuations in the prices of materials, the average cost method gives better results because it tends to smooth out the fluctuations in prices by taking the average of prices of various lots in stock. The material issue price is calculated

by the formula given below:

$$\text{Weighted Average Price} = \frac{\text{Value of Materials in Stock}}{\text{Quantity in Stock}}$$

Illustration: 9

From the following particulars, prepare stores Ledger Account on weight Average basis

2003	March	1	Opening balance 200 units at Rs. 2 per unit
		10	Purchased 300 units at Rs. 2.40 per unit
		15	Issued 250 units
		18	Purchased 250 units at Rs. 2.60 per unit
		20	Issued 200 units.
		25	Purchased 300 units at Rs. 2.50 per unit
		31	Purchased 100 units at Rs. 2 per unit

Date	Receipts			Issues			Balance		
	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.	Qty.	Rate Rs.	Amt. Rs.
01.03.2003	200	2	400				200	2	400
10.03.2003	300	2.40	720				200	2	400
							300	2.40	720
15.03.2003				250	2.24	560	250		560
18.03.2003	250	2.60	650				500		1,210
20.03.2003				200	2.42	484	300		726
25.03.2003	300	2.50	750				600		1,476
31.03.2003	100	2	200				700		1,676

Working Notes

$$\text{Issue Price} = \frac{\text{Value of Materials in Stock}}{\text{Quantity in Stock}}$$

$$\text{Issue Rate on 15}^{\text{th}} = \frac{400+720}{220+300} = \frac{1120}{500} = \text{Rs.2.24}$$

$$\text{Issue Rate on 20}^{\text{th}} = \frac{560+650}{250+250} = \frac{1210}{500} = \text{Rs. 2.42}$$

Periodic Simple Average Method: Under this method, the simple average rate is calculated for a particular period ignoring the rate of opening stock. The issue price is calculated by totaling the unit price of all materials purchased during a particular period by the total number of prices during that period. Thus this rate is applied to the issue to production for a particular period say a month and not at the occasion of each issue of materials.

Periodic Weighted Average Method: This method is similar to the periodic simple average method. In this method issue rate is calculated by total cost of materials purchased during a period by the total quantity of materials purchased during that period. Here both quantity and prices of materials in stock during a particular period are taken into account for calculation of periodic weighted average rate. Under this method the issue rate is determined for a particular period ignoring the rate and quantity of opening stock. A new average rate is computed at the end of each period say a month and this average rate is applied to subsequent issues.

C. STANDARD PRICE METHOD

Under this method, standard price of material issues are calculated on the basis of detailed analysis of market prices and trends. The standard price also referred to as predetermined price is fixed for a definite period of six months or more. Accordingly the material issue is done on the basis of standard price irrespective of actual rate. The difference between actual price and standard price is treated as material variance. At the end of the period, new standard price is fixed for a further period.

D. INFLATED PRICE METHOD

This method is used to cover material losses on account of obsolescence, deterioration, and materials handling expenses. Under this method cost of materials issue, such losses and expenses are directly charged to material cost. Therefore, when the issue of materials is made, the price is to inflated to cover all the losses and expenses.

E. MARKET PRICE METHOD

This method is also known as Replacement Rate Method. Under this method issue materials that are valued at the market rate prevailing at the time issue. It therefore follows that when prices increase the stock on hand is continuously under estimated because receipts are cost at actual and issued at higher rates. Conversely Hand grossly overestimated. This method is most suitable when quotations or tenders have to be made because they are to be quoted at competitive prices. Besides this system requires continuous monitoring of market price for all materials and hence it is very unwieldy.

Practical Problems:

1. The following transactions occur in the purchase and issue:

2013 Jan. 2 Purchased 4000 units at Rs. 4.40 per unit

Jan. 20 Purchased 500 units at Rs. 5 per unit

Feb. 5 Issued 2000 units

Feb. 10 Purchased 6000 units at Rs. 6 per unit

Feb. 12 Issued 4000 units

March 2 Issued 1000 units

March 5 Issued 2000 units

March 15 Purchased 4500 units at Rs. 5.50 per unit

March 20 Issued 3000 units

From the above, prepare the stores ledger account in two ways (a) by adopting FIFO (b) by adopting LIFO method.

[Ans: (I) FIFO Closing Stock = 3,000 units at Rs. 5.50 = Rs. 16,500 (2) LIFO Closing Stock = 3,000 units 1,500 units at Rs. 4 1,500 units at Rs. 5.50 6,000 8,250 Total 3000 units = 14,250].

2. From the following receipts and payments of a material X prepare a stores ledger account showing under Simple Average Method and Weighted Average Method.

2012 Jan. 1 Opening stock 200 units at Rs. 3.50 per unit
 3 Purchased 300 units at Rs. 4 per unit
 5 Issued 400 units
 13 Purchased 900 units at Rs. 4.30 per unit
 15 Issued 600 units
 23 Purchased 600 units at Rs. 3.80 per unit
 25 Issued 600 units.

[Ans : Issued price rate 5", 15", 25", closing stock (a) Simple Average Rs. 3.75, 4.15, 4.400 units Rs. 1,630 (b) Weighted Average Rs. 3.80,4.25, 3.98, 400 units Rs. 1,5921

3. From the following receipts and payments of a material X prepare stores ledger account under Base Stock Method with FIFO. Assume base stock of 400 units out of opening stock.

2013 Jan. 1 Opening stock 1000 units at Rs. 2 each
 3 Purchased 800 units at Rs. 2.10 per unit
 5 Issued 800 units
 12 Purchased 1,600 units at Rs. 2.10 per unit
 17 Issued 1,500 units
 20 Purchased 900 units at Rs. 2.50 per unit
 25 Issued 600 units

[Ans : Closing stock: Base Stock 400 units at Rs. 2 per unit = Rs. 800 Closing Balance 100 units at Rs. 2.10 = Rs. 210 900 units at Rs. 2.50 = Rs. 2250 I

4. From the following details of store receipts and issues of materials 'PQ' in a manufacturing visit prepare the stock ledger using weighted average methods of valuing the issues.

2011 January 1 Opening stock 2,000 units at Rs. 5 per unit
 4 Issued 1,500 units
 5 purchased 4,500 units at Rs. 6 per unit
 9 Issued 1,600 units 12 Returned to stock 100 units (from the issue of January 4)
 15 Purchased 2,400 units at Rs. 6.50 per unit
 18 Purchased to supplier 200 units out of the quantity received on January 5"

25 Purchased 1,000 units at Rs. 7 each

28 Issued 2,100 units

29 Purchased 1,200 units at Rs. 7.50 per unit

30 Issued 2800 units

[Ans: Value of closing stock Rs. 19.558 (3,000 units @ Rs. 6.52 per unit)

1. Show the Stores Ledger entries as then would appear when using: (a) Weighted Average Method (b) Simple Average Method and (c) LIFO Method.

	Units	Rate Per unit
2010 March 1 Opening Balance	600 2.00	
4 Purchased	400	2.20
7 Issued	300	
9 Purchased	400	2.30
15 Issued	300	
20 Issued	400	
25 Purchased	400	2.40
29 Issued	300	

[Ans : Value of Stock (a) Rs. 1.140 (500 units @ Rs. 2.28 (b) Rs. 1,074 (c) Rs. 1.040 (400 units @ Rs. 2.750 units Rs. 2.50 units @ Rs. 2.40»)

2. The following information refers to the receipts and issues of a certain material during January 2013.

2013 January	1	Purchased 1,000 units at Re. 1 per unit .
	5	Purchased 1,000 units at Rs. 1.10 per unit
	11	Issued 500 units
	15	Purchased 1,600 units at Rs. 1.15 per unit
	18	Issued 1,200 units
	20	Purchased 1,500 units
	25	Purchased 1,500 units at Rs. 1.20 per unit
	29	Issued 200 units

Write up the priced stores ledger card adopting the standard method of issue at Rs. 1.10 per unit

[Ans : 29.01.2013 Balance 1,700 units, Rs. 2.000)

3. Prepare a stores ledger account from the following information adopting FIFO method of Principle of issue of materials.

- March 2012
- 1 Opening balance 500 units at Rs. 200 per unit
 - 4 Issued to production 70 units
 - 5 Issued to production 100 units
 - 7 Issued to production 80 units
 - 12 Purchased materials 200 units at Rs. 190 per unit
 - 15 Returned to stores 15 units
 - 17 Issued to production 180 units
 - 20 Purchased materials 240 units Rs. 195 per unit
 - 23 Issued to production 300 units
 - 25 Purchased materials 320 units at Rs. 200 per unit
 - 27 Issued to production 115 units
 - 29 Returned to stores 35 units
 - 31 Purchased materials 100 units at Rs. 200 per unit

[Ans: Closing balance 565 units valued at Rs. 1,12,275]

UNIT – III

LABOUR

Importance of Labour cost control – Various methods of Wage payment – Calculation of wages – Methods of Incentives for schemes.

3.0 Introduction

Labour cost is one of the important elements of production. Wage salaries and other incentives of employee remuneration constitute a very large component of operating costs. Remuneration of employees 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 employers, employees and the nation as whole.

3.1 Importance of Labour Cost Control

Labour is of two types *(a) direct labour, (b) indirect labour*. Direct Labour is that labour which is directly engaged in the production of goods or services and which can be conveniently allocated to the job, process or commodity or process. For example labour engaged in spinning department can be conveniently allocated to the spinning process.

Indirect Labour is that labour which is not directly engaged in the production of goods and services but which indirectly helps the direct labour engaged in production. The examples of indirect labour are supervisors, sweepers, cleaners, time-keepers, watchmen etc. The cost of indirect labour cannot be conveniently allocated to a particular job, order, process or article.

The distinction between direct and indirect labour must be observed carefully because payment of direct labour is a direct expenditure and is a part of prime cost whereas payment of indirect labour is an item of indirect expenditure and is shown as works, office, selling and distribution expenditure according to the nature of the time spent by the indirect worker. Management is interested in the labour costs due to the following reasons.

- To use direct labour cost as a basis for increasing the efficiency of workers.
- To identify direct labour cost with products, orders, jobs or processes for ascertaining the cost of every product, order, or process.
- To use direct labour cost as a basis for absorption of overhead, if percentage of direct labour cost to overhead is to be used as a method of absorption of overhead.
- To determine indirect labour cost to be treated as overhead and
- To reduce the labour turnover.

Hence control of labour cost is an important objective of management and the realization of this objective depends upon the co-operation of every member of the supervisory force from the top executive to foremen.

3.2 Time keeping

Time-keeping will serve the following purposes:

- ❖ Preparation of Pay Rolls in case of time-paid workers.
- ❖ Meeting the statutory requirements.
- ❖ Ensuring discipline in attendance.
- ❖ Recording of each worker's time 'in' and 'out' of the factory making distinction between normal time, overtime, late attendance, early leaving.
- ❖ For overhead distribution when overheads are absorbed on the basis of labour hours.

3.2.1 Methods of Time-keeping

There are two methods of time-keeping. They are the *manual methods* and the *mechanical methods*. Whichever method is used it should make a correct record of the time and the method should be cost effective and minimize the risk of fraud.

The manual methods of time keeping are as follows:

- Attendance Register Method, and
- Metal Disc Method

Attendance Register Method

This is the traditional method where an attendance register or muster roll is kept at the time office near the factory gate or in each department. The timekeeper records the name of the worker, the worker's number, the department in which he is working, the rate of wages, the time of arrival and departure, normal time and overtime. If the workers are literate, they may make a record of time themselves in the presence of a time-keeper or foreman.

This method is simple and inexpensive and can be used in small firms where the number of workers is not large. However recording the time of workers who work at customers' premises and places which are situated at a distance from the factory is not practical in this method.

Metal Disc Method

Under this method, each worker is allotted a metal disc or a token with a hole bearing his identification number. A board is kept at the gate with pegs on it and all tokens are hung on this board. These boards can be maintained separately for each department so that the workers can remove the token without delay and put it in a tray or box kept near the board. Immediately after the scheduled time for entering the factory, the box is removed and the latecomers will have to give their tokens to the timekeeper and their exact time of arrival is recorded. The tokens or disc left on the board will represent the absentee workers. Later the timekeeper records the attendance in the attendance register and subsequently it is passed on to the Pay Roll Department.

Mechanical Methods

The mechanical methods that are generally used for the recording of time of workers may be as follows:

- (a) Time Recording Clocks
- (b) Dial Time Records

Time Recording Clocks

The time recording clock is a mechanical device which automatically records the time of the workers. Under this method, each worker is given a *Time Card* which is kept in a tray near the factory gate and as the worker enters the gate, he picks up his card from the tray, puts it in the time recording clock which prints the exact time of arrival in the proper space against the particular day. This procedure is repeated for recording time of departure for lunch, return from lunch and time of leaving the factory in the evening. Late arrivals and overtime are recorded in red to attract the attention of the management.

Dial Time Records

Under this method, a dial time recorder machine is used. It has a dial with number of holes (usually about 150) and each hole bears a number corresponding to the identification number of the worker concerned. There is one radial arm at the centre of the dial. As a worker enters the factory gate, he is to press the radial arm after placing it at the hole of his number and his time will automatically be recorded on roll of a paper inside the dial time recorder against the number. The sheet on which the time is recorded provides a running account of the worker's time and it can calculate the number of hours and prepare the wage sheets. However, the high installation cost of the dial time recorder and its use for only a limited number of workers are the drawbacks of this method.

3.3 Time Booking

Time booking is the recording of time spent by the worker on different jobs or work orders carried out by him during his period of attendance in the factory. The objects of time booking are:

- ❖ To ensure that time spent by a worker in a factory is properly utilized on different jobs or work orders.
- ❖ To ascertain the labour cost of each individual job or work order.
- ❖ To provide a basis for the apportionment of overhead expenses over various jobs or work orders when the method for the allocation of overheads depends upon time spent on different jobs.
- ❖ To ascertain unproductive time or idle time so as to make efforts to keep it in limit.
- ❖ To know the time taken to complete a particular job so that bonus can be paid as per the incentive schemes.
- ❖ To know the efficiency of workers, it is necessary to make the comparison of actual time taken with time allowed for completing a particular task.

Following documents are generally used for time booking:

- ❖ Daily Time Sheets
- ❖ Weekly Time Sheets
- ❖ Job Tickets or Job Cards.

Daily time sheets are given to each worker where he records the time spent by him on each job or work order. Weekly time sheets record the same particulars for a week and hence one card is required for a week. Job cards are used to keep a close watch on the time spent by a worker on each job so that the labour cost of a job may be conveniently ascertained.

Idle Time

There is always a difference between the time booked to different jobs or work orders and the time recorded at the factory gate. This difference is known as idle time. Idle time is of two types.

- Normal Idle Time
- Abnormal Idle Time

A. Normal Idle Time:

This represents the time, the wastage of which cannot be avoided and, therefore, the employer must bear the labour cost of this time. But every effort should be made to reduce it to the lowest possible level. Examples of normal idle time are: time taken in going from the factory gate to the department in which the worker is to work and back at the end of the day, time taken in picking up the work for the day, time between the completion of one work and the start of another work, time taken for personal needs like tea or toilet, time taken for machine maintenance, time taken for waiting for instructions, printouts, machine set-up time etc.

Normal Idle Time is unavoidable cost as such should be included in cost of production. The cost of normal idle time can be treated as an item of factory expenses and recovered as an indirect charge or added to labour cost.

B. Abnormal Idle Time:

It is that time the wastage of which can be avoided if proper precautions are taken. Example: time wasted due:- to breakdown of machinery on account of inefficiency of the works engineer, failure of the power supply, shortage of materials, waiting for instructions, waiting for tools and raw materials, strikes or lock-outs in the factory.

It is a principle of costing that all abnormal expenses and losses should not be included in costs and as such wages paid for abnormal idle time should not form part of the cost of production. Hence it is debited to Costing Profit and Loss Account.

Over Time:

It is the work done beyond the normal working period in a day or week. For overtime done, the workers are given double the wages for the overtime done. The additional amount paid on account of overtime is known as overtime premium.

Overtime increases the cost of production and should not be encouraged as it has the following disadvantages.

- ❖ Overtime is paid at higher rate.
- ❖ Overtime is done at late hours when workers have become tired and efficiency will be as much as during the normal working hours.
- ❖ Workers will develop the habit of working slowly during normal hours and complete the work using overtime to earn more wages.
- ❖ Expenses like lighting, cost of supervision, and wear and tear of machines will increase disproportionately.

Overtime should be recorded separately and thoroughly investigated to see that it is incurred only when genuinely required.

The treatment of overtime depends on the situation. If overtime is incurred for because of the sequence of jobs, then normal wages is charged to labour cost for the overtime also but if it is a rush job, then the overtime wages is added to the cost of labour. On the other hand if overtime arises due to any abnormal reason like breakdown of machinery or power failure, overtime premium is excluded from the cost of production and is debited to the Costing Profit and Loss Account.

Illustration 1: Calculate the normal and overtime wages payable to a workman from the following data:

Days	Hours Worked
Monday	8 hrs.
Tuesday	10 hrs.
Wednesday	9 hrs.
Thursday	11 hrs.
Friday	9 hrs.
Saturday	4 hrs.
Total	
Normal Working Hours	8 hours per day
Normal rate	Re.1 per hour

Overtime rate up to 9 hours in a day at single rate and over 9 hours in a day at double rate; or up to 48 hours in a week at single rate and over 48 hours at double rate whichever is more beneficial to the workman.

Solution:

Days	Total Hours	Normal Working Hours	At Single rate	At Double rate
Monday	8	8	-	-
Tuesday	10	8	1	1
Wednesday	9	8	1	-
Thursday	11	8	1	2
Friday	9	8	1	-
Saturday	4	4		
Total	51	44	4	3

Normal Wages for 44 hours @ Re.1 Rs.44

Overtime Wages:

At single rate for 4 hours @ Re.1 = Rs.4

At double rate for 3 hours @ Rs.2 = Rs.6 Rs.10

Total Wages Rs.54

Or

Normal Wages for 48 hours @ Re.1 per hour = Rs.48

Overtime Wages for 3 hours @ Rs.2 per hour = Rs. 6

Rs.54

Therefore, whichever method is followed, the amount of the wages payable to the worker is Rs.54.

3.4 System of Wage Payment

There is no single method of wage payment which is acceptable both to the employers and the workers. The system of wages should result into higher production, improved quality of output and a contented labour force.

There are two principal wage systems: (i) Payment on the basis of time spent in the factory irrespective of the amount of work done. This method is known as time wage system. (ii) Payment on the basis of the work done irrespective of the time taken by the worker. This method is called piece rate system.

Other methods called premium plans or bonus and profit sharing schemes are used with either of the two principal methods of wage payment.

Time Wage System

Under this method of wage payment, the worker is paid at an hourly, daily, weekly or monthly rate.

This payment is made according to the time worked irrespective of the work done.

This method is highly suitable for following types of work:

- ❖ Where highly skilled and apprentices are working.
- ❖ Where quality of goods produced is of extreme importance eg., artistic goods
- ❖ Where the speed of work is beyond the control of the workers.
- ❖ Where close supervision of work is possible.
- ❖ Where output cannot be measured.

The disadvantages of this method are:

- ❖ Workers are not motivated.
- ❖ Workers will get payment for idle time.
- ❖ Efficient workers will become inefficient in the long run as all of them get same wages.
- ❖ Employer finds it difficult to calculate labour cost per unit as it varies as production increases and decreases.
- ❖ Strict supervision is necessary to get the work done.
- ❖ Inefficiency results in upsetting the production schedule and increases the cost per unit.
- ❖ It will encourage a tendency among workers to go slow so as to earn overtime wages.

Thus this method does not establish a proportionate relationship between effort and reward and the result is that it is not helpful in increasing production and lowering labour cost per unit.

Piece Rate System (payment by result)

Under this system of wage payment, a fixed rate is paid for each unit produced, job completed or an operation performed. Thus, payment is made according to the quantity of work done no consideration is given to the time taken by the workers to perform the work.

There are four variants of this system.

- a) Straight piece rate system
- b) Taylor's differential piece rate system
- c) Merrick's multiple piece rate system
- d) Gant's task and bonus plan

(a) Straight piece rate system

Payment is made as per the number of units produced at a fixed rate per unit. Another method is piece rate with guaranteed time rate in which the worker is given time rate wages if his piece rate wages is less than the time rate.

Advantages

- ❖ Wages are linked to output so workers are paid according to their merits.
- ❖ Workers are motivated to increase production to earn more wages.
- ❖ Increased production leads to decreased cost per unit of production and hence profit per unit increases.
- ❖ Idle time is not paid for and is minimized.
- ❖ The employer knows his exact labour cost and hence can make quotations confidently.
- ❖ Workers use their tools and machinery with a greater care so that the production may not be held up on account of their defective tools and machinery.
- ❖ Less supervision is required because workers get wages for only the units produced.
- ❖ Inefficient workers are motivated to become efficient and earn more wages by producing more.

Disadvantages

- ❖ Fixing of piece work rate is difficult as low piece rate will not induce workers to increase production.
- ❖ Quality of output will suffer because workers will try to produce more quickly to earn more wages.
- ❖ There may not be an effective use of material, because of the efforts of workers to increase the production. Haste makes waste. Thus there will be more wastage of material.
- ❖ When there is increased production, there may be increased wastage of materials, high cost of supervision and inspection and high tools cost and hence cost of production might increase.
- ❖ Increased production will not reduce the labour cost per unit because the same rate will be paid for all units. On the other hand, increased production will reduce the labour cost per unit under the time wage system.
- ❖ Workers have the fear of losing wages if they are not able to work due to some reason.
- ❖ Workers may work for long hours to earn more wages, and thus, may spoil their health.
- ❖ Workers may work at a very high speed for a few days, earn good wages and then absent themselves for a few days, upsetting the uniform flow of production.
- ❖ Workers in the habit of producing quality goods will suffer because they will not get any extra remuneration for good quality.
- ❖ The system will cause discontentment among the slower workers because they are not able to earn more wages.

This method can be successfully applied when:

- a. The work is of a repetitive type.
- b. Quantity of output can be measured.
- c. Quality of goods can be controlled.
- d. It is possible to fix an equitable and acceptable piece rate

- e. The system is flexible and rates can be adjusted to changes in price level.
- f. Materials, tools and machines are sufficiently available to cope with the possible increase in production.
- g. Time cards are maintained so that workers are punctual and regular so that production may not slow down.

(b) Taylor's Differential Piece Rate system

This system was introduced by Taylor, the father of scientific management to encourage the workers to complete the work within or less than the standard time. Taylor advocated two piece rates, so that if a worker performs the work within or less than the standard time, he is paid a higher piece rate and if he does not complete the work within the standard time, he is given a lower piece rate.

Illustration 2 : Calculate the earnings of workers A and B under Straight Piece-rate System and Taylor's Differential Piece-rate System from the following particulars.

Normal rate per hour = Rs.1.80

Standard time per unit = 20 seconds

Differentials to be applied:

80 % of piece rate below standard

120% of piece rate at or above standard.

Worker A produces 1,300 units per day and worker B produces 1,500 units per day.

SOLUTION

Standard production per 20 seconds = 1 unit

Standard production per minute = $60/20 = 3$ units

Standard production per hour = $3 \times 60 = 180$ units

Standard production per day of 8 hrs(assumed) = $180 \times 8 = 1440$ units

Normal rate per hour = Rs.1.80

Normal piece rate = $Rs.1.80 / 180 \text{ units} = 1 \text{ paisa}$

Low piece rate below standard production $\frac{1P \times 80}{100} = 0.8 \text{ paise}$

High piece rate at or above standard $\frac{1P \times 120}{100} = 1.2 \text{ paise}$

Earning of worker A

Under straight piece rate system

1300 units @ 1P = $\frac{1300 \times 1}{100} = Rs.13$

Under Taylor's Differential Piece-rate System

1300 units @ 0.8 P = $\frac{1300 \times 0.8}{100} = Rs.10.40$

Low piece rate has been applied because worker A's daily production of 1300 units is less than the standard daily production of 1,440 units.

Earnings of Worker B

Under Straight Piece-rate System

$$1500 \text{ units @ } 1P = \frac{1500 \times 1}{100} = \text{Rs.15}$$

Under Taylor's Differential Piece-rate System

$$1500 \text{ units @ } 1.2P = \frac{1500 \times 1.2}{100} = \text{Rs.18}$$

High piece-rate has been applied because worker B's daily production of 1500 units is more than the standard daily production of 1440 units.

c) Merrick's Multiple Piece Rate System

This method seeks to make an improvement in the Taylor's differential piece rate system. Under this method, three piece rates are applied for workers with different levels of performance. Wages are paid at ordinary piece rate to those workers whose performance is less than 83% of the standard output, 110% of the ordinary piece rate is given to workers whose level of performance is between 83% and 100% of the standard and 120% of the ordinary piece rate is given to workers who produce more than 100% of the standard output.

This method is not as harsh as Taylor's piece rate because penalty for slow workers is relatively lower.

Illustration 3: Calculate the earnings of workers A, B and C under straight piece rate system and Merrick's multiple piece rate system from the following particulars:

Normal rate per hour Rs.1.8

Standard time per unit 1 minute

Output per day is as follows:

Worker A : 384 units

Worker B : 450 units

Worker C : 552 units

Working hours per day are 8

SOLUTION

Standard output per minute	=	1 unit
Standard production per hour	=	60 units
Standard production per day of 8 hours	=	480 units(8 x 60)
Normal rate per hour	=	Rs.1.80
Normal output per hour	=	60 units
Normal piece rate = Rs. 1.80	=	3 paise

60

Calculation of level of performance:

Standard output per day	=	480 units
Worker A's output per day	=	384 units
Worker A's level of performance	=	$384 \times 100 = 80\%$
Worker B's output per day		480
	=	450 units
Worker B's level of performance	=	$450 \times 100 = 93.75\%$
		480
Worker C's output per day	=	552 units
Worker C's level of performance	=	$552 \times 100 = 115\%$
		480

Earnings of Worker A

Under straight piece rate system:

For 384 units @ 3 paise per unit = $384 \times 0.03 = \text{Rs.}11.52$

Under Merrick's multiple piece rate system:

For 384 units @ 3 paise per unit = $384 \times 0.03 = \text{Rs.}11.52$

Earnings of Worker B

Under straight piece rate system:

For 450 units @ 3 paise per unit = $450 \times 0.03 = \text{Rs.}13.50$ Under Merrick's multiple piece rate system:

For 450 units @ 3.3 paise per unit = $450 \times 0.033 = \text{Rs.}14.85$

Earnings of Worker C

Under straight piece rate system:

For 552 units @ 3 paise per unit = $552 \times 0.03 = \text{Rs.}16.56$ Under Merrick's multiple piece rate system:

For 552 units @ 3.6 paise per unit = $552 \times 0.036 = \text{Rs.}19.87$

Worker C's level of performance is 115% which is more than 100% of standard output; so he is entitled to get 120% of normal piece rate (ie. 120% of 3 paise or 3.6 paise per unit)

d. Gantt's Task Bonus Plan

This system is designed by Henry L. Gantt. Under this system, standard time for every task is fixed through time and motion study. The main feature of this system is a good combination of time rate, differential piece rate and bonus. In this system day wages are guaranteed to all workers. Wages under this system are calculated as follows :

<i>Performance</i>	<i>Earnings</i>
(Output)	
(1) Output Below Standard	- Time Rate (Guaranteed)
(2) Output at Standard	- Wages of Time Rate plus Bonus of 20% of the Time Rate
(3) Output at Above Standard	- High Piece Rate on worker's output

Illustration 4

From the following particulars, calculate total earnings of each worker under Gantt's Task and bonus Scheme :

Standard production per week per worker is 2000 units, piece work rate Rs. 5 per unit

Actual production during the month :

A - 1000 units

B - 2000 units

C - 2500 units

Solution:

Standard production per month = 2000 units

Piece work rate = Re. 0.50 per unit

$$\therefore \text{Guaranteed Time Rate} = \frac{2000}{0.50} = \text{Rs. 4000 per month}$$

Level of Efficiency:

Standard output per month = 2000 units

(100% efficiency)

A's actual production = 1000 units
1000

$$\text{A's level of efficiency} = \frac{1000}{2000} \times 100 = 50\%$$

B's actual production = 2000 units

$$\text{B's level of efficiency} = \frac{2000}{2000} \times 100 = 100\%$$

C's actual production = 2500 units

$$\text{C's level of efficiency} = \frac{2500}{2000} \times 100 = 125\%$$

Earnings;

Under Gantt's Task and Bonus Plan wages are computed as follows :

Output	Rate
Below Standard	- Guaranteed Time Wages
At Standard	- Given piece wages plus bonus of 20%
Above Standard	- High piece rate on worker's whole output

The earnings of the worker will be is follows :

A (50% below the standard)	= Rs. 4000 (Guaranteed monthly wages)
B (100% efficiency)	= 2000 units x Re. 0.30 per unit + Bonus of 20%
	Rs. 1000 + 20% of Rs. 1000
	Rs. 1000 + 200 = Rs. 1200
C (125% efficiency above standard)	= 2500 units x Re. 0.50 + Bonus of 20%
	Rs. 1250 + 20% of Rs, 1250
	= Rs. 1500

Bonus or Incentives Schemes

Incentive schemes of wage payment are also known as Premium Bonus Plans. introduced in order to increase production with ensuring proper industrial climate. Wage incentive plans may be of two types :(1) Individual Incentive Plans and (2) Group Incentive Plans. Under individual incentive plans, remuneration can be measured on the performance of the individual worker. In the case of the group incentive scheme earnings can be measured on the basis of the productivity of the group of workers or entire work force of the organization. Various types of incentive schemes are combinations of time and piece rate systems. The following are the important individual incentive plans discussed below:

- (i) **Halsey Premium Plan:** Under this method, the worker is given wages for the actual time taken and a bonus equal to half of wages for time saved. The standard time for doing each job or operation is fixed. In practice the bonus may vary from 33% to 66% of the wages of the time saved. Thus if S is the standard time, T the time taken, R the labour rate per hour, and % the percentage of the wages of time saved to be given as bonus, total earnings of the worker will be:

$$T \times R + 50\% (S - T) R$$

The Halsey-Weir Scheme: Under this system, the worker gets the bonus of 30% of the time saved instead of 50% of time saved under Halsey Plan. Except for this, Halsey Plan and Halsey-Weir Systems are similar in all other respects.

Illustration 5

Rate per hour = Rs.1.50 per hour

Time allowed for job = 20 hours

Time taken = 15 hours

Calculate the total earnings of the worker under the Halsey Plan. Also find out effective rate of earnings.

SOLUTION:

Standard time (S) = 20 hours

Time taken (T) = 15 hours

Rate per hour (R) = Rs.1.50 per hour

$$\begin{aligned}\text{Total Earnings} &= T \times R + 50\% (S-T) \times R \\ &= 15 \times \text{Rs. } 1.50 + \frac{50}{100} (20-15) \times \text{Rs. } 1.50 \\ &= \text{Rs. } 26.25\end{aligned}$$

Total wages for 15 hours = Rs.26.25

Therefore, effective rate of earning per hour

$$= \frac{\text{Total Wages}}{\text{Actual Time Taken}} = \frac{\text{Rs. } 26.25}{15} = \text{Rs. } 1.75$$

(The percentage of bonus is taken as 50% when not given)

The advantages of the Halsey Premium Plan are:

It is simple to understand and relatively simple to calculate.

- ❖ It guarantees time wages to workers.
- ❖ The wages of time saved are shared by both employers and workers, so it is helpful in reducing labour cost per unit.
- ❖ It motivates efficient workers to work more as there is increasing incentive to efficient workers.
- ❖ Fixed overhead cost per unit is reduced with increase in production.
- ❖ The employer is able to reduce cost of production by having reduction in labour cost and fixed overhead cost per unit. So, he is induced to provide the best possible equipment and working conditions.

Disadvantages

- ❖ Quality of work suffers because workers are in a hurry to save more and more time to get more and more bonus.
- ❖ Workers criticize this method on the ground that the employer gets a share of wages of the time saved.

ii) **Rowan Plan:** The difference between Halsey plan and Rowan Plan is the calculation of the bonus. Under this method also the workers are guaranteed the time wages but the bonus is that proportion of the wages of the time taken which the time saved bears to the standard time allowed.

$$\text{Total Earnings} = T \times R + \frac{S-T}{S} \times T \times R$$

Illustration 6:

A worker completes a job in a certain number of hours. The standard time allowed for the job is 10 hours, and the hourly rate of wages is Rs.1. The worker earns a 50% rate of bonus of Rs. 2 under Halsey Plan. Ascertain his total wages under the Rowan Premium Plan.

Solution: The worker earns Rs.2 as bonus at 50%; so total bonus at 100% should be Rs.4. The hourly rate of wages being Re.1, the time saved should be 4 hours.

Standard time allowed	10 hours
Less: Time Saved	4 hours
Time Taken	6 hours

Earnings under the Rowan Premium Plan

$$\text{Earnings} = T \times R + \frac{S-T}{S} \times T \times R$$

Where, T = 6 hours

$$S = 10 \text{ hours}$$

$$R = \text{Re.1 per hour}$$

$$\text{Earnings} = 6 \times 1 + \frac{10-6}{10} \times 6 \times 1$$

$$= 6 + \text{Rs.2.40} = \text{Rs.8.40}$$

Advantages

- ❖ It guarantees time wages to workers
- ❖ The quality of work does not suffer as they are not induced to rush through production as bonus increases at a decreasing rate at higher levels of efficiency.
- ❖ Labour cost per unit is reduced because wages of time saved are shared by employer and employee.
- ❖ Fixed overhead cost is reduced with increase in production.

Disadvantages

- ❖ The Rowan plan is criticized by workers on the ground that they do not get the full benefit of the time saved by them as they are paid bonus for a portion of the time saved.
- ❖ The Rowan plan suffers from another drawback that two workers, one very efficient and the other not so efficient, may get the same bonus.

Illustration 7

The finished shop of a company employs 60 direct workers. Each worker is paid Rs. 400 as wages per week of 40 hours. When necessary, overtime is worked up to a maximum of 15 hours per week per worker at time rate plus one-half as premium. The current output on an average is 6 units per man hour which may be regarded a standard output. If bonus scheme is introduced, it is expected that the output will increase to 8 units per man hour. The workers will, if necessary, continue to work overtime upto the specified limit although no premium on incentives will be paid.

The company is considering introduction of either Halsey Scheme or Rowan Scheme of wage incentive system. The budgeted weekly output is 19200 units. The selling price is Rs. 11 per unit and the direct material cost is Rs. 8 per unit. The variable overheads amount to Rs, 0,50 per direct labour hour and the fixed overhead is Rs. 9000 per week.

Prepare a statement to show the effect on the company's weekly profit of the proposal to introduce (a) Halsey Scheme, and (b) Rowan Scheme.

Solution:

Total hour 60 workers x 40 = 2400 hours

Output = 8 units per hour

$$\text{Hours required} = \frac{(2400 \times 8)}{8 \text{ hours}} = \frac{19200 \text{ units}}{8 \text{ hours}} = 2400 \text{ hours}$$

$$\text{Standard hours allowed} = \frac{19200 \text{ units}}{6 \text{ hours}} = 3200 \text{ hours}$$

Time Saved = 3200 - 2400 = 800 hours

$$\text{Rate per hour} \frac{\text{Rs. 400}}{40 \text{ hours}} = \text{Rs. 10}$$

Bonus

Halsey Scheme = 50% of Time Saved

Bonus = 50% of Time Saved

$$\frac{800}{2} = 400 \text{ hrs.} \times \text{Rs. 10} = \text{Rs. 4000}$$

Rowan Scheme

$$\text{Bonus} = \frac{\text{Time Saved}}{\text{Std.Hrs}} \times \text{Actual Hrs.} \times \text{Hourly Rate}$$

$$= \frac{800 \text{ hrs}}{3200 \text{ Hrs}} \times 2400 \text{ Hrs.} \times 10 = 6000$$

Particulars	Present RS.	Halsey Rs.	Rowan Rs.
Sales 19200 units x Rs.11	2,11,200	2,11,200	2,11,200
Direct Material (19200 units x Rs.8)	1,53,600	1,53,600	1,53,600
	32,000	24,000	24,000
$\frac{(19200 \text{ units} \times \text{Rs.8})}{6} = 3200 \text{ hrs} \times \text{Rs.10}$			
2400 hrs x Rs.10			
Overtime 800 hrs. x Rs.5	4,000		
Bonus	---	4,000	6,000
Variable overheads (3200 hrs x Rs. 0.50 2400 hrs x Rs. 0.50)	1,600	1,200	1,200
Fixed Overheads	9,000	9,000	9,000
	2,00,200	1,91,800	1,93,800
Profit	11,000	19,400	17,400

Bonus Payable

At 100% efficiency = 20% of time wages

Further increase of 1% in the bonus is given for every 1% increase in the efficiency,

\ For next 25% efficiency @ 1% for
each 1% increase in efficiency } = 25% of Time Wages

Total Bonus payable = 43% of Time Wages.

Earning

Time Wages for 8 hours @ Rs, 2-50 per hour = Rs, 20,

45

Add: 45% bonus of time wages = $\frac{45}{100} \times 20 = \text{Rs.}$

100

Total Earning = Rs. 20 + Rs. 9 = Rs. 29

iii) Emerson's Efficiency Sharing Plan: Under this plan, earning of a worker is by combining guaranteed day wages with a differential piece rate. Accordingly the level of efficiency is determined on the basis of establishment of standard task for a unit of time. If the level of worker's efficiency reaches 67% the bonus is paid to him at a normal rate. The rate of bonus increases in a given rate as the output increases from 67% to 100% efficiency. Above 100% efficiency, the bonus increases to 20% of the wage earned plus additional bonus of 1 % is added for each increase of 1 % in efficiency.

Illustration: 8

From the following particulars calculate total earnings of a worker under Emerson's Efficiency Sharing Plan :

Standard output per day of 8 hours U 16 units

Actual output of a worker for 8 hours is 20 units

Rate per hour is Rs, 2.50

Solution:

Calculation of earnings under Emerson's Sharing Plan :

$$\text{Level of performance} = \frac{\text{Actual Output}}{\text{Standard Output}} \times 100$$

$$\frac{20 \text{ units}}{16 \text{ units}} \times 100 = 125\%$$

iv) Barth Variable Sharing Plan:

This scheme introduced to attract newly recruited and skilled employees who are motivated to learn work. It provides sufficient incentives to inefficient workers who are motivated to increase productivity.

v) Bedaux Point Premium System:

This plan was introduced by Charles E. Bedaux in 1911. Under this plan, standard time fixed for each operation or job is expressed in terms of Bedaux point or 'S.' For example, a standard time of 360 B means the operation or job should be completed within 360 minutes. The chief advantage of this plan is that it can be applied to any kind of a job. Under this system, worker is paid at the time for actual hours worked, and 75% of the wages for the time saved are paid as bonus to the worker and 25% to the foremen, supervisors etc. The following is the formula for calculation of total wages of a worker:

$$\text{Total earnings} = S \times R + 75\% \text{ of } R (S - T)$$

vi) Accelerating Premium Bonus Plan:

Under this plan, bonus is determined on the basis of time saved unlike a fixed percentage under Halsey Plan and as a decreasing percentage under Rowan Plan. The bonus is paid to workers at an increased rate according to more and more time saved. This provides increasing incentives to efficient workers.

GROUP OR COLLECTIVE BONUS PLAN

The incentive schemes explained so far are applicable to individual performance depending directly on production. However, it is not the individual worker who produce the goods or services (operation) alone

but group of several other workers are required to jointly perform a single operation. It is, therefore, essential that a group incentive scheme be introduced. Bonus is calculated for a group incentive scheme. The bonus is calculated for a group of workers and the total amount is distributed among the group of workers on anyone of the following basis :

- (a) Equally by all the workers of the group.
- (b) Pro rata on the time rate basis.
- (c) Pre determined percentage basis.
- (d) Specified proportion basis.

Types of Group Incentive Plans

The following are the important types of group incentive bonus plans:

- (1) **Budgeted Expenses Bonus Plan:** Under this method, bonus is determined on the basis of savings in actual expenditure compared with total budgeted expenditure.
- (2) **Priest Man Bonus Plan:** Under this plan, standard performance is fixed by the management and committee of workers. The group of workers get bonus when actual performance exceeds the standard performance irrespective of individual's efficiency or inefficiency.
- (3) **Towne's Gain-sharing Plan:** Under this plan, bonus is calculated on the basis of savings in labour cost. The group of workers get bonus when actual costs is less than the standard costs, one-half of the savings is distributed among workers including foremen in proportion with the wages earned.
- (4) **Scanlon Plan:** Scanlon Plan is designed with the chief aim of reducing the cost of operations in order to increase the production efficiency. This plan is generally applicable in industries where the operation cost is high. Under this scheme, bonus is determined on the basis of standard costs or wages and percentage of the reduction in operation cost.

Indirect Monetary Incentives

Incentive schemes are regarded beneficial to both employers and workers. In this regard, under in direct monetary incentives by giving them a share of profit and introducing co-partnership schemes or as they have become partners in the business in order to make a very profitable enterprise.

Profit Sharing: Profit sharing and bonus is also known as Profit sharing bonus. Under this scheme, there is an agreement between the employer and employee by which employee receives a share, fixed in advance of the profits. Accordingly profit sharing bonus refers to the distribution of profit on the basis of a certain percentage of one's monthly earnings. The amount to be distributed depends on the profits earned by an enterprise. The proportion of the profits to be distributed among the employees is determined in advance.

Co-partnership: This system provides not only a worker to become partner in the business but also to share in the profits of the concern. There are different degrees of partnership and share of responsibilities allowed to the workers to take part in its control.

Non-Monetary Incentive Schemes: Under this system, employees are provided better facilities, instead of additional monetary payments. Some of the examples of non-monetary incentives are free education for children, rent free accommodation, medical facilities, canteen facilities, welfare facilities, and entertainment facilities etc.

Practical problems

1. From the following particulars, calculate the earnings of workers X and Y under Piece Rate System and Taylor's Differential piece rate system :

Standard time allowed = 10 units per hour

Normal time rate per hour = Re.1

Differential to be applied:

80% of piece rate when below standard

120% of piece rate at or above standard

In a day of 8 hours X produced 75 units and Y produced 100 units

[Ans : Earning of workers	X	Y
	Rs.	Rs.
Straight piece rate	7.5	10
Taylor's Differential Piece rate	6	12]

2. From the following particulars, calculate total earnings of the worker under Halsey Premium Plan :

Time allowed for job 20 hours

Time taken 15 hours

Rate per hour Rs. 1.50 per hour

[Ans: Total earning = Rs. 26.25]

3. From the following particulars, calculate total earnings of the worker under Rowan Plan:

Standard time 20 hours

Time taken 16 hours

Hourly rate Rs. 2 per hour

[Ans: Total earnings” Rs. 38.40]

4. A worker takes 9 hours to complete a job on daily wages and 6 hours on a scheme of payment by result. His daily rate is 75 paise an hour; the material cost of the product is Rs. 4 and the overheads are recovered at 150% of the total direct wages. Calculate the factory cost of the product under:

(a) Piece work plan; (b) Rowan plan; and (c) Halsey plan.

[Ans: Piece work plan Rs. 20.88

Rowan plan Rs. 19

Halsey plan Rs. 18.07]

5.(I) Calculate the earning of workers P & Q under:

(a) Straight piece rate system and

(b) Taylor's Differential piece rate system from the following details:

Standard time per unit = 12 units

Standard rate per hour = Rs. 60

Differential to be used 80% and 120%.

In a particular day if 8 hrs, worker P produced 30 units and worker Q produced 50 units

[Ans : Earnings under straight piece rate system.

Worker P - Rs. 360; Q - Rs. 600.

Earnings under Taylor's Differential piece rate system

Worker P - Rs. 288; Y - Rs. 720]

(II) Calculate the earnings of a worker under:

(a) Halsey premium plan and

(b) Rowan plan

Time allowed - 48 hours

Time taken - 40 hours

Rate per hour - Rs. I

[Ans : Halsey premium plan Rs. 44; Rowan Scheme Rs. 46.67]

UNIT IV

OVERHEADS

Factory, Administration, Selling and Distribution of overheads – Classification – Allocation and apportionment – Redistribution (Secondary Distribution) – Absorption of overheads including Machine Hour Rate.

4.0. Introduction

Cost related to a cost centre or cost unit may be divided into two i.e. Direct and Indirect cost. The Indirect cost is the overhead cost and is the total of indirect material cost, indirect labour cost, indirect expenses. CIMA defines indirect cost as “**expenditure on labour, materials or services which cannot be economically identified with a specific salable cost per unit**”. Indirect costs are those costs which are incurred for the benefit of a number of cost centers or cost units. So any expenditure over and above prime cost is known as overhead. It is also called ‘burden’, ‘supplementary costs’, ‘on costs’, ‘indirect expenses’.

4.1 Classification of Overheads

In order to have a proper accounting and control, careful classification of overheads is necessary.

Overhead can be classified as –

(a) Classification of overhead by elements or nature of expense. All overhead expenses can be classified element wise into indirect material, indirect labour and indirect expenses, as well as by nature of expense, e.g. consumable stores, repair-parts, salaries, maintenance, depreciation, etc. Even when overheads are classified functionally, the expenses are classified in the same order within each group as will be indicated below.

(b) Classification of overhead by functions. A manufacturing organisation is normally divided into various functional divisions, such as manufacturing, selling, administration, etc. Overhead expenses relating to each of the functional divisions can be grouped as –

- (i) Manufacturing or production or factory overhead,
- (ii) Administration overhead,
- (iii) Selling overhead,
- (iv) Distribution overhead, and
- (v) Research and development overhead.

Manufacturing overheads is the total indirect costs associated with manufacturing activities, the sequence of which begins with the procurement of materials and ends with the primary packing of the product. Examples are as follows: indirect materials such as lubricants, cotton waste, and other factory supplies, direct materials of small individual value, repair parts, wages of indirect workers, supervisory salaries, salaries and wages relating to service cost centres, canteen and other welfare expenses, factory rent, rates, lighting and heating, power and fuel, depreciation of factory building, depreciation of plant and machinery and other equipments, expenses connected with the administration of factory.

Administration overheads is the total costs of formulating the policy, directing the organisation and controlling the operations of an undertaking which is not directly related to production, selling, distribution,

research or development activity or function. Examples of such expenses are as follows: Office supplies, printing and stationery, salaries to office staff, directors remuneration, office rent and rates, office lighting, heating and air conditioning, postage, telephone & courier service, depreciation, repair and maintenance of office building, equipments, furniture and office machines, audit fees, legal charges, bank charges and interest.

Selling overhead refers to those expenses which are associated with the marketing and selling activities. For example: Salaries and commission of salesmen, selling agents, etc. Travelling expenses, sales office expenses Advertisement and publicity Market research, Bad debts, Brokerage.

Distribution overhead relates to total indirect cost associated with the distribution of finished products, beginning with the primary packed product available for dispatch and ending with making reconditioned returnable empty container, if any, available for reuse. Examples are: Secondary packing materials. Packing charges, Salaries and wages of distribution staff, Carriage and freight outwards, Warehousing charges, insurance, Depreciation, repairs and maintenance, insurance and cost of operating distribution vehicles.

Research and development overhead is the total indirect costs incurred for the research and development activities undertaken by the organisation for the development of new products, improvement of existing products, substitution of material and methods, etc.

If the total cost is not very sizeable and significant, it is often merged with manufacturing or administrative overheads.

(c) Classification of overhead according to their behaviour with changes in the volume of production.

Some of the overhead expenses tend to vary with the change in the level of activity or production, while some tend to remain practically unaltered whatever may be the volume of output. Some of the expenses remain partly variable with the production and partly unchanged with the change in activity. Overheads can therefore, be classified into —

- i) Fixed overhead,
- ii) Variable overhead,
- iii) Semi-fixed or semi-variable overhead.

The above classification is extremely important for cost control and decision making.

(i) Fixed overhead. This represents overhead expenses which tend to remain unaffected by the fluctuations in the volume of production or sale within a relevant range and during a defined period of time. Examples are rent, rates, insurance, executive salaries, audit fees, etc. Fixed cost is also termed as period cost or policy cost, since most of the expenses are incurred over a period of time and arising out of the policy of the management. Fixed overheads remain unchanged within a relevant range of activity, because if the activity exceeds or recedes the range, expenses on certain items of fixed overheads may increase or decrease. Again, fixed overheads change with the change in price levels. For example, prices of indirect materials, executive and supervisory salaries, insurance premium, power tariff, etc. may change over a period of time, resulting in the change of fixed overheads. However, such changes do not occur in a short period, say, one year. Hence, fixed overheads are said to remain fixed within a short period of time. Total fixed overheads remain unchanged with the increase or decrease of output in a short period, but the fixed overhead cost per unit changes with the change in the activity level.

(ii) Variable overhead. Variable overhead expenses tend to follow (in the short run) the level of activity. The variation may not always be in the same proportion as the production or sales volume changes, but, by and large, there is a linear relationship between the variable overheads and output. Examples of variable overheads are indirect material, indirect labour, power and fuel, lighting and heating expenses, salesmen's commission, etc. Although the amount of variable overhead changes, the cost per unit of output tends to remain constant at different levels of output. This is, again, true only within a limited range of output.

(iii) Semi-fixed or semi-variable overheads. This represents partly fixed and partly variable overhead. There are certain expenses which neither remain fixed for all levels of activity nor vary in sympathy with the change of output. For example, repairs and maintenance expenses remain fixed, if production does not fluctuate widely. But if production increases beyond the relevant range, additional expenditure on maintenance may be necessary, which may not vary directly with production. There could be expenses, like telephone charges, where there is a fixed charge as rental, and variable charge per unit for actual number of calls. There are still another type of expenses which increases in steps. That is, it remains constant upto a level, and then jumps and remains constant upto the next level Supervisory salary is the most appropriate example of step cost. Suppose, three supervisors are managing 30 workers, and six more workers are added to cope up with additional production. A fourth supervisor has to be recruited, and he will be able to cover further recruitment of 4 workers. Supervisory salary will increase but shall remain constant upto a limit of 40 workers.

4.2 Allocation and Apportionment of Overhead to Cost Centres (Departmentalisation of Overhead)

When all the items are collected properly under suitable account headings, the next step is allocation and apportionment of such expenses to cost centres. This is also known as departmentalization or primary distribution of overhead.

A factory is administratively divided into different departments like Manufacturing or Producing department, Service department, partly producing departments.

Allocation of Overhead Expenses

Allocation is the process of identification of overheads with cost centres. An expense which is directly identifiable with a specific cost centre is allocated to that centre. Thus it is allotment of a whole item of cost to a cost centre or cost unit. For example the total overtime wages of workers of a department should be charged to that department. The electricity charges of a department if separate meters are there should be charged to that particular department only.

Apportionment of Overhead Expenses

Cost apportionment is the allotment of proportions of cost to cost centres or cost units. If a cost is incurred for two or more divisions or departments then it is to be apportioned to the different departments on the basis of benefit received by them. Common items of overheads are rent and rates, depreciation, repairs and maintenance, lighting, works manager's salary etc.

Basis of Apportionment

Suitable bases have to be found out for apportioning the items of overhead cost to production and service departments and then for reapportionment of service departments costs to other service and production departments. The basis selected should be correlated to the expenses and the expense should be measurable by the basis. This process of distribution of common expenses over the departments on some equitable basis is known as 'Primary Distribution'.

The following are the main bases of overhead apportionment utilized in manufacturing concerns:

Direct Allocation. Under direct allocation, overheads are directly allocated to the department for which it is incurred. Example overtime premium of workers engaged in a particular department, power, repairs of a particular department etc.

- (i) **Direct Labour/Machine Hours.** Under this basis, overhead expenses are distributed to various departments in the ratio of total number of labour or machine hours worked in each department. Majority of general overhead items are apportioned on this basis.
- (ii) **Value of materials passing through cost centres.** This basis is adopted for expenses associated with material such as material handling expenses.
- (iii) **Direct wages.** Expenses which are booked with the amounts of wages eg:-worker's insurance, their contribution to provident fund, worker's compensation etc. are distributed amongst the departments in the ratio of wages.

BASIS FOR APPORTIONMENT OF OVERHEADS:

EXPENSES	BASIS
Factory Rent, Rates and Taxes	Floor area (area occupied) / Sq. meters
Factory lighting or electricity	Light point / Floor area
Power	House power / K.W.H
Depreciation on plant and machinery	Value of P&M / machine hours
Repairs on asset, Insurance on assets (P&M)	Value of asset
Insurance on stock	Value of stock
Insurance on buildings	Value of buildings / floor area
Indirect material	Direct material
Indirect wages	Direct wages
Transport expenses	Value of materials
Supervision expenses, Labour welfare expenses	No of Employees
Canteen expenses, Time keeping expenses	“
Staff recreation	“
Contribution to provident fund	Wages / No of Employees
Employees insurance	Wages / No of Employees
Stores overheads, Materials handling charges	Value of direct materials
Sundry expenses	Direct wages/ Labour hours/machine hours.

Illustration 1: The Modern Company is divided into four departments: A, B and C are producing departments, and D is a service departments. The actual costs for a period are as follows:

Rent	Rs.1000	Repairs to Plant
Rs.600	Rs.500	Rs.900
Rs.150		
Supervision	Rs.1500	Fire Insurance in respect of Stock
Depreciation of Plant	Rs.450	Power
Light	Rs.120	Employers' liability for insurance

The following information is available in respect of the four departments;

	Dept.A	Dept.B	Dept.C	Dept.D
Area (sq.mtrs)	1,500	1,100	900	500
Number of Employees		2015	10	5
Total Wages (Rs.)	6,000	4,000	3,000	2,000
Value of Plant (Rs.)	24,000	18,000	12,000	6,000
Value of stock (Rs.)	15,000	9,000	6,000	-
H.P. of Plant		2418	12	6

Apportion the costs to the various departments on the most equitable basis.

SOLUTION

OVERHEADS DISTRIBUTION SUMMARY

Items	Basis of Apportionment	Total Amount	Product Departments			Service Department D
			A	B	C	
		Rs.	Rs.	Rs.	Rs.	Rs.
Rent	Floor Area	1,000	375	275	225	125
Supervision	No. of Employees	1,500	600	450	300	150
Depreciation	Plant Value	450	180	135	90	45
Light	Floor area	120	45	33	27	15
Repairs to Plant	Plant Value	600	240	180	120	60
Fire Insurance	Stock Value	500	250	150	100	-
Power	HP. Of Plant	900	360	270	180	90
Employer's Liability	No. of Employees	150	60	45	30	15
Total		5,220	2,110	1,538	1,072	500

Re-apportionment of Service Department Costs to Production Departments

Service department costs are to be reapportioned to the production departments or the cost centres where production is going on. This process of re-apportionment of overhead expenses is known as 'Service Distribution'. The following is a list of the bases of apportionment which may be accepted for the service departments noted against

Service Department Cost	Basis of Apportionment
1. Maintenance Department	- Hours worked for each department
2. Payroll or time-keeping department	- Total labour or Machine hours or number of employees in each department
3. Store keeping department	- No. of requisitions or value of materials of each department.
4. Employment or Personnel department	- Rate of labour turnover or number of employees in each department.
5. Purchase Department	- No. of purchase orders or value of materials
6. Welfare, ambulance, canteen service, recreation room expenses.	- No. of employees in each department.
7. Building service department	- Relative area in each department
8. Internal transport service or overhead crane service	- Weight, value graded product handled, weight and distance travelled.
9. Transport Department	- crane hours, truck hours, truck mileage, truck tonnage, truck tonne-hours, tonnage handled, number of packages.
10. Power House (Electric power cost)	- wattage, horse power, horse power machine hours, number of electric points etc.

The following are the various methods of re-distribution of service department costs to production departments.

- ❖ Direct re-distribution method
- ❖ Step distribution method
- ❖ Reciprocal Services method
 - a. Simultaneous Equation Method
 - b. Repeated Distribution Method
 - c. Trial and Error Method

Direct re-distribution method

Under this method, the costs of service departments are directly apportioned to production departments without taking into consideration any service from one service department to another service department. Thus, proper apportionment cannot be done on the assumption that service departments do not serve each other and as a result the production departments may either be overcharged or undercharged. The share of each service department cannot be ascertained accurately for control purposes. Budget for each department cannot be prepared thoroughly. Therefore, Department Overhead rates cannot be ascertained correctly.

Illustration 2: In an Engineering factory, the following particulars have been collected for the three months' period ended on 31st March, 2007. You are required to prepare Production Overheads

Distribution Summary showing clearly the basis of apportionment where necessary.

		Production Departments			Service Departments	
		A	B	C	D	E
Direct Wages	Rs.	2000	3000	4000	1000	2000
Direct Material	Rs.	1000	2000	2000	1500	1500
Staff	Nos.	100	150	150	50	50
Electricity	Kwh.	4000	3000	2000	1000	1000
Light Points	No.	10	16	4	6	4
Asset Value	Rs.	60,000	40,000	30,000	10,000	10000
Area Occupied	Sq.m.	150	250	50	50	50

The expenses for the period were:

Motive power Rs.550; Lighting Power Rs.100; Stores Overheads Rs.400; Amenities to Staff Rs.1500; Depreciation Rs.15,000; Repairs and Maintenance Rs.3,000; General Overheads Rs.6000; and Rent and Taxes Rs. 275.

Apportion the expenses of service department E in proportion of 3:3:4 and those of service department D in the ratio of 3:1:1 to departments A, B and C respectively.

SOLUTION

PRODUCTION OVERHADS DISTRIBUTION SUMMARY

For the quarter ending 31st March, 2007

	Production Departments			Service Departments		Total Rs.
	A Rs.	B Rs.	C Rs.	D Rs.	E Rs.	
Direct Wages				1000	2000	3000
Direct Materials				1500	1500	3000
Motive Power @ 5p.per Kwh	200	150	100	50	50	550
Lighting Power @ Rs.2.50per Point	25	40	10	15	10	100
Stores Overhead @ 5% of Direct Material	50	100	100	75	75	400
Amenities to staff @ Rs.3 per employee	300	450	450	150	150	1500
Depreciation @ 10% of the value of asset.	6000	4000	3000	1000	1000	15000
Repairs and maintenance @ 2% of value	1200	800	600	200	200	3000
General Overheads @ 50% of Direct Wages	1000	1500	2000	500	1000	6000
Rent and Taxes @Re.0.50 per sq.meter	75	125	25	25	25	275
Total	8,850	7,165	6,285	4,515	6,010	32,825
Dept. E (3: 3 : 4)	1,803	1,803	2,404		(6,010)	
Dept. D (3 : 1 : 1)	2,709	903	903	(4,515)		
Total	13,362	9,871	9,592			32,825

Step Distribution Method

Under 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 goes on till the cost of the last service department is apportioned. Thus, the cost of last service department is apportioned only to production departments.

Illustration 3:

A manufacturing company has two Production Departments, P1 and P2 and three Service Departments, Time-keeping, Stores and Maintenance. The Departmental Summary showed the following expenses for July, 2007 .

Production Departments		Service Departments		
P1	P2	S1	S2	S3
		(Time-keeping)	(Stores)	(Maintenance)
Rs.	Rs.	Rs.	Rs.	Rs.
16,000	10,000	4,000	5,000	3,000

The other information relating to departments were:

	Service Departments			Production Departments	
	S1 (Time-keeping)	S2 (Stores)	S3 (Maintenance)	P1	P2
No. of Employees	-	20	10	40	30
No. of Stores requisitions	-	-	6	24	20
Machine Hours	-	-	-	2400	1600

Department	As per Primary Distribution System				
S1 (Time-keeping)	4000	(-) 4000			
S2 Stores	5000	800	(-) 5800		
S3 Maintenance	3000	400	696	(-) 4096	
P1	16000	1600	2784	2458	22,842
P2	10000	1200	2320	1638	15,158
	38,000				38,000

Note: basis of apportionment

- (a) Time-keeping – No. of employees (ie. 2:1:4:3)
- (b) Stores – No. of stores requisitions (ie. 3:12:10)
- (c) Maintenance- Machine Hours (ie. 3:2)

The most important limitation of this method is that the cost of one service centre to other service cost centres is ignored and thus the cost of individual cost centres are not truly reflected.

Reciprocal Services Method

In order to avoid the limitation of Step Method, this method is adopted. This method recognizes the fact that if a given department receives service from another department, the department receiving such service should be charged. If two departments provide service to each other, each department should be charged for the cost of services rendered by the other. There are three methods available for dealing with inter-service departmental transfer:

- a. Simultaneous Equation Method
- b. Repeated Distribution Method
- c. Trial and Error Method

(a) Simultaneous Equation method

Under this method, the true cost of the service departments are ascertained first with the help of simultaneous equations; these are then redistributed to production departments on the basis of given percentage. The following illustration may be taken to discuss the application of this method.

Illustration 4:

A company has three production departments and two service departments, and for a period the departmental distribution summary has the following totals.

	Rs.
Production Departments	
P1- Rs. 800; P2- Rs. 700; P3- Rs.500	2000
Service Departments:	
S1 –Rs. 234; S2- Rs.300	534
	2534

The expenses of the service departments are charged out on a percentage basis as follows;

	P1	P2	P3	S1	S2
Service Department S1	20%	40%	30%	-	10%
Service Department S2	40%	20%	20%	20%	-

Prepare a statement showing the apportionment of two service departments expenses to production departments by Simultaneous Equation Method.

SOLUTION:

By Simultaneous Equation Method

Let x = total overheads of department S1

y = total overheads of department S2

Then,

$$x = \text{Rs.}234 + .2y$$

$$y = \text{Rs.}300 + .1x$$

Rearranging and multiplying to eliminate decimals;

$$10x - 2y = \text{Rs.}2,340 \dots\dots\dots(1)$$

$$-x + 10y = \text{Rs.}3,000 \dots\dots\dots(2)$$

Multiplying equation (1) by 5 and add result to (2), we get $49x = \text{Rs.}14,700$

$$x = \text{Rs.}300$$

Substituting this value in equation (1), we get

$$y = \text{Rs.}330$$

All that now remains to be done is to take these values $x = \text{Rs.}300$ and $y = \text{Rs.}330$ and apportion them on the basis of the agreed percentage to the three production departments; thus:

	Total	P 1	P 2	P 3
Per distribution summary	2,000	800	700	500
Service department S1	270	60	120	90
Service department S2	264	132	66	66
	2,534	992	886	656

This method is recommended in more than two service departments if the data is processed with computers and in two service departments only where the data is processed manually.

(b) Repeated Distribution Method

Under this method, the totals are shown in the departmental distribution summary, are put out in a line, and then the service department totals are exhausted in turn repeatedly according to the agreed percentages until the figures become too small to matter.

By solving illustration 4 by Repeated Distribution Method, we get the Secondary

Distribution Summary which is given as follows:

SECONDARY DISTRIBUTION SUMMARY

	P1	P2	P3	P3	S1	S2
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
As per summary	800	700	500	234	300	800
Service department S1	47	94	70	(234)	23	47
Service Department S2	129	65	65	64	(323)	129
Service department S1	14	25	19	(64)	6	14
Service department S2	2	2	2		(6)	2
	992	886	656	-	-	992

(c) Trial and Error Method

Under this method, the cost of one service department is apportioned to another centre. The cost of another centre plus the share received from the first centre is again apportioned to the first cost centre and this process is repeated till the balancing figure becomes negligible.

By solving illustration 4 by Trial and Error Method, we get the following:

	Service Departments	
	S1	S2
	Rs.	Rs.
Original apportionment	234	300
	(23)	23 (10% of 234)
	65 (20% of 323)	(323)
	(65)	7 (10% of 65)
	1 (20% of 7)	(7)
Total of positive figures	300	330

ABSORPTION OF OVERHEAD

Absorption means the distribution of the overhead expenses allotted to a particular department over the units produced in that department. Overhead absorption is accomplished by overhead rates.

Methods of Absorption of Manufacturing Overhead

The following are the main methods of absorption of manufacturing or factory overheads.

(a) **Direct Material Cost Method.** Under this method percentage of factory expenses to value of direct materials consumed in production is calculated to absorb manufacturing overheads.

The formula is $\text{Overhead Rate} = \frac{\text{Production Overhead Expenses (Budgeted)}}{\text{Anticipated Direct Material Cost}}$

Anticipated Direct Material Cost

If in a factory the anticipated cost of direct material is Rs. 4,00,000 and the over head budgeted expenses are Rs. 1,00,000, then the overhead rate will be 25% ie. (Rs.1,00,000 ÷ Rs.4,00,000) of the materials used. It is assumed that relationship between materials and factory expenses will not change. This method is simple and can be adopted under 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 ie. Only one kind of article is produced.

(b) Direct Labour Cost (or Direct Wages) Method. This is a simple and easy method and widely used in most of the concerns. The overhead rate is calculated as under:

$$\text{Overhead Rate} = \frac{\text{Production Overhead Expenses}}{\text{Direct Labour Cost}}$$

Direct Labour Cost

If from past experience, the percentage of factory expenses to direct wages is 50%, then the factory expenses in the next year is taken as 50% of the direct wages.

This method is suitable under the following situations:

- (i) Where direct labour constitutes a major proportion of the total cost of production.
- (ii) Where production is uniform.
- (iii) Where labour employed and types of work performed are uniform.
- (iv) Where the ratio of skilled and unskilled labour is constant.
- (v) Where there are no variations in the rates of pay ie., the rates of pay and the methods are the same for the majority of the workers in the concern.

In some concerns a separate rate is calculated for the fringe benefits and applied on the basis of direct labour cost.

(c) Prime Cost Method. Under this method the recovery rate is calculated dividing the budgeted overhead expenses by the aggregate of direct materials and direct labour cost of all the products of a cost centre. The formula is

$$\text{Overhead Recovery Rate} = \frac{\text{Production Budgeted Overhead Expenses}}{\text{Anticipated Direct Materials and Direct Labour Cost}}$$

Suppose if the budgeted overheads are Rs.50,000 and the estimated values of direct materials and direct labour are Rs.30,000 and Rs.20,000, then overhead recovery rate will be 100%

i.e., $\frac{50000}{30000+20000} \times 100$.

$$\frac{50000}{30000+20000} \times 100$$

(d) Direct Labour (or Production) Hour Method. This rate is obtained by dividing the overhead expenses by the aggregate of the productive hours of direct workers.

The formula is $\text{Overhead rate} = \frac{\text{Production Overhead Expenses}}{\text{Direct Labour Hours}}$

Direct Labour Hours

In a particular period the overhead expenses are Rs.50,000 and direct labour hours are 1,00,000, then overhead labour rate will be Re.0.50 (i.e., Rs.50,000 ÷ 1,00,000).

This rate is suitable where:

- (i) The production is done using more of labour and less technology is used.
- (ii) It is desired to taken into consideration the time factor.
- (iii) The rate may not be affected by the method of wage payment or the grade or the rate of workers.

Illustration 5 :From the following particulars find out “Direct Labour Rate”.

(a) Total number of labourers working in the department.	400
(b) Total working days in a year	300
(c) Number of working hours per day	8
(d) Total departmental overheads per year	Rs.1,82,400
(e) Normal idle time allowed.	5%

SOLUTION:

CALCULATION OF DIRECT LABOUR RATE FOR DEPARTMENTAL OVERHEADS

Total working days in a year	300
Number of working hours per day	8
Total working hours available per worker per year	2,400
	(300 x 8)
Less: normal idle time allowed (5% of 2,400hrs)	120
Effective working hours per worker per year (2400-120)	2,280
Number of workers working in the department	400
Total effective working hours in the department(2280 x 400)	9,12,000
Total departmental overheads per year	Rs.1,82,000
Direct Labour Rate for absorption of overheads per hour	Re.0.20
(Rs.182,400÷9,12,000hr s=Rs.0.20)	

(e)Machine Hour Rate. Machine hour rate is the cost of running a machine per hour. It is oneof the methods of absorbing factory expenses to production. 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 depends on the actual circumstances of the individual case.

In respect of departments or operations, in which machines predominate and the operators perform a 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 semi-automatic 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:

$$\text{Machine hour rate} = \frac{\text{Amount of overheads}}{\text{Machine hours during a given period}}$$

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 machines expenses rates will give the ordinary machine hour rate.

Some of the bases which may be adopted for apportioning the different expenses for the purpose of calculation of machine hour rate are given below.

Some of the expenses and the basis of apportionment are given below.

- i. Rent and Rates - Floor area occupied by each machine including the surrounding space.
- ii. Heating and Lighting - The number of points used plus cost of special lighting or heating for any individual machine, alternatively according to floor area occupied by each machine.
- iii. Supervision – estimated time devoted by the supervisory staff to each machine.
- iv. Lubricating Oil and Consumable Stores – On the basis of past experience.
- v. Insurance – Insurable value of each machine
- vi. Miscellaneous Expenses – Equitable basis depending upon facts.

Machine Expenses

- ❖ Depreciation – cost of machine including cost of stand-by equipment such as spare motors, switchgears etc., less residual value spread over its working life.
- ❖ Power – Actual consumption as shown by meter readings or estimated consumption ascertained from past experience.
- ❖ Repairs – Cost of repairs spread over its working life.

Particulars	Rs	Rs
I-Fixed Charges:	Xxx	
Rent, rates and taxes	Xxx	
Supervisor salary	Xxx	
Wages of operator	Xxx	
Electricity and	Xxx	Xxx
Any other fixed expenses	Xxx	
Total Fixed Cost:	Xxx	
Fixed Cost Per Hour = $\frac{\text{Total Fixed Cost}}{\text{Total machine hours}}$		Xxx
		Xxx
II- Variable Charges:	Xxx	
Repairs and maintenance	Xxx	
Oil, petrol, diesel etc.,	Xxx	
Depreciation (Cost + Installation – Scrap/No of Yrs)	Xxx	
Amount		
Dep.(per hour) = $\frac{\text{M.H.R}}{\text{M.H.R}}$		
Any other variable expenses		
Machine Hour Rate (MHR)		

NOTE: If direct materials and direct wages are given for production departments it should not be taken into account. If direct materials and direct wages are given for service department, it will be shown in the service department column.

Illustration 6:

Calculate machine hour rate of Machine X

	Rs.
Consumable stores	600
Repairs	800
Heat and Light	360
Rent	1,200
Insurance of building	4,800
Insurance of machines	800
Depreciation of machines	700
Room service	60
General charges	90
Normal working hours	10,000 hours
Area of Sq. ft.	100
Book value of machine	12,000

Solution:

Computation of Machine Hour Rate for Machine X

Particulars	Total per hour Rs.	Rate per hour Rs.
Standing Charges:		
Consumable stores	600	
Heat and Light(360 x 100 / 600)	60	
Rent (1200 x 100 / 600)	200	
Insurance of building(4800 x 100 / 600)	800	
Insurance of machines(800 x 12000 / 32000)	300	
Room service(60 x 100 / 600)	10	
General charges(90 x 100 x 600)	15	
Total Standing Charges	1,985	
Standing Charges per hour (1.985 / 10,000)		0.199
Machine Expenses:		
Repairs (800 / 10,000)		0.080
Depreciation of machine(135.48 / 10,000)		0.014
Machine Hour Rate		0.293

Working Notes:

- (1) Heat and light, rent, insurance of building, room service and general charges have been distributed on the basis of floor area.
- (2) Depreciation of machine has been calculated on the basis of book value of machines and working hours, i.e. $10,000 \times 12,000$ (or) $120 : 500 = 6 : 25$
 $700 \times 6 / 31 = \text{Rs.}135.48$
- (3) Insurance of machine has been apportioned on the basis of book value of machine

Illustration 7

Additional Information

Particular	Machine A	Machine B	Machine C
Direct wages	Rs.1,200	2,400	2,400
Power units	30,000	10,000	20,000
No.of workers	4	8	8
Light points	8	24	48
Space	400 sq.ft.	800 sq.ft.	800 sq.ft.
Cost of Machine	Rs.3,00,000	Rs.1,20,000	Rs.1,80,000
Hours worked	200	300	300

Solution:**Computation of Machine Hours Rate**

Expenses	Basis	Total	Machine A	Machine B	Machine C
Depreciation on Machinery	Machine value	12,000	6,000	2,400	3,600
Depreciation on Building	Space	2,880	576	1,152	1,152
Machine Repairs	Machine Value	4,000	2,000	800	1,200
Insurance	-do-	800	400	160	240
Indirect Wages	No. of workers	6,000	1,200	2,400	2,400
Power	Power units	6,000	3,000	1,000	2,000
Lighting	Light points	800	80	240	480
Miscellaneous Expenses	Direct wages	4,200	840	1,680	1,680
Total		36,680	14,096	9,832	12,752

Hours worked	200	300	300
Machine hour rate	Rs.70.48	32.77	42.51

Working Notes:

Basis:

Direct wages = 12 : 24 : 24 or 1 : 2 : 2

Power Units = 3 : 1 : 2

Cost of machine = 30 : 12 : 18

Space = 1 : 2 : 2

Hours worked = 2 : 3 : 3

Light points = 1 : 3 : 6

No. of workers = 1 : 2 : 2

A department is having 3 machines. The figures indicate the departmental expenses. Calculate the machine hour rate in respect of these machine from the information give below:

	Rs.
Depreciation of machinery	12,000
Depreciation of building	2,880
Repairs machinery	4,000
Insurance of machinery	800
Indirect wages	6,000
Power	6,000
Lighting	800
Miscellaneous Expenditure	4,200
	36,680

f. Rate Per Unit of Production. This method is simple, direct and easy. It is suitable for mining and other extractive industries, foundries and brick laying industries, where the output is measured in convenient physical units like number, weight, volume etc. the rate is calculated as under:

$$\text{Overhead Rate} = \frac{\text{Overhead expenses (budgeted)}}{\text{Budgeted production}}$$

For example, if the overhead expenses (budgeted) are Rs. 30,000 and the budgeted production is 10,000 tonnes, then overhead rate according to this method will be Rs. 3 per tonne.

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, qualities or grades of the same product. If more than one item are produced, then it is essential to express dissimilar units against a common denominator on weightage or point basis.

(g) Sale Price Method: Under this method, budgeted overhead expenses are divided by the sale price of units of production in order to calculate the overhead recovery rate. The formula is sale price of units of production in order to calculate the overhead recovery rate, the formula is

$$\text{Overhead Recovery Rate} = \frac{\text{Budgeted overhead expenses}}{\text{Sale value of units of production}}$$

The method is more suitable for apportioning of administration, selling and distribution, research, development and design costs of products. It can also be used with advantage for the appropriation of joint products costs.

Practical Problems:

1. Compute main hour rate from the following data :

Cost of machine Rs. 1,10,000

Installation charges Rs. 10,000

Estimated scrap value (after 15 years) Rs. 5000

Rent and rates for the shop Rs. 200 P.M.

General lighting for the shop Rs. 300 P.M.

Insurance premium for the machine Rs. 960 P.a.

Repairs and maintenance Rs. 1000 P.a.

Power consumption 10 units per hour

Rate of power per 100 units Rs. 20

Estimated working hours per annum 2200 which include setting up time of 200 hours.

Shop supervisor's salary per month Rs. 600

The machine occupies 1/4 of the total area of the shop. The shop supervisor is expected to devote 1/5th of his time for supervising the machine.

[Ans : Machine hour rate: Rs.7.95]

2. Calculate the machine hour rate from the following information:

Cost of the machine Rs. 19,200

Estimated scrap value Rs. 1,200

Average repairs and maintenance Rs. 150p.m.

Standing charges allocated Rs. 50p.m.

Effective working life of the machine 10,000 hours

Running time per month 166 hours

Power used by machine

5 units per hour at the rate of 19 paise per unit

[Ans : Machine hour rate = Rs. 3.95]

UNIT –V

MAGINAL COSTING

The concept – Break Even Analysis – Break Even Chart – Importance and Assumptions – Application of Profit Volume Ratio – Different types of Problems(Special emphasis on decision making problems) – Budget and Budgetary control : Procedure and Utility – Preparation of Different types of budget including Flexible budget.

Marginal costing is a technique of costing. This technique of costing uses the concept 'marginal cost'. Marginal cost is the change in the total cost of production as a result of change in the production by one unit. Thus marginal cost is nothing but variable cost. In marginal costing technique only variable costs are considered while calculating the cost of the product, while fixed costs are charged against the revenue of the period. The revenue arising from the excess of sales over variable costs is known as 'contribution'. Using contribution as a vital tool, marginal costing helps to a great extent in the managerial decision making process. This unit deals with the various aspects of marginal costing.

5.1 Absorption Costing

In absorption costing the classification of expenses is based on functional basis whereas in marginal costing it is based on the nature of expenses. In absorption costing, the fixed expenses are distributed over products on absorption costing basis that is, based on a pre-determined level of output. Since fixed expenses are constant, such a method of recovery will lead to over or under-recovery of expenses depending on the actual output being greater or lesser than the estimate used for recovery. This difficulty will not arise in marginal costing because the contribution is used as a fund for meeting fixed expenses.

The presentation of information to management under the two costing techniques is as under:

Income Statement (Absorption costing)		
Sales		XXXXX
Production Costs:		
Direct material consumed		XXXXX
Direct labour cost		XXXXX
Variable manufacturing overhead		XXXXX
Fixed manufacturing overhead		<u>XXXXX</u>
Cost of Production		XXXXX
Add: Opening stock of finished goods		<u>XXXXX</u>
(Value at cost of previous period's production)		
		XXXXX
Less: Closing stock of finished goods		XXXXX
(Value at production cost of current period)		
Cost of Goods Sold		XXXXX
Add: (or less) Under (or over) absorption of fixed		
Manufacturing overhead		XXXXX
Add: Selling and distribution costs	XXXXX	
Administration costs	<u>XXXXX</u>	<u>XXXXX</u>
Total Cost		XXXXX
Profit (Sales – Total cost)		XXXXX
Income Statement (Marginal costing)		

Sales		<u>XXXXX</u>
Variable manufacturing costs:		
– Direct material consumed		XXXXX
– Direct labour		XXXXX
– Variable manufacturing overhead		<u>XXXXX</u>
Cost of Goods Produced		XXXXX
Add: Opening stock of finished goods (Value at cost of previous period)		XXXXX
Less: Closing stock of finished goods (Value at current variable cost)		
Cost of Goods Sold		XXXXX
Add: Variable adm., selling and dist. overhead		XXXXX
Total Variable Cost	XXXXX	
Add: Selling and distribution costs		
Contribution (Sales – Total variable costs)	XXXXX	
Less: Fixed costs (Production, adm., selling and dist.)	<u>XXXXX</u>	
Net Profit	XXXXX	

It is evident from the above that under marginal costing technique the contributions of various products are pooled together and the fixed overheads are met out of such total contribution. The total contribution is also known as gross margin. The contribution minus fixed expenses yields net profit. In absorption costing technique cost includes fixed overheads as well.

The main points of distinction between marginal costing and absorption costing are as below:

Marginal costing	Absorption costing
1. Only variable costs are considered for product costing and inventory valuation.	Both fixed and variable costs are considered for product costing and inventory valuation.
2. Fixed costs are regarded as period costs. The Profitability of different products is judged by their P/V ratio.	Fixed costs are charged to the cost of production. Each product bears a reasonable share of fixed cost and thus the profitability of a product is influenced by the apportionment of fixed costs.
3. Cost data presented highlight the total contribution of each product.	Cost data are presented in conventional pattern. Net profit of each product is determined after subtracting fixed cost along with their variable costs.
4. The difference in the magnitude of opening stock and closing stock does not affect the unit cost of production.	The difference in the magnitude of opening stock and closing stock affects the unit cost of production due to the impact of related fixed cost.
5. In case of marginal costing the cost per unit remains the same, irrespective of the production as it is valued at variable cost	In case of absorption costing the cost per unit reduces, as the production increases it is fixed cost which reduces, whereas, the variable cost remains the same per unit.

5.2 Various Elements of Marginal Costing

According to the institute of cost and management accountants (ICMA), London, marginal cost is 'the amount at any given volume of output by which aggregate costs are changed if the volume of output is increased or decreased by one unit'. Thus marginal cost is the added cost of an extra unit of output.

$$Mc = \text{Direct Material} + \text{Direct Labour} + \text{Other Variable Costs} = \text{Total Cost} - \text{Fixed Cost}.$$

Contribution

The difference between selling price and variable cost (or marginal cost) is known as 'contribution' or 'gross margin'. It may be considered as some sort of fund from out of which all fixed costs are met. The difference between contribution and fixed cost represents either profit or loss, as the case may be. Contribution is calculated thus:

$$\text{Contribution} = \text{Selling Price} - \text{Variable Cost}$$

$$\text{Fixed Cost} + \text{Profit Or} - \text{Loss}$$

It is clear from the above equation that profit arises only when contribution exceeds fixed costs. In other terms, the point of 'no profit no loss' will be at a level where contribution is equal to fixed costs.

Marginal cost equation

The algebraic expression of contribution is known as marginal cost equation. It can be expressed thus:

$$\begin{aligned} S - V &= F + P \\ S - V &= C \\ C &= F + P \text{ And In Case Of Loss} \\ C &= F - L \end{aligned}$$

Where:

$$\begin{aligned} S &= \text{Sales} \\ V &= \text{Variable Cost} \\ C &= \text{Contribution} \\ F &= \text{Fixed Cost} \\ P &= \text{Profit} \\ L &= \text{Loss} \end{aligned}$$

Profit Volume Ratio (P/V Ratio)

The profitability of business operations can be found out by calculating the p/v ratio. It shows the relationship between contribution and sales and is usually expressed in percentage. It is also known as 'marginal-income ratio', 'contribution-sales ratio' or 'variable-profit ratio'. P/v ratio thus is the ratio of contribution to sales, and is calculated thus:

$$\begin{aligned} \text{P/V Ratio} &= \frac{\text{Contribution}}{\text{Sales}} \times 100 \\ &= \frac{C}{S} \quad \text{or} \quad \frac{S - V}{S} \quad \text{or} \quad \frac{F + P}{S} \\ 1 &= \frac{\text{Variable Costs}}{\text{Sales}} \end{aligned}$$

The ratio can also be shown by comparing the change in contribution to change in sales, or change in profit to change in sales. Any increase in contribution, obviously, would mean increase in profit, as fixed expenses are assumed to be constant at all levels of production.

$$\begin{aligned} \text{P/V Ratio} &= \frac{\text{Change In Contribution}}{\text{Change In Sales}} \\ &= \frac{\text{Change In Profit}}{\text{Change In Sales}} \end{aligned}$$

The importance of p/v ratio lies in its use for evaluating the profitability of alternative products, proposals or schemes. A higher ratio shows greater profitability. Management should, therefore, try to increase p/v ratio by widening the gap between the selling price and the variable costs. This can be achieved by increasing sale price, reducing variable costs or switching over to more profitable products.

Break-Even or Cost-Volume-Profit Analysis

Break-even analysis is a specific method of presenting and studying the inner relationship between costs, volume and profits. (hence, the name c-v-p analysis). It is an important tool of financial analysis whereby the impact on profit of the changes in volume, price, costs and mix can be found out with a certain amount of accuracy. A business is said to break even when its total sales are equal to its total costs. It is a point of no profit or no loss. At this point contribution is equal to fixed costs. Break-even point, can be calculated thus:

Assumptions of Break – even Analysis

The break even analysis is based on the following assumptions:

- All elements of cost can be segregated into fixed and variable components.
- Variable cost per unit remains same and it varies in total proportionate to the variation in output.
- Fixed cost in total remains the same irrespective of the level of output.
- Selling price remains the same at all levels of output.
- Volume of production is the only factor that influences cost.
- Product mix remains the same
- Entire units produced are sold out.

Objectives of Cost Volume Profit Analysis

The following are the important objectives of cost volume profit analysis:

- Cost volume is a powerful tool for decision making.
- It makes use of the principles of Marginal Costing.
- It enables the management to establish what will happen to the financial results if a specified level of activity or volume fluctuates.
- It helps in the determination of break-even point and the level of output required to earn a desired profit.
- The P/V ratio serves as a measure of efficiency of each product, factory, sales area etc. and thus helps the management to choose a most profitable line of business.
- It helps us to forecast the level of sales required to maintain a given amount of profit at different levels of prices.

Break even point: It may be defined as that point of sales volume at which total revenue is equal to total cost. It is a point of no profit no loss.

$$\begin{aligned} \text{B.E.P. (In Units)} &= \frac{\text{Fixed Cost}}{\text{Contribution Per Unit}} \\ &= \frac{\text{Fixed Cost}}{\text{Selling Price/Unit} - \text{Marginal Cost/Unit}} \\ \text{B.E.P. (Sales)} &= \frac{\text{Fixed Cost}}{\text{Contribution Per Unit}} \times \text{Selling Price/Unit} \\ &= \frac{\text{Fixed Cost}}{\text{Total Contribution}} \times \text{Total Sales} \\ &\text{or} = \frac{F \times S}{S - V} \\ &\text{or} = \frac{\text{Fixed Cost}}{\text{Variable Cost Per Unit}} \\ &1 - \frac{\text{Fixed Cost}}{\text{Selling Price Per Unit}} \\ &\text{or} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}} \end{aligned}$$

At break-even point the desired profit is zero. Where the volume of output or sales is to be calculated so as to earn a desired amount of profit, the amount of desired profits has to be added to the fixed cost given in the above formula.

$$\begin{aligned} \text{Units To Earn A Desired Profit} &= \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Contribution Per Unit}} \\ \text{Sales To Earn A Desired Profit} &= \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V Ratio}} \end{aligned}$$

Cash Break-Even Point

It is the level of output or sales where the cash inflow will be equivalent to cash needed to meet immediate cash liabilities. To this end, fixed costs have to be divided into two parts (i) fixed cost which do not need immediate cash outlay (depreciation etc.) And (ii) fixed cost which need immediate cash outlay (rent etc.). Cash break-even point can be calculated thus:

$$\text{Cash Break-Even Point (Of Output)} = \frac{\text{Cash Fixed Costs}}{\text{Cash Contribution Per Unit}}$$

Composite Break-Even Point

Where a firm is dealing with several products, a composite breakeven point can be calculated using the following formula:

$$\text{Composite Break-Even Point (Sales)} = \frac{\text{Cash Fixed Costs}}{\text{Composite P/V Ratio}}$$

$$\text{or} = \frac{\text{Total Fixed Costs} \times \text{Total Sales}}{\text{Total Contribution}}$$

$$\text{or} = \frac{\text{Total Contribution}}{\text{Total Sales}} \times 100$$

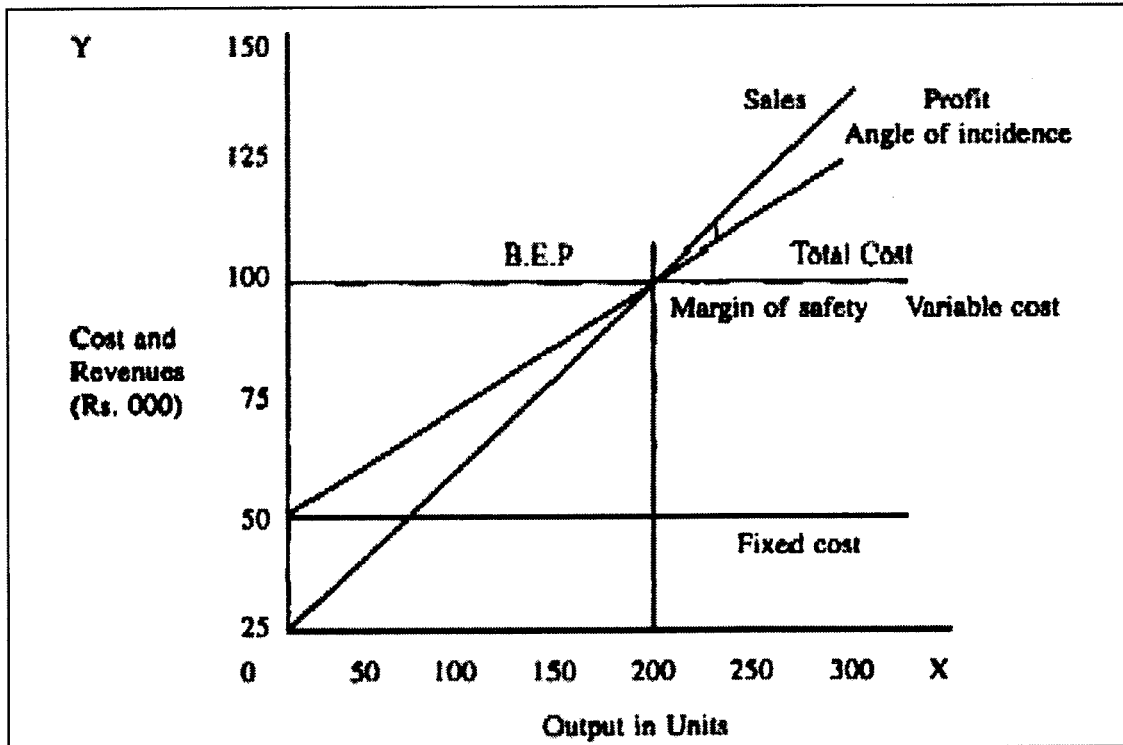
Breakeven Chart

A break-even chart is a graphical presentation which indicates the relationship between cost, sales and profit. The chart depicts fixed costs, variable cost, break-even point, profit or loss, margin of safety and the angle of incidence. Such a chart not only indicates break-even point but also shows the estimated cost and estimated profit or loss at various level of activity. Break-even point is an important stage in the break-even chart which represents no profit no loss.

Angle of Incidence

This angle is formed by the intersection of sales line and total cost line at the break -even point. This angle shows the rate at which profits are being earned once the break -even point has been reached. The wider the angle the greater is the rate of earning profits. A large angle of incidence with a high margin of safety indicates extremely favourable position.

The following Break-even Chart can explain more above the inter relationship between the costs, Volume and Profit:



From the above break even chart, we can understand the following points ;

- (1) Cost and sales revenue are represented on vertical axis, i.e., Y-axis,
- (2) Volume of production or output in units are plotted on horizontal axis, i.e., X-axis.
- (3) Fixed cost line is drawn parallel to X-axis.
- (4) Variable costs are drawn, above the Fixed cost line at different level of activity. The variable cost line is joined to fixed cost line at zero level of activity,
- (5) The sales line is plotted from the zero level, it represents sales revenue.
- (6) The point of intersection of total Cost line and sales line is called the break-even point which means no profit no loss.
- (7) The margin of safety is the distance between the break-even point and total output produced.
- (8) The area below the breakeven point represents the loss area as the total sales are less than the total cost.
- (9) The area above the break-even point represents profit area as the total sales are more than the cost,
- (10) The angle of incidence of the sales line intersects the total cost line represents the angle of incidence. The large angle of incidence indicates a high rate of profit and vice versa,

Contribution Breakeven chart: It is not possible to use a breakeven chart as described above to measure contribution. This is one of its major limitations especially so because contribution analysis is literally the backbone of marginal costing. To overcome such a limitation, accountants frequently resort to the making of a contribution breakeven chart which is based on the same principles as a conventional breakeven chart except for that it shows the variable cost line instead of the fixed cost line. Lines for Total cost and Sales revenue remain the same. The breakeven point and profit can be read off in the same way as with a conventional chart. However it is also possible to read the contribution for any level of activity.

Profit-volume chart: This is also very similar to a breakeven chart. In this chart the vertical axis represents profits and losses and the horizontal axis is drawn at zero profit or loss.

In this chart each level of activity is taken into account and profits marked accordingly. The breakeven point is where this line intersects the horizontal axis.

Advantages of the profit-volume chart

The biggest advantage of the profit-volume chart is its capability of depicting clearly the effect on profit and breakeven point of any changes in the variables. The following example illustrates this characteristic,

Relationship between Angle of Incidence, Break-Even Sales and Margin of Safety Sales

- a. When the Break-even sales are very low, with large angle of incidence, it indicates that the firm is enjoying business stability and in that case margin of safety sales will also be high.
- b. When the break-even sales are low, but not very low with moderate angle of incidence, in that case though the business is stable, the profit earning rate is not very high as in the earlier case.
- c. Contrary to the above when the break-even sales are high, the angle of incidence will be narrow with much lower margin of safety sales.

Limitations of Break Even Analysis

The limitations of the practical applicability of breakeven analysis and breakeven charts stem mostly from the assumptions underlying CVP which have been mentioned above. Assumptions like costs behaving in a linear fashion or sales revenue remain constant at different sales levels or the stocks shall remain constant period after period are unrealistic. Similarly, the assumption that the only factor which influences costs is the 'activity level achieved' is erroneous because other factors like inflation also have a bearing on costs.

Margin of Safety

Total sales minus the sales at break-even point is known as the margin of safety. Lower break-even point means a higher margin of safety. Margin of safety can also be expressed as a percentage of total sales. The formula is:

$$\text{Margin Of Safety} = \text{Total Sales} - \text{Sales At B.E.P.}$$

Profit

$$\text{or} = \frac{\text{Profit}}{\text{P/V Ratio}}$$

P/V Ratio

Margin Of Safety

$$\text{Margin Of Safety} = \frac{\text{Margin Of Safety}}{\text{Total Sales}} \times 100$$

(As A Percentage)

Higher margin of safety shows that the business is sound and when sales substantially come down, (but not below break even sales) profit might be earned by the business. Lower margin of safety, as pointed out earlier, means that when sales come down slightly profit position might be affected adversely. Thus, margin of safety can be used to test the soundness of a business. In order to improve the margin of safety a business can increase selling prices (without affecting demand, of course) reducing fixed or variable costs and replacing unprofitable products with profitable one.

Illustration 1: beta 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
Units 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 rs.24,000.

Solution:

$$\text{Selling Price Per Unit} = \frac{60,000}{20,000} = \text{Rs.3}$$

$$\text{Variable Cost Per Unit} = \frac{30,000}{20,000} = \text{Rs.1.50}$$

$$\begin{aligned} \text{(A) Contribution Per Unit} &= \text{Selling Price Per Unit} - \text{Variable Cost Per Unit} \\ &= \text{Rs.3} - \text{Rs.1.50} \\ &= \text{Rs.1.50} \end{aligned}$$

$$\text{(B) Break-Even Point} = \frac{\text{Total Fixed Cost}}{\text{Contribution Per Unit}}$$

$$\begin{aligned} &= \frac{\text{Rs.18,000}}{\text{Rs.1.50}} \\ &= 12,000 \text{ Units} \end{aligned}$$

$$\begin{aligned} \text{(C) Margin Of Safety} &= \text{Units Sold} - \text{Break-Even Point} \\ &= 20,000 - 12,000 \\ &= 8,000 \text{ Units (Or) Rs.24,000} \end{aligned}$$

$$\begin{aligned} \text{(D) Profit} &= (\text{Units Sold} \times \text{Contribution Per Unit}) - \\ &\text{Fixed Cost} \\ &= (20,000 \times \text{Rs.1.50}) - \text{Rs.18,000} \\ &= \text{Rs.12,000} \end{aligned}$$

$$\begin{aligned} \text{2. Volume Of Sales To Earn A Profit Of Rs.24,000} \\ &= \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Contribution Per Unit}} \\ &= \frac{18,000 + 24,000}{1.50} = 28,000 \text{ units} \end{aligned}$$

Illustration 2:

Calculate 'Margin Of Safety' from the following data:

Particulars	Mary & Co.	Geetha& Co.
Sales	1,00,000	1,00,000
Cost	80,000	80,000
Fixed – Mary & Co.	30,000	
Geetha& Co.	50,000	
Variable – Mary & Co.	50,000	
Geetha& Co.	30,000	
<hr/> Profit <hr/>	<hr/> 20,000 <hr/>	<hr/> 20,000 <hr/>

Solution:

Particulars	Mary& Co.	Geetha& Co.
Actual Sales	1,00,000	1,00,000
Less: Sales At Break-Even Point	60,000	71,429
Marginal Of Safety	40,000	28,571
	Fixed Cost	
Break-Even Sales = -----		
	P/V Ratio	
	Sales – Variable Cost	
P/V Ratio = -----		
	Sales	
Therefore;		
P/V Ratio	1,00,000	1,00,000
	- 50,000	- 30,000
	50,000	70,000
	50%	70%

30,000	50,000
Break-Even Sales = -----	-----
50%	70%
Rs.60,000	Rs.71,429

Illustration 3:

From the following particulars, find out the selling price per unit if b.E.P. Is to be brought down to 9,000 units.

Variable Cost Per Unit	Rs.75
Fixed Expenses	Rs.2,70,000
Selling Price Per Unit	Rs.100

Solution:

Let us assume that the contribution per unit at B.E.P. Sales of 9,000 is X.

$$\text{B.E.P.} = \frac{\text{Fixed Cost}}{\text{Contribution Per Unit}}$$

Contribution per unit is not known.

Therefore,

$$9,000 \text{ Units} = \frac{2,70,000}{X}$$

$$9,000 X = 2,70,000$$

$$X = 30$$

Contribution Is Rs.30 Per Unit, In Place Of Rs.25. So, The Selling Price Should Be Rs.105, I.E. Rs.75 + Rs.30.

5.3 Benefits Of Marginal Costing

The technique of marginal costing is of immense use to the management in taking various decisions, as explained below:

1. How Much To Produce?

Marginal costing helps in finding out the level of output which is most profitable for running a concern. This, in turn, helps in utilising plant capacity in full, and realise maximum profits. By determining the most profitable relationships between cost, price and volume, marginal costing helps a business determine most competitive prices for its products.

2. What To Produce?

By applying marginal costing techniques, the most suitable production line could be determined. The profitability of various products can be compared and those products which languish behind and which do not seem to be feasible (in view of their inability to recover marginal costs), may be eliminated from the production line by using marginal costing. It, thus, helps in selecting an optimum mix of products, keeping the capacity and resource constraints in mind. It will also serve as a guide in arriving at the price for new products.

3. Whether To Produce Or Procure?

The marginal cost of producing an article inside the factory serves as a useful guide while arriving at make or buy decisions. The costs of manufacturing can be compared with the costs of buying outside and a suitable decision can be arrived at easily.

4. How To Produce?

In case a particular product can be produced by two or more methods, ascertaining the marginal cost of producing the product by each method will help in deciding as to which method should be allowed. The same is true in case of decisions to use machine power in place of manual labour.

5. When To Produce?

In periods of trade depression, marginal costing helps in deciding whether production in the plants should be suspended temporarily or continued in spite of low demand for the firm's products.

6. At What Cost To Produce?

Marginal costing helps in determining the no profit- no-loss point. The efficiency and economy of various products, plants, departments can also be determined. This helps in profit planning as well as cost control.

5.4 Application of Marginal Costing

Marginal costing technique helps management in several ways.

These are discussed below:

5.4.1. Profit Planning

There are four important ways of improving the profit performance of a business: (i) increasing the volume, (ii) increasing the selling price, (iii) Decreasing variable cost, and (iv) decreasing fixed costs. Profit planning is the planning of future operations so as to attain maximum profit. The contribution ratio shows the relative profitability of various sectors of business whenever there is a change in the selling price, variable cost etc.

Illustration 4:

Two businesses, p ltd. And q ltd. Sell the same type of product in the same type of market. Their budgeted profit and loss accounts for the coming year are as under:

	P Ltd.		Q Ltd.	
Sales		1,50,000		1,50,000
Less: Variable Costs				
	1,20,000		1,00,000	
Fixed Costs	15,000	1,35,000	35,000	1,35,000
Budget Net Profit		15,000		15,000

You are required to:

- Calculate the break-even point for each business
- Calculate the sales volume at which each business will earn rs.5,000 Profit.
- State which business is likely to earn greater profit in conditions of:
 - ❖ Heavy demand for the product
 - ❖ Low demand for the product, and, briefly give your argument also.

- In conditions of heavy demand, a concern with larger p/v ratio can earn greater profits because of greater contribution. Thus, q ltd. Is likely to earn greater profit.
- In conditions of low demand, a concern with lower break-even point is likely to earn more profits because it will start earning profits at a lower level of sales. In this case, p ltd. Will start earning profits when its sales reach a level of rs.75,000, Whereas q ltd. Will start earning profits when its sales reach rs.1,05,000. Therefore, in case of low demand, break-even point should be reached as early as possible so that the concern may start earning profits.

5.4.2 Introduction Of A New Product

Sometimes, a product may be added to the existing lines of products with a view to utilise idle facilities, to capture a new market or for any other purpose. The profitability of this new product has to be found out initially. Usually, the new product will be manufactured if it is capable of contributing something toward fixed costs and profit after meeting its variable costs.

Illustration 5:

A concern manufacturing product x has provided the following information:

	Rs.
Sales	75,000
Direct materials	30,000
Direct labour	10,000
Variable overhead	10,000
Fixed overhead	15,000

In order to increase its sales by rs.25,000, the concern wants to introduce the product y, and estimates the costs in connection therewith as under:

Direct materials	10,000
Direct labour	8,000
Variable overhead	5,000

Fixed overhead Nil Advise whether the product Y will be profitable or not.

Solution:

Marginal Cost Statement

	X	Y	(in Rupees) Total
Sales	75,000	25,000	1,00,000
Less: marginal costs:			
Direct materials	30,000	10,000	40,000
Direct labour	10,000	8,000	18,000
Variable overhead	10,000	5,000	15,000
	50,000	23,000	73,000
Contribution	25,000	2,000	27,000
Fixed cost			15,000
Profit			12,000

Commentary: if product Y is introduced, the profitability of product X is not affected in any manner. On the other hand, product Y provides a contribution of Rs.2,000 Towards fixed cost and profit. Therefore, Y should be introduced.

5.4.3. Level Of Activity Planning

Marginal costing is of great help while planning the level of activity. Maximum contribution at a particular level of activity will show the position of maximum profitability.

Illustration 6:

Following is the cost structure of sundaram corporation, pondicherry, manufacturers of colour tvs.

Level of activity

	50%	70%	90%
Output (in units)	200	280	360
Cost (in rs.)			
Materials	10,00,000	14,00,000	18,00,000
Labour	3,00,000	4,20,000	5,40,000
Factory overhead	5,00,000	6,00,000	7,00,000
Factory Cost	18,00,000	24,20,000	30,40,000

In view of the fact that there will be no increase in fixed costs and import license for the picture tubes required in the manufacture of its tvs has been obtained, the corporation is considering an increase in production to its full installed capacity.

The management requires a statement showing all details of production costs at 100% level of activity.

Solution:

Marginal Cost Statement

(At 100% Level Of Activity	Total Cost	Cost Per Unit
With 400 Units)	Rs.	Rs.
Materials	20,00,000	5,000
Labour	6,00,000	1,500
Variable Factory Overhead	5,00,000	1,250
Marginal Factory Cost	31,00,000	7,750
Fixed Factory Overhead	2,50,000	625
Total factory cost	33,50,000	8,375

Thus, the marginal factory cost per unit is rs.7,750 and the total production cost per unit is rs.8,375.

Commentary:

(i) Calculation Of Variable Factory Overheads Per Unit:

$$= \frac{\text{Rs.6,00,000} - \text{Rs.5,00,000}}{\text{Units}} = \text{Rs.1,250 80}$$

(II) Calculation Of Fixed Factory Overheads:

Factory Overheads – (No. Of Units At Certain Level Of Activity X Variable Factory Overheads Per Unit).

Therefore Rs.5,00,000 – (200 Units X 1,250) Therefore Rs.5,00,000 – Rs.2,50,000 = Rs.2,50,000

The Amount Can Be Verified By Making Calculation At Any Other Level Of Activity.

Variable Factory Overheads At 100% Level Of Activity: 400 Units X 1,250 = Rs.5,00,000

5.4.4. Key Factor

A concern would produce and sell only those products which offer maximum profit. This is based on the assumption that it is possible to produce any quantity without any difficulty and sell likewise. However, in actual practice, this seems to be unrealistic as several constraints come in the way of manufacturing as well as selling. Such constraints that come in the way of management's efforts to produce and sell in unlimited quantities are called 'key factors' or 'limiting factors'. The limiting factors may be materials, labour, plant capacity, or demand. Management must ascertain the extent of the influence of the key factor for ensuring maximisation of profit. Normally, when contribution and key factors are known, the relative profitability of different products or processes can be measured with the help of the following formula:

$$\text{Profitability} = \frac{\text{Contribution}}{\text{Key Factor}}$$

Illustration 7: from the following data, which product would your recommend to be manufactured in a factory, time, being the key factor?

	Per Unit of Product X	Per Unit of Product Y
Direct Material	24	14
Direct Labour At Re.1 Per Hour	2	3
Variable Overhead At Rs.2 Per Hour	4	6
Selling Price	100	110
Standard Time To Produce	2 Hours	3 Hours

Solution:

	Per Unit of Product X		Per Unit of Product Y	
Selling Price		100		110
Less: Marginal Cost:				
Direct Materials		24		14
Direct Labour		2		3
Variable Overhead	4	30	6	23
	—	—	—	—
Contribution		70		87
Standard Time To Produce	2 Hours		3 Hours	
Contribution Per Hour		70/2		87/3
	= Rs.35		= Rs.29	

Contribution per hour of product x is more than that of product y by rs.6. Therefore, product x is more profitable and is recommended to be manufactured.

5.4.5. Make Or Buy Decisions

A company might be having unused capacity which may be utilized for making component parts or similar items instead of buying them from the market. In arriving at such a 'make or buy' decision, the cost of manufacturing component parts should be compared with price quoted in the market. If the variable costs are lower than the purchase price, the component parts should be manufactured in the factory itself. Fixed costs are excluded on the assumption that they have been already incurred, and the manufacturing of components involves only variable cost. However, if there is an increase in fixed costs and any limiting factor is operating while producing components etc. That should also be taken into account. Consider the following illustration, throwing light on these aspects.

Illustrations 8:

You are the management accountant of XYZ CO. Ltd. The Managing director of the company seeks your advice on the following problem: the company produces a variety of products each having a number of computer parts. Product "B" takes 5 hours to produce on machine no.99 working at full capacity. "bB" has a selling price of rs.50 and a marginal cost, Rs.30 per unit. "A-10" a component part could be made on the same machine in 2 hours for marginal cost of Rs.5 per unit. The supplier's price is Rs.12.50 per unit. Should the company make or buy "A10"? Assume that machine hour is the limiting factor.

Solution:

In this problem the cost of new product plus contribution lost during the time for manufacturing “A-10” should be compared with the supplier’s price to arrive at a decision.

	Rs.
“B” – Selling Price	50.00
(-_)Marginal Cost	30.00
	20.00

It takes 5 hours to produce one unit of “B”.

Therefore, contribution earned per hour on machine no.99 is $\text{Rs.}20/5 = \text{Rs.}4$. “A-10” takes two hours to be manufactured on machine which is producing “B”. Real cost of “A-10” to the company = marginal cost of “aA-10” plus contribution lost for using the machine for “A-10”.

Rs.5 + Rs.8 = Rs.13

This is more than the seller’s price of rs.12.50 and so it is advisable for the company to buy the product from outside.

Illustration 9:

A t.V. Manufacturing company finds that while it costs Rs.6.25 To make each component X, the same is available in the market at Rs.4.85 Each, with an assurance of continued supply. The break down of cost is:

	Rs.	
Materials	2.75	Each
Labour	1.75	Each
Other Variables	0.50	Each
Depreciation And Other Fixed Costs	1.25	Each
	6.25	

Should you make or buy?

Solution:

Variable cost of manufacturing is Rs.5; ($\text{Rs.}6.25 - \text{Rs.}1.25$) but the market price is Rs.4.85. If the fixed cost of Rs.1.25 is also added, it is not profitable to make the component. Because there is a saving of Rs.0.15 even in variable cost, it is profitable to procure from outside.

5.4.6. Suitable Product Mix/Sales Mix

Normally, a business concern will select the product mix which gives the maximum profit. Product mix is the ratio in which various products are produced and sold. The marginal costing technique helps management in taking appropriate decisions regarding the product mix, i.e., in changing the ratio of product mix so as to maximise profits. The technique not only helps in dropping unprofitable products from the mix but also helps in dropping unprofitable departments, activities etc. Consider the following illustrations:

Illustration 10: (Product Mix)

The following figures are obtained from the accounts of a departmental store having four departments.

Departments

(Figures InRs.)

Particulars	A	B	C	D	Total
Sales	5,000	8,000	6,000	7,000	26,000
Marginal Cost	5,500	6,000	2,000	2,000	15,500
Fixed Cost	500	4,000	1,000	1,000	6,500
(Apportioned)					
Total Cost	6,000	10,000	3,000	3,000	22,000
Profit/Loss(-)	1,000 (-)	2,000	3,000	4,000	4,000

On the above basis, it is decided to close down dept. B immediately, as the loss shown is the maximum. After that dept. A will be discarded. What is your advice to the management?

Statement Of Comparative Profitability

Departments

Particulars	A	B	C	D	Total
Sales	5,000	8,000	6,000	7,000	26,000
Less:					
Marginal Cost	5,500	6,000	2,000	2,000	15,500
Contribution (-)	500	2,000	4,000	5,000	10,500
Fixed Cost					6,500
Profit					----- 4,000 -----

Commentary:

From the above, it is clear that the contribution of dept. A is negative and should be discarded immediately. As dept. B provides rs.2,000 towards fixed costs and profits, it should not be discarded.

Illustration 11 (Sales Mix):

Present the following information to show to the management:

- (a) the marginal product cost and the contribution per unit; (b) the total contribution and profits resulting from each of the following mixtures:

	Product	Per Unit (Rs.)
Direct Materials	A	10
	B	9
Direct Wages	A	3
	B	2
Fixed Expenses Rs.800		

Variable Expenses Are Allocated To Products As 100% Of Direct Wages.
Rs.

Sales Price	A	20
	B	15

Sales mixtures

- 1000 Units Of Product A And 2000 Units Of B
- 1500 Units Of Product A And 1500 Units Of B
- 2000 Units Of Product A And 1000 Units Of B

Solution:

(A) Marginal Cost Statement		A		B
Direct Materials			10	9
Direct Wages		3		2
Variable Overheads (100%)		3		2
		---		---
Marginal Cost		16		13
Sales Price			20	15
Contribution			4	2
		1000 A+	1500 A+	2000 A+
(B) Sales Mix	2000 B	1500 B	1000B	
Choice		(I)	(II)	(III)
	(Rs.)		(Rs.)	(Rs.)
Total Sales	(1000 X 20 + 2000 X 15) =	(1500 X 20 + 1500 X 15) =		(2000 X 20 + 1000 X 15) =
	50,000	52,500		55,000
	(1000 X 16 + 2000 X 13) =	(1500 X 16 + 1500 X 13) =		(2000 X 16 + 1000 X 13) =
Less: Marginal Cost	42,000	43,500		45,000

Contribution	8,000	9,000		10,000
Less: fixed costs	800	800		800

Profit	7,200	8,200		9,200

Therefore sales mixture (iii) will give the highest profit; and as such, mixture (iii) can be adopted.

5.4.7. Pricing Decisions

Marginal costing techniques help a firm to decide about the prices of various products in a fairly easy manner. Let's examine the following cases:

(I) Fixation of Selling Price Illustration 12:

P/V Ratio Is 60% and the marginal cost of the product is Rs.50. What will be the selling price?

Solution:

$$\begin{aligned}
 S - V & & V & & C \\
 \text{P/V Ratio} = \frac{\quad}{S} & = 1 - \frac{\quad}{S} = \frac{\quad}{S} \\
 \text{Variable Cost} & & 40 & & \\
 \frac{\quad}{\quad} = 40\% & & \text{Or} \frac{\quad}{\quad} & & \\
 & & \text{Sales} & & 100 \\
 & & 50 & & 50 & & X 100 \\
 \text{Selling Price} = \frac{\quad}{40\%} = \frac{\quad}{40} & = \quad = \text{Rs.125}
 \end{aligned}$$

(ii) Reducing Selling Price Illustration 13:

The Price Structure Of A Cycle Made By The Visu Cycle Co. Ltd. Is

As Follows:	Per Cycle
Materials	60
Labour	20
Variable Overheads	20

Fixed Overheads	100
Profit	50
Selling Price	50

	200

This is based on the manufacture of one lakh cycles per annum. The company expects that due to competition they will have to reduce selling prices, but they want to keep the total profits intact. What level of production will have to be reached, i.e., how many cycles will have to be made to get the same amount of profits, if:

- (a) the selling price is reduced by 10%?
- (b) the selling price is reduced by 20%?

Solution:

	(Rs.)		(Rs.)
Existing profit	=	1,00,000 x 50	= 50,00,000
Total fixed overheads	=	1,00,000 x 50	= 50,00,000

(a) Selling price is reduced by 10% and to get the existing profit of rs.50 lakhs.

New Selling Price	=	200 - 10% Of Rs.200
	=	200 - 20 =Rs.180
New Contribution	=	180 - 100 =Rs.80 Per Unit
Total Sales (Units)	=	F + P/Contribution Per Unit
	=	5,00,000 + 5,00,000
	=	<hr style="width: 50%; margin: auto;"/>
		80
	=	1,25,000 Cycles

Are to be obtained and sold to earn the existing profit of rs.5,00,000.

(b) Selling price reduced by 20% and to get the existing profit of rs.5,00,000.

New Selling Price	=	200 - 20% Of Rs.200
	=	200 - 40 = Rs.160
New Contribution	=	S - V
	=	160 - 100 = Rs.80 Per Unit
Total Sales (Units)	=	F + P/Contribution Per Unit
	=	5,00,000 + 5,00,000
	=	<hr style="width: 50%; margin: auto;"/>
		60
	=	1,66,667 cycles are to be produced and sold to earn the existing profit of rs.50 Lakhs.

(iii) Pricing During Recession: Illustration 14:

SSA company is working well below normal capacity due to recession. The directors of the company have been approached with an enquiry for special job. The costing department estimated the following in respect of the job.

Direct Materials Rs.10,000
Direct Labour 500 Hours @ Rs.2 Per Hour
Overhead Costs: Normal Recovery Rates
Variable Re.0.50 Per Hour
Fixed Re.1.00 Per Hour

The directors ask you to advise them on the minimum price to be charged. Assume that there are no production difficulties regarding the job.

Solution:

Calculation Of Marginal Cost:

	(Rs.)
Direct Materials	10,000
Direct Labour	1,000
Variable Overhead @ Re.0.50 Per Hour	250
Marginal Cost	<u>11,250</u>

Commentary:

Here the minimum price to be quoted is Rs.11,250 which is the marginal cost. By quoting so, the company is sacrificing the recovery of the profit and the fixed-costs. The fixed costs will continue to be incurred even if the company does not accept the offer. So any price above Rs.11,250 is welcome.

5.4.8 Accepting Foreign Order

Marginal costing technique can also be used to take a decision as to whether to accept a foreign offer or not. The speciality of this situation is that normally foreign order is requiring the manufacturer to supply the product at a price lower than the inland selling price. Here the decision is taken by comparing the marginal cost of the product with the foreign price offered. If the foreign order offers a price higher than the marginal cost then the offer can be accepted subject to availability of sufficient installed production capacity. The following illustration highlights this decision:

Illustration 15:

Due to industrial depression, a plant is running at present at 50% of the capacity. The following details are available:

Cost Of Production Per Unit	(Rs.)
Direct Materials	2
Direct Labour	1
Variable Overhead	3
Fixed Overhead	2
	—
	8
	—
Production Per Month	20,000 Units
Total Cost Of Production	Rs.1,60,000
Sale Price	Rs.1,40,000
	—————
Loss	Rs.20,000
	—————

An exporter offers to buy 5000 units per month at the rate of rs.6.50 per unit and the company is hesitant to accept the order for fear of increasing its already large operating losses. Advise whether the company should accept or decline this offer.

Solution:

At present the selling price per unit is Rs.7/- and the marginal cost per unit is Rs.6/- (Material Rs.2 + Labour Re.1 + Variable Overhead Rs.3). The foreign order offers a price of Rs.6.50 and there is ample production capacity (50%) available. Since the foreign offer is at a price higher than marginal cost the offer can be accepted. This is proved hereunder:

			(Rs.)
Marginal Cost Of 5000 Units	= 5000	X 6	= 30,000
Sale Price Of 5000 Units	= 5000	X 6.50	=32,500
			—————
Profit			2,500
			—————

Thus by accepting the foreign order the present loss of Rs.20,000 would be reduced to Rs.17,500 I.E., Rs.20000 Loss – Rs.2,500 Profit.

5.5 Limitations Of Marginal Costing

Marginal costing has the following limitations:

a) *Difficulty in classification:*

In marginal costing, costs are segregated into Fixed and variable. In actual practice, this classification scheme proves to be Superfluous in that, certain costs may be partly fixed and partly variable and Certain other costs may have no relation to volume of output or even with the time. In short, the categorisation of costs into fixed and variable elements is a difficult and tedious job.

b) *Difficulty in Application:*

The marginal costing technique cannot be applied in industries where large stocks in the form of work-in-progress (job and contracting firms) are maintained.

c) *Defective Inventory Valuation:*

Under marginal costing, fixed costs are not included in the value of finished goods and work in progress. As fixed costs are also incurred, these should form part of the cost of the product. By eliminating fixed costs from finished stock and work-in-progress, marginal costing techniques present stocks at less than their true value. Valuing stocks at marginal cost is objectionable because of other reasons also:

- ❖ In case of loss by fire, full loss cannot be recovered from the insurance company.
- ❖ Profits will be lower than that shown under absorption costing and hence may be objected to by tax authorities.
- ❖ Circulating assets will be understated in the balance sheet.

d) *Wrong Basis For Pricing:*

In marginal costing, sales prices are arrived at on the basis of contribution alone. This is an objectionable practice. For example, in the long run, the selling price should not be fixed on the basis of contribution alone as it may result in losses or low profits. Other important factors such as fixed costs, capital employed should also be taken into account while fixing selling prices. Further, it is also not correct to lay more stress on selling function, as is done in marginal costing, and relegate production function to the background.

e) *Limited Scope:*

The utility of marginal costing is limited to short-run profit planning and decision-making. For decisions of far-reaching importance, one is interested in special purpose cost rather than variable cost. Important decisions on several occasions, depend on non-cost considerations also, which are thoroughly discounted in marginal costing.

In view of these limitations, marginal costing needs to be applied with necessary care and caution. Fruitful results will emerge only when management tries to apply the technique in combination with other useful techniques such as budgetary control and standard costing.

5.6 Introduction of Budget and Budgetary Control

The management is efficient if it is able to accomplish the objective of the enterprise. It is effective when it accomplishes the objectives with minimum effort and cost in order to attain long-range efficiency and effectiveness management must chart out its course in advance. A systematic approach to facilitate

effective management performance is profit planning and control or budgeting. Budgeting is therefore an integral part of management in a way, a budgetary control system has been described as a historical combination of a “goal setting machine for increasing an enterprises profits and a goal achieving machine for facilitating organizational co ordination and planning while achieving the budgeted targets”.

Meaning and definition of budget:

A budget is a plan of action for a future period. It simply means a financial plan expressed in terms of money. The budget pertaining to any of the activities of business is always forward looking. The term ‘budget’ has been derived from the French word, “bougette”, which means a leather bag into which funds are appropriated to meet the anticipated expenses.

The CIMA Official Terminology defines a budget as “ A quantitative statement, for a defined period of time, which may include planned revenues, expenses, assets, liabilities and cash flows.”

Budgeting and Budgetary control:

Budgeting simply means preparing budgets. It is a process of preparation, implementation and the operation of budget. Being a plan of action, a budget guides every manager in the decision making process.

In the words of Rowland Harr, “Budgeting is the process of building budgets”.

Budgetary control is a system of using budgets for planning and controlling costs. The official terminology of CIMA defines the term ‘budgetary control , as “ the establishment of budgets relating to the responsibilities of executives to the requirement of a policy, and the continuous comparison of actual with budgetary result, either to secure by individual action the objectives of that policy or to provide a basis for its revision.” Thus, when plans are embodied in a budget and the same is used as the basis for regulating operations, we have budgetary control. As such budgetary control starts with budgeting and ends with control.

5.6.1 Objectives of Budget and Budgetary control:

The following points reveal the objectives of Budget and budgetary control:-

- ❖ To aid the planning of annual operations
- ❖ To co ordinate the activities of the various parts of the organization
- ❖ To communicate plans to the various responsibility centre managers
- ❖ To motivate managers to strive to achieve the organizational goals.
- ❖ To control activities
- ❖ To eliminates the wastes of all kinds
- ❖ To provide a yard stick against which actual results can be compared
- ❖ To evaluate the performance of managers.
- ❖ To reduce the uncertainties

Meaning of Estimate, forecast and Budget:

An estimate is predetermination of future events either on the basis of simple guess work or following scientific principles.

Forecast is an assessment of probable future events. Budget is based on the implication of a forecast and related to planned events. To establish a realistic budget, it is necessary to forecast a wide range of factors like sales volume, sales prices, material availability, wage rate, the cost of overheads etc.

5.6.2 Steps involved in Budgetary Control:

The following steps may be considered necessary for a comprehensive budgetary control programme:-

- i. Laying down organizational goals or objectives
- ii. Formulating the necessary plans to ensure that the desired objectives are achieved.
- iii. Translating plans into budget
- iv. Relating the responsibilities of executives to the requirements of a policy.
- v. Recording and reporting actual performance
- vi. Continuous comparison of actual with budgeted results
- vii. Ascertainment of deviations, if any
- viii. Focusing attention on significant deviations
- ix. Investigation into deviations to establish causes
- x. Presentation of information to management, relating the variations to individual responsibility.
- xi. Taking corrective action to prevent recurrence of variations.
- xii. Provide a basis for revision of budgets.

5.6.3 Requisites for a Successful Budgetary Control System

For making a budgetary control system successful requisites are required.

a. Clarifying Objectives:

The budgets are used to realize objectives of the business. The objective must be clearly spelt out to that budgets are properly prepared. In the absence of clear goals, the budgets will also be unrealistic.

b. Proper Delegation of Authority and Responsibility:

Budget preparation and control is done at every level of management. Even though budgets are finalized at top level but involvement of persons from lower levels of management is essential for their success. This necessitates proper delegation of authority and responsibility.

c. Proper Communication System:

An effective system of communication is required for a successful budgetary control. The flow of information regarding budgets should be quick so that these are implemented. The upward communication will help in knowing the difficulties in implementation of budgets. The performance reports of various levels will help top management in budgetary control.

d. Budget Education:

The employees should be educated about the benefit of budgeting system. They should be the benefits of budgeting system they should be educating about their roles in the success of this system. Budgetary control may not be taken only as a control device by the employees but it should be used as a tool to improve their efficiency.

e. Flexibility:

Flexibility in budgets is required to make them suitable under changed circumstances. Budgets are prepared for the future, which is always uncertain, even though budgets are prepared by considering the future possibilities but still some adjustment. Flexibility makes the budgets more appropriate and realistic.

f. Motivation:

Budgets are to be implemented by human beings. Their successful implementation will depend upon the interest shown by the employees. All persons should be motivated to improve their working so that budgeting is successful. A proper system of motivation should be introduced for making this system a success.

g. Adequate accounting system

There should be an adequate accounting system for the successful budgetary control system, because those who are involved in the preparation of estimates depend heavily on the accounting department.

h. Periodic reporting

There should be a prompt and timely communication and reporting system for the effective implementation of a budgetary control system.

5.6.4 Essentials of Budgetary Control:

The proper organization is essential for the successful preparation, maintenance and administration of budgets. A budgetary committee is formed which comprises the departmental heads of various departments. All the functional heads are entrusted with the responsibility of ensuring proper implementation of their respective departmental budgets.

The chief executive is the overall in charge of budgetary system. He constitutes a budget committee for preparing realistic budgets. A budget officer is the convener of the budget committee who co-ordinates the budgets of different departments. The managers of different departments are made responsible for their departmental budgets.

I. Budget Officer:

- a. The chief executive appoints budget officer. Such budget officer also called as “budget controller or budget director”. His rank should be equal to other functional managers.
- b. The budget officer does not have the direct responsibility of preparing the budgets. The various functional managers prepare the budgets. His role is that of a supervisor. The budget officer has the specific duty of administering the budget. He is responsible for timely completion of budgeting activity by various departments and for co-ordination between them so that there is a proper link between them. He is empowered to scrutinize the budgets prepared by different functional heads and to make changes in them. If the situation so demands.

- c. The budget officer works as a coordinator among different department. He continuously monitors the actual performance of different departments. He determines the deviations in the budgets and takes necessary steps to rectify the deficiencies, if any. He also informs the top management about the performance of different department.
- d. The budget officer will be able to carry out his work only if is conversant with the working of all the departments he must have technical knowledge of the business and should also possess accounting knowledge.

II. Budget Committee:

- a. A budget committee is formed to assist the budget officer. The heads of all the important department's are made members of this committee. The committee is responsible for preparation and execution of budgets. The members of this committee put up the case of their respective departments and help the committee to take collective decisions, if necessary.

The budget committee is responsible for reviewing the budgets prepared by various functional heads. Coordinate all the budgets and approve the final budgets, the budget officer acts as coordinator of this committee. All the functional heads are entrusted with the responsibility of ensuring proper of ensuring proper implementation of their respective final departmental budgets.

III. Budgets Centres:

- a. A budget centers is that part of the organization for which the budget is prepared. A budget center may be a department, section of a department or any other part of the department. Ideally, the head of every center should be a member of the budget committee. However, it must be ensured that each budget center at least has an indirect representation in the budget committee.
- b. The establishment of budget centers is essential for covering all parts of the organization becomes easy. When different centers are establishment. The budget centers are also necessary for cost control purposes.

IV. Budget Manual:

- a) A budget manual is a document that spells out the duties and responsible of the various executives concerned it specifies among various functional areas. A budget manual covers the following matters.
- b) A budget manual clearly defines the objectives of budgetary control system. It also gives the benefits and principles of this system.
- c) The duties and responsibilities of various persons dealing with preparation and execution of budgets are also given in a budget manual. It enables the management to know the persons dealing with various aspects to budgets and provides clarity on their duties and responsibilities,
- d) It gives information about the sanctioning authorities of various budgets. The financial powers of different managers are given in the manual for enabling he spending amount on various expenses.
- e) A proper table for budgets including the sending of performance reports is drawn so that every work starts in time and systematic control is exercise.
- f) The specimen forms and number of copies to be listed for budget repots is also stated. Budget involved should be clearly stated.

- g) The length of various budget periods and control points is clearly given.
- h) The procedure to be followed in the entire system is clearly stated.
- i) A method of accounting to be used for various expenditures is also stated in the manual.

The budget manual helps in documentation the role of every employee, his duties, responsibilities the ways of undertaking various tasks etc. thus it also in reducing ambiguity at any point of time.

V. Budget Period:

A budget period is the length of time for which a budget is prepared. It depends upon a number of factors. The choice of a budget period depends upon the following considerations. The types of budget (long/short)

- The nature of demand for the products.
- The timings for the availability of the finance.
- The economic situations of the cycles.

All the above mentioned factors are taken into account while fixing the period of budgets. In this budgeting process the financial manager has to take the financial decision on the budgets.

The financial manager usually responsible for organizing this budget, he must perform the following functions.

- ❖ To decide the general policies and guidelines.
- ❖ To officer technical advice
- ❖ To suggest changes
- ❖ To receive and review individual budget estimates
- ❖ To reconcile divergent views
- ❖ To co-ordinate budgeting activities.
- ❖ To approve budgets with or without revisions.
- ❖ To scrutinize control reports later on
- ❖ To scrutinize budget reports later on
- ❖ To disseminate these guide lines.

5.7 Continuous Budgeting System:

A continuous budgeting system is a method of having two different budget periods within the same budget. The purpose of having this system is to have greater control in terms of operational activities without losing sight is to have greater control in terms of it results in incorporating the effect of changes in the short term on the long-term targets of the organization.

Determination of key factor:

The budgets are prepared for all functional areas. These budgets are interring dependent and inter-related. A proper co-ordination among different budgets is necessary for budgetary control to be successful.

The constraints on some budgets may have an effect on other budgets too. A factor which influences all other budgets is known as “key factor or principal factor”.

The key factor may not necessarily remain the same. The raw materials supply may be limited at one time but it may be easily available at another time. Similarly, other factors may also improve at different times. The key factor highlights the limitations of the enterprise. This will enable the management to improve the working of these departments where scope for improvement exists.

5.8 Classification of Budget

1. Classification according to time factor
2. Classification according to flexibility factor
3. Classification according to function.

I. **Classification according to time factor:** - On this basis, budgets can be of three types:

1. Long term budget – for a period of 5 to 10 years
2. Short term budgets – Usually for a period of one to two year
3. Current budgets - Usually covers a period of one month or so,

1. Long -Term Budgets:

The long-term budgets prepared for a long period of five to ten years. They are concerned with planning the operations of a firm over a considerably long period of time. The financial “controller” exclusively for the top management usually prepares long-term budgets. These budgets are very useful in terms of physical units (i.e. quantities) or percentages, since accrued values may be difficult to forecast over such long-period. Capital expenditure, research and development budgets, etc, are examples of long-term budgets.

2. Short Term Budgets:

Short-term budgets are budgets prepared for a short period of one to two year. They are prepared for those activities the trend in which cannot be for seen easily over long periods. These budgets are very useful in case of consumer goods industries such as sugar, cotton, textiles, etc. they are generally prepared in terms of physical units (i.e.. quantities) as well as monetary units (i.e. values) materials budget.

Each budget etc, are example of short-term budget. They are useful to lower level of management for control purpose.

3. Current Budgets:

Current budget is a budget, which is established for use over a short period of time and is related to current conditions. Thus current budgets are essentially short term budgets adjusted to current (i.e., present or prevailing) condition or circumstances. They are prepared for a very short period. Say, a quarter or a month. They related to current activities of the budgets.

II. **Classification according to flexibility:** It includes

1. Flexible budgets and
2. Fixed budgets

Flexible budgets: It is a dynamic budget. It gives different budgeted cost for different levels of activity. It is prepared after making an intelligent classification of all expenses between fixed, semi variable and variable because the usefulness of such a budget depends up on the accuracy with which the expenses can be classified.

Steps in preparing flexible budgets:

1. Identifying the relevant range of activity
2. Classify cost according to variability
3. Determine variable cost
4. Determine fixed cost
5. Determine semi variable cost
6. Prepare the budget for selected levels of activity

Example 1

The expenses budgeted for production of 10,000 unit in a factory are furnished below:

	Per unit in Rs
Material cost	70
Labour cost	25
Variable factory over head	20
Fixed over head(Rs. 1,00,000)	10
Variable expenses(Direct)	5
Selling expenses (20% fixed)	15
Distribution overhead (10% fixed)	10
Administration expenses (Rs, 50,000)	5

Prepare a flexible budget for production of 8,000 units.

Solution:

	Out put Perunit (Rs)	10,000 units Total	Out put Per unit (Rs)	8,000 units Total (Rs.)
Material	70.00	7,00,000	70.00	5,60,000
Labour	25.00	2,50,000	25.00	2,00,000
Direct expe, (variable)	5.00	50,000	5.00	40,000
	100.00	10,00,000	100.00	8,00,000
Factory overhead : Variable	20.00	2,00,000	20.00	1,60,000
Fixed	10.00	1,00,000	12.50	1,00,000
	130.00	13,00,000	132.50	10,60,000
Administrative expenses:	5.00	50,000	6.25	50,000
	135.00	13,50,000	138.75	11,10,000
Selling expenses:Fixed (20% of 15)				
Variable (80% of 15)	3.00	30,000	3.75	30,000
	12.00	1,20,000	12.00	96,000
Distribution expenses:Fixed				
(10% of Rs. 10)	1.00	10,000	1.25	10,000
Variable (90% of 10)	9.00	90,000	9.00	72,000
	160.00	16,00,000	164.75	13,18,000
Material	70.00	7,00,000	70.00	5,60,000
Labour	25.00	2,50,000	25.00	2,00,000
Direct expe, (variable)	5.00	50,000	5.00	40,000
	100.00	10,00,000	100.00	8,00,000
Factory overhead : Variable	20.00	2,00,000	20.00	1,60,000
Fixed	10.00	1,00,000	12.50	1,00,000
	130.00	13,00,000	132.50	10,60,000
Administrative expenses:	5.00	50,000	6.25	50,000
	135.00	13,50,000	138.75	11,10,000
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(10% of Rs. 10)	1.00	10,000	1.25	10,000
Variable (90% of 10)	9.00	90,000	9.00	72,000
	160.00	16,00,000	164.75	13,18,000

Fixed Budget

It is a budget which is designed to remain unchanged irrespective of the level of activity attained. It does not change with the change in the level of activity. This type of budget are most suited for fixed expenses. It is a single budget with no analysis of cost.

III. Classification according to function: It includes:

1. Functional budgets and
2. Master budgets

Functional budgets are those which are prepared by heads of functional departments for their respective departments and are subsidiary to the master budget. Functional budget may be **Operating budgets or financial budget**. Operating budgets are those budgets which relate to the different activities or operations of a firm. These are the primary budgets. Financial budgets are those which incorporate financial decisions of an organization. They show in detail the inflow and outflow of cash and the overall financial position.

Master budget is the summary of all functional budgets. It summarizes sales, production, purchase, labour, finance budgets etc. It is considered as the overall budget of the organization.

Different types of functional budgets:

A. Sales budget: It is forecast of total sales expressed in quantities and money. It is prepared by the sales manager. While preparing sales budget we have to consider the past sales data, market conditions, general trade and business conditions etc

Illustration 1

A manufacturing company submits the following figures of product 'Z' for the first quarter of 2010.

Sales (in units) January	50,000
February	40,000
March	60,000

Selling price per unit Rs. 100

Sales target of 1st quarter 2011:

Sales quantity increase 20%

Sales price increase 10%

Prepare sales budget for the first quarter of 2011.

Solution:

SALES BUDGET for the first quarter of 2011

Months	Units	Price per unit	Value
January	60,000	110	66,00,000
February	48,000	110	52,80,000
March	72,000	110	79,20,000
	1,80,000		1,98,00,000

Production budget: It is the forecast of the quantity of production for the budget period. It is usually expressed in physical quantity.

Illustration 2

A manufacturing company submits the following figures relating to product X for the first quarter of 2010.

Sales targets:	January	60,000 units
	February	48,000 units
	March	72,000 units

Stock position: 1-1-2010(% of January 2010 sale) - 50%

Stock position: 31-3-2010 40,000 units

Stock position: End January & February 50%

(% of subsequent month's sales)

You are required to prepare production budget for the first quarter of 2010

Solution

PRODUCTION BUDGET FOR THE FIRST QUARTER OF 2010

Month	Sales(Units)	+closing stock (Units)	-Opening stock (in Units)	Production (units)
January	60,000	24,000	30,000	54,000
February	48,000	36,000	24,000	60,000
March	72,000	40,000	36,000	76,000
				1,90,000

Material budget: It shows the estimated quantities as well as cost of raw material required for the production of different product during the budget period.

B. Purchase budget: It shows the quantity of different type of materials to be purchased during the budget period taking into consideration the level of activity and the inventory levels.

C. Cash budget: It is prepared only after all the other functional budgets are prepared. It is also known as financial budget. It is a statement showing estimated cash inflows and cash outflows over the budgeted period.

The cash budget is prepared on the basis of the cash forecast. The cash forecast is an estimate showing the availability or otherwise of adequate amount of cash in a future period for meeting the operating expenses and all other commitments. It summarizes the anticipated cash receipts and cash payments for the budget period.

There are three methods for preparing the cash budget. They are:

- a. The receipts and payment method
- b. Adjusted Profit and Loss account method
- c. Balance sheet method.

Example (Receipts and Payment method)

A company is expecting to have Rs. 25000 cash in hand on 1st April 2000 and it requires you to prepare an estimate of cash position during the three month, April to June 2000. The following information is supplied to you.

Months	Sales (Rs)	Purchase (Rs)	Wages (Rs)	Expenses (Rs)
February	70,000	40,000	8,000	6,000
March	92,000	52,000	9,000	7,000
May	1,00,000	60,000	10,000	8,000
June	1,20,000	55,000	12,000	9,000

Other information:

1. Period of credit allowed by suppliers – two months
2. 25% of sale is for cash and the period of credit allowed to customers for credit sale is one month.
3. Delay in payment of wages and expenses – one month.
4. Income tax of Rs.25,000 is to be paid in June 2000.

	April (Rs.)	May(Rs.)	June(Rs.)	Total(Rs.)
Opening balance	25,000	53,000	81,000	-----
Receipts:				
Cash sales	23,000	25,000	30,000	78,000
Cash from debtors	60,000	69,000	75,000	2,04,000
Total	83,000	94,000	1,05,000	2,82,000
	=====	=====	=====	=====
Payments:				
Creditors	40,000	50,000	52,000	1,42,000
Wages	8,000	9,000	10,000	27,000
Expenses	7,000	7,000	8,000	22,000
Income Tax	-----	-----	25,000	25,000
Total	55,000	66,000	95,000	2,10,000
	=====	=====	=====	=====
Closing balance	53,000	81,000	91,000	-----

b. Adjusted Profit and Loss method: Under this method, profit is adjusted by adding back depreciations, provisions, stock and work in progress, capital receipts, decrease in debtors, increase in creditors etc. Similarly, dividends, capital payments, increase in debtors, increase in stock and decrease in creditors are deducted. The adjusted profit will be the estimated cash available. Under this method, the following information becomes necessary.

1. Expected opening balance
2. Net profit for the period
3. Changes in current asset and current liabilities
4. Capital receipts and capital expenditure
5. Payment of dividend

c. Balance sheet method: Under this method, a budgeted balance sheet is prepared for the budgeted period, showing all assets and liabilities except cash. The two sides of the balance sheet are then balanced. The balance then represents cash at bank or overdraft, depending upon whether the assets total is more than that of the liabilities total or the latter is more than that of the former.

Advantages of Cash budget:

- It helps to ascertain the shortage of cash
- It helps to identify excess of cash, so that the surplus cash can be invested for a short period
- It helps to ensure sufficient cash is available when required.

5.9 Recent trends in budgeting:

I. Zero Base Budgeting (ZBB): According to the official CIMA terminology, zero base budgeting is, “a method of budgeting which requires each cost element to be specifically justified, as though the activities to which the budget relates were being undertaken for the first time. Without approval, the budget allowance is zero” . Under ZBB the programmes and activities get evaluated and ranked from zero base as if these were launched for first time. In this technique of budgeting the unwanted projects and activities get dropped and wanted and desirable activities and projects get included in the budget.

Features:

- a. It starts from zero
- b. All activities are identified in appropriate decision packages
- c. All programmes are considered totally afresh
- d. A detailed cost benefit analysis of each programme is undertaken
- e. There is an officer responsible for each decision packages
- f. Priorities are established and decision packages are ranked

Advantages of ZBB

- It considers every time alternative ways of performing the same job. It helps the management to get a critical appraisal of its activities.
- It is helpful to the management in making optimum allocation of scarce resources
- ZBB is particularly useful for service departments and Governments
- It ensures active participation of managers in the budgeting process.
- It promote high level of motivation at the level of unit managers
- It focuses on output in relation to value for money.
- It makes managers cost conscious and helps them in identifying priorities in the overall interest of the organization.

Difference between Traditional budgeting and ZBB

Traditional budgeting ZBB	ZBB
1. Begins with previous year's budget	1. Begins with zero a based
2. Focuses on money	2. Focuses on goals and objectives
3. Produces a single level of expenditure for an activity	3. Produces alternative level of expenditure and desired result
4. Resources are allocated not on the basis of cost benefit analysis	4. Resources are allocated on the basis of cost benefit analysis
5. Prepared annually	5. Prepared once in every five years

II. Activity base budgeting: The CIMA official terminology defines activity based budgeting as, "a method of budgeting based on an activity frame work and utilizing cost driver data in the budget setting and variance feedback processes." In the case of traditional budgeting, budgets are established on the basis of budget centers. In the case of activity based budgeting, however, the budget centres are activity based cost pools or cost centres in relation to which budgets are prepared. Separate cost pools are established for each type of activity.

III. Performance budgeting: - Performance oriented budgets are established in such a manner that each item of expenditure related to a specific responsibility centre is closely linked with the performance of that centre. The following matters will be specified very clearly in such budgeting

- a. Objectives of the organization and for which funds are requested
- b. Cost of activities proposed for the achievement of these objectives
- c. Quantitative measures to measure the performance
- d. Quantum of work to be performed under each activity.

Advantages of performance budgeting:

- It improves budget formulation process
- It enhances accountability of the executives
- It facilitate more effective performance audit
- It presents clearly the purpose and objectives for which funds are required

Practical problems

1. From the following particulars, you are required to find out (a) Contribution (b) Break-even point in units (c) Margin of safety and (d) Profit

Total Fixed cost Rs. 4,500

Total Variable cost Rs. 7,500

Total Sales Rs. 15,000

Units sold 5,000 units

Also calculate the volume of sales to earn profit of Rs. 6,000

[ANS: (a) Contribution Rs. 7,500 (b) Break-even point in units Rs. 3,000 units (c) Margin of Safety Rs. 6,000 (d) Profit Rs. 3,000]

2. From the following data, calculate:

(a) P I V Ratio.

(b) Profit when sales are Rs. 40,000.

(c) New break-even point if selling price is reduced by 20%.

Fixed Expenses Rs. 8,000.

Break-Even point Rs. 10,000.

[Ans : (a) Profit volume ratio 40%. (b) Profit when sales are Rs. 40,000 is Rs. 8,000.

(c) New break-even point if selling price is reduced by 20% is Rs. 32,000.]

3. From the following particulars you are required to calculate (a) P I V ratio and (b) Break-even point:

Present sales Rs. 2,00,000

Variable cost Rs. 1,20,000

Fixed expenses Rs. 40,000

Ascertain the effect of 10% reduction of selling price on (a) P I V ratio and (b) Break-Even Point. Also calculate the sales required to maintain the profit at the present level.

[Ans : (a) P I V Ratio 40% ; New P I V Ratio = 33%.

(a) Break-even point Rs. 1,00,000; New BEP = Rs. 1,20,000. (b) Sales required to maintain the profit at the present level. Present profit Rs. 20,000. Required Sales Rs. 1,81,820.)

4. Present production and sales : 8,000 units

Selling price per unit Rs. 20

Direct labour Rs. 2.50

Variable overhead Rs 100% of direct labour cost

Direct materials Rs. 5

Fixed costs Rs. 40,000 Find out;

(a) P/V Ratio

(b) Sales required to break-even point and

(c) Margin of safety

[Ans: P/V ratio 50% ; BEP Rs 80,000, Margin of safety Rs 80,000]

MODEL QUESTION PAPER

PART – A

Answer any TWO Questions
(2X12=24MARKS)

1. From the following particulars, prepare a cost sheet for the year ending 31-12-2011.

Opening stock of raw materials (1-1-2011)	50,000
Purchases of raw materials	1,60,000
Closing stock of raw materials (31-12-2011)	80,000
Wages – productive	1,50,000
General	20,000
Chargeable expenses	40,000
Rent, rates and taxes – factory	10,000
Rent, rates and taxes – office	1,000
Depreciation on plant and machinery	3,000
Salary – office	5,000
Salary – travelers	4,000
Printing and stationery	1,000
Office cleaning and lighting	800
Repairs and renewals (factory)	6,400
Other factory expenses	5,000
Management expenses (including managing Director's fees)	24,000
Travelling expenses of salesmen	2,200
Showroom expenses and samples	2,000
Carriage and freight – outwards	2,000
Carriage and freight – inwards	9,000
Octroi on purchases	1,000
Advertisement	30,000
Sales	4,60,000

Management expenses should be allocated in the ratio of 2:1:3 on factory, office and sales departments.

2. The received side of the Stores Ledger Account shows the following particulars:

Jan. 1	Opening Balance: 500 units @ Rs.4
Jan. 5	Received from vendor: 200 units @ Rs.4.25
Jan.12 Received from vendor:	150 units @ Rs.4.10
Jan.20 Received from vendor:	300 units @ Rs.4.50
Jan.25 Received from vendor:	400 units @ Rs.4

Issues of material were as follows:

Jan. 4- 200 units; Jan.10- 400 units; Jan. 15- 100 units; Jan 19- 100 units; Jan.26- 200 units;
Jan.30- 250 units.

Issues are to be priced on the principle of "first in first out". Write the Stores Ledger Account in respect of the materials for the month of January.

3. Explain briefly the classification of budgets?

PART – B

(2X7=14MARKS)

Answer any TWO questions

4. Differentiate costing and cost accountancy.

5. Beta 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
Units 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 rs.24,000.

6. Calculate the minimum stock level, maximum stock level, re-ordering level and average stock level from the following information:

- (i) Minimum consumption = 100 units per day
- (ii) Maximum consumption = 150 units per day
- (iii) Normal consumption = 120 units per day
- (iv) Re-order period = 10-15 days
- (v) Re-order quantity = 1,500 units
- (vi) Normal re-order period = 12 days

PART – C

Answer any FIVE questions

(5X4=20MARKS)

7.a). From the following information, find out the amount of profit earned during the year, using marginal cost equation:

Fixed Cost	Rs.5,00,000
Variable Cost	Rs.10 Per Unit
Selling Price	Rs.15 Per Unit
Output Level	1,50,000 Units

b). Write down the objectives of cost accounting.

c) What are the manual methods of time-keeping?

d) What are the disadvantages of time wage system?

e) Rate per hour = Rs.1.50 per hour

Time allowed for job = 20 hours

Time taken = 15 hours

Calculate the total earnings of the worker under the Halsey Plan. Also find out effective rate of earnings.

f) Find the Prime Cost, Works Cost, Cost of production, total Cost and profit from the following:- Direct Materials Rs.20000; Direct Labour Rs. 10000; Factory Expenses Rs. 7000; Administration Expenses Rs. 5000; Selling Expenses Rs. 7000 and Sales Rs.60,000.

g) Sales 10,000 Units @ Rs.25 Per Unit

Variable Cost Rs.15 Per Unit

Fixed Costs Rs.1,00,000

Find Out The Sales For Earning A Profit Of Rs.50,000

PART – D

Answer any SIX questions

(6X2=12MARKS)

8 a) Define marginal cost.

b) What is cost sheet?

c) What is meant by budgetary control?

d) Give the meaning of normal idle time?

e) What is meant by Machine Hour Rate?

f) What are direct expenses?

g) Marginal cost Rs.2400, Selling Price Rs.3000. Calculate P/V ratio.

h) Direct material Rs.10000, Direct Labour Rs. 8000, Direct Expenses Rs. 12000. Find prime cost.

ANSWERS FOR THE MODEL QUESTION PAPER

PART -A

1.Solution:

Statement of cost and profit for 2011

	Rupees	Rupees
Materials consumed		
Opening stock	50,000	
Add purchases	1,60,000	
Add carriages freight inwards	9,000	
Add octroi on purchases	1,000	
	2,20,000	
Less closing stock	80,000	
	1,40,000	
Cost of materials used		
Productive wages	1,50,000	
Chargeable expenses	40,000	
	3,30,000	
Factory expenses		
General wages	20,000	
Rent, rates and taxes	10,000	
Depreciation on plant and Machinery	3,000	
Repairs and renewals	6,400	
Other factory expenses	5,000	
Management expenses: 1/6 of Rs.24,000	8,000	52,400
	3,82,400	
<i>Factory cost</i>		3,82,400
Administrative expenses		
Rent, rates and taxes	1,000	
Salary	5,000	
Printing and stationery	1,000	
Cleaning and lighting	800	
Management expenses:1/6 of Rs.24,000	4,000	11,800
		11,800

<i>Cost of production</i>		3,94,200
Selling and distribution expenses		
Advertising	4,000	
Show-room expenses and samples	2,000	
Traveller's salary	4,000	
Salesmen's travelling expense	2,200	
Carriage outwards and freight	2,000	
Management expenses: 3/6 of Rs.24,000	12,000	26,200
<i>Cost of sales</i>		4,20,400
<i>Sales</i>		4,60,000
		<hr/>
Profit		39,600
		<hr/>

2.

SOLUTION

STORES LEDGER
ACCOUNT

Date	Particulars	Receipts			Issues			Balance		
		Quantity (Units)	Total Cost(Rs)	Unit cost(Rs)	Quantity (units)	Total Cost(Rs)	Unit cost(Rs)	Quantity (units)	Amount (Rs)	Per unit(Rs)
Jan 1	Balance b/d	-	-	-	-	-	-	500	2000	4
Jan 4	Requisition slip no.	-	-	-	200	800	4	300	1200	4
Jan 5	Goods received note no.	200	850	4.25	-	-	-	300	1200	4
								200	850	4.25
Jan 10	Requisition slip no.	-	-	-	300	1200	4			
					100	425	4.25	100	425	4.25
Jan 12	Goods received note no.	150	615	4.10	-	-	-	100	425	4.25
								150	615	4.10
Jan 15	Requisition slip no.	-	-	-	100	425	4.25	150	615	4.10
Jan 19	Requisition slip no.	-	-	-	100	410	4.10	50	205	4.10
Jan 20	Goods received note no.	300	1350	4.50	-	-	-	50	205	4.10
								300	1350	4.50
Jan 25	Goods received note no.	400	1600	4.00	-	-	-	50	205	4.10
								300	1350	4.50
								400	1600	4.00
Jan 26	Requisition slip no.	-	-	-	50	205	4.10	150	675	4.50
					150	675	4.50	400	1600	4.00
Jan 30	Requisition slip no.	-	-	-	150	675	4.50	300	1200	4.00
					100	400	4.00			

3. TYPES OF BUDGETS:

1. Long -Term Budgets:

The long-term budgets prepared for a long period of five to ten years. They are concerned with planning the operations of a firm over a considerably long period of time. The financial "controller" exclusively for the top management usually prepares long-term budgets. These budgets are very useful in terms of physical units (i.e. quantities) or percentages, since accrued values may be difficult to forecast over such long-period. Capital expenditure, research and development budgets, etc, are examples of long-term budgets.

2. Short Term Budgets:

Short-term budgets are budgets prepared for a short period of one to two year. They are prepared for those activities the trend in which cannot be for seen easily over long periods. These budgets are very useful incase of consumer goods industries such as sugar, cotton, textiles, etc. they are generally prepared in terms of physical units (i.e.. quantities) as well as monetary units (i.e. values) materials budget.

Each budget etc, are example of short-term budget. They are useful to lower level of management for control purpose.

3. Current Budgets:

Current budget is a budget, which is established for use over a short period of time and is related to current conditions. Thus current budgets are essentially short term budgets adjusted to current (i.e., present or prevailing) condition or circumstances. They are prepared for a very short period. Say, a quarter or a month. They related to current activities of the budgets.

4. Interim Budgets:

Interim budgets are budgets, which are prepared in between two budget periods. These budgets may get integrated with the budget of the following period.

CLASSIFICATION OF BUDGETS ACCORDING TO CONTENT

Budgets may be classified into budgets in physical terms and into budgets in monetary terms.

A) BUDGETS IN PHYSICAL TERMS:

Budgets in physical terms are budgeted that budget in terms quantities only. They do not include corresponding rupee value. Long-term budgets are usually prepared in physical terms. Examples of such budgets are production budgets, material budget etc...

B) BUDGETS IN MONETARY TERMS:

Budgets in monetary terms are budgets that budget in terms of quantities as well as their corresponding rupee value, sales budget, purchase budget, etc are example of such budgets. Budgets such as cash budget, capital expenditure budget, etc that may not have physical quantities also from part of budgets in monetary terms.

CLASSIFICATION OF BUDGETS ACCORDING TO FUNCTION:

Budgets can be classified into:

1. operating budgets
2. financial budgets
3. master budgets

1) Operating Budget:

These budgets relate to different activities or operations of a firm. The number of such budgets depends upon the size and nature of the business, the commonly used operating budgets are:

- 1) Sales budgets
- 2) Purchase budgets
- 3) Raw material budgets
- 4) Labour budgets
- 5) Factory utilization budget
- 6) Manufacturing expenses or works overhead budget
- 7) Administrative and selling expenses budget etc.

The operating budget for a firm may be constructed in terms of programmes or responsibility areas, and hence may consist of:

Programme budget

Responsibility budget

A) Programme Budget:

It consists of expected revenues and costs of various products or projects that are termed as the major programmes of the firm, such a budget can be prepared for each product line or project showing revenues, cost and the relative profitability of the various in locating areas where efforts may be required to reduce costs and increase revenues. They are also useful in determining imbalance and inadequacies in programmes so that corrective action may be taken in future.

B) Responsibility Budgets:

Where the operating budget of a firm is constructed in terms of responsibility Areas, such a budget show the plan in terms of persons responsible for achieving them. It is used by the management as a control them. It is used by the management as a control device to evaluate the performance of executives who are in charge of various cost centers. Their performance is compared to the targets (budgets), set for them and proper action is taken for adverse results.

Responsibility areas may be classified under three broad categories:

Cost /expense center

Profit center

Investment center

2) Financial Budgets:

Financial budgets are concerned with cash receipts and disbursements, working Capital, financial position and results of business operations. The commonly used financial budgets include cash budget, working capital budget and income statement budget, statement of retained earnings budget, budgeted balance sheet or position statement budget.

3) Master Budgets:

The master budget is the summary budget incorporating its functional budgets.

All The operational and financial budgets are integrated into the master budget. The budget officer for the benefit of the top level management prepares this budget. This budget is used to coordinate the activities of various functional departments. It is also used as an effective control device.

CLASSIFICATION ON THE BASIS OF FLEXIBILITY

A) Fixed Budget:

According to ICMA London a fixed budget is a budget which is designed to

Remain unchanged irrespective of the level of activity actually attained it is based on a fixed volume of activity and shows one volume of output and related cost. It is not adjusted according to the actual level of activity attained. A fixed budget is useful only when the actual level of activity corresponds with the budgeted level of activity. But this generally does not happen as such a fixed budgets is not useful for managerial purposes.

B) Flexible Variable Sliding Scale or Control Type Budgets:

According to ICMA London a flexible budget is a budget which is designed to Change in accordance with the level of activity actually attained. Thus a flexible budget changes according to the change in the level of activity. In other words it provides the budgeted costs at any level of activity.

Business activity cannot be accurately predicted on account of uncertainties of Business environment. A flexible budget contains several estimates for different assumed circumstances instead of just one estimate, it provides for automatic adjustments with changes in the volume of activity. Hence, a situations operating in an unpredictable environment.

PART – B

4. Distinction Between Costing And Cost Accounting

Costing is the technique and process of ascertaining costs. It tries to find out the cost of doing something, i.e., the cost of manufacturing an article, rendering a service, or performing a function. Cost accounting is a broader term, in that it tries to determine the costs through a formal system of accounting (unlike costing which can be performed even through informal means). Stated precisely, cost accounting is a formal mechanism by means of which costs of products and services are ascertained and controlled. The institute of cost and management accountants, u.k. define cost accounting as: the application of accounting

and costing principles, methods and techniques in the ascertainment of costs and the analysis of savings and/or excesses as compared with previous experience or with standards. It, thus, includes three things:

- Cost Ascertainment: finding out the specific and precise total and unit costs of products and services.
- Cost Presentation: reporting cost data to various levels of management with a view to facilitate decision making.
- Cost Control: this consists of estimating costs for production and activities for the future, and keeping them within proper limits. Budgets and standards are employed for this purpose.

Cost accounting also aims at cost reduction, i.e., achieving a permanent and real reduction in cost by improving the standards. Cost accountancy is a comprehensive term that implies the 'application of costing and cost accounting principles, methods and techniques to the science, art and practice of cost control'. It seeks to control costs and ascertain the profitability of business operations.

5. Solution:

$$\text{Selling Price Per Unit} = \frac{60,000}{20,000} = \text{Rs.3}$$

$$\text{Variable Cost Per Unit} = \frac{30,000}{20,000} = \text{Rs.1.50}$$

$$\begin{aligned} \text{(A) Contribution Per Unit} &= \text{Selling Price Per Unit} - \text{Variable Cost Per Unit} \\ &= \text{Rs.3} - \text{Rs.1.50} \\ &= \text{Rs.1.50} \end{aligned}$$

$$\begin{aligned} \text{(B) Break-Even Point} &= \frac{\text{Total Fixed Cost}}{\text{Contribution Per Unit}} \\ &= \frac{\text{Rs.18,000}}{\text{Rs.1.50}} \\ &= 12,000 \text{ Units} \end{aligned}$$

$$\begin{aligned} \text{(C) Margin Of Safety} &= \text{Units Sold} - \text{Break-Even Point} \\ &= 20,000 - 12,000 \\ &= 8,000 \text{ Units (Or) Rs.24,000} \end{aligned}$$

$$\begin{aligned} \text{(D) Profit} &= (\text{Units Sold} \times \text{Contribution Per Unit}) - \\ \text{Fixed Cost} & \\ &= (20,000 \times \text{Rs.1.50}) - \text{Rs.18,000} \\ &= \text{Rs.12,000} \end{aligned}$$

2. Volume Of Sales To Earn A Profit Of Rs.24,000

$$\begin{aligned} & \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Contribution Per Unit}} \\ & = \frac{18,000 + 24,000}{1.50} = 28,000 \text{ units} \end{aligned}$$

6.Solution

Re-ordering Level = Maximum Consumption x Maximum re-order period = 150 units x 15 days = 2,250 units

Minimum Stock Level = Re-ordering Level - (Normal consumption x Normal re-order period) = 2,250 - (120 x 12) = 810 units

Maximum Stock Level = Re-ordering Level + Re-order Quantity - (Minimum Consumption x Minimum Re-Order Period)

= 2,250 + 1500 - (100 x 10) = 2,750 units
Average stock Level = Minimum Stock Level + $\frac{1}{2}$ Re -order Quantity

= 810 units + $\frac{1}{2}$ x 1500 units = 1,560 units

PART C

7a).Solution:

Contribution = Selling Price - Variable Cost = (1,50,000 X 15) - (1,50,000 X 10)

= Rs.22,50,000 - Rs.15,00,000

= Rs.7,50,000

Contribution = Fixed Cost + Profit

Rs.7,50,000 = 5,00,000 + Profit

Profit = 7,50,000 - 5,00,000

= (C - F)

Profit = Rs.2,50,000

7 b).OBJECTIVES OF COST ACCOUNTING: (UTILITY OF COSTING)

Ascertainment of Cost (Cost Finding): The primary objective of cost accounting is ascertainment of cost. It is done through the methods and techniques of costing. Costing is the process of collection, classification and analysis of costs or expenses.

Control of Cost: A basic function of cost accounting is control of costs. Cost control refers to, regulate the cost of production. In simple words, control of cost means maintain the level of cost which means cost per unit remain constant.

Cost Reduction: Cost reduction is the real and permanent reduction in the unit of goods manufactured or services. In other words cost reduction means reduce the cost of production, which means reduce the cost per unit of output.

Fixation of Selling Price: The total cost and the margin requirement determines the price of a product. Cost accounting provides detailed information regarding total cost in the form of various stages. It is aid to management for fixation of selling price.

Framing Business Policy: Cost accounting helps the management in formulating business policy and decision making. For.eg. Break even analysis and Cost volume profit analysis etc.

7 C) The manual methods of time keeping are as follows:

- Attendance Register Method, and
- Metal Disc Method

Attendance Register Method

This is the traditional method where an attendance register or muster roll is kept at the time office near the factory gate or in each department. The timekeeper records the name of the worker, the worker's number, the department in which he is working, the rate of wages, the time of arrival and departure, normal time and overtime. If the workers are literate, they may make a record of time themselves in the presence of a time-keeper or foreman.

This method is simple and inexpensive and can be used in small firms where the number of workers is not large. However recording the time of workers who work at customers' premises and places which are situated at a distance from the factory is not practical in this method.

Metal Disc Method

Under this method, each worker is allotted a metal disc or a token with a hole bearing his identification number. A board is kept at the gate with pegs on it and all tokens are hung on this board. These boards can be maintained separately for each department so that the workers can remove the token without delay and put it in a tray or box kept near the board. Immediately after the scheduled time for entering the factory, the box is removed and the latecomers will have to give their tokens to the timekeeper and their exact time of arrival is recorded. The tokens or disc left on the board will represent the absentee workers: Later the timekeeper records the attendance in the attendance register and subsequently it is passed on to the Pay Roll Department.

7 d) The disadvantages of this method are:

- Workers are not motivated.
- Workers will get payment for idle time.
- Efficient workers will become inefficient in the long run as all of them get same wages.
- Employer finds it difficult to calculate labour cost per unit as it varies as production increases and decreases.
- Strict supervision is necessary to get the work done.
- Inefficiency results in upsetting the production schedule and increases the cost per unit.
- It will encourage a tendency among workers to go slow so as to earn overtime wages.

7. e) SOLUTION:

Standard time (S) = 20 hours

Time taken (T) = 15 hours

Rate per hour (R) = Rs.1.50 per hour

Total Earnings = T x R + 50% (S-T) x R

$$= 15 \times \text{Rs. } 1.50 + \frac{50}{100} (20-15) \times \text{Rs. } 1.50$$

100

=Rs.26.25

Total wages for 15 hours = Rs.26.25

Therefore, effective rate of earning per hour

$$= \frac{\text{Total Wages}}{\text{Actual Time Taken}} = \frac{\text{Rs. } 26.25}{15} = \text{Rs. } 1.75$$

Actual Time Taken

(The percentage of bonus is taken as 50% when not given)

7 f) **Solution:**

Prime Cost = Direct Materials + Direct Labour = Rs.20,000 + Rs.10,000 = Rs.30,000.

Works Cost = Prime Cost + Factory Expenses = Rs.30,000 + Rs.7,000 = Rs.37,000.

Cost of Production = Works Cost + Administration Expenses = Rs.37,000 + Rs.5,000 = Rs.42,000.

Total Cost or Cost of sales = Cost of Production + Selling Expenses = Rs.42,000 + Rs.7,000 = Rs.49,000.

Profit = Sales - Total Cost = Rs.60,000 - Rs.49,000 = Rs.11,000.

7 g) **Solution:**

Sales To Earn A Profit Of Rs.50,000

(Fixed Cost + Profit) Sales

= _____

Sales – Variable Cost

$$1,00,000 + 50,000 \times 2,50,000$$

= _____

2,50,000 – 1,50,000

$$1,50,000 \times 2,50,000$$

= _____

1,00,000

$$= \text{Rs. } 3,75,000$$

PART –D

- 8 a) **Marginal Cost:** According to the institute of cost and management accountants (ICMA), london, marginal cost is 'the amount at any given volume of output by which aggregate costs are changed if the volume of output is increased or decreased by one unit'.
- b) **Cost sheet:** The expenses of a product are analysed under different heads in the form of statement. This statement is called cost sheet.
- c) **Budgetary control:** budgetary control is the system of management control and accounting in which all operations are forecast and so as possible planned ahead and actual results compared with the forecast and the planned ones.
- d) **Normal Idle Time:** This represents the time, the wastage of which cannot be avoided and, therefore, the employer must bear the labour cost of this time. But every effort should be made to reduce it to the lowest possible level. Examples of normal idle time are: time taken in going from the factory gate to the department in which the worker is to work and back at the end of the day, time taken in picking up the work for the day.
- e) **Machine Hour Rate.** Machine hour rate is the cost of running a machine per hour. It is one of the methods of absorbing factory expenses to production. 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 depends on the actual circumstances of the individual case
- f) **Direct Expenses** are expenses directly identified to a particular cost centre. Hence expenses incurred for a particular product, job, department etc are direct expenses. Example royalty, excise duty, hire charges of a specific plant and equipment, cost of any experimental work carried out especially for a particular job, travelling expenses incurred in connection with a particular contract or job etc.
- g) Solution :pv ratio=contribution/sales X 100:
contribution = sales – variable cost
= 3000-2400 =600
=600/3000 X 100 = 20%.
- h) Solution :
prime cost = direct material+ direct labour+ direct expenses
= 10000+8000 + 12000 = 30000

SUGGESTED READINGS:

- Jain S.P. and Narang K.L – Cost Accounting
- T.S.Reddy and Y.Haripraasad Reddy- Cost Accounting
- N.K.Prasad and V.K.Prasad - Cost Accounting
- Saxena and Vashist - Cost Accounting

BOOKS FOR REFERENCE:

- Wheldon A.J - Cost Accounting and costing methods
- Iyengar S.P. Cost Accounting : Principles and Practice
- KhannaB.S.Pandy I.M. Ahuja G.K and Arora M.N. – Practical Costing
- Hansen / Mowen – Cost and Management accounting and Control