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INTRODUCTION OF COST & MANAGEMENT ACCOUNTING

Unit Structure

1.0 OBJECTIVE

- Understanding the concepts related to Financial, Cost and Management Accounting.
- Understanding the role of cost
- Understanding the various classification of cost for product and services.

1.1 INTRODUCTION

Accounting comprises compilation, record, categorization and demonstration of financial data. The word "Accounting" can be classified into 3 classifications viz. Financial Accounting; Management Accounting and Cost Accounting.

Financial Accounting has arisen with the growth of large-scale business in the form of joint stock companies. General community money is involved in share capital; companies act has provided a legal framework to the present-day operating results and financial position of the company. Financial accounting is concerned with the preparation of a profit and loss account and balance sheet to disclose information to the shareholders. If financial accounting is oriented towards the preparation of a financial statement which summarizes the result of operations to select a proper period of time and show the financial position of the business on a particular day. Financial accounting is concerned with providing information to the external users so preparation of financial statements is a statutory obligation. Financial accounting is required to be prepared in accordance with the generally accepted accounting principles and the practice. In fact the corporate law that governs the enterprise not only makes it mandatory to prepare such accounts but also lays down the

format and information to be provided in such accounts. In sharp contrast management accounting is entirely optional and there is no standard format for preparation of the report. Financial accounts relate to the business as a whole while management accounts focus on a part of segments of the business. In sharp contrast management accounting is entirely optional and there is no standard format for preparation of the report. Financial accounts relate to the business as a whole while management accountant accounts focus on a part of segments of the business.

Management accounting does a new approach to accounting. The term management accounting is composed of two words management and accounting. It refers to accounting for the management. Management accounting is a modern tool for management. Management accounting provides the techniques for internal interpretation of accounting data. Your accounting should serve the needs of management. The management is concerned with decision making. So the role of management accounting is to facilitate the process of decision making by the management. The managers in all types of organizations needs information about the business activity activities to plan, accurately for the future and make the decisions for achieving the goal of the enterprise and certainly it is the characteristics of the decision-making process and uncertainty cannot be eliminated also together but can be reduced the function of management accounting is to reduce the uncertainty and helps the management in decision making process. Management accounting is the field of accounting which deals with providing information including the social accounting information to the managers to use in planning, decision making, performance evaluation, control, management of costs and cost determination for financial reporting. Management accounting contains reports prepared to fulfill the needs of management.

Cost Accounting: Way back to 15 century no accounting system was there. It was a barter system rebuilt in the last year of the 15th century Luca Pacioli, an Italian found out the double entry system of accounting in the year 1494. Later it was developed in England and all over the world up to the 20th century. During these 400 years the purpose of cost accounting needs to serve as a small branch of financial accounting except for a few Royal wallpaper manufacturing factories in France and some iron Masters and bottles in 18 centuries. The period of 1880AD – 1925 AD saw the development of complex product design and the emergence of multi activity diversified corporation like dew point, General Motors et cetera It was during this period that the scientific management was developed which led the accountant to convert physical standards into cost standards and later being used for warrants analysis and control. During World War I and II the social importance of cost accounting grew with the growth of each country's defense expenditure. In the absence of a competitive market for most of the material required for war, the government in several countries placed a cost plus contract under which the price to be paid per porch cost production plus an aggregate rate of profit. The reliance on cost estimation by parties to defense contracts continued after

World War II. In addition to the above the following factors have made accountant to find new techniques to serve the industry :-

1. Limitations placed on financial accounting.
2. Improved cost consciousness.
3. Rapid industrial development after the Industrial Revolution and world wars.
4. To control galloping price rises, the cost of computing the precise cost of product and services.
5. To control cost several legislations passed throughout the world and India too such as Essential Commodities Act, Industrial Development and Regulation Act.

In India, prior to Independence there were few cost accountants and they were qualified mainly from high CMA London during the Second World War the need for developing profession in the country was filled and leadership of forming an Indian institution was taken by some members of the defense service employed at Kolkata however the enactment of the cost and Works accountants of India act 1959 the Institute of cost and Works accountants of India was established at Kolkata the profession as and further importance in 1968 when the government of India introduced cost audit under section 233 (8) of the companies act 1956 at present under section 148 of companies act 2013.

1.2 DISTINCTION AND RELATIONSHIP AMONG FINANCIAL ACCOUNTING, COST ACCOUNTING AND MANAGEMENT ACCOUNTING

1.2.1 Financial Accounting & Cost Accounting

A. Financial accounting provides information about the business in a general way that is profit and loss account, balance sheet of the business to the owners and other outside partners whereas cost accounting provides information to the management for proper planning, operation, control and decision-making.

B. Financial accounting classifies records and analyzes the transaction in a subjective manner that is according to the nature of expenses whereas cost accounting records the expenditure in an objective manner that is according to the purpose for which the costs are incurred.

C. Financial accounting leaves and means in the face of the recording aspect without attaching any importance to control whereas cost accounting provides a detailed system of control for materials, labor and overhead cost with the help of standard costing and budgetary control.

D. Financial accounting reports operating results and financial position usually at the end of the year whereas cost accounting gives information through cost report to the management as and when desired.

E. Financial accounts or accounts of the whole business are independent in nature whereas cost accounting is only a part of financial accounts and disclose profit or loss of each product, job or services.

F. Financial accountants record all the commercial transactions of the business and include all the expenses that are manufacturing, office, selling etc. whereas cost accounting relates to the transaction connected with the manufacturing of goods and services means expenses which enter into production.

G. Shall accounts are concerned with the external transaction that is the transaction between the business concern and the third-party whereas cost accounts are concerned with internal transactions which do not involve any cash payment or receipt.

H. In financial accounting only transactions which can be measured in monetary terms are recorded whereas in cost accounting non-wanted information like number of units, number of hours are used.

I. Financial accounting deals with the actual figures and facts only whereas cost accounting deals with the partly facts and figures and partly estimates and standards.

J. Financial accounting does not provide information on efficiencies and various workers, plant and machineries whereas cost accountant provides valuable information on the efficiencies of employee plant and machineries.

K. In Financial accounting stocks are valued at cost or market price whichever is lower whereas in cost accounting stocks are valued at cost only.

L. Financial accounting is a positive sign as it is a subject to legal entities with regard to preparation of financial statements whereas cost accounting is not only positive science but also normative because it includes techniques of budgetary controls and standard costing.

M. Financial accounts are kept in such a way to meet the requirements of companies act 2013 as per section 128 and income tax act 1961 section 44AA whereas generally the cost accounts are kept voluntarily to meet the requirements of the management only in some industries cost accounting records are kept as per the companies' act.

1.2.2 Cost Accounting and Management Accounting

Management accounting is primarily concerned with the management. It involves application of appropriate technique and concept which helps the management in establishing a plan for reasonable economic objectives. It helps in making rational decisions for accomplishment of these objectives.

Any workable concept or technique whether it is drawn from cost accounting, financial accounting, economics, mathematics and statistics can be used in management accountancy. The data used in management accountancy should satisfy only one broad test. It should serve the purpose that it is intended for. A management accountant gathers, summarizes and analyzes the available data and presents it in relation to specific problems, decisions and debt to the task of a management. A management accountant reviews all the decisions and analyzes from a management point of view to determine how these decisions and analysis contribute to overall organizational objectives. Accountants judge the relevance and adequacy of available data from management point of view.

The scope of management accounting is broader than the scope of cost accountancy. In cost accounting the primary emphasis is on cost and it deals with its collection analysis, relevance interpretation and presentations for various problems of management accountancy utilizing the principles and practice of financial accounting and cost accounting in addition to other management techniques for efficient operations of a company. It widely uses different techniques from various branches of knowledge like statistics, mathematics, economics, law and psychology to assist the management in its task of maximizing profits or minimizing losses. The main thrust in management accountancy is towards determining policy and formulating plans to achieve the desired objectives of management. Management accounting makes corporate planning and strategy effective.

1.3 ROLE OF COST IN DECISION MAKING ANALYSIS

A cost system reveals unprofitable activities, losses or inefficiencies occurring in any form such as wastage of manpower, ideal time and last time. Wastage of material in the form of spoilage, excessive scrap and wastage of resources for example inadequate utilization of plant, machinery and other facilities. Cost locates the exact cause for decrease or increase in the profit or loss of the business. It identifies the unprofitable product or product line so that these may be limited or alternative measures may be taken. Cost furnishes suitable data and information to the management to serve as guides in making decisions involving financial consideration.

Cost is useful for Price fixation purposes. Although the sale price is generally related more to economic conditions prevailing in the market than to cost, the latter serves as a guide to test the adequacy of selling prices. With the application of standard costing and budgetary control methods the optimum level of efficiency is set. The cost comparison helps in cost control, comparison maybe period to period, of the figures in the respect of the same unit or factory or several units in an industry by employing uniform cost and inter-firm comparison methods. Comparison may be made in respect of cost of jobs, process or cost centers. Cost system provides ready figures for use by the government, wage tribunal and boards and labor and trade unions. When a concern is not working to full capacity due to various reasons such as shortage of demands or

bottleneck in production, the cost of ideal capacity can readily work out and be repealed to the management. Introduction of a cost reduction program combined with operation research and value analysis techniques leads to economic growth.

Marginal costing is employed for suggesting a source of action to be taken so it is a useful tool for the management for making decisions. Determination of cost centers or responsibility centers to meet the need of cost accounting system ensures that the organ organizational structure of the consent has been properly laid and the responsibilities can be properly defined and fixed on individuals. Perpetual inventory system which includes a procedure for continuous stocktaking is an essential feature of caste system. The operation of a system of a cost audit in the organization prevents manipulation and fraud and assists in furnishing correct and reliable cost data to the management as well as to the outside parties like shareholders, the consumers and the government.

1.4 CLASSIFICATION OF COST

Cost accounting standard one, the base for cost classification is as follows:

1. Nature of Expenses
2. Relation to Object
3. Functions or Activities
4. Fixed, Semi Variable and Variables
5. Management Decision Making
6. Production Process
7. Time Period

1. Classification By Nature Of Expenses:

Costs should be gathered together in their natural groupings such as material, labor and other direct expenses. The items of cost differ on the basis of their nature; the element of cost can be classified in the three categories 1. Material, 2. Labour And 3. Expenses

(1)Material cost is the cost of material of any nature used for the purpose of production of a product or a service. It includes the cost of material, freight in words, taxes and duties, insurance etc., directly attributed to the acquisition, but excluding the trade discount, duty drawback and refund on account of excise duty and VAT.

(2)The labor post means the payment made to the employees, permanent or temporary for their service. Labor cost includes salaries and wages paid to permanent employees, temporary employees and also to the employees of the contractor. Here salaries and wages include all the benefits like provident fund, gradually, ESI, over time and incentives.

(3)The expenses or other than material cost and labor cost which are involved in an activity.

2. Classification By Relation To Object I.E. Cost Center Or Cost Unit

Expenditures can be allocated to a cost center or cost object in an economically feasible way then it is called direct otherwise the cost component will be termed as indirect. According to these criteria for classification, material cost is divided into direct material cost and indirect material cost, the labor cost is divided into direct labor direct labor cost and indirect labor cost and expenses are divided into Direct expenses and indirect expenses.

(1)The direct material cost is the cost of materials which can be directly allocated to the cost center or cost object in an economically feasible way; whereas the indirect material cost is the cost of material which cannot be directly allocable to a particular cost center or cost object.

(2)The direct labor cost is a cost of wages of those workers who are readily identified or linked with the cost center or cost object; whereas indirect labor cost is the cost of wages of employees which are not directly allocable to a particular cost center.

(3)The direct material expenses are expenses other than the direct material and direct labor which can be identified or linked with a cost center or cost object whereas the indirect expenses are the expenses other than of the nature of material or labor cannot be directly allocable to a particular cost center.

3. Classification By Function Or Activities

A business enterprise performs a number of functions like manufacturing, selling, research etc. Cost may be required to be determined for each of these functions and on this basic functional cost may be classified into Production or manufacturing cost; Administration cost; Selling and distribution cost; Research and development cost.

(1) **Production Or Manufacturing Cost:** production cost is the cost of all items involved in the production of a product or services. This refers to the cost of operating the manufacturing division of an undertaking and includes all costs incurred by the factory from the receipt of raw materials and supply of law labor and services until production is completed and the finished product is packed with the primary packing. Direct material, direct labor, direct expenses, factory overheads are considered as a production or manufacturing cost.

(2) **Administration Cost:** the admission cost or expenses incurred for general management of an organization. These are in the nature of indirect cost and also termed as administrative overheads. For understanding the administration cost it is necessary to know the scope of administrative functions. The administrative functions in any organization are concerned with formulation of policy, directing the organization and controlling the

operation of an organization but administrative functions will not include control activities concerned with the production, selling and distribution and research and development therefore the administration cost is the cost of administrative function such as salary of office staff accounts and directors, rent rate and appreciation of office building, postage stationery and telephone bills, office supplies and expenses, and the general administration expenses.

(3) **Selling And Distribution Cost:** selling cost or indirect cost related to selling of products or services and include all indirect cost in sales management for the organization. Distribution costs are the costs incurred in handling products from the time it is completed in the work until it reaches the ultimate consumers. Selling function includes activities directed to create and stimulate demand for company products and secure orders. Distribution cost incurred to make the sellable goods available in the hands of the customer. The selling and distribution cost include (A) salaries and commission of a salesman and sales managers, (b) expenses of advertisement and insurance, (c) the rent, rates, depreciation and insurance of sales office and warehouses, (d) cost of insurance, freight, export, duty, packaging, shipping and (e) maintenance of delivery vans.

(4) **Research & Development Costs:** Research & development costs are the cost for undertaking research to improve quality of present product or improve process of manufacture, develop a new product, market research and commercialization thereof. Did you search and development cost comprises development of new product, improvement of existing products, finding new uses for known products, solving technical problem arising in manufacture and application of products and development cost includes the cost incurred for commercialization or implementation of research findings.

4. Classification Based On Behavior

5.4.1. Fixed cost is the cost which does not vary with the change in the volume of activity in the short run. This cost is not affected by temperature fluctuation in activity of an enterprise. These are also known as a period cost for example rent, depreciation etc.

5.4.2. Variable cost is the cost of an element which tends to directly vary with a volume of activity. Variable cost has two parts: variable direct cost and variable indirect cost. Variable indirect costs are termed as variable overheads for example direct labor, outward freight etc.

5.4.3. Sammy variable cost contains both fixed and variable elements. They are partly affected by fluctuations in the level of activity. These are partly fixed and partly variable cost and vice versa for example factory supervision, maintenance etc.

5. Classification Based On Management Decision Making

5.5.1. Marginal cost is the aggregate of variable cost that is prime cost + variable overheads. Marginal cost per unit is the change in the amount at

any given volume of output by which the aggregate cost changes if the volume of output is increased or decreased by one unit. Marginal costing system is based on the system of classification of cost into fixed and variable. The fixed cost is excluded and only the marginal cost that is the variable cost or taken into consideration for determining the cost of product and the inventory of work in progress and completed products.

5.5.2. Cost is the change in the cost due to change in activity from one level to another.

5.5.3. Opportunity cost is the value of alternative foregone by adopting a particular strategy or employing resources in a specific manner. It is the return expected from an investment other than the present one. These refers to posts which result from the use or application of material, labor or other facilities in a particular manner which has been foregone due to not using the facility in the manner originally planned.

5.5.4. Replacement Cost is the cost of an acid in the current market for the purpose of replacement. The replacement cost is used for determining the optimum time of replacement of an equipment or machine in consideration of maintenance cost of the existing one and its productive capacity.

5.5.5. Relevant cost or cost which are relevant for specific purpose or situation. In the context of decision-making, only those costs are relevant to the decision at hand. Since we are concerned with the future cost only while making a decision, historical cost, unless they remain unchanged in the future period or irrelevant to the decision-making process.

5.5.6. Sunk costs which are incurred, that is some is the past and or not relevant to the particular decision-making problem being considered. Sunk costs are those that have been incurred for a project and which will not be recovered if the project is terminated. While considering the replacement of a plant did appreciate the book value of the older one, it is irrelevant as the amount is some cost which is to be written off at the time of replacement.

5.5.7. Normal cost is a cost that is normally incurred at a given level of output in the conditions in which that level of output is achieved. Abnormal cost is an unusual and typical cost whose occurrence is usually irregular and unexpected and due to some abnormal situation of the production.

5.5.8. Avoidable costs are those which under a given condition of performance efficiency should not have been incurred. Unavoidable costs which are inescapable costs, which are essentially to be incurred, within the limits. It is the cost that must be incurred under a programme of business restrictions.

5.5.9. Engineered cost relates to an item where the input has an explicit physical relationship with the output. For example, in the manufacture of a product, there is a definite relationship between the units of raw material

and labor time consumed and the amount of variable manufacturing overhead on the one hand and units of products produced on the other.

5.5.10. Uniform costing applies to costing principles and procedures which are adopted in common by a number of undertakings which desire to have the benefits of a uniform system. The methods of uniform costing may be extended so as to be useful in interfirm comparison.

6. Classification By Nature Of Production

5.6.1. Batch Costing: Batch costing is the aggregate cost related to a cost unit which consists of a group of similar articles which maintains its identity throughout one or more stages of production. In this method the cost of a group of products is ascertained. The unit cost is a batch or group of identical products instead of a single job, order, or contract.

5.6.2. Process Costing: production process such that goods are produced from one sequence of continuous or effective operations or processes, the cost incurred during the period which is considered as a process cost. The process cost per unit is detected by dividing the process cost by the number of units produced in the process during the period. Process costing is employed in the industry where a continuous process of manufacturing is carried out.

5.6.3. Operation Cost: Operation cost is the cost of specific operation involved in the production process or business activity. The cost unit in this method is operation instead of process; when the manufacturing method consists of a number of distinct operations, operation costing is suitable.

5.6.4. Operating Cost: Operating cost is the cost incurred in conducting a business activity. Operating cost refers to the cost of undertaking which does not manufacture any product but which provides services.

5.6.5. Contract Costing: Contract cost is the cost of a contract with some terms and conditions between contractor and contractor. This method is used in undertakings, carrying out, building or construction contracts like contractional engineering concerns.

5.6.6. Joint Cost: Joint costs are the common cost of facilities or services employed in the output of two or more simultaneously produced or otherwise closely related operations, commodities or services. When a production process is such that from a set of same input two or more distinguish different products are produced together, products of greater importance are termed as Joint Products and products of minor importance are termed as By-Products and the costs incurred prior to the point of separation are called Joint Cost.

7. Classification By Time

5.7.1. Historical Costs: Historical costs are the actual costs of acquiring assets or producing goods or services. They are post mortem costs ascertained after they have been incurred and they represent the cost of actual operational performance. Historical costing follows a system of accounting to which all values are based on costs actually incurred as relevant from time to time.

5.7.2. Predetermined Costs: Predetermined costs for a product are computed in advance of the production process, on the basis of a specification of all the factors affecting cost and cost data. Predetermined cost may be either standard or estimated.

5.7.2.1. Standard Cost: A predetermined norm applies as a scale of reference for assessing actual cost, whether these are more or less. The standard cost serves as a basis of cost control and as a measure of productive efficiency, when ultimately posed with an actual cost.

5.7.2.2. Estimated Cost: Estimate costs of a product are prepared in advance prior to the performance of operations or even before the acceptance of sale order. Estimated cost is found with specific reference to product in questions and the activity levels of the plant. It has no link with actual and hence it is assumed to be less accurate than the standard cost.

2

ELEMENTS OF COST

Unit Structure

2.0 Objective

2.1 Elements of cost - Materials, Labor, and Overheads

2.2 Allocation and apportionment of overheads

2.0 OBJECTIVE

1. Understanding the difference between direct and indirect cost as well as apportionment and allocation of cost

Cost is a measurement in monetary terms of the number of resources used for the production of goods or rendering services. Cost in simple words means the total of all expenses. Cost is also defined as the amount of expenditure incurred on or attributable to keeping things or to a certain cost of given things. It is that which is given or in Satish satisfied to obtain something. The cost of an article consists of actual outgoings or ascertained charges incurred in its production and sale. The cost ended down and it is always advisable to qualify the word cost to show exactly what it means for example prime cost, factory cost, etc. What is also different from value is the cost is measured in terms of money whereas value is in terms of the usefulness or utility of an article.

2.1 ELEMENTS OF COST

1.1. Direct Material Cost :

The direct material cost can be defined as the cost of material which can be attributed to its cost object in an economically feasible way. Are those materials which can be identified in the product or can be conveniently measured and charged to the product therefore these materials directly enter the product and form a part of Finnish products for example timber in furniture making, cloth in dressmaking, bricks in building a house. The following or normally classified as a direct material:

1. All raw materials like jute in the manufacture of gunny bags, pig iron in the foundry, and fruit in the canning industry.

2. Material specifically purchased for a specific job, process, or order like glue for bookbinding, and starch powder for dressing yarn.

3. Parts or components purchased or produced like batteries for transistor radios.

4. Primary packing material like cotton, wrapping cardboard boxes.

1.2. Indirect Material Cost

Materials the cost of which cannot be directly linked to a particular cost object. Indirect materials are those materials that do not normally become a part of the finished product. It has been defined as the materials which cannot be allocated but which can be appropriated to or absorbed by the cost center or cost unit. Pizza stores used in the maintenance of machinery, building like will you break and cotton waste bricks and cement; stores used by the service department like non-group to departments like power House boiler house and canteen; deals which do not which are due to their cost being small and not consider worthwhile to be treated as direct materials.

1.3. Direct Labour Cost

The cost of an employee can be linked to a cost object in an economically feasible way. In simple words, it is that labour that can be identified only to a particular job, product, or process or expanded in converting the raw material into finished goods. Wages of such labour or known as direct wages therefore it includes the payment made to the following group of laborers like labour engaged inthe actual production of the product or in carrying out of an operation or process; the labour engaged in adding the manufactured by way of supervision, maintenance tools settings, transportation of material; inspector, analyst especially required for such production.

1.4. Indirect Labour Cost

The labour cost cannot be directly linked to a particular cost object. The wages of that labour which cannot be allocated but which can be apportioned by the cost center first unit is known as indirect labour. In other words paid to labour which are employed other than on power production constitute indirect labour cost example of such labour or charge hands and supervisors; maintenance workers; main employed in the service department, material handling and internal transport; apprentice, trainees, and instructors; clerical staff and labour employed in time office and security office.

1.5. Direct Expenses Cost

The direct expenses or expenses relating to the manufacture of products or rendering of services can be identified or linked with the cost object other than direct material cost and direct labour cost. Direct expenses include all expenditures other than direct material or direct labour that is specifically incurred on a particular product or process. Search expenses are charged directly to the particular cost account concerned as a part of the prime cost. Examples of direct expenses or excise duty, royalty, architects fees, cost of rectifying defective work, travel expenses to the cities, experimental expenses of pilot projects, expenses of designing or drawing patterns or models, repairs and maintenance of plants obtained on higher, higher or special equipment obtained for a contract.

1.6. Indirect Material Cost

The indirect material cost cannot be directly linked to the manufacture of a product or rendering services which can be identified or linked with the cost object other than indirect material cost and indirect labour cost.

1.7. Overheads

Overhead comprises indirect material, indirect implied cost, and indirect expenses which are not directly identifiable or allocable to a cost object. Overheads may be defined as the aggregate of the cost of indirect material, indirect labour, and such other expenses including services as cannot conveniently be charged directly to a specific cost. Therefore the overheads for all expenses other than direct expenses. In general terms, favorite compromise comprises all expenses incurred for or in connection with the general organization of the whole or part of the undertaking which is the cost of operating supplies and services used by the undertaking and includes the maintenance of capital assets.

1.8. Cost Center

A cost Center is a location, a person, or an item of equipment in or connected with an undertaking, concerning which cost a certain and used for cost control.

Call centers are of two types: personal and impersonal power centers. A personal cost center consists of a person or group of people. An impersonal cost center consists of a location or item of equipment or a group of equipment.

In Manufacturing concerns, cost centers generally follow the pattern or layout of the department or sections of the factory, and accordingly, there are two types of porn centers production cost centers and service cost centers. The production cost centers or engaged in production work that is engaged in converting the raw material into finished products for example machine shops, welding shops, etc. This service is for centers or ancillary to and renders service to production cost centers for example plant maintenance, administration, etc.

The number of cost centers and the size of each varies from one undertaking to another and R depends upon the expenditures involved and the requirement of the management for control.

1.9. Responsibility Center

Responsibility center in cost accounting denotes a segment of business organization for the activities of which responsibility is assigned to a specific person. Therefore a factory may be split into many centers and a supervisor is assigned with the responsibility of the Center. All past relating to the Center or collected and the management or manager are responsible for such power centers judged by reference to activity levels

achieved concerning cost. Even an individual machine may be treated as a responsible center for cost control and cost reduction.

1.10.Profit Center

A profit center is the segment of a business that is responsible for all the activities involved in the production and sales of a product, system, and services. Therefore a profit center encompasses both the cost that it incurred and revenue that is generated. Profit centers are created to delegate the responsibility to individuals and major their performance. In the concept of responsibility accounting, profit centers are sometimes also responsible for the investment made for the centers. The profit is related to the invested capital. Such a profit center may also be termed an investment center.

2.2. ALLOCATION AND APPORTIONMENT OF OVERHEADS

2.1. Introduction

Accounting for the analysis and collection of overheads, their allocation, and apportionment of different cost centers, and absorption of products or services play an important role in the determination of past as well as control purposes. A system of better distribution of power can only ensure greater accuracy in the determination of the cost of products or services. It is, therefore, necessary to follow the standard practices for a location, apportionment, and absorption of overhead for the profession of cost statement.

2.2. Definitions

2.2.1. Overheads: Overheads comprise indirect material, indirect employee cost, and indoor expenses which are not directly identifiable or a look able to cost objects in an economically feasible way. Overheads are to be classified based onthe function to which the overheads are related viz. Production Overheads, Administrative Overheads, Selling Overheads, And Distribution Overheads. Overheads may also be classified based on behavior such as variable overheads, semi-variable overheads, and fixed overheads.

2.2.2. Collection of Overheads: Collection of overheads means the pooling of indirect items of expenses from books of accounts and supportive Records in a logical group having regard to their nature and purpose. Overheads or collected based on pre-planned groupings called cost pools. Homogeneity of the cost component and introspect of their behavior and character are to be considered in developing the cost pool. The variable and fixed overheads should be collected in separate costs under a cost center. A great degree of how much unity in the cost pool or women tend to make an apportionment of overheads more rational and scientific.

2.2.3. Allocation of Overheads: allocation of overheads is assigning all items of cost directly to the cost center. An item of expense that can be directly related to percent is to be allocated to the cost center. For example depreciation of a particular machine should be allocated to a particular cost center if the machine is directly attached to the cost center.

2.2.4. Apportionment of Overheads: Apportionment of overhead is the distribution of overheads to more than one cost Centre on some equitable basis. When the indirect cost R- Mama to different cost centers, diesel is to be apportioned to the cost centers on an equitable basis. For example, the expenditure on general repair and maintenance returning to the department can be allocated to the department but has to be apportioned to various machines in the department. If the department is involved in the production of a single product, repair and maintenance of the department may be allocated to the product.

2.2.5. Primary and Secondary Distribution of Overheads: In multi-product environments, there are common service power centers which are providing services to the various production cost centers and other service cost centers. The cost of service is required to be apportioned to the relevant cost center. The first step to be followed is to apportion the overhead to different cost centers and the second step is to apportion the cost of service cost centers to production cost centers on an equitable basis. The first step is termed a primary distribution and the second step is termed a secondary distribution of overheads.

2.2.6. Absorptions of Overheads: Absorption overheads are charging of overheads from a cost center to product or services employing absorption rate for each cost center which is calculated as follows :

Overhead Absorption Rate = Total Overheads of the cost Center / Total quantum of the base.

The best is selected based onthe type of the cost center and its contribution to the product or services for example machine hours, labour hours, and quantity produced.

2.3. APPORTIONMENT AND ABSORPTION OF PRODUCTION OVERHEADS

3.1. Overheads are to be apportioned to different cost centers based on the following two principles :

3.1.1. Cause & Effect: Cause is the process or operation or activity and effect is the incurrence of cost. Apportionment of overheads based on this criterion ensures better rationality as it is guided by the relationships between cost object and cost.

3.1.2. Benefits Received: overheads are to be apportioned to the various cost centers in proportion to the benefits received by them.

3.2. Primary Distribution of overheads: primary apportionment of items of production overhead is to be selected to distribute them among the cost interest following the above principles as given above in 3.1. The basis of apportionment must be rational to distribute overheads. Once the best is selected the same is to be followed consistently uniformly. However change in the base for apportionment can be adopted only when it is considered necessary due to changes in circumstances like change in technology, degree of mechanization, and product mix it is C. In the case of such a change, proper disclosure of cost records is essential.

3.3. Secondary Distribution of Overheads: secondary distribution of overheads may be done by following either a reciprocal basis or not a simple basis. While reciprocal basis considers the exchange of service among the service department, non-reciprocal basis considers only one-directional service flow from the service cost center to other production cost centers.

3.3.1. Reciprocal basis is the service rendered by certain service percentages that are also utilized by the other POP centers. In reciprocal secondary distribution the cost of service percentage or opportunity to production cost centers as well as the other cost centers.

3.3.2. In non-reciprocal secondary distribution the cost of service cost centersare apportioned to the production cost centers, and the steps involved are

(1) the cost of the first service cost center is apportioned on a suitable basis to production centers;

(2) the next step is to apportion the cost of the second service center to the production costcenter as indicated in step (1);

(3) The process is to be continued till the cost of all service cost centers is apportioned.

3.4. Apportionment and Absorption of Administrative Overheads

Administrative Overheads include the following items of cost :

1. Printing and Stationary, other office supplies
2. Employee cost – salaries of staff
3. Establishment expenses – office rent and rates, insurance, depreciation of office building and other assets, legal expenses, audit fees, bank charges, etc.

3.5. Apportionment and Absorption of Selling & Distribution Overheads

Selling overheads and distribution overheads are collected under different cost full such as :

1. Sales employee cost
2. Rent
3. Traveling expenses
4. Warranty claim
5. Brokerage and commission
6. Advertisement relating to sales and sales promotion
7. Sales incentives
8. Bad debt
9. Secondary packaging
10. Freight and forwarding
11. Warehousing and storage
12. Insurance etc.

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3

PREPARATION OF COST SHEET

Unit Structure

3.0 OBJECTIVE

1. Ability to prepare the cost sheet

3.1 INTRODUCTION

One of the objectives of the cost accounting system is sad as the attainment of a cost-for-cost object. The cost object may be the product, service, or any cost Center the calculation of cost includes element-selection of cost, accumulation of the cost so collected for a certain volume or period, and then arranging all these accumulated costs into a sheet to calculate the total cost for the cost object. In this chapter, a productor service will be the cost object for cost calculation and cost ascertainment. A cost sheet or cost statement is "a document which provides detailed cost information". In a typical cost, cost information is presented based on functional classification however the other classification may also be adopted as per the requirement of the user of the information.

The Functional Classification Of Element Of Cost

Under this classification costs, a divided according to the functions for which they have been incurred. The following are the classification of costs based on functions.

1. Direct Material Cost
2. Direct Employee Cost
3. Direct Expenses Cost
4. Production or Manufacturing Overheads
5. Administration Overheads
6. Selling Overheads
7. Distribution Overheads
8. Research & Development Overheads

Cost Heads In A Cost Sheet

As classified based on functions are grouped into the following cost head in a cost sheet.

1. Prime Cost
2. Cost of Production
3. Cost of Goods Sold
4. Cost of Sales

1. **PRIME COST:** Prime cost represent the total direct material cost, direct employee cost, and direct expenses the total cost of each element has to be calculated separately.

Direct Material Cost	XXX
+ Direct Employee Cost	XXX
+ Direct Expenses	XXX
Prime Cost	**XXX**

1.1 Direct Material Cost: ost of direct material consumed the cost of direct concern is calculated as follows.
Direct Materials Consumed = Opening Stock of Material + Additional Purchase of Material – Closing Stock of Material.

1.2. Direct Employee Cost I is the total of payment made to the employees who are engaged in the production of goods and provision of services. Employee cost is also known as Labour Cost and it includes the following :
(a) Wages and Salary
(b) Allowances and incentives
(c) Payment for overtimes
(d) Employer's contribution to PF and other welfare funds
(e) Other benefits such as leave with pay, free or subsidized food, leave travel concessions, etc.

1.3. Direct Expenses: other than direct material cost and direct employee costs which are incurred to manufacture a product or for provision of service and can be directly traced in an economically feasible manner to cost object. The following are examples of direct expenses.
(a) Royalty paid / payable for production or provision of services.
(b) Higher charges paid for hiring specific equipment
(c) Asked for product or services specific design or drawing
(d) The cost of the product or service-specific software
(e) Other expenses are directly related tothe production of goods or provision of services.

2. COST OF PRODUCTION: In a conventional cost sheet, this item of cost can be seen. It is the total of prime cost and factory-related to ts and overheads.

Direct Material Cost	XX
Add: Direct Employee Cost	XX
Add: Direct Expenses	XX
PRIME COST	**XXX**
Add: Factory Overheads	XX
Gross Works Cost	XXX
Add: Opening Stock of Work in Process	XX
Less: Closing Stock of work in process	(XX)
Factory Cost of Works Costs	XXX
Add: Quality Control Cost	XX
Add : Research & Development Cost (process-related)	XX
Add: Administrative overheads (process-related)	XX
Less: Credit for recoveries (if any)	(XX)
Add: Packing Cost (Primary stage packing)	XX
COST OF PRODUCTION	**XXX**

2.1. Factory Overheads: It is also known as a work for production or manufacturing overhead it includes the following indirect cost :

a. consumable stores and spares
b. Presentation of plant and machinery, factory building
c. Lease rent of production assets
d. Repair and maintenance of plant and machinery, factory buildings.
e. Direct employee cost is connected with production activities.
f. Insurance of plant and machinery, factory building, stock of Raw Materials, and working process
g. Service department costs such as control room, engineering, tenancy, and pollution control.

2.2. The stock of Work in Process: the cost of opening and closing stock of work in process is adjusted to arrive at the factory or work cost. They work in process stop is valued based ona percentage of completion in respect of each element of cost.

2.3. Quality control cost is the cost of resources consumed towards the quality control procedures.

2.4. Research and development cost includes only those research and development-related cost that is incurred forthe improvement of process, system product, or services.

2.5. Administrative overhead includes the cost of production admission only; the general administration over it is not included in production cost.

2.6. Credit for recoveries is the realized or realizable value of scrap or waste that is deducted.

2.7. Packing cost is packing material that is essential to hold and preserve the product for its use by the consumer.

3. COST OF GOODS SOLD: it is the cost of production for good food. It is calculated after adjusting the values of opening and closing stock of Finnish goods it can be calculated as follows.

Direct Material Cost	XX
Add: Direct Employee Cost	XX
Add: Direct Expenses	XX
PRIME COST	**XXX**
Add: Factory Overheads	XX
Gross Works Cost	XXX
Add: Opening Stock of Work in Process	XX
Less: Closing Stock of work in process	(XX)
Factory Cost of Works Costs	XXX
Add: Quality Control Cost	XX
Add : Research & Development Cost (process-related)	XX
Add: Administrative overheads (process-related)	XX
Less: Credit for recoveries (if any)	(XX)
Add: Packing Cost (Primary stage packing)	XX

COST OF PRODUCTION	**XXX**
Add: Cost of Opening Stock of Finished Goods	XX
Less: Cost of Closing Stock of Finished Goods	(XX)
COST OF GOODS SOLD	**XXX**

4. COST OF SALES: It is the total cost of product incurred to make the product available to the customers or consumers. It includes the cost of goods sold administration and marketing expenses it is calculated as below.

Direct Material Cost	XX
Add: Direct Employee Cost	XX
Add: Direct Expenses	XX
PRIME COST	**XXX**
Add: Factory Overheads	XX
Gross Works Cost	XXX
Add: Opening Stock of Work in Process	XX
Less: Closing Stock of work in process	(XX)
Factory Cost of Works Costs	XXX
Add: Quality Control Cost	XX
Add : Research & Development Cost (process-related)	XX
Add: Administrative overheads (process-related)	XX
Less: Credit for recoveries (if any)	(XX)
Add: Packing Cost (Primary stage packing)	XX
COST OF PRODUCTION	**XXX**
Add: Cost of Opening Stock of Finished Goods	XX
Less: Cost of Closing Stock of Finished Goods	(XX)
COST OF GOODS SOLD	**XXX**
Add: Admin Overheads	XX
Add: Selling Overheads	XX
Add: Packing Expenses	XX
Add: Distribution Overheads	XX
COST OF SALES	**XXX**

THE FINAL COST SHEET

The main advantage of the cost sheet is it provides the total cost figure as well as the cost per unit of production. It helps in cost comparison, it facilitates the preparation of cost estimate required for submitting tenders, it also provides sufficient help in arriving at the figures of selling price and it facilitates the cost control by disclosing operational efficiency.

PARTICULARS	**TOTAL COST (RS.)**	**COST PER UNIT (RS.)**
Direct Material Cost	XX	XX
Add: Direct Employee Cost	XX	XX
Add: Direct Expenses	XX	XX
PRIME COST	**XXX**	**XXX**
Add: Factory Overheads	XX	XX
Gross Works Cost	XXX	XXX
Add: Opening Stock of Work in Process	XX	XX
Less: Closing Stock of work in process	(XX)	(XX)
Factory Cost of Works Costs	XXX	XXX
Add: Quality Control Cost	XX	XX
Add : Research & Development Cost (process-related)	XX	XX
Add: Administrative overheads (process-related)	XX	XX
Less: Credit for recoveries (if any)	(XX)	(XX)
Add: Packing Cost (Primary stage packing)	XX	XX
COST OF PRODUCTION	**XXX**	**XXX**
Add: Cost of Opening Stock of Finished Goods	XX	XX
Less: Cost of Closing Stock of Finished Goods	(XX)	(XX)
COST OF GOODS SOLD	**XXX**	**XXX**
Add: Admin Overheads	XX	XX
Add: Selling Overheads	XX	XX
Add: Packing Expenses	XX	XX
Add: Distribution Overheads	XX	XX
COST OF SALES	**XXX**	**XXX**
Add: Net Profit	**XX**	**XX**
SALES	**XXX**	**XXX**

Q1. The following data relates to the manufacture of a standard product during April 2023.

Raw Material	Rs. 180,000
Direct Wages	Rs. 90,000
Machine Hours Worked	10,000
Machine Per Hour Rate	Rs. 8
Administration Overheads	Rs. 35,000
Selling Overheads Per Unit	Rs. 5
Units Produced	4,000
Units Sold	3600
Selling Price Per Unit	Rs. 125

You are required to preparea cost sheet in respect of the above following: Cost Per Unit & Profit for the month.

Answer:

Cost Particulars	Total Cost Rs.	Cost Per Unit Rs.
Raw Materials	180,000	= Rs. 180,000 / 4000 Units = Rs. 45/ Unit
Add : Direct Wages	90,000	= Rs. 90,000 / 4000 Units = Rs. 22.5 / Unit
Prime Cost	270,000	= Rs. 45 + Rs. 22.5 = Rs. 67. 50
Add : Factory Overheads (10,000 hrs x Rs. 8)	80,000	= Rs. 80,000 / 4000 Units = Rs. 20
Cost of Production	350,000	= Rs. 67.50 + Rs. 20 = Rs. 87.50
Less : Closing Stock of finished goods (4000 Units – 3600 Units)	35,000	
Cost of Goods Sold	315,000	Rs. 87.50
Add: Admin Overheads	35,000	Rs. 8.75
Add: Selling Overheads (3600 units x Rs. 5)	18,000	Rs. 5.00
Cost of Sales / Total Cost	368,000	Rs. 101.25
Add: Profit	82,000	
Sales (3600 units x Rs. 125/Unit)	450,000	Rs. 125

Q2. The following information has been obtained from the records of XYZ Company for the period 1st Dec to 30th Dec. 2023.

	On 1st Dec. 2023 Rs.	On 30th Dec. 2023 Rs.
Cost of raw material	60,000	50,000
Cost of work in progress	12,000	15,000
Cost of stock of finished goods	90,000	1,10,000
Purchase of raw materials during Dec. 2023		4,80,000
Wages Paid		2,40,000
Factory Overheads		1,00,000
Admin Overheads (Production related)		50,000
Selling & Distribution Overheads		25,000
Sales		10,00,000

Prepare a cost sheet.

Answer:

Cost Particulars	**Total Amount (Rs.)**
Opening Stock of Raw Materials	60,000
Add: Purchases of Raw Materials	4,80,000
Less: Closing Stock of Raw Materials	(50,000)
Raw Materials Consumed	**4,90,000**
Add: Direct Wages	2,40,000
Prime Cost	**7,30,000**
Add: Factory Overheads	1,00,000
Works Cost	**8,30,000**
Add: Opening Stock of Work in Progress	12,000
Less: Closing Stock of Work in Progress	(15,000)
Factory Cost	**8,27,000**
Add: Admin Overheads	50,000
Cost of Production	**8,77,000**
Add: Opening Stock of Finished Goods	90,000
Less: Closing Stock of Finished Goods	(1,10,000)
Cost of Goods Sold	**8,57,000**
Add: Selling & Distribution Overheads	25,000
Cost of Sales	**8,82,000**
Add: Net Profit	1,18,000
Sales	**10,00,000**

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4

INTRODUCTION TO DIFFERENT COSTING TECHNIQUES & METHODS

Structure:

4.1. OBJECTIVES

The primary goals of this unit are to familiarize you with:

- To know the methods of Costing
- To know the Techniques of Costing
- To understand the concept of Job costing.
- To understand the concept of Process Costing.
- To know accounting treatment of process costing
- To understand the concept of Service Costing
- To know accounting treatment of service costing

4.2. INTRODUCTION OF TECHNIQUES OF COSTING

The way in which the cost of a good, service, or activity is determined is referred to as a 'technique' or a 'type'. However, these terminologies (techniques or types) also unavoidably denote the kinds of costs that are being determined, such as historical cost, standard cost, absorption (full) cost, marginal cost, etc. It is evident that the phrase "techniques of costing" refers simply to the method(s) used to calculate costs, such as job costing or process costing, without mentioning the several categories of expenses (historical, standard, full, or marginal) that are calculated using the two methods of costing (Job or Process Costing).

4.3. VARIOUS TECHNIQUES OF COSTING

The following are generally the techniques of costing:

(1) **Historical Costing:** The historical costing method involves calculating costs after they have already been incurred.

(2) **Standard Costing:** Standard costing involves establishing and using standard costs, comparing them to actual costs, and determining the variances so that corrective action can be performed. Standard costs are the predetermined costs in accordance with the film's most effective operation and resource use.

(3) **Absorption or Full Costing:** All production expenses, both fixed and variable, are applied to the goods using this costing methodology. Jobs, procedures, etc., are accounted for in the overall cost.

(4) **Variable or Marginal Costing:** With the variable costing approach, only variable production costs are applied to products or jobs; as a result, only variable costs, is included in the cost of the products or tasks. All the variable expenses are deducted from sales to find out contribution, most of the decisions are taken on the basis of contribution. For decision making purpose fixed cost is eliminated.

(5) **Uniform Costing:** In reality, uniform costing is an attempt by many undertakings and organisations to utilise comparable costing concepts and/or procedures rather than a method of costing.

4.4. INTRODUCTION OF METHODS OF COSTING

As has already been established, "costing" refers to the methods and procedures used to calculate the expenses associated with producing a good or providing a service. Depending on the nature of the product, the method of manufacturing, and the unique business circumstances, many methodologies are used in business organisations to determine costs. For instance, production is continuous while raw materials go through various stages in a textile or steel industry. In several other businesses, production is carried out in response to particular orders from various customers, and each work is plainly distinct from the others. All actions and costs incurred in service industries like transportation, healthcare, banking, etc. are mostly related to providing specific services.

4.5. VARIOUS METHODS OF COSTING

There are two methods of costing:

(A) Job Costing

(B) Process Costing

The two ways of costing mentioned above are the only ones that differ from all other methods. The following are all conceivable job and process costs variations:

(A) Job Costing

When production is carried out in accordance with a specific order and client specifications, job costing is applied in the firm. Each task (or product) stands alone from the others and is unique. Construction, shipbuilding, furniture manufacturing, and repair businesses frequently use this technique. There are several types of job costing:

(1) Batch Costing:

To calculate the cost of a group of identical or related products, batch costing is used. The unit is a group of related products grouped together, not a specific item within the batch. This technique can be applied to the production of hardware, pharmaceuticals, components, and other goods that are produced in different batches.

(ii) Contract Costing:

Both home builders and civil contractors employ this costing technique, which is based on the task costing theory. When relevant charges are collected, the contract becomes the cost unit.

(ii) Multiple or Composite Costing:

This approach of costing is employed in sectors where the nature of the product is complex, such as the automotive, aerospace, and other industries. In these situations, costs are accrued for the many parts that make up the finished product and are then added together to determine the entire cost of the product.

(B) Process Costing:

This costing approach is employed in sectors like chemicals, oil, gas, paper, etc. where manufacturing occurs continually. It is challenging to link costs to particular units, therefore the total cost is calculated as an average across all manufactured units. At each stage of manufacturing, overall cost and per unit cost may be computed for control purposes.

Process costing has the following variants:

(i) Unit or Single Output Costing:

When a single item is created and the end production is made up of uniform units, this method is applied. By dividing the entire cost by the total number of units made, one may determine the cost per unit.

(ii) Operating (Service) Costing:

The operating costing method is employed by businesses like hospitals, power plants, and transportation that provide services rather than producing physical goods. Depending on the type of service being provided, different cost units are used by these service companies. But typically, the units used are passenger miles, tonne miles in transportation, patient beds in hospital, and per students in college.

(iii) Operation Costing:

Instead of focusing on the process, this costing method seeks to determine the costs of each activity. This approach relies on the assumption that output is obtained through a variety of operations. The operations costing method is used in industries with different operations are part of the process. At the conclusion of each process, it provides better control and makes it easier to calculate the unit operation cost.

4.6. JOB COSTING

A costing technique known as "job costing" is used to calculate the price of certain jobs or lots of production that are typically produced in accordance with customer's standards. No two orders are necessarily alike, and not all orders go through the same manufacturing process, which is the key characteristic of the job order pricing system. Construction, contracting, production of machine tools, furniture, foundries, job printing, and general engineering are examples of industries that typically use the job order system to produce orders according to customer specifications.

4.6.1. Advantages Job costing has the following advantages:

1. More precise costing is possible, because all costs are compiled and directly associated with a particular order or product.
2. It is easy since the hours of direct labour and direct materials are documented by product or job.
3. Job cost sheets can be used to predict future work and manage efficiency.

It offers a foundation for comparing job costs to one another or job cost sheets to cost estimates.

4.6.2. Job costing has the following disadvantages:

1. It necessitates meticulous record-keeping for many jobs.

2. Keeping records for several tasks could be challenging.

3.Despite not being the cause, a job may be charged for inefficiencies.

4.7. PROCESS COSTING

Process costing is a type of operations costing that is utilised when standardised commodities are produced in big quantities with a constant stream of production. The chemical, petroleum, textile, steel, rubber, cement, plastic, footwear, sugar, and coal sectors all employ this costing technique. This costing technique is equally applicable to companies that manufacture small electrical components, screws, and nuts. The assembly-type sector of the economy, which produces things like typewriters, cars, planes, and home electronics like washing machines, refrigerators, electrical irons, radios, and television sets, also uses process costing.

4.7.1. Features of Process Costing:

a) The various processes that make up a factory are split into cost centres.
b) Each process has its own account, which is kept up to date.
c) Each process's individual direct and indirect costs are noted.
d) The production is continuous and the final product is the end result of series of processes.
e) One process' output serves as the input for another, until the finished product is obtained.
f) The steps taken to process the product are predetermined and followed exactly.
g) At one or more stages, multiple products, with or without byproducts, are created sequentially.
h) Controllable and preventable wastes typically occur at various phases of production.

4.7.2. Proforma of Process Account:

Process Accounts

Particular	Quantity	Amou nt Rs.	Particular	Quantity	Amoun t Rs.
To Previous Process A/c (in case of subsequent process)	XX	XX	By Normal Loss A/c (% of input)	XX	XX
To Raw Material		XX	By Weight loss	XX	-

To Wages		XX	By Scrap	XX	XX
To Factory Overhead		XX	By Sale of by-product	XX	XX
To Abnormal Gain A/c	XX	XX	By Abnormal Loss A/c	XX	XX
			By Next Process A/C or Finished Goods A/c (in the case of last process)	XX	XX
	XX	**XX**		**XX**	**XX**

4.7.3. Normal Loss: It is the part of process loss that is discovered under typical situations. A loss is unavoidable. It can't be prevented. Despite the management's efforts, it still happens. It is also known as a non-controllable loss, such as a loss through theft or evaporation. Normal loss is determined as a specific proportion of the units of input used in the relevant process. On the basis of scientific research into the production process and the nature of the raw materials, the percentage of the normal loss is determined in advance. Normal loss has a scrap value. The output of the relevant process is responsible for covering the cost of normal loss in the absence of scrap value.

Journal Entries related to Normal Loss:

a) For the scrap value of normal loss:
Normal Loss A/c Dr.
To Process A/c
b) For adjustment of the shortfall in the sale of normal loss:
Abnormal Gain A/c Dr.
To Normal Loss A/c
c) For realization of the scrap value of normal loss
Cash A/c Dr.
To normal loss A/c

Normal Loss Accounts

Particular	Quantity	Amount Rs.	Particular	Quantity	Amount Rs.
To Process A/c	XX	XX	By Abnormal Gain A/c	XX	XX
			By Cash A/c (Sale)	XX	XX
	XX	**XX**		**XX**	**XX**

4.7.4. Abnormal Loss:

It is a part of the process loss that results from abnormal conditions in the factory, such as a labour strike, equipment breakdown, a power outage, accidents, etc. Abnormal loss can be prevented. The management can handle it by taking the appropriate safety precautions. Along with regular loss, abnormal loss also happens.

Journal Entries related to abnormal Loss:

a) For the value of abnormal loss
Abnormal loss A/c Dr.
To Process A/c
b) For the scrap realized
Cash A/c Dr.
To Abnormal loss A/c
c) For transfer of the balance to costing profit & loss a/c
Costing Profit & Loss A/c Dr.
To Abnormal loss A/c

Abnormal Loss Accounts

Particular	Quantity	Amount Rs.	Particular	Quantity	Amount Rs.
To Process A/c	XX	XX	By Cash A/c (Sale)	XX	XX
			By Costing P & L A/c	-	XX
	XX	**XX**		**XX**	**XX**

4.7.5. Abnormal Gain:

When the actual wastage (loss) is less than the normal wastage or the actual output is higher than the expected output, abnormal gain results. The production department's increased efficiency leads to abnormal gain.

Journal Entries related to abnormal Gain:

a) For the value of abnormal Gain
Process A/c Dr.
To Abnormal Gain A/c
d) For the adjustment of the scrap value of abnormal gain
Abnormal gain A/c Dr.
To Normal loss A/c
e) For transfer of the balance to costing profit & loss a/c
Abnormal gain A/c Dr.
To Costing Profit & Loss A/c

Abnormal Gain Accounts

Particular	Quantity	Amount Rs.	Particular	Quantity	Amount Rs.
To Normal Loss A/c	XX	XX	By Process A/c	XX	XX
To Costing Profit & Loss A/c	-	XX			
	XX	**XX**		**XX**	**XX**

4.7.6. Process Stock Accounts:

In some circumstances, a separate stock account is kept in addition to the relevant process account. To have control over stock at various locations, separate stock accounts should be kept.

Process Stock Accounts

Particular	Quantity	Amount Rs.	Particular	Quantity	Amount Rs.
To Balance b/d (Opening Stock)	XX	XX	By Next Process A/c (Transfer to next Process) (Balancing Amt.)	XX	XX
To Process A/c (Transfer from process)	XX	XX	By Balance c/d (Closing Stock)	XX	XX
	XX	**XX**		**XX**	**XX**

4.7.7. Formula for calculation of Process Cost:

$$Rate = \frac{Cost\ of\ the\ process - scrap\ value\ of\ normal\ loss}{Input\ in\ units - Normal\ loss\ in\ units}$$

The above rate is used to calculate amount of Abnormal Loss, Abnormal gain, closing stock and output transferred to next process.

4.8. DIFFERENCE BETWEEN JOB COSTING & PROCESS COSTING

The main point of difference between job costing and process costing are given here as under:

Basis	Job Costing	Process Costing
1) Nature	Every task is distinct from and independent to others.	As goods are made in a continuous flow, they lose their unique identities.
2) Cost ascertainment	Each job's costs are calculated independently.	Each process or department's costs are tallied on a timely basis.
3) Specific orders	Production goes against the established order.	The product is homogeneous and production is continuous.
4) Applicability	When it is necessary to associate costs with a particular product or job, job costing might be used.	On the other side, process costing is utilised when producing large quantities of identical goods continually through various departments or processes.
5) Purpose	Production in job costing typically depends on the order and specifications from the customer.	Production is done using process costing in order to store inventory and sell it later.
6) Degree of control	The production is not continuous, and each product unit is unique, making proper management somewhat challenging.	Since the production is uniform and more stable, proper control is comparatively simpler.
7) Transfer	Unless there is an excess of work or production, transfers from one job to another are uncommon.	As the product progresses from one process to another, costs are transferred from one to the next.
8) Unit cost	In job costing, unit cost is calculated by dividing the cost of the job order by the number of units of the production.	Unit costs are determined by dividing departmental or process cost by process production in process costing.

4.9. SERVICE COSTING

Operating costing is another name for service costing. It is most frequently used in situations where services are provided but no products are manufactured or produced. According to the Institute of Cost and Management Accountants (UK) operating costing is "that form of operation costing which applies where standardized services are provided either by an undertaking or by a service cost center within an undertaking".

4.9.1. Cost unit: The term cost unit may be defined as a unit of quantity of product, service in respect of which cost is ascertained. The following cost units are usually applied in different service undertaking:

4.9.2. Composite cost unit: It should be noted that several cost units in the below table, such per tonnes, per kilometre or beds per day, are composed of two components. Composite cost units are two-part cost units. Composite cost units are excellent tools for cost management. E.g. Price per passenger mile.

Nature of Business	Possible Cost Unit
Public carriers, trucks, goods trains	Per ton kms or per km
Electricity supply	Per kilowatt hours
Passenger buses and trains	Per km or passenger kms
Hospitals	Per patient day, Per bed per day
Road maintenance	Per km of road
Hotels	Per room, Room Day
Canteen	Per meal
Water supply	Per 1000 gallons
Cinema	Man shows

4.9.3. Characteristics of Operating/ Service Costing:

a) The cost-of-service output can be calculated using this way of costing.
b) The majority of firms that don't produce any tangible goods use this way of costing. However, this approach of costing is also widely used by manufacturers and nonprofit organisations.
c) Typically, the cost-of-service output is not calculated using a "single cost unit." In many situations, "Composite Cost Unit" is applied to compute cost-of-service output.
d) Because everything is intangible, determining the cost-of-service output is very subjective.
e) A significant portion of the cost-of-service output involves fixed costs.

4.9.4. Transport Costing:

The fundamental goal of transport costing is to calculate the operational costs of each vehicle and apply these costs to specific units, such as tonnes, kilometres, tonnes per mile, passengers per mile, etc.

The cost determination is important for the following purpose:

a) To determine the fare that will be imposed for transporting a passenger for a specific distance.
b) To determine the freight that will be charged for transporting products to various locations.
c) To assess alternate forms of transportation.
d) To figure out how much should be charged to various departments employing the services.

A specimen of operating cost sheet is given below:

Operating cost sheet for the month of _____.

Particular	**Total Rs.**
A) Standing Charges/ Fixed Cost:	
Insurance	XX
Depreciation*	XX
Salary of permanent staff #	XX
License fees	XX
Administrative expenses	XX
Road tax	XX
Garage rent	XX
Hire charges	XX
Interest	XX
Total (A)	XX
B) Running and Maintenance Costs:	
Cost of Diesel	XX
Cost of oils, grease, etc.	XX
Driver's Salary #	XX
Conductor Salary #	XX
Tyre, Tube, etc	XX
Total (B)	XX
C) Total Cost (A+B)	**XX**
D) Total Ton Kilometers	XX
E) Cost per Ton Kilometers $(C \div D)$	**XX**

* Generally, Depreciation will be treated as fixed cost/ standing charges. But when depreciation is charge on the basis of kilometers run, then depreciation is treated as running cost.

Salary or wages paid to drivers, conductors and cleaners will be treated as 'Running and Maintenance cost' on the assumption that no payment to be made when there is no work. However, salary or wages paid to permanent drivers, conductors or cleaners will be treated as fixed cost.

4.9.5. Hotel Costing/ Canteen Costing: Operating costing is also used by hotels, eateries, and cafeterias. The main goals of hotel costing are to establish the price for housing guests and to establish the room rent that will be charged to visitors. The majority of expenses incurred by hotels are fixed costs**.**Examples include the depreciation of a building and its equipment, furniture, and other items, insurance, the salaries of managers and permanent employees, and the expense of maintaining a garden and a lawn. The hotels also pay variable expenses. Examples include the price of power, the pay of temporary attendants, the expense of complimentary food and drink, etc. the cost of transportation for pickups and drops at the airport, the train station, etc. The term "composite unit," such as room-night, room-day, etc., is used to determine pricing. The proportion of occupancy and seasonal influence should be taken into account while determining room rent.

Additionally, many hotels have restaurants. Restaurants are typically considered a separate profit centre. Restaurant-related fixed and variable costs are all budgeted individually. Some shared expenses are allocated on an equitable basis.

Cost determination is important for the following:

a) To ascertain the operating cost of running a hotel.
b) To fix the room rent per day.

Canteen Operating cost sheet for the month of _____.

Particular	**Rs.**
A) Provisions:	
Bread	XX
Biscuits	XX
Cakes	XX
Eggs	XX
Fish	XX
Vegetables	XX
Milks	XX
Fruits	XX

Meat	XX
Others	XX
Total (A)	XX
B) Labour and Supervision:	
Supervisor	XX
Cooks	XX
Helpers	XX
Counter Clerks	XX
Cleaners	XX
Sweepers	XX
Total (B)	XX
C) Maintenance Costs:	
Crockery	XX
Glassware	XX
Towels	XX
Rent	XX
Gas	XX
Insurance	XX
Light	XX
Total (C)	XX
D) Total Operating Cost (A+B+C)	**XX**
E) Number of meals served	XX
F) Cost per meal Served $(D \div E)$	**XX**

4.9.6. Hospital Costing: Finding out how much it will cost to provide patients with medical care and figuring out how much to charge are the two basic goals of hospital costing. Most expenses are fixed in nature. The expense of air conditioning, or the depreciation of a structure or piece of equipment like an X-ray machine or a CT scanner. In general, indoor patients receive care using "composite cost units," while outdoor patients receive care using "single cost units."

Cost determination is important for the following:

a) To ascertain the operating cost of running a hospital.
b) To fix the room rent per day or bed.

Hospital Operating cost statement for the month of _____.

Particular	Total Rs.	Per unit Rs.
A) Standing Charges/ Fixed Cost:		
Insurance	XX	
Depreciation	XX	
Staff Salaries	XX	
Administration expenses	XX	
Cost of Oxygen, X-Rays, etc.	XX	
Total (A)	XX	XX
B) Variable Costs:		
Doctor's fees	XX	XX
Food	XX	XX
Medicines	XX	XX
Diagnostic Services	XX	XX
Hire charges of extra beds	XX	XX
Toilet & Bathrooms supplies	XX	XX
Total (B)	XX	XX
C) Total Operating Cost (A+B)	**XX**	**XX**
D) Number of patient days		XX
E) Cost per patient day (C ÷ D)		**XX**

4.10. SUMMARY

Process costing is the component of operation costing that is used to calculate the cost of the final product at each stage or process of production. In industries where the manufacturing process is split into two or more processes, this accounting approach is applied. Finding the process's overall cost as well as its per-unit cost for each and every process is the goal. Textile, oil, cement, pharmaceutical, and other industries are often those that use process costing.

Operating costing is a form of costing used by businesses that offer services rather than produce goods. Operating costing places more focus on determining the cost of providing services than it does on the cost of producing a product. Within an organisation, it is used by transportation firms, gas and water utilities, energy providers, canteens, hospitals, theatres, schools, etc. Additionally, some departments that support the manufacturing departments are referred to as service departments.

4.11. ILLUSTRATIONS

Illustration 1) (Process Costing)

ABC Ltd. submits the following information in respect of its product which passes through three consecutive processes viz P, Q and R for the month ended 31st March, 2022:

Particulars		P Process	Q Process	R Process
Quantitative Information				
Basic Raw Material at Rs. 15.00 per kg.	(Kgs.)	60,000	-	-
Output during the month	(Kgs.)	46,500	31,000	19,000
Stock of Process Output				
On 01-02-2008	(Kgs.)	6,000	5,000	4,000
On 29-02-2008	(Kgs.)	7,500	6,000	3,000
Other Additional Information				
Process Material	(Rs.)	2,55,000	5,40,000	4,50,000
Direct Labour	(Rs.)	1,45,000	1,05,000	90,000
Machine Overheads		80% of Direct Labour	150% of other factory overhead	40% of process Material
Other Factory Overheads	(Rs.)	1,68,000	2,25,000	97,000
Normal Loss (%)		20%	30%	40%
Value of Opening Stock per kg.	(Rs.)	29	70	145
Scrap Value Per Kg.	(Rs.)	12	14	16

The Percentage of normal loss is computed on the number of units entering in the process concerned. Closing stock is to be valued at the respective cost of each process during the month. You are required to prepare:

(a) Process Accounts (b) Process Stock Accounts (c) Normal Loss Account (d) Abnormal Loss Account (e) Abnormal Gain Account.

Solution:

Process P Account							
Particular	**Rate**	**Unit**	**Rs.**	**Particular**	**Rate**	**Unit**	**Rs.**
To Basic Raw Material (@Rs.15/-)	15	60000	900000	By Normal Loss (20%)	12	12000	144000
To process Material			255000				
To Labour			145000				
To Machine Overhead				By Abnormal loss	30	1500	45000
(80% on Labour)			116000				
To Factory Overhead			168000	**By Output transfer to process P Stock A/c**	**30**	**46500**	**1395000**
	-	**60000**	**1584000**	-	-	**60000**	**1584000**

$$\textbf{Rate} = \frac{\textbf{Cost of the process} - \textbf{scrap value of normal loss}}{\textbf{Input in units} - \textbf{Normal loss in units}}$$

$$\textbf{Rate} = \frac{1584000 - 144000}{60000 - 12000}$$

$$\textbf{Rate} = \frac{1440000}{48000}$$

$$\textbf{Rate} = Rs.30/-$$

Process P Stock Account							
Particular	**Rate**	**Unit**	**Rs.**	**Particular**	**Rate**	**Unit**	**Rs.**
To balance b/d	29	6000	174000	**By Process Q A/c**		**45000**	**1344000**
To Process P A/c	30	46500	1395000	by balance c/d	30	7500	225000
	-	**52500**	**1569000**	-	-	**52500**	**1569000**

Process Q Account							
Particular	**Rate**	**Unit**	**Rs.**	**Particular**	**Rate**	**Unit**	**Rs.**
To Process P Stock A/c		45000	1344000	By Normal Loss A/c (30%)	14	13500	189000
To process Material			540000				
To Labour			105000	By Abnormal loss	75	500	37500
To Machine Overhead (150% of Other Factory Overhead)			337500	**By Output transferred to process Q Stock A/c**	**75**	**31000**	**2325000**
To Factory Overhead			225000				
		45000	**2551500**			**45000**	**2551500**

$$\textbf{Rate} = \frac{2551500 - 189000}{45000 - 13500}$$

$$\textbf{Rate} = \frac{2362500}{31500}$$

$$\textbf{Rate} = Rs.75/-$$

Process Q Stock Account							
Particular	**Rate**	**Unit**	**Rs.**	**Particular**	**Rate**	**Unit**	**Rs.**
To balance b/d	70	5000	350000	**By Process R A/c**		**30000**	**2225000**
To Process Q A/c	75	31000	2325000	by balance c/d	75	6000	450000
		36000	**2675000**			**36000**	**2675000**

Process R Account							
Particular	**Rate**	**Unit**	**Rs.**	**Particular**	**Rate**	**Unit**	**Rs.**
To Process Q Stock A/c		30000	2225000	By Normal Loss A/c (40%)	16	12000	192000
To process Material			450000				
To Labour			90000				
To Machine Overhead (40% of Material)			180000	**By Output transferred to process R Stock A/c**	**158.33**	**19000**	**3008333**
To Factory Overhead			97000				
To Abnormal Gain A/c	158.33	1000	158333				
		31000	**3200333**			**31000**	**3200333**

$$Rate = \frac{3042000 - 192000}{30000 - 12000}$$

$$Rate = \frac{2850000}{18000}$$

$$Rate = Rs.158.33/-$$

Process R Stock Account							
Particular	**Rate**	**Unit**	**Rs.**	**Particular**	**Rate**	**Unit**	**Rs.**
To balance b/d	145	4000	580000	**By finished Stock A/c**		**20000**	**3113328**
To Process R A/c	158.3	19000	3008327	by balance c/d	158.33	3000	474999
	-	**23000**	**3588327**	-	-	**23000**	**3588327**

Normal Loss Account							
Particular	**Rate**	**Unit**	**Rs.**	**Particular**	**Rate**	**Unit**	**Rs.**
To Process P A/c	12	12000	144000	By Abnormal Gain	16	1000	16000
To Process Q A/c	14	13500	189000	By Cash A/c		36500	509000
To Process R A/c	16	12000	192000				
	-	**37500**	**525000**	-	-	**37500**	**525000**

Abnormal Loss Account							
Particular	**Rate**	**Unit**	**Rs.**	**Particular**	**Rate**	**Unit**	**Rs.**
To Process P A/c	30	1500	45000	By Cash A/c (P)	12	1500	18000
To Process Q A/c	75	500	37500	By Cash A/c (Q)	14	500	7000
				By Costing P & L A/c			57500
	-	-	**82500**	-	-	-	**82500**

Abnormal Gain Account							
Particular	**Rate**	**Unit**	**Rs.**	**Particular**	**Rate**	**Unit**	**Rs.**
To Normal Loss A/c	16	1000	16000	By Process R A/c	158.33	1000	158333
To Costing P & L A/c			142333				
		1000	**158333**	-	-	**1000**	**158333**

Illustration 2) (Hotel Costing)

The following are the information given by the owner of a hotel situated at Mumbai, Maharashtra. You are required to advise him what rent should be charged per day per room from guests so that he can earn 25% profit on cost excluding interest.

a) Staff salaries per year= Rs.80,00,000.
b) Room attendance salary Rs.200 per day. The salary is paid on daily basis and services of room attendance is needed only when the room is occupied. There is one room attendant for each room.
c) Lighting, heating and power: The normal lighting expenses for a room if it is occupied for the whole month is Rs.5,000. Power is used only in winter and normal charges per month if occupied for a room is Rs.2,000.
d) Repairs to building Rs.10,00,000 per year.
e) Sundries Rs.11,40,000 per year.
f) Interior decoration Rs.10,00,000 per year.
g) Cost of building Rs.4,00,00,000. Rate of depreciation is 5%.
h) Other equipments Rs.1,00,00,000. Rate of depreciation is 10%.
i) Interest @ 5% is to be charged on its investments of Rs.5,00,00,000 on the building and equipment.

There are 100 rooms in the hotel. 80% of the rooms are normally occupied in summer and 30% of the rooms are occupied in winter. You assume that period of summer and winter is 6 months each. Normal days in a month may be assumed to be 30 including the month of February.

Solution:

Operating cost sheet

Particular	Rs.	Cost per year Rs.
Staff Salaries		80,00,000
Room attendant salary (WN 1)		39,60,000
Lighting (WN 2)		33,00,000
Power (2,000 x 6 x 100 x 30%)		3,60,000
Repairs		10,00,000
Sundries		11,40,000
Interior Decoration		10,00,000
Depreciation: On Building (WN 3)	20,00,000	
On Equipment (WN 4)	10,00,000	30,00,000
Interest on Investments		25,00,000
Total Costs per year		**2,42,60,000**

Revenue required to earn a profit of 25% on Cost:	**Rs.**
Total costs per year (including interest)	2,42,60,000
Add: Profit @ 25% on cost (excluding interest) [(Rs.2,42,60,000 – Rs.25,00,000) 25%]	54,40,000
	2,97,00,000

$$\textbf{Rent per Room per Day} = \frac{2,97,00,000}{19,800} = \textbf{Rs. 1,500/-}$$

Working notes:

1) Calculation of Room Attendants Salary per year:
Summer: 200 x 100 x 80%x 30 x6 = Rs.28,80,000
Winter: 3200 x 100 x 30%x 30 x 6 = Rs.10,80,000

Total **=Rs.39,60,000**

2) Calculation of Lighting Charges per year:
Summer: 5,000 x 6 x 100 x 80% = Rs.24,00,000

Winter: 35,000 x 6 x 100 x 30% = Rs. 9,00,000

Total **=Rs.33,00,000**

3) Depreciation on Building:
5% of Rs.4,00,00,000 =Rs.20,00,000
4) Depreciation on Equipment
10% of Rs.1,00,00,000 = Rs.10,00,000
5) Calculation of Room Days:
Summer: 100 x 80% x 30 x 6 = 14,400
Winter: 100 x 30% x 30 x 6 = 5,400
Total **=19,800**

Illustration 3) (Transport Costing)

The following expenses were incurred by a company in connection with two Trucks for 25 days.

Particular	**Truck A**	**Truck B**
Driver's Wages	1,20,000	1,25,000
Cleaner's Wages	1,30,000	1,30,000
Petrol	1,50,000	2,30,000
Depreciation	3,20,000	2,10,000

Oil	18,000	25,000
Repairs	1,40,000	1,40,000
Supervision	80,000	80,000
Garage Overhead	1,40,000	1,20,000
Road tax	45,000	45,000
Other Expenses	35,000	40,000

Truck A carried 100 tons of raw material and covered a distance of 3,000 kilometers in 25 days. Truck B carried 120 tons of raw material and covered a distance of 4,500 kilometers in 25 days.

Find out the cost per ton-kilometer. Prepare an operating cost sheet in summary form for the two Trucks for July, 2022.

Solution:

Operating cost sheet for the month July, 2022

Particular	**Truck A**	**Truck B**
A) Standing Charges/ Fixed Expenses		
Driver's Wages	1,20,000	1,25,000
Cleaner's Wages	1,30,000	1,30,000
Depreciation	3,20,000	2,10,000
Supervision	80,000	80,000
Garage Overhead	1,40,000	1,20,000
Road tax	45,000	45,000
Other Expenses	35,000	40,000
Total Standing Charges (A)	**8,70,000**	**7,50,000**
B) Running & Maintenance Cost:		
Petrol	1,50,000	2,30,000
Oil	18,000	25,000
Repairs	1,40,000	1,40,000
Total Running & Maintenance Cost (B)	**3,08,000**	**3,95,000**
C) Total Operating Cost (A+B)	**11,78,000**	**11,45,000**
D) Total Ton Kilometers	3,00,000	5,40,000
E) Cost per Ton Kilometers $(C \div D)$	**Rs.3.927**	**Rs.2.12**

Calculation of Ton Kilometer:

Truck A = $100\ tons \times 3000\ kms = 3{,}00{,}000\ ton\ Kilometer$

Truck B = $120\ tons \times 4500\ kms = 5{,}40{,}000\ ton\ Kilometer$

Illustration 4) (Transport Costing)

A transport company is running four buses between Mumbai and Pune, covering a distance of 100 kms, the seating capacity each bus is 40 passengers. The following particulars are obtained from its books for the month of October, 2022:

Particular	Rs.
Wages of drivers, conductors	48,000
Salaries of office staff	15,000
Honorarium of accountant	5,000
Diesel, oil, etc.	80,000
Repairs and maintenance	16,000
Road tax and insurance	32,000
Depreciation	52,000
Interest and other charges	40,000

Actual passengers carried were 75% of the seating capacity. All the buses ran for 30 days. Each bus made one round trip per day. Find out the fare the company should charge per passenger/km if it wants a profit of 20% on the takings.

Solution:

Operating cost sheet for the month October, 2022

Particular	**Rs.**
A) Standing Charges/ Fixed Expenses	
Wages of drivers, conductors	48,000
Salaries of office staff	15,000
Honorarium of accountant	5,000
Road tax and insurance	32,000
Depreciation	52,000
Interest and other charges	40,000

Total Standing Charges (A)	**1,92,000**
B) Running & Maintenance Cost:	
Diesel, oil, etc.	80,000
Repairs and maintenance	16,000
Total Running & Maintenance Cost (B)	**96,000**
C) Total Operating Cost (A+B)	**2,88,000**
D) Total Passenger Kilometers	7,20,000
E) Cost per Passenger Kilometers $(C \div D)$	**Rs.0.40**

Calculation of Passenger kilometer:

Passenger km= Distance x Seating capacity x Occupancy rate x No. of days x No. of trips x No. of buses

= 100 kms x 40 passengers x 75% x 30 days x 2 x 4

=7,20,000 passenger- kilometer

Calculation of fare to be charge per passenger per km:

Let fare per passenger-km be x

$$x = 0.40 \times 20\% \, of \, x$$

$$x = 0.40 \times 0.20x$$

$$x - 0.20x = 0.40$$

$$x = Rs.0.50$$

Bus fare to be charge per passenger per km = Rs.0.50/-

4.12. EXERCISES

A) Fill in the blanks:

1) Operating costing is also known as _____.
2) Unit of cost for passenger transport is _____.
3) Rent of premises is _____ cost.
4) In process Costing _____ product is manufactured.
5) Percentage of _____ loss decided in advance.
6) Abnormal loss is valued at _____.

(Answers: 1) Service Costing, 2) per passenger km, 3) Fixed, 4) Standardized, 5) normal, 6) Process cost)

B) State whether each of the following statement is True or False.

1) Normal loss is controllable.
2) Process account is credited by scrap value of Normal loss.
3) Abnormal loss cannot be avoided.
4) Driver's salary is a variable cost.
5) Cost of diesel is running cost.
6) Unit of cost for hospital is per kilometer.

(Answers: 1) False, 2) True, 3) False, 4) False, 5) True, 6) False)

C) Theory Questions.

1) Write a note on Normal Loss.
2) Write a note on Process Costing.
3) What are the methods of costing?
4) Write a note on service costing.
5) What is the difference between Job Costing & Process Costing?
6) What is transport costing? What are its objectives?

❖❖❖❖

5

MARGINAL COSTING

Unit Structure:

5.1. OBJECTIVES

The primary goals of this unit are to familiarize you with:

- To grasp the notion of Marginal Costing, read on.
- to understand the characteristics, benefits, and drawbacks of marginal costing
- To comprehend the distinction between Marginal and Absorption Costing

- Understanding the concepts of Contribution, Profit Volume Ratio, Break Even Point, and Margin of Safety, as well as how to calculate them.
- In managerial decision-making, marginal costing is used.

5.2. INTRODUCTION

Certain expenses are a mix of fixed and variable expenses. Semi-variable costs are what they're known as. In order to make managerial decisions, the mixed costs must be divided into fixed and variable costs. Variable costs fluctuate in response to variations in output volume or activity level. Fixed cost, on the other hand, is time-related and does not fluctuate with changes in activity level.

The calculation of product cost, which includes direct material, direct labour, direct costs, and variable overheads, is the subject of marginal costing. It's important to remember that variable cost per unit is constant, whereas fixed cost per unit increases with the level of output. Direct costing, contributory costing, variable costing, differential costing, and incremental costing are all terms for marginal costing.

5.3. MEANING OF MARGINAL COSTING

Marginal Cost is defined as "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." Prime Cost plus Variable Overheads is known as Marginal Cost. A constant ratio that may be represented as an amount per unit of production is known as marginal cost. Fixed cost, but at the other hand, signifies a set amount of money spent over the course of an accounting period and is not generally traceable to a specific unit.As a result, fixed costs are also known as time costs, period costs, standby costs, capacity costs, and constant costs. Direct cost, activity cost, volume cost, or out-of-pocket costs are all terms for variable cost or marginal cost.

Marginal costing is "the ascertainment of marginal costs and of the effect on profit of changes in volume or type of output by differentiating between fixed costs and variable costs." It is a process in which costs are categorized as fixed or variable, and many managerial decisions are made as a result of this classification. The split of total expenses into fixed and variable costs is a key feature of marginal costing, without which it would not exist.

5.4. FEATURES OF MARGINAL COSTING

a) The cost factor is the distinction between fixed and variable costs.
b) Only variable costs are taken into account when computing product costs.
c) Work in progress and stock of finish goods are valued at a variable cost.
d) It is a technique of cost recording and cost reporting.
e) Marginal cost is used to determine product prices.

f) This technique includes breakeven analysis and cost volume profit analysis.
g) Contribution is used to determine the profitability of various products.

5.5. ADVANTAGES OF MARGINAL COSTING

a) Marginal costing systems are easier to use than absorption costing systems since they do not have to deal with overhead apportionment and recovery overhead.
b) Making judgments based on marginal cost presentations is easier; for example, marginal costing indicates which items contribute and which fail to cover their variable costs.
c) The marginal costing technique aids management in profit forecasting. The sales volume can be planned by the management in order to achieve the needed profit.
d) When a company is made up of numerous units and produces a variety of products, marginal costing can be used to assess the performance of individual components.
e) Managerial decisions can be made using marginal costing, and some examples are as follows: Make or buy decision, accept or reject an order, determining the selling price under various scenarios, substituting one product for another, etc. Getting the most out of your labour or machine hours. Alternative options are assessed. Expanding or not expanding the business, diversification, and shutting down or not shutting down the business are all options.
f) It is feasible since fixed costs are eliminated. Inventory is valued at its lowest possible cost. As a result, it is more realistic and consistent.
g) Management reporting is more meaningful because it is focused on sales figures rather than output.

5.6. LIMITATIONS OF MARGINAL COSTING

a) **Difficulty in Analysis of overheads:** Under certain circumstances and in specific corporate contexts, separating fixed and variable expenses becomes extremely difficult. The precision with which marginal costing results are produced is determined on how precisely costs are categorised.
b) **Inappropriate basis for pricing decision :**When using marginal costing, there is a risk of making too many sales at marginal cost or marginal cost plus a some portion of fixed cost, leading to a reduction in fixed overhead recovery. During times of depression or increased competitiveness, this situation may occur.
c) **Under valuation of inventory :**Inventory is valued at variable costs in marginal costing. It could cause issues with inter-firm product transfers at marginal costs, resulting in increased profits. Employees may seek a raise in pay and other perks. The practice of excluding fixed costs from inventory costs appears to be contrary to recognized accounting practice.
d) **Not suitable in long run:** Within a restricted spectrum of activity, this premise is partially correct. Changes in pricing due to scarcity of labour and materials, trade discounts for bulk purchases, and changes in

men's productivity, among other factors, will affect the marginal cost per unit.

e) **Not acceptable for tax purpose:** For inventory valuation, income tax authorities do not recognize marginal costing.

f) **Less effective in capital intensive industry**: This method may not be appropriate for businesses with a substantial stock of work-in-progress, such as the contact and shipbuilding industries. If fixed expenses are not taken into account while valuing work-in-progress, losses may occur in the early years of the contract. After the contract is completed, a large profit will be shown.

g) **Ignores fixed cost:** New cost-effective machinery have become accessible as science and technology has progressed, resulting in lower labour costs and higher fixed expenses. A costing system that ignores a large element of the cost, namely fixed costs, cannot be very effective.

5.7. Marginal Costing and Absorption Costing

In absorption costing, expenses are classified on a functional basis, whereas in marginal costing, expenses are classified according to their nature. Fixed expenses are divided over goods depending on a predetermined level of output in absorption costing. Because fixed expenses are constant, this type of recovery will result in either an over- or under-recovery of expenses, depending on whether the actual production is larger or less than the estimate utilized for recovery. Because the contribution is used as a resource to fulfil fixed expenses, this problem will not emerge in marginal costing.

Differences between Absorption Costing and Marginal Costing

Absorption Costing	Marginal Costing
a)For product costing and inventory valuation, both fixed and variable costs are taken into account.	a) For product costing and inventory valuation, only variable costs are taken into account.
b) In absorption costing, the cost per unit decreases as production increases because the fixed cost decreases, whereas the variable cost per unit remains constant.	b) Because marginal costing is based on variable cost, the cost per unit remains constant regardless of production.
c) It could result in under and over absorption of expenses.	c) It will not cause a problem of under or over absorption.
d) Because fixed costs are included in closing stock, it indicates a higher profit.	d) As fixed costs are removed from closing stock, it indicates a lower profit.
e) It does not reveal the relationship between cost, volume, and profit.	e) The link between cost, volume, and profit is an important aspect of marginal costing.
f) Sales minus the cost of goods sold equals profit.	f) Contribution minus fixed costs equals profit.

Marginal Cost Statement

Particular	Total Cost Rs.	Per Unit Rs.
Sales	XX	XX
Less: Variable Cost	XX	XX
Contribution	XX	XX
Less: Fixed Cost	XX	XX
Profit	XX	XX

5.8. CONTRIBUTION:

The difference between the selling price and the variable cost is referred to as contribution. Contribution is named for the fact that it helps to recover fixed costs and profits.

- **The following formulas are used to calculate Contribution:**

$$Contribution = Sales - Variable\ Cost$$

Or

$$Contribution = Sales \times P/v\ Ratio$$

Or

$$Contribution = Fixed\ Cost + Profit$$

5.9. PROFIT VOLUME RATIO

P/V ratio is a common term for this. It expresses the connection between sales and contributions. It's a percentage figure. It's a metric that measures how quickly a company makes money. A high ratio suggests a high level of profitability, whereas a low ratio indicates a low level of profitability.

The profit volume ratio shows how stable the company's product is. Profit volume analysis is used to calculate break even for a product or a collection of items, as well as to see how profit changes as price, volume, costs, or any combination of these factors are changed. Profit volume ratio and contribution are strongly intertwined. Contribution can be improved to increase the profit volume ratio, and contribution can be improved by:

i) Increasing the selling price

ii) Decreasing the marginal or variable costs.

iii) Putting more emphasis on those products which have higher profit volume ratio.

- **The following formulas are used to calculate P/V ratio:**

$$\text{P/V ratio} = \frac{sales - variable\ cost}{sales} \times 100$$

Or

$$\text{P/V ratio} = \frac{contribution}{sales} \times 100$$

Or

$$\text{P/V ratio} = \frac{fixed\ cost + profit}{sales} \times 100$$

or

$$\text{P/V ratio} = \frac{change\ in\ profit}{change\ in\ sales} \times 100$$

Or

$$\text{P/V ratio} = \frac{profit}{margin\ of\ safety} \times 100$$

Or

$$Profit\ Volume\ Ratio = \frac{Fixed\ Cost}{Break\ Even\ Sales} \times 100$$

5.10. BREAK EVEN POINT

The point at which total income equals total expense is known as the break-even point (BEP). It's the point at which there's no profit or loss in terms of output or sales. Contributions are just enough to cover fixed costs at this point. When the output or sales activity reaches this level, the company begins to make a profit. Below this level of output or sales, a loss occurs.

- **The following formulas are used to calculate Break Even Point (BEP):**

Break Even Point (BEP) in Rs.:

$$\text{Break Even Point (BEP)}(in\ Rs.) = \frac{fixed\ cost}{P/V\ ratio}$$

Or

$$\text{Break Even Point (BEP)}(in\ Rs.) = \frac{fixed\ cost}{sales - variable\ cost} \times selling\ price\ per\ unit$$

Or

$$\text{Break Even Point (BEP)}(in\ Rs.) = \frac{fixed\ cost}{contribution\ per\ unit} \times selling\ price\ per\ unit$$

Or

$$\text{Break Even Point (BEP)}(in\ Rs.) = \text{break even point in units} \times \textit{selling price per unit}$$

Break Even Point (BEP) in Units:

$$\text{Break Even Point (BEP)}(in\ Units) = \frac{\textit{fixed cost}}{\textit{contribution per unit}}$$

Or

$$\text{Break Even Point (BEP)}(in\ Units) = \frac{\textit{fixed cost}}{\textit{sales price per unit} - \textit{variable cost per unit}}$$

Or

$$\text{Break Even Point (BEP)}(in\ Units) = \frac{\textit{break even sales}}{\textit{selling price per unit}}$$

Cash Break Even Point (BEP):

$$\text{Cash Break Even Point (BEP)}(in\ Rs.) = \frac{\textit{Cash fixed cost}}{\textit{P/V ratio}}$$

$$\text{Cash Break Even Point (BEP)}(in\ Units) = \frac{\textit{Cash fixed cost}}{\textit{cash contribution per unit}}$$

Assumptions in Break Even Analysis:

a) All costs can be broken down into two categories: fixed and variable.
b) Fixed costs stay the same at all levels of activity.
c) Variable costs fluctuate in total with production. It means that the variable cost per unit stays the same.
d) At all levels of activity, the selling price per unit remains constant.
e) Men's and machines' technological approaches and efficiency will not be altered.
f) The market is large enough to absorb the full output.

5.11. REQUIRED SALES FOR DESIRED PROFIT:

The Break Even Point calculation can be used to calculate profit and loss at various stages of production. Profit is zero at Break Even Point, but the profit value is used to calculate the sales volume required to make a specified profit. For this reason, the equations below can be used.

In units:

$$\text{Sales Volume Required (in Units)} = \frac{\text{Fixed Costs} + \text{Desired Profit}}{\textit{Selling price per unit} - \textit{variable cost per unit}}$$

Or

$$\text{Sales Volume Required (in Units)} = \frac{\text{Fixed Costs} + \text{Desired Profit}}{\textit{Contribution per unit}}$$

In Value:

$$\text{Sales Volume Required (in Value)} = \frac{\text{Fixed Costs} + \text{Desired Profit}}{\textit{P/V Ratio}}$$

Or

$$\text{Sales Volume Required (in Value)} = \frac{(\text{Fixed Costs} + \text{Desired Profit}) \times \text{Sales}}{\textit{Selling price} - \textit{variable cost}}$$

Or

$$\text{Sales Volume Required (in Value)} = \frac{(\text{Fixed Costs} + \text{Desired Profit}) \times \text{Sales}}{\textit{Total Contribution}}$$

5.12. MARGIN OF SAFETY

The gap between actual sales and sales at Break Even Point is the margin of safety. It's the difference between the current sales value and the Break Even Sales. A company's strength is measured by its margin of safety. A high margin of safety means that profit will be made even if the selling price falls. M/S (margin of safety) is a common abbreviation for margin of safety.

- **The following formulas are used to calculate margin of safety (M/S):**

$$\text{Margin of Safety} = \text{Actual sales} - \text{break even sales}$$

Or

$$\text{Margin of Safety} = \frac{\textit{profit}}{\textit{P/V Ratio}}$$

Or

$$\text{Margin of Safety} = \text{M/S in Units} \times \text{selling price per unit}$$

Or

$$\text{Margin of Safety in Units} = \text{Sales Units} \times \text{BEP units}$$

Or

$$\text{Margin of Safety in Units} = \frac{profit}{contribution\ per\ unit}$$

Or

$$Margine\ of\ Safety\ (in\ \%) = \frac{Margin\ of\ Safety}{Total\ Sales} \times 100$$

7.13. OTHER FORMULAS:

- $Profit = Contribution - fixed\ cost$
- $Profit = \frac{Profit\ volume\ Ratio}{Margine\ of\ Safety}$
- $Profit = Margin\ of\ safety \times profit\ volume\ ratio$
- $Fixed\ Cost = Break\ Even\ Sales \times Profit\ volume\ Ratio$

5.14. MANAGERIAL USES OF MARGINAL COSTING:

Management can utilize marginal costing to make various policy decisions, profit planning, and cost control. Here are a few examples of managerial issues where marginal costing might help in decision-making.

a) Price Fixation: Fixed costs are neglected in marginal costing, and price is decided solely on the basis of variable costs. Under typical business conditions, the fixed price must cover all costs; otherwise, the company may lose money. In some cases, such as when there is a trade depression, dumping, seasonal demand fluctuations, or a highly competitive market, pricing is determined using marginal costing rather than full costing.

b) Accepting Special Order and Exploring Additional Markets: Accepting a special order above the marginal cost and at a lower price than the regular selling price might boost a firm's total earnings in the case of spare capacity. The extra earnings generated by the particular order will go to the company. When an additional order is taken at a lower price than the current pricing in order to use idle capacity, it must be carefully examined to ensure that it will not have an adverse effect on the company's usual market and goodwill. Because it will influence relationships with other dealers, the special order from a local dealer should not be accepted.

c) Profit Planning: Marginal costing is extremely useful for evaluating the level of activity required to obtain the desired profit. The division of expenses into fixed and variable costs aids management in

planning and analyzing profit as a result of changes in volume, selling price, fixed costs, and variable costs.

d) Key Factors or Limiting Factor: According to the marginal costing method, the product with the largest contribution per unit is preferred. As long as it is able to sell as much as it can create, this inference is true. However, an organization may be able to sell whatever it makes, but output may be constrained owing to a lack of raw materials, labour, electricity, plant capacity, or money. These are referred regarded as key or limiting Factor. The firm's production and profit are limited by a crucial element or limiting factor. In this case, management must decide whether output should be expanded, decreased, or stopped. In these circumstances, the product is chosen based on the contribution per unit of a limited factor of production. The key factor, or scarce factor, should be used in a way that maximizes contribution per unit of limited resource.

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

e) Sales Mix Decisions: Profit is calculated by deducting fixed costs from contribution in marginal costing. It implies that management should make every effort to maximize the contribution. When a company develops a range of product lines, the difficulty of determining the appropriate sales mix arises. The optimal sales mix is the one that generates the most revenue. The products that contribute the most should be kept, and their production should be enhanced in response to demand. Depending on the situation, products that contribute less should be lowered or discontinued.

f) Make or Buy Decisions: A specific component utilised in the main product can be purchased or made in its own factory using idle capacity. The marginal cost of producing in the unit is compared to the market price in such a make or buy decision. If the component's marginal cost is less than the purchase price, it should be made in its own unit; otherwise, it should be purchased from the market. Because fixed expenses are assumed to have already been incurred, they are not included in the cost of manufacturing; the additional cost is simply variable cost.

g) Adding or Dropping Decisions: A company may have multiple product lines or departments. With the passage of time or owing to technical advancements, certain product lines or divisions may prove to be unproductive. Such goods or divisions may be phased out of production. In these cases, the marginal costing approach can help you make a decision. It aids in the introduction of a new product line and serves as a solid guide for determining the best combination based on available resources and product demand. Different products or departments' contributions should be compared, and the product or department with the lowest P/V ratio should be eliminated.

h) Suspension of Activities: When demand for a product is insufficient to cover fixed expenses during a period of economic downturn and fierce competition, management may consider temporarily suspending operations. If a percentage of fixed expenses, such as the wage of temporary employees, is escapable, the quantity of the contribution should be more than the escapable fixed costs. When manufacturing is restarted after a period of suspension, various additional or specific costs, such as plant and machinery overhauling, are incurred. These expenses are referred to as "extra shutdown costs." The amount of contribution is compared to the net escapable fixed costs once these costs are removed from the escapable fixed costs. The production should be continued if the contribution is larger than the net escapable fixed cost, and vice versa.

5.15. IMPACT OF CHANGES OF VARIOUS ITEMS ON CONTRIBUTION, PROFIT VOLUME RATIO, BREAK EVEN POINT, MARGIN OF SAFETY.

Change in	Contribution (Total Rs.)	Contribution (Rs. Per unit)	Profit Volume Ratio	Break Even Point	Margin of Safety
Increase in Sales Volume (Unit)	Increase	No change	No change	No change	Increase
Decrease in Sales Volume (Unit)	Decrease	No change	No change	No change	Decrease
Increase in Selling price per unit	Increase	Increase	Increase	Decrease	Increase
Decrease in Selling price per unit	Decrease	Decrease	Decrease	Increase	Decrease
Increase in Variable cost per unit	Decrease	Decrease	Decrease	Increase	Decrease
Decrease in Variable cost per unit	Increase	Increase	Increase	Decrease	Increase
Increase in Fixed cost	No change	No change	No change	Increase	Decrease
Decrease in Fixed cost	No change	No change	No change	Decrease	Increase

5.16. SOME IMPORTANT RELATIONSHIP

- $Sales = Variable\ cost + Contribution$

Sales (100%)	=	Variable Cost (%)	Plus	P/V Ratio (%)
100%	=	75%	+	25%
100%	=	70%	+	30%
100%	=	40%	+	60%
100%	=	65%	+	35%
100%	=	80%	+	20%
100%	=	78%	+	22%
100%	=	82%	+	18%

- $Sales = Break\ Even\ Point + Margin\ of\ Safety$

Sales (100%)	=	BEP(%)	Plus	MOS(%)
100%	=	75%	+	25%
100%	=	70%	+	30%
100%	=	40%	+	60%
100%	=	65%	+	35%
100%	=	80%	+	20%
100%	=	78%	+	22%
100%	=	82%	+	18%

5.17. SUMMARY

Material, labour, and expenses are the three components of costs. These costs are divided into two categories: fixed costs and variable costs. Absorption costing and marginal costing can be used to determine the cost of a product or process. The cost of a product is established using absorption costing or full costing, which takes into account both fixed and variable costs. In marginal costing, only variable expenses are taken into account when computing the cost of a product, while fixed costs are levied against the period's revenue. In comparison to absorption costing, marginal costing is a significant improvement.

The computation of marginal cost is a part of marginal costing. Variable costs are another name for marginal expenses. Direct material, direct labour, and variable overheads make up this category. Price fixation, profit planning, add and drop decisions, make or buy decisions, sales mix decisions, and other managerial decisions are all aided by marginal costing.

There are a few drawbacks to using marginal costing. It's a time-consuming and difficult operation to categories expenses into fixed and variable aspects. Assumed in marginal costing, the behaviour of the per unit variable and the total fixed cost is dubious. Despite these drawbacks, marginal costing is a useful tool for making business decisions in a variety of situations.

Break even analysis aids in determining the level of production at which total costs and total revenue are equal. Losses occur below this level of production, whereas profits occur above this level. This analysis, like marginal costing, is based on cost classification into fixed and variable costs. Break even analysis is useful for determining the impact of Sales volume changes, costs, selling price, and product mix on profit.

5.18. ILLUSTRATIONS

Illustration 1) The following information was extracted from the books of Sam Ltd.

Particular	Rs.
Sales (10,000 unit)	1,00,000
Variable Cost	60,000
Fixed Cost	30,000

Find out: 1) P/v Ratio

2) Break Even Point

3) Margin of Safety

4) Sales require to earn profit of Rs.20,000/-

5) Profit when sales are Rs.3,00,000/-

Solution:

Marginal Cost Statement (10,000 units)		
Particular	Per Unit Rs.	Total Rs.
Sales	10	100000
Less: Variable Cost	6	60,000
Contribution	**4**	**40,000**
Less: Fixed Cost		30000
Profit		**10,000**

1) Contribution

Contribution=Sales -Variable Cost

= 100000- 60000

Contribution= Rs.40,000/-

2) P/v Ratio:

$$\text{P/V ratio} = \frac{contribution}{sales} \times 100$$

$$\text{P/V ratio} = \frac{40000}{100000} \times 100$$

= 40%

3) Break Even Point:

a) $\text{Break Even Point (BEP)}(in\ Rs.) = \frac{fixed\ cost}{P/V\ ratio}$

$$= \frac{30000}{40\%}$$

= Rs.75,000/-

b) $\text{Break Even Point (BEP)}(in\ Units) = \frac{fixed\ cost}{contribution\ per\ unit}$

$$= \frac{30000}{4}$$

= 7,500 Units

4) Margin of Safety:

$$\text{Margin of Safety} = \text{Actual sales} - \text{break even sales}$$

= 1,00,000 – 75,000

= Rs.25,000/-

5) Sales require to earn profit of Rs.20,000/-

$$\text{Sales Volume Required (in Value)} = \frac{\text{Fixed Costs} + \text{Desired Profit}}{P/V\ Ratio}$$

$$= \frac{30000 + 20000}{40\%}$$

= Rs.1,25,000/-

6) Profit when sales are Rs.3,00,000/-

$$Contribution = Sales \times P/v\ Ratio$$

$$= 300000 \times 40\%$$

= Rs.1,20,000/-

$$Profit = Contribution - Fixed\ cost$$

= 120000- 30000

= Rs.90,000/-

Illustration 2) The turnover and Total costs during the two periods were as follows:

	Sales	Total cost
1st Period	25,000	20,000
2nd Period	37,500	27,500

Calculate:

1) P/v Ratio
2) Fixed Cost
3) Break Even Point
4) Amount of profit or loss when sales are Rs.20,000/-.
5) Amount of sales required to earn a profit of Rs.7,500/-.
6) Margin of safety, when sales are Rs.30,000/-

Solution:

1) P/v Ratio:

Particular	**1st Period Rs.**	**2nd Period Rs.**	**Difference**
Sales	25,000	37,500	12,500
Total cost	20,000	27,500	20000
Profit	**5000**	**10,000**	**5,000**

$$\text{P/V ratio} = \frac{change\ in\ profit}{change\ in\ sales} \times 100$$

$$= \frac{5000}{12\,500} \times 100$$

= 40%

2) Fixed Cost:

$$Contribution\ for\ 1st\ period = Sales \times P/v\ Ratio$$

$$= 25000 \times 40\%$$

= Rs.10,000/-

$$\text{Fixed Cost} = Contribution - profit$$

$$= 10000 - 5000$$

= Rs.5,000/-

3) Break Even Point:

$$\text{Break Even Point (BEP)}(in\ Rs.) = \frac{fixed\ cost}{P/V\ ratio}$$

$$= \frac{5000}{40\%}$$

= **Rs.12,500/-**

4) Amount of profit or loss when sales are Rs.20,000/-.

$$Contribution = Sales \times P/v\ Ratio$$

$$= 20000 \times 40\%$$

= Rs.8,000/-

$$Profit = Contribution - Fixed\ cost$$

= 8000- 5000

= Rs.3,000/-

5) Amount of sales required to earn a profit of Rs.7,500/-.

$$\text{Sales Volume Required (in Value)} = \frac{\text{Fixed Costs} + \text{Desired Profit}}{P/V\ Ratio}$$

$$= \frac{5000 + 7500}{40\%}$$

= Rs.31,250/-

6) Margin of safety, when sales are Rs.30,000/-

$$\text{Margin of Safety} = \text{Actual sales} - \text{break even sales}$$

$$= 30000 - 12500$$

= Rs.17,500/-

Illustration 3) SSM Ltd has the following data for the coming year:

Particular	Rs.
Sales (1,00,000 Units)	1,00,000
Variable costs	40,000
Fixed costs	50,000

a) Find out P/V Ratio, BEP and MOS
b) Find out revised P/V Ratio, BEP and MOS in following situations:
i) 20% increase in physical sales volume.
ii) 20% decrease in physical sales volume.
iii) 5% increase in variable costs per unit.
iv) 10% decrease in Fixed costs.

Solution:

Marginal Cost Statement (100000 units)		
Particular	**Per Unit Rs.**	**Total Rs.**
Sales	1	100000
Less: Variable Cost	0.40	40,000
Contribution	**0.60**	**60,000**
Less: Fixed Cost		50000
Profit		**10,000**

a) Find out P/V Ratio, BEP and MOS

1) Contribution

$$Contribution = Sales - Variable\ Cost$$

$$= 1{,}00{,}000 - 40{,}000$$

Contribution= Rs.60,000/-

2) P/v Ratio:

$$\text{P/V ratio} = \frac{contribution}{sales} \times 100$$

$$\text{P/V ratio} = \frac{60000}{100000} \times 100$$

$$\text{P/V ratio} = 60\%$$

3) Break Even Point:

i) $\text{Break Even Point (BEP)}(in\ Rs.) = \frac{fixed\ cost}{P/V\ ratio}$

$$= \frac{50000}{60\%}$$

= Rs.83,333/-

ii) $\text{Break Even Point (BEP)}(in\ Units) = \frac{fixed\ cost}{contribution\ per\ unit}$

$$= \frac{50000}{0.60}$$

= 83,333 Units

4) Margin of Safety:

$$\text{Margin of Safety} = \text{Actual sales} - \text{break even sales}$$

= 1,00,000 – 83,333

= Rs.16,667/-

b) Find out revised P/V Ratio, BEP and MOS in following situations:

i) 20% increase in physical sales volume

Particular	Units
old sales volume	100000
add: 20% increase	20000
new sales volume	**120000**

Marginal Cost Statement (120000 units)		
Particular	Per Unit Rs.	Total Rs.
Sales	1	120000
Less: Variable Cost	0.40	48,000
Contribution	0.60	72,000
Less: Fixed Cost		50000
Profit		22,000

$$\text{P/V ratio} = \frac{72000}{120000} \times 100$$

$$\text{P/V ratio} = 60\%$$

$$\text{Break Even Point (BEP)}(in\ Rs.) = \frac{50000}{60\%}$$

$$\text{Break Even Point (BEP)}(in\ Rs.) = \text{Rs.}83,333/-$$

$$\text{Margin of Safety} = 120000 - 83333$$

$$\text{Margin of Safety} = \text{Rs.}\ 36,367$$

ii) 20% decrease in physical sales volume.

Particular	Units
old sales volume	100000
Less: 20% decrease	20000
new sales volume	**80000**

Marginal Cost Statement (80000 units)		
Particular	Per Unit Rs.	Total Rs.
Sales	1	80000
Less: Variable Cost	0.40	32,000
Contribution	0.60	48,000
Less: Fixed Cost		50000
Profit		-2,000

$$\text{P/V ratio} = \frac{48000}{80000} \times 100$$

$$\textbf{P/V ratio} = \textbf{60\%}$$

$$\text{Break Even Point (BEP)}(in\ Rs.) = \frac{50000}{60\%}$$

$$\textbf{Break Even Point (BEP)}(in\ Rs.) = \textbf{Rs.83,333/-}$$

$$\text{Margin of Safety} = 80000 - 83333$$

$$\textbf{Margin of Safety} = \textbf{(Rs.3,333)}$$

iii) 5% increase in variable costs per unit.

Particular	Rs. Per unit
Old variable cost per unit	0.4
Add: 5%	0.02
New variable cost per unit	**0.42**

Marginal Cost Statement (100000 units)		
Particular	Per Unit Rs.	Total Rs.
Sales	1	100000
Less: Variable Cost	0.42	42,000
Contribution	0.58	58,000
Less: Fixed Cost		50000
Profit		8,000

$$\text{P/V ratio} = \frac{58000}{100000} \times 100$$

$$\textbf{P/V ratio} = \textbf{58\%}$$

$$\text{Break Even Point (BEP)}(in\ Rs.) = \frac{50000}{58\%}$$

$$\textbf{Break Even Point (BEP)}(in\ Rs.) = \textbf{Rs.86,207/-}$$

$$\text{Margin of Safety} = 100000 - 86207$$

$$\textbf{Margin of Safety} = \textbf{Rs. 13,793/-}$$

iv) 10% decrease in Fixed costs.

Particular	Rs.
Old fixed cost	50000
Less: 10% decrease	5000
New fixed cost	45000

Marginal Cost Statement (100000 units)		
Particular	Per Unit Rs.	Total Rs.
Sales	1	100000
Less: Variable Cost	0.42	42,000
Contribution	0.60	60,000
Less: Fixed Cost		45000
Profit		15,000

$$\text{P/V ratio} = \frac{60000}{100000} \times 100$$

$$\textbf{P/V ratio} = \textbf{60\%}$$

$$\text{Break Even Point (BEP)}(in\ Rs.) = \frac{45000}{60\%}$$

$$\textbf{Break Even Point (BEP)}(in\ Rs.) = \textbf{Rs.75,000/-}$$

$$\text{Margin of Safety} = 100000 - 75000$$

$$\textbf{Margin of Safety} = \textbf{Rs. 25,000/-}$$

Illustration 4) A company annually manufactures and sells 20,000 units of a product, the selling price of which is Rs.50 and profit earned is Rs.10 per unit.

The analysis of cost of 20,000 units is

Material Cost	Rs.3,00,000
Labour Cost	Rs.1,00,000
Overhead (50% variable)	Rs.4,00,000

You are required to compute:

(i) Contribution per unit and in Rs.

(ii) P/V Ratio

(iii) Break Even Sales in Rs.

(iv) Break Even Sales in Units

(v) Sales required to earn a profit of Rs.4,00,000

(vi) Profit when sales are 18,000 units

(vii) Margin of safety when actual sales are Rs.7,00,000

Solution:

Marginal Cost Statement (20000 units)			
	Particular	Per Unit Rs.	Total Rs.
a)	**Sales**	**50**	**1000000**
b)	Less: Variable Cost		
	Material	15	300000
	Labour	5	100000
	Overhead (50%)	10	200000
	Total Variable cost	**30**	**600000**
c)	**Contribution (a-b)**	**20**	**400,000**
d)	Less: Fixed Cost		
	Overhead (50%)		200000
e)	**Profit (c-d)**		**200,000**

(i) Contribution per unit and in Rs.

$$Contribution\ in\ Rs. = Sales - Variable\ Cost$$

$$= 1000000 - 600000$$

= Rs.4,00,000/-

$$\text{Contribution in Unit} = \text{Selling price per unit} - \text{Variable Cost per unit}$$

$$= 50 - 30$$

= **Rs. 20 per unit**

(ii) P/V Ratio

$$\text{P/V ratio} = \frac{contribution}{sales} \times 100$$

$$= \frac{400000}{1000000} \times 100$$

= **40%**

(iii) Break Even Sales in Rs.

$$\text{Break Even Point (BEP)}(in\ Rs.) = \frac{fixed\ cost}{P/V\ ratio}$$

$$= \frac{200000}{40\%}$$

= **Rs.5,00,000/-**

(iv) Break Even Sales in Units

$$\text{Break Even Point (BEP)}(in\ Units) = \frac{fixed\ cost}{contribution\ per\ unit}$$

$$= \frac{200000}{20}$$

= **10000 units**

(v) Sales required to earn a profit of Rs.4,00,000

$$\text{Sales Volume Required (in Value)} = \frac{\text{Fixed Costs} + \text{Desired Profit}}{P/V\ Ratio}$$

$$= \frac{200000 + 400000}{40\%}$$

= Rs.15,00,000/-

(vi) Profit when sales are 18,000 units

Marginal Cost Statement (18000 units)			
	Particular	Per Unit Rs.	Total Rs.
a)	**Sales**	50	9,00,000
b)	Less: Variable Cost	30	5,40,000
c)	**Contribution (a-b)**	20	3,60,000
d)	Less: Fixed Cost		2,00,000
e)	**Profit (c-d)**		**1,60,000**

OR

sales are 18,000 units i.e.

Sales = 18,000 × 50 = Rs.9,00,000/-

$$Contribution\ in\ Rs. = Sales \times P/v\ Ratio$$

$$= 900000 \times 40\%$$

= Rs.3,60,000/-

$$Profit = Contribution - Fixed\ cost$$

$$= 360000 - 200000$$

= Rs.1,60,000/-

(vii) Margin of safety when actual sales are Rs.7,00,000

$$\text{Margin of Safety} = \text{Actual sales} - \text{break even sales}$$

$$= 700000 - 500000$$

= Rs.2,00,000/-

Illustration 5) The following information is related to Laxman Limited for the year ending 31st March, 2022:

Sales – 24,000 units @ Rs.200 per unit;

profit volume ratio – 25% and Break-even point – 50% of sales.

You are required to calculate:

a) Fixed cost for the year

b) Profit earned for the year

c) Units to be sold to earn a target net profit of Rs.11,00,000 for the year

d) Selling price per unit if break-even point is to be brought down by 4,000 units

Solution:

a) Fixed cost for the year

Break-even point = 50% of sales

Sales – 24,000 units @ Rs.200 per unit = Rs.48,00,000

Break-even point = Rs.24,00,000/-

$$\text{Break Even Point (BEP)}(in\ Rs.) = \frac{fixed\ cost}{P/V\ ratio}$$

$$24{,}00{,}000 = \frac{\text{fixed cost}}{25\%}$$

$$fixed\ Cost = 2400000 \times 25\%$$

$$\boldsymbol{fixed\ Cost = Rs.6{,}00{,}000/-}$$

b) Profit earned for the year

$$Contribution\ in\ Rs. = Sales \times P/v\ Ratio$$

$$= 4800000 \times 25\%$$

= Rs.12,00,000/-

$$Profit = Contribution - Fixed\ cost$$

= 1200000 − 600000

= **Rs.6,00,000**/-

c) Units to be sold to earn a target net profit of Rs.11,00,000 for the year

$$\text{Sales Volume Required (in Units)} = \frac{\text{Fixed Costs + Desired Profit}}{Contribution\ per\ unit}$$

$$\text{Contribution per unit} = \text{Sales price per unit} \times \text{P/v Ratio}$$

$$\text{Contribution per unit} = 200 \times 25\%$$

= Rs.50/- per unit

$$\text{Sales Volume Required (in Units)} = \frac{\text{Fixed Costs + Desired Profit}}{Contribution\ per\ unit}$$

$$= \frac{600000 + 1100000}{50}$$

= 34000 units

d) Selling price per unit if break-even point is to be brought down by 4,000 units

Old BEP	12000 units
LESS:	4000 units
NEW BEP	**8000 units**

$$\text{Sales Volume Required (in Units)} = \frac{\text{Fixed Costs + Desired Profit}}{\textit{Contribution per unit}}$$

$$8000 = \frac{600000 + \text{Nil}}{\textit{Contribution per unit}}$$

$$\text{Contribution per unit} = \frac{600000}{8000}$$

Contribution per unit = Rs.75/–

If P/v Ratio is 25% then Variable cost to Sales ratio will be 75%.

Original Variable cost per unit = Original selling price × Variable cost to sales ratio

= 200 × 75%

= Rs.150/-

New selling price = New contribution per unit + Variable cost per unit

= 75 + 150

New selling price = Rs.225/- per unit

Illustration 6) The following information is provided:

Ratio of Variable cost to sales 80%

Break-even point occurs at 60% of sales capacity

Fixed cost Rs.300000/-

Calculate:

1) P/V ratio

2) Sales at Break-even point

3) Sales and profit at 100% of sales capacity

4) Profit at 75% of sales capacity

Solution:

1) P/V ratio:

Ratio of Variable cost to sales 80%

Sales = P/V ratio + Variable cost to sales ratio

100% = P/V ratio + 80%

P/V ratio = 20%

2) Sales at Break-even point

$$\text{Break Even Point (BEP)}\,(in\ Rs.) = \frac{fixed\ cost}{P/V\ ratio}$$

$$= \frac{300000}{20\%}$$

Break Even Point (BEP) (*in Rs.*) = Rs.15,00,000/-

3) Sales and profit at 100% of sales capacity

$$\text{Break Even Point (BEP)}\ in\ \% = \frac{Break\ Even\ Sales}{Total\ Sales}$$

$$60\% = \frac{1500000}{Total\ Sales}$$

$$Total\ Sales = \frac{1500000}{60\%}$$

$$Total\ Sales = Rs.25,00,000/-$$

$$Contribution\ in\ Rs. = Sales \times P/v\ Ratio$$

$$= 2500000 \times 20\%$$

= Rs.5,00,000/-

$$Profit = Contribution - Fixed\ cost$$

= 500000 – 300000

= Rs.2,00,000/-

4) Profit at 75% of sales capacity

Sales at 75% Capacity = 2500000 X 75%

= Rs.18,75,000/-

$$Contribution\ in\ Rs. = Sales \times P/v\ Ratio$$

$$= 1875000 \times 20\%$$

= Rs.3,75,000/-

$$Profit = Contribution - Fixed\ cost$$

= 375000 – 300000

= **Rs.75,000/-**

OR

You can prepare Marginal Cost statement to find out Profit.

5.19. EXERCISES

A) Fill in the blanks:

1. The technique of marginal costing is based on classification of costs into _____ and _____.
2. Contribution is the sum of _____ and _____.
3. Profit-volume ratio is the relationship between _____ and _____.
4. In absorption costing, closing stock is valued at _____.
5. Margin of safety is excess of actual sales over _____ Sales.
6. If contribution is Rs.40,000 and Sales is Rs.1,00,000, P/V ratio is _____.
7. If fixed cost is Rs.12,00,000 and P/V ratio is 20%, the BEP is _____.

(Answers: 1) fixed and variable, 2) fixed cost and profit, 3) Contribution and Sales, 4) Total Cost, 5) Break Even, 6) 40%, 7) Rs.60,00,000/-,

B) State whether each of the following statement is True or False.

1. Fixed cost per unit remains constant.
2. Variable cost per unit remains constant.
3. Contribution is the difference between the total sales and fixed cost.
4. At Break Even Point contribution equals to fixed cost.
5. P/V ratio can be improved by decreasing the selling price.
6. P/v ratio can be improved by reducing the fixed costs.

(Answers: 1) False, 2) True, 3) False, 4) True, 5) False, 6) False)

C) Theory Questions.

1. What is Marginal Costing? What are its features?
2. What are the advantages and limitations of Marginal Costing?
3. Distinguish between absorption costing and Marginal Costing.
4. Write short note on Break Even Point.
5. What factors affects Break Even?
6. Write note on Margin of Safety.
7. What are the managerial uses of Marginal costing?

❖❖❖❖

6

BUDGETING AND BUDGETARY CONTROL

Unit Structure:

6.1. OBJECTIVES

The main objectives of this unit are to acquaint you with:

- The concept of Budget and Budgetary control
- The establishment of effective Budgetary control system.
- Classification of various types of Budgets
- Preparation of different types of Budgets

6.2. INTRODUCTION

Attainment of objectives of the enterprise determines the efficiency of a management. The management can be considered effective when it achieves the objective with minimum efforts and cost. The course of action must be prepared in advance as it requires appropriate planning. Profit planning and budgeting can help to acquire effective management performance. The management's essential components are profit planning

and budgeting. The effective technique for cost control is budgeting.This is the process of pre-estimation of cost, revenue, profit and other figures for the next year or period and on that basis, actual expenses incurred revenue generated/earned. To measure the actual performance budget is used as a standard. First the deviations are observed and, on that basis, responsibility is fixed for deviations. This unit we are going to explore the basic concepts of budgeting, its classification and preparation of budgets.

6.3. MEANING OF BUDGETING

Budget and Budgetary control are the two important functions of the budgeting process. Budget is a planning function while budgetary control is a controlling system. A manager keeps the future in mind and looks for alternative courses of action and predetermines an action plan for the events and possibilities of future problems.

6.4. DEFINITION OF BUDGET AND BUDGETARY CONTROL

If we take the literary meaning of the word budget then it is a statement of income and expenditure of a selected period. According to principle, the meaning is likewise in the context of business. An individual person, a family, a local authority, state or any country can have their respective budget. Therefore, it is necessary that a business concern must have its own budget so that the objectives of the business can be attained.

So a budget can give better work results to a business enterprise. ICMA, London defines the budget as "Budget is financial and/or quantitative statement, prepared prior to a defined period of time, of the policy to be pursued during that period for the purpose of attaining a given objective".

This can also be evaluated as controlling the process of calibrating current performances and guiding them towards predetermined goals. In the planning process some desired results are predetermined which can be controlled by checking existing actions. The tool to control to achieve the budgeted goals can also be called as budgetary control. Therefore, the budgetary control is a tool of control to achieve the budgeted goals. I.C.M.A., London defines budgetary control as, "Budgetary control is the establishment of budgets relating to the responsibilities of executives to the requirement of a policy and the continuous comparison of actual with budgeted results either to secure by individual action the objectives of that policy or to provide a basis for its revision."

6.5. OBJECTIVES OF BUDGETING

Budgeting is help to achieve desire goals of the organization. Budgeting is effective planning and controlling tool. The objectives of Budgeting are:

a) Budgeting makes it possible to control expenses and increase income.
b) With the preparation of budget, the production process is carried out smoothly and efficient manner.
c) The budget helps in maintaining the coordinator in the various functions of the organization. This is important for any type of organization.
d) The Budget makes it easier to compare the actual figures with budget figures and find out the deviations in them. So, the responsibility can be fixed and corrective actions can be taken.
e) Budgets are helpful for forecasting the operating activities and financial position of a business enterprise.
f) Budgets help to fix the responsibility of the divisional managers and departmental managers.
g) To ensure that actions taken are in accordance with the targets and if required, to take suitable corrective action.
h) To predict short-term and long-term financial positions for better financial position and management of working capital in better manner.

6.6. ADVANTAGES OF BUDGETING

Following are the advantages of Budgeting:

1. Budget can be used to maximize the utilization of the resources available so that maximum return can be ensured.
2. In the process of fulfillment of targets, budget increases awareness about business enterprise at all levels of management.
3. Budgeting is helpful in better co-ordination between different functions or activities of business organization and hence, better understanding between different functions.
4. Budgeting is a process of self-examination and self-criticism which is essential for the success of any organization.
5. For the support of top management budget makes an effective path.
6. To Prefix the goals and push up the forces towards their achievement budgeting plays an important role.
7. To createan attitude of cost consciousness throughout the organization, budgeting stimulates the effective use of resources
8. Different performances of different departments can be measured through budgeting which helps in production activities.

6.7. LIMITATIONS OF BUDGETING

1. **Risk of Rigidity:** Sometimes Budget createsa sense of rigidity in the minds of people who are working in the organization. There fore, it is the need that the budget should be dynamic in nature, so that it can be updated according to situation.

2. **Budgets fail if estimates are not accurate:** The budget rely upon precision of estimates. Therefore, all the information must be considered to make the estimates. Advanced statistical techniques can be used to make accurate estimates even though forecasting is not an exact science. Therefore, Certain amount of judgment and proper interpretation is required to prepare a budget

3. **Budgeting is an expensive process:** Too much time and cost is involved in the installation and implementation of the budgeting. There fore, small organizations cannot afford to it. The large organization also conducts cost benefit analysis before installing such a system. The system can only be adopted if the benefit exceeds the cost. Experienced man-power, technical staff, analysis, control are needed therefore it is a costly affair.

4. **Continuous monitoring is required:** To check how far the plans and budgets are helpful in achieving the goals of the organization, the management must be active in monitoring Budgetary system. Merely installing the budgeting system does not imply that it is effectively carried out.

5. **Support by Top Management:** In any organization support from management members plays an important role. Similarly for the success of budgeting top management must provide its support. If there is a lack of support, the budget system might collapse.

6. **Budgeting is not a substitute for management:** Budgeting is only a tool and not a substitute for the management. Budgeting system is a tool for management. Therefore, can be considered as a system of monitoring rather than the principal activity.

6.8. ESSENTIALS OF EFFECTIVE BUDGETING

a) To lay out accurate and timely information the accounting system should be good.

b) The management must give proper support and co-operation.

c) The Staff must be strongly and properly motivated towards the systems.

d) The organization must assign the responsibility to the deserving units of the organization and should distinctively explain the organizational structure.

e) The organization should set the objectives and the target should be real and not exaggerated. The management must keep in mind the long-term plan of the organization while forming the objectives.

f) The person in charge of a particular task must be briefed about his duties and the task, he is responsible for.

g) Budgets should be prepared for the future periods on the basis of expected course of actions.

h) while establishing budgets, the budgets should be updated for the events

i) The management shall keep in mind that the budget must be flexible enough for mid-term revision.

j) The whole organisation must be committed to budgeting.

k) A master budget should be classified into various functional budgets where as a general budget should be quantifiable.

l) On periodical basis the budget should be monitored. Responsibility should be fixed and the variances from the standard yardsticks should be fixed.

m) The Budgetary performance should be linked to the reward system effectively.

6.9. STEPS FOR BUDGETARY CONTROL

The steps for Budgetary Control can be drawn as follows: -

(i) Establishment of Budgets: preparation of various budgets such as sales Budget, production budget, overhead expenses budget, cash budget etc. are the primary functions of budget control.

(ii) Responsibilities of executives: The responsibilities of executives should be fixed as per the budgetary control system by preparing the budget.

(iii) Policy making: The policies are made according to the budgets and then the responsibilities are distributed to the executives.

(iv) Comparison of actuals with budgets: The budgets are finalized and then they are compared with the actual. If there are any deviations in the budget, they are called variances.

(v) Achieving the desired result: In order to find comparison of actuals with the budgeted results the budgetary control system is used. It is also used to find the variance, and if there are any variances they are properly analyzed.

(vi) Reporting to Top Management: To take the appropriate action on the variances, causes of variances are established. Afterwards, they are reported to top management.

6.10. CLASSIFICATION OF BUDGETS

Budgets can be classified into different categories on the basis of:

a) Time,

b) Nature of expenditure and receipt

c) Functions

d) Flexibility.

Classification of Budgets			
a) Time	**b) Nature of expenditure and receipt**	**c) Functions**	**d) Flexibility**
i) Long term	i) Capital Budget	i) Sales	i) Fixed
ii) Short term	ii) Revenue Budget	ii) Production	ii) Flexible
		iii) Cost of Production	
		iv) Purchase	
		v) Cash Budget	
		vi) Personal or Direct Labour	
		viii) Capital Expenditure Budget	
		ix) Research Budget	
		x) Master Budget	

a) Classification according to Time:

i. **Long Term Budget:** Generally, a budget covering the period of more than a year can be considered as long-term budget.

ii. **Short term budget:** The budget which is prepared for a very short time of period is called as short-term budget.

b) Classification according to Nature of expenditure and receipt:

i) Capital Budget: The budget which is prepared for capital receipts and expenditure such as obtaining loans, issue of shares, purchase of assets is called as capital budget.

ii) Revenue Budget: The budget which covers revenue receipts and expenses for a certain period is called Revenue Budget. Examples: Sales, other incomes, purchases, administrative expenses etc. is called as revenue budget.

c) Classification according to functions:

i. Sales Budget: In order to show accuracy as far as possible of the sales anticipated during the period of the budget the sales budget is prepared. The sales manager assisted by research personnel prepares the sales budget. The sales budget focuses on forecast of total sales which are expressed in terms of money or quantity. This is the most important budget on which all other budgets are based.

ii. Production Budget: The production budget generally shows the production of the budget period. The production budget is dependent upon sales budget. It exhibits the quantity in terms of period, areas, etc. The work manager looks after the preparation of overall production budget while the departmental manager is responsible for departmental production budgets.

iii. Cost of Production Budget: It shows the cost of production. For the different elements like direct materials budget, direct labour budget, factory overheads budget, office overheads budget, selling and distribution overhead budget, etc. separate budgets can be prepared.

iv. Purchase Budget: This budget generally shows the quantity and value of purchase required for production. The materials which are to be purchased quantity-wise and period-wise are enlisted in this budget. This budget is correlates with the sales and production planning.

v. Cash Budget: Cash budget shows the cash position of for a specific period of time of different time period. It generally shows the balance of cash in hand at the end of different period and the estimated amount of receipt of the period. Cash budget covers the important aspect such as cash sales, collection from debtors and other receipts and payment to suppliers, payment of wages, payment of other expenses etc.

vi. Personnel Budget: The labour budget is also known as personnel budget. The budget decides the persons or labour required during a period of production. The personnel budget is also divided into direct and indirect budgets.

vii. **Capital Expenditure Budget:** Capital expenditure budget is an outlay prepared on fixed assets viz. Land, Building, Plant & Machinery etc. during the period of budget. This budget is prepared for the period of 5 to 10 years. To control the management process of the budget, it is broken down into small period. Generally, it is the responsibility of the head of the accounts to prepare the capital expenditure budget who is assisted by the plant manager and other functional heads. The functional heads have deep knowledge of Plant utilisation budget, Long term business policy, and Potential demand for certain products, etc. After the analysis of all the information a company may decide for extension factory capacity, purchase of new factory.

viii. **Research and Development Budget (R & D Budget):** It is essential for every company to do research so that effective growth and development can take place. Therefore, research and development budget is prepared. The budget covers the important aspects such as materials, equipment and supplies, salaries, expenses, and other costs relating to design, development, and technical research projects.

ix. **Master Budget:** To cover all the functions of business organization master budget is prepared. Master budget shows the profit or loss of financial position. It includes the summary of finalized profit plan by combining all the budgets of a particular period into one harmonious unit, thus it shows the budget covering all the aspects. All the subsidiary functional budgets are included in the master budget. The management does the analysis of the master budget before it is brought into action. It is made sure that the profit position disclosed in the budget is satisfactory.

d) Classification on the basis of Flexibility:

i. **Fixed Budget:** A budget prepared on the basis of a standard or a fixed level of activity is called a fixed budget. Even if the level of activity is changed there is no change in the fixed budget. If there is no change in the output or sales the same fixed budget can be continued.

ii. **Flexible Budget:** To give the budgeted cost any level of activity, flexible budget is prepared. After considering the fixed and variable elements of cost such budget is prepared.

6.11. SUMMARY:

The management can be considered effective when it achieves the objective with minimum efforts and cost. To make a management more effective budgeting and budgetary control plays a very important role. Budget and budgetary control has some objectives which helps the management and its personnel to work productively. There are many kinds of budgets which are prepared according to the required functions of a management for a particular period. Therefore, the budget plays an important role for overall development of the organization.

6.12. ILLUSTRATIONS:

Illustration 1) (Production and Purchase Budget)

The following are the estimated sales of ABC Limited for eight months ending 31st October 2022.

Month	estimated sales unit
April 2022	12,000 units
may 2022	13,000 units
June 2022	9,000 units
July 2022	8,000 units
August 2022	10,000 units
September 2022	12,000 units
October 2022	14,000 units
November 2022	12,000 units

As a matter of policy, the company maintains the closing balance Are finished goods and raw material as follows:

i. Finished goods- closing stock of a month will be e 50% of the estimated sales for the next month.
ii. Raw material- closing stock of a month will be equal to estimated consumption for the next month.

Each unit of production consumes 2 kg of raw material costing rupees 6 per kg.

Prepare the following budgets for the half year ending 30th September 2022.

i. production budget (month wise in units)
ii. raw material purchase budget (month wise in units and in cost)

Solutions:

ABC Limited

Production budget for half year ending 30th September 2022

Particular	April	May	June	July	August	September
Sales (units)	12,000	13,000	9,000	8,000	10,000	12,000
Add: - closing	6,500	4,500	4,000	5,000	6,000	7,000

stock						
	18,500	17,500	13,000	13,000	16,000	19,000
Less: - opening stock	(6,000)	(6,500)	(4,500)	(4,000)	(5,000)	(6,000)
Estimated production	**12,500**	**11,000**	**8,500**	**9,000**	**11,000**	**13,000**

Raw material purchase budget for the half year ending 30th September 2022

Particular	**April**	**May**	**June**	**July**	**August**	**September**
Estimated production	12,500	11,000	8,500	9,000	11,000	13,000
Material at 2 kg per unit of production (Kg)	25,000	22,000	17,000	18,000	22,000	26,000
Add: - closing stock	22,000	17,000	18,000	22,000	26,000	26,000
Less: - opening stock	(25,000)	(22,000)	(17,000)	(18,000)	(22,000)	(26,000)
Purchases (Units)	**22,000**	**17,000**	**18,000**	**22,000**	**26,000**	**26,000**
Cost @ Rs.6/- per Kg (Rs.)	**1,32,000**	**1,02,000**	**1,08,000**	**1,32,000**	**1,56,000**	**1,56,000**

Illustration 2) (Flexible budget)

PQR Limited is currently working at 50% capacity. Prepare flexible budget and estimate the profit for 60%, 70% and 80% capacity. The company produces 10,000 units at 50% capacity.

a) At 60% capacity the raw material cost will increase by 2% and selling price fall by 2%.

b) At70% capacity the raw material cost will increase by 4% and selling price fall by 4%.

c) At 80% capacity the raw material cost will increase by 5% and selling price fall by 5%.

d) At 50% capacity the product cost is rupees 180 per unit and it is sold at Rs.200 per unit.

The cost per unit at 50% capacity is as follows:

Material	Rs.100
Labor	Rs.30
Factory overhead	Rs.30 (40% Fixed)
Administrative overhead	Rs.20 (50% Fixed)
Total	**Rs.180**

Solution:

PQR Limited

Flexible budget

Capacity		**50%**		**60%**		**70%**		**80%**	
Units		**10000**		**12000**		**14000**		**16000**	
Particulars		**Per Unit Rs.**	**Total Rs.**	**Per Unit Rs.**	**Total Rs.**	**Per Unit Rs.**	**Total Rs.**	**Per Unit Rs.**	**Total Rs.**
A)	**Sales**	**200**	**2000000**	**196**	**2352000**	**192**	**2688000**	**190**	**3040000**
B)	**Variable Costs**								
	Direct Materials	100	1000000	102	1224000	104	1456000	105	1680000
	Direct Labour	30	300000	30	360000	30	420000	30	480000
	Variable Overhead								
	Factory Overhead	18	180000	18	216000	18	252000	18	288000
	Administrative Overhead	10	100000	10	120000	10	140000	10	160000
	Total Variable Costs	**158**	**1580000**	**160**	**1920000**	**162**	**2268000**	**163**	**2608000**
C)	**Contribution (A-B)**	**42**	**420000**	**36**	**432000**	**30**	**420000**	**27**	**432000**
D)	**Fixed Overhead**								
	Factory Overhead	12	120000	10	120000	8.57	120000	7.5	120000
	Administrative Overhead	10	100000	8.33	100000	7.14	100000	6.25	100000
	Total Fixed Overhead	**22**	**220000**	**18.33**	**220000**	**15.71**	**220000**	**13.75**	**220000**
E)	**Profit (C-D)**	**20**	**200000**	**17.67**	**212000**	**14.29**	**200000**	**13.25**	**212000**

Illustration 3) (Sales and Production budget)

MNP Limited submit the following data of its product manufactured during the first quarter of 2021 and 2022.

Particular	
Sales:	
January 2021	30,000 units
February 2021	25,000 units
March 2021	35,000 units
Selling price per unit in 2021	Rs.20
Targets for the first quarter of 2022	
Increase in sales quantity	10%
Increase in sale price	10%
Stock as on 1st January 2022 (percentage of January 2022 sales)	50%
Start as on 31st March 2022	25,000 units
Stock as on 31st January 2022 and 28 February 2022 (as percentage of subsequent month sales)	50%

Prepare sales and production budget for first quarter of 2022.

Solution:

Sales Budget			
Particular	**January 2022**	**February 2022**	**March 2022**
Sales of 2021 Units	30000	25000	35000
Add: increase by 10%	3000	2500	3500
Estimated Sales Units for 2022	**33000**	**27500**	**38500**
Sales Price per unit Rs.	22	22	22
Total Sales price Rs.	**726000**	**605000**	**847000**

Production Budget			
Particular	**January 2022**	**February 2022**	**March 2022**
Estimated Sales Units for 2022	33000	27500	38500
Add: Closing Stock	13750	19250	25000
	46750	**46750**	**63500**
Less: Opening Stock	16500	13750	19250
Estimated Production	**30250**	**33000**	**44250**

Illustration 4)

XY limited estimates sales of its product 'Z' during the last five months of 2022 as under;

Month	**Units**
August	21,600
September	31,200
October	24,400
November	20,800
December	19,600

a) Inventory of product 'Z' at the end of every month is to be equal to 50% of sales estimate for the next month. Closing inventory of July was maintained on the above basis. There was no work in progress at the end of any month.

b) Every unit of product requires two types of material in the following quantities
Material P- 5 liters, material Q- 6 liters

c) Material equal to 25% of the requirement for the next month consumption are kept as a closing stock.

d) The stock position on 31st July was as under:
Material P- 32,000 liters, material Q- 28,000 liters

e) The purchase price of material P is Rs.3 per liter and material Q is Rs.2 per liter.

f) There will not be closing stock of material P & Q on 30th November 2022.

From the above information prepare following budgets for the period August to November 2022.

1) Production budget
2) Material consumption budget
3) Purchase budget showing quantity and value.

Solution:

Production Budget				
Particular	**August**	**September**	**October**	**November**
Estimated Sales	21600	31200	24400	20800
Add: Closing Stock	15600	12200	10400	9800
	37200	43400	34800	30600
Less: Opening Stock	10800	15600	12200	10400
Estimated Production	**26400**	**27800**	**22600**	**20200**

Material Consumption Budget				
Particular	**August**	**September**	**October**	**November**
Material A (5 liter per unit)	132000	139000	113000	101000
Material B (6 liter per unit)	158400	166800	135600	121200
Total Material Consumption	**290400**	**305800**	**248600**	**222200**

Purchase Budget (Material P)				
Particular	**August**	**September**	**October**	**November**
Material Consumption	132000	139000	113000	101000
Add: Closing Stock	34750	28250	25250	0
	166750	167250	138250	101000
Less: Opening Stock	32000	34750	28250	25250
Estimated Material to be Purchase	**134750**	**132500**	**110000**	**75750**
Rs. Per liter	3	3	3	3
Estimated Purchase Cost	**404250**	**397500**	**330000**	**227250**

Purchase Budget (Material Q)				
Particular	**August**	**September**	**October**	**November**
Material Consumption	158400	166800	135600	121200
Add: Closing Stock	41700	33900	30300	0
	200100	200700	165900	121200
Less: Opening Stock	28000	41700	33900	30300
Estimated Material to be Purchase	**172100**	**159000**	**132000**	**90900**
Rs. Per liter	2	2	2	2
Estimated Purchase Cost	**344200**	**318000**	**264000**	**181800**

Illustration 5) (Sales Budget)

The Unique Ltd. manufactures two brands of pens - one sold under the name 'Hero' and another under the name of 'Honda'. The sales department of the company has three departments in different areas of the country.

a) The sales budgets for the year ending 31st March, 2022 were
Hero: Department I = 3,00,000, Department II = 5,62,500; Department III = 1,80,000 and
Honda: Department I = 4,00,000; Department II = 6,00,000 and Department III = 20,000.

b) Selling price are Rs.3 and Rs.1.20 in all departments for Hero and Honda.

c) It is estimated that by forceful sales promotion the sale of 'Honda' in Department I will increase by 1,75,000.

d) It is also expected that by increasing production and arranging extensive advertisement Department III will be enabled to increase the sale of 'Honda' by 50,000.

e) It is recognized that the estimated sales by Department II represent an unsatisfactory target. It is agreed to increase both estimates by 20%.

Prepare a Sales Budget for the year ended 31st March, 2023.

Solution:

Unique Limited

Sales Budget for the year ended 31st March, 2023						
Departments	**Hero**			**Honda**		
	Qty	**Rate**	**Amt. Rs.**	**Qty**	**Rate**	**Amt. Rs.**
Department I	300000	3	900000	575000	1.2	690000
Department II	675000	3	2025000	720000	1.2	864000
Department III	180000	3	540000	70000	1.2	84000
Total	**1155000**		**3465000**	**1365000**		**1638000**

Working notes	
1) Honda Department I	
Sales For 2022	400000
Add: increase	175000
Sales For 2023	**575000**
2) Honda Department III	
Sales For 2022	20000
Add: increase	50000
Sales For 2023	**70000**
3) Honda Department II	
Sales For 2022	600000
Add: increase by 20%	120000
Sales For 2023	**720000**
4) Hero Department II	
Sales For 2022	562500
Add: increase by 20%	112500
Sales For 2023	**675000**

5) Sales for Hero for Department I and Department III will be same as in the year 2022.

Illustration 6) (Cash Budget)

Prepare a cash budget for three months ending 30th June 2022 from the following information:

Month	Sales	Material	Wages	Overheads
February	1,40,000	96,000	30,000	17,000
March	1,50,000	90,000	30,000	19,000
April	1,60,000	92,000	32,000	20,000
May	1,70,000	1,00,000	36,000	22,000
June	1,80,000	1,04,000	40,000	23,000

a) Credit terms are 10% sales are on cash, 50% of credit sales are collected next month end and the balance in the following month.

b) Creditors: Materials two Months
Wages ¼ Months
Overheads ½ Months

c) Cash and bank balance on 1st April 2022 is expected to be Rs.60,000.

d) Other relevant information are:

i. Plant and machinery will be installed in February at a cost of Rs.9,60,000. The monthly installment of Rs.12,000 are payable from April onwards.

ii. Dividend at the rate of 5% on preference capital of Rs.12,00,000 will be paid on 1st June 2022.

iii. Advanced to be received for sale of vehicles Rs.90,000 in June 2022.

iv. Dividend from investment amounting to Rs.10,000 are expected to be received in June 2022.

v. Income tax advance to be paid in June is Rs.20,000.

Solution:

Cash Budget					
	Particular		**April**	**May**	**June**
A	**Opening Balance**		**60000**	**47500**	**46000**
	Add:	**Receipts:**			
	1	Cash Sales	16000	17000	18000
	2	Advance Received	0	0	90000
	3	Dividend Received	0	0	10000
	4	Collection From Debtors	130500	139500	148500
B	**Total Receipts**		**146500**	**156500**	**266500**
	Less:	**Payments:**			
	1	Payment for P&M	12000	12000	12000
	2	Dividend	0	0	60000
	3	Income Tax Paid	0	0	20000
	4	Creditors for material	96000	90000	92000
	5	Wages	31500	35000	39000
	6	overheads	19500	21000	22500
C	**Total Payable**		**159000**	**158000**	**245500**
D	**Closing Balance (A+B-C)**		**47500**	**46000**	**67000**

Working Notes:

1	Cash Sales and Collection from Debtors						
		February	March	April	May	June	
	Sales	140000	150000	160000	170000	180000	
	Less: Cash Sales 10%	14000	15000	**16000**	**17000**	**18000**	
	Credit Sales 90%	126000	135000	144000	153000	162000	
	1st 50%		63000	67500	72000	76500	
	2nd 50%			63000	67500	72000	76500
	Collection from Debtors			**130500**	**139500**	**148500**	

2)	Creditors for Material					
		February	March	April	May	June
	Material	96000	90000	92000	100000	104000
	Paid			**96000**	**90000**	**92000**

3)	Wages					
		February	March	April	May	June
	Wages incurred	30000	30000	32000	36000	40000
	¾	22500	22500	24000	27000	30000
	¼		7500	7500	8000	9000
	Wages Paid			**31500**	**35000**	**39000**

4)	Overheads					
		February	March	April	May	June
	overheads incurred	17000	19000	20000	22000	23000
	1/2	8500	9500	10000	11000	11500
	1/2		8500	9500	10000	11000
	overheads Paid			**19500**	**21000**	**22500**

Illustration 7) (Cash Budget)

Prepare cash budget of Master Limited.

Particular	**Quarter I**	**Quarter II**	**Quarter III**	**Quarter IV**
Opening cash balance	10,000	-	-	-
Receipt:				
Collection from customer	1,25,000	1,50,000	1,60,000	2,21,000
Payment:				
Purchase of material	20,000	35,000	35,000	17,000
Other expenses	25,000	20,000	20,000	17,000
Salary and wages	90,000	95,000	95,000	1,09,200
Income tax	5,000	-	-	-
Purchase of furniture	-	-	-	20,000

The company desires to maintain a cash balance of Rs.15,000 at the end of each quarter. Cash can be borrowed or repaid in multiple of Rs.500 at an interest of 10% per annum. Management does not want to borrow cash more than what is necessary and want to replay as early as possible. In any event, loan cannot be extended beyond four quarters. Interest is computed and paid when the principal is repaid. Assume that borrowing take place at the beginning and repayment are made at the end of the quarter.

Solution:

Master Limited					
Cash Budget					
Particular		**Rs. 1ST Quarter**	**Rs. 2ND Quarter**	**Rs. 3RD Quarter**	**Rs. 4TH Quarter**
A	**Opening Balance**	**10000**	**15000**	**15000**	**15325**
	Add: Receipts:				
	1 Collection from Debtors	125000	150000	160000	221000
B	**Total Receipts**	**125000**	**150000**	**160000**	**221000**
	Less:Payments:				
	1 Purchase of Material	20000	35000	35000	17000
	2 other expenses	25000	20000	20000	17000
	3 salary and wages	90000	95000	95000	109200
	4 income tax	5000	0	0	0
	5 Purchase of Machinery	0	0	0	20000
C	**Total Payable**	**140000**	**150000**	**150000**	**163200**
D	**Cash Balance (A+B-C)**	-5000	15000	25000	73125
E	**Add: Loan taken**	20000	0		
F	**Less: Loan Repayment**	0	0	**9000**	**11000**
G	**Less: Interest on Loan paid**	0	0	**675**	**1100**
H	**Closing Balance (D+E-F-G)**	**15000**	**15000**	**15325**	**61025**

Illustration 8) (Master Budget)

Mac Limited requires you to calculate and present the budget for the next year from the following information.

Sales:	
Product A	Rs. 3,00,000
Product B	Rs. 5,00,000
Direct Material	60% of Sales
Direct Wages	20 Workers @ Rs. 150 per month
Stores and spares	2½ % on Sales
Depreciation on Machinery	Rs. 12,600
Light and Power	Rs. 5,000
Factory Overhead:	
Indirect Labour:	
Works Manager Rs. 500 per month	
Foreman Rs. 400 per month	
Repairs and maintenance 10% on direct wages	
Administration, selling and distribution expenses Rs. 14,000 per year.	

Solution:

Master Budget for the period ending _____

Particular	**Rs.**	**Rs.**	**Rs.**
Sales (as per Sales Budget)			
Product A	3,00,000		
Product B	5,00,000		8,00,000
Less- Cost of Production (as per Cost of Production Budget) :			
Direct Materials	4,80,000		
Direct Wages	36,000		
Prime Cost		5,16,000	

Factory Overhead:			
Variable:			
Stores and Spares (2½% of Sales)	20,000		
Light and Power	5,000		
Repairs and Maintenance	8,000	33,000	
Fixed:			
Works Manager's Salary	6,000		
Foreman's Salary	4,800		
Depreciation	12,600		
Sundries	3,600	27,000	
Works Cost			5,76,000
Gross Profit			2,24,000
Less: Administration, Selling and Distribution Overheads			14,000
Net Profit			2,10,000

6.13. EXERCISES

A) Fill in the blanks:

1. The most important budget on which all other budgets are based is _____.
2. A summary of budget which contains all functional budgets is called _____.
3. In the preparation of budgets _____ limits the volume of budget activity.
4. _____ is responsible for the preparation and execution of sales budget.
5. Production budget is based on _____ budget.
6. A budget which is prepared to change according to the level of activity is called _____.

(Answers: 1) Sales Budget, 2) Master Budget, 3) Key factor, 4) Sales Manager, 5) Sales, 6) Flexible Budget)

B) State whether the following statement are True or False.

1. A budget is both a plan as well as a control tool.
2. A budget manual contains a summary of all functional budgets.
3. A budget is a plan of the management for a future period expressed in quantitative terms.
4. Direct materials are generally included in overhead budget.
5. Cash budget indicates the amount of loan required as well as the time when it is needed.
6. A Master Budget is the master plan drawn up by the organisation for the budget period.
7. Fixed budget is suitable for fixed expenses.
8. Fixed budgeting is useful when there is no significant variations in the budgeted output and actual output.

(Answers: 1) True, 2) False, 3) True, 4) False, 5) True, 6) True, 7) True, 8) True)

C) Theory Questions.

1. What is Sales Budget? How is it prepared?
2. What is Cash Budget? How is it prepared?
3. What are fixed and flexible budgets?
4. Define budgeting and budgetary control. State objective of Budgeting.
5. Explain in brief different types of budgets.

7

STANDARD COSTING AND VARIANCE ANALYSIS

Unit Structure:

7.1. OBJECTIVES

After studying the unit, the students will be able to:

- Understand the concept of Standard Cost and Standard Costing
- Understand how standard costing operates
- Explain the benefits of standard costing
- Calculate the material, labour, overhead and Sales Variances
- Understand the use of standard costing for cost reduction

7.2. INTRODUCTION

One of the most significant tasks of management accounting is to aid managerial control, and cost control is a key part of managerial control. The ability to regulate costs effectively is critical to managerial efficiency. As a result, cost planning and control are critical. One of the most significant tools for management to plan and control the cost of business

operations is standard costing. All expenses are pre-determined in standard costing, and the pre-determined costs are then compared to the actual costs. Variance is the difference between pre-determined costs and actual costs, which is analysed and probed for reasons. The deviations are then reported to management, who will take corrective action to ensure that actual costs match pre-determined costs. Actual expenses are only determined in historical costing after they have been incurred. Only when they are compared to predetermined expenses. Such charges are useless to management in terms of cost control and decision-making. As a result, standard costing is employed as a tool for company operations planning, decision-making, and control. This unit will cover the fundamentals of standard costing.

7.3. MEANING OF STANDARD COST & STANDARD COSTING

The term "standard" refers to a yardstick or a benchmark. Under certain circumstances the standard cost determines the charges of services or products. The required amount of raw material to produce a unit of product is determined and then the cost of raw material is estimated. This becomes the standard material input. When actual raw material usage or costs differ from the standards, the difference, known as 'variance,' is reported to the responsible manager. When the extent of the one variance is large, a thorough investigation will be conducted to establish the sources of the variance.

Backer and Jacobsen put this into perspective as “Standard cost is the amount the firm thinks a productor the operation of the process for a period of time should cost, based upon certain assumed conditions of efficiency, economic conditions and other factors.”

The CIMA, London has defined standard cost as “a predetermined cost which is calculated from management standards of efficient operations and the relevant necessary expenditure.”They are the predetermined expenses based on a technical assessment of materials, labour, and overheads for a specific timeframe and set of operating conditions. To put it another way, a standard cost is the anticipated cost of a unit of product or service.

Standard costing is the practice of employing standard costs for the goal of cost control. It's a cost accounting system that determines how much a thing should cost under current circumstances. Only when production has begun can the true cost be determined. The predetermined cost is compared to the actual cost, and any variance encourages management to take appropriate corrective action.

The steps in standard costing are as follows:

1. Creating a set of standard costs for various cost aspects
2. Determination of actual costs
3. determining variances by comparing standard and actual costs

4. Identifying the sources of the differences by analyzing them.
5. Taking corrective action and overcoming variances.

7.4. OBJECTIVES OF STANDARD COSTING

1. **Cost Control:** The primary goal of standard costing is to assist management with cost control. This could be used as a benchmark to gauge efficiency by comparing real costs to it. At regular intervals, management can compare actual costs to standard costs and take corrective action in order to keep expenses under control.

2. **Management by Exception:** The second goal of standard cost is to aid management in cost control by using the exception principle. Standard cost aids in the prescription of standards, and management's attention is raised only when actual performance deviates from the specified standards. Its attention is solely focused on variations.

3. **Develops Cost Conscious Attitude:** Another goal of standard cost is to make everyone in the company more cost conscious. It teaches employees the value of efficient operations in order to decrease expenses through collaborative efforts.

4. **Fixation of Prices:** To assist management in developing production policies, determining price quotations, and filing tenders for diverse products. This is easier to achieve using standard costing rather than actual costs. It also contributes to the expansion of production policies. In production planning, standard costs eliminate the reflection of unexpected price changes.

5**. Fixing Prices and Formulating Policies:** Standard costing also serves to assist management in deciding prices and formulating production policies. It also aids management in profit planning, product pricing, and inventory pricing, among other things.

6. **Management Planning:** Management plans budgets at various levels at regular periods in order to increase revenue through various product combinations. Standard costing, rather than actual expenses, is more convenient for this purpose because it is done in a scientific and rational manner, taking into account all technical considerations.

7.5. ADVANTAGES OF STANDARD COSTING

1. **To measure efficiency:** Standard Expenses serve as a benchmark against which real costs can be compared. The management can evaluate the effectiveness of various cost centers by comparing real costs to standard costs. In the absence of standard costing, efficiency is determined by comparing real costs over time, which is difficult to do because the conditions in both periods may alter.

2. **To fix prices and formulate policies:** When calculating prices and formulating production policies, standard costing is beneficial. The standards are established by examining all of the existing circumstances. It

also assists in determining the costs of various things. It facilitates management in the early development of production and pricing plans, as well as profit planning, product pricing, and tender price quotation. It also aids in the provision of cost estimates when developing new items.

3. **For Effective cost control:** Standard costing has a number of advantages, one of which is that it improves in cost control. Variances are calculated by comparing actual costs to standard costs. These variations make it easier for management to spot inefficiencies and take corrective action as soon as possible.

4. **Management by exception:** Management by exception indicates that each individual has a set of goals to attain, and everyone is expected to meet these goals. The principles of management by exception are used to conduct variance analysis and reporting. Top management may be more interested in the variations from the standards than in the details of actual performance in order to take corrective action in a timely manner.

5. **Valuation of stocks:** Stock is valued at standard cost, and any difference between standard cost and actual cost is moved to the variance account under standard costing. As a result, stock valuation is simplified, and a lot of clerical work is reduced to a minimum.

6. **Cost consciousness:** Standard pricing places a greater emphasis on cost variations, making the entire organization more cost conscious. It helps employees understand the necessity of efficient operations so that joint efforts can be made to minimize costs to the bare minimum.

7. **Provides incentives:** Men, materials, and machines can all be employed efficiently under a standard costing scheme. Schemes can be designed to reward persons who meet their goals. It improves employee efficiency, production, and morale.

8. **Facilities delegation of authority:** Each department or individual can delegate authority and assign responsibility using the Standard Costing method. This also strengthens the company's overall organization.

9. **Prompt decision-making:** Prior to the start of manufacturing, production and pricing policies might be established. This facilitates quick decision-making.

7.6. LIMITATIONS OF STANDARD COSTING:

1. **Difficulty in setting standards:** Setting standards is a complex undertaking that necessitates extensive scientific investigation such as time studies, motion studies, and so on. When standard is set too high, it may cause workers to become frustrated. As a result, establishing appropriate criteria is extremely challenging.

2. **Not suitable to small business:** Standard costing is not appropriate for small businesses since it necessitates extensive scientific research, which is costly. As a result, small businesses may find it difficult to use the system.

3. **Not suitable to all industries:** Standard costing is not appropriate for industries that manufacture non-standardized goods, nor is it appropriate for job or contract costing. Likewise, standard costing is difficult to implement in sectors where the production process spans multiple accounting periods.

4. **Difficult to fix responsibility:** Fixing accountability is a difficult issue. Controllable and uncontrolled variations must be distinguished since only controllable variances can be assigned to a responsible party. Controllable and uncontrollable deviations are difficult to distinguish since what is controllable in one context may become uncontrollable in another. As a result, under standard costing, determining accountability is extremely difficult.

5. **Technological changes:** Standard costing may not be suitable for organizations and industries that experience frequent technology shifts. When technology changes, the manufacturing process necessitates a revision of the standard. The approach is not ideal for industries where methods and techniques of production are capable of rapid change since frequent modification of standards is a costly process.

6. Standards can sometimes have a negative psychological impact. If the standard is set too high, failure to meet it will cause dissatisfaction and resistance to grow.

7. The approach is effectively ineffectual due to management's lack of interest in standard costing.

7.7. TYPES OF STANDARDS

There are different types of standards stated as follows:

a) **Ideal Standard:** When material and labour prices are at their lowest, the ideal standard indicates the highest degree of performance possible. When the best equipment and designs are combined with maximum efficiency, the highest production is attained by with minimum cost. This type of standard, on the other hand, is criticized since it is practically impossible.

b) **Normal Standard:** Under regular operating conditions, a normal standard can be obtained. The usual activity is defined as the number of standard hours required to produce at a level of efficiency, sufficient to meet the average sales demand across time. This standard necessitates some foresight. Variances are variations from normal efficiency, normal sales volume, or normal production volume in this system.

c) **Basic Standard:** Only when a basic standard is likely to remain consistent over a lengthy period of time is it used. For the purposes of comparison, a base year is chosen. Because the basic standard does not represent what should be achieved in the current time, when the basic standard is adopted, current standard should also be established.

d) **Current Standard:** The current standard represents management's forecast of current-period expenses. These are the costs the company will incur if the expected prices for products and services, as well as the usage required to generate the planned output, are paid.

e) **Expected Standard:** Based on existing conditions, this is the standard that is predicted to be met during the budget period. The standards are established based on projected performance after allowing for inevitable losses and deviations from perfect efficiency. Standards are usually set on a short-term basis and must be revised frequently. This is a more practical standard than the ideal standard.

7.8. VARIANCE ANALYSIS

Variance is defined as the difference between a standard cost and the similar actual cost generated during a period in standard costing. Variation analysis is the act of an alysing variances by splitting the total variance into smaller segments so that management can allocate responsibility for any deviations from the norm. As a result, variance analysis refers to the measurement of the difference between actual and desired performance.

Depending on whether the actual cost is less or more than the standard cost, variance can be beneficial or detrimental. The variation is referred to as 'favourable' if the actual cost is less than the standard cost, and 'unfavourable' or 'adverse' if the actual cost is larger than the standard cost. The effect of favourable variance improves profit and is a measure of the organization's efficiency. Unfavorable variance, on the other hand, refers to a loss of business and is an indication of inefficiency in the organisation.

7.9. TYPES & CLASSIFICATION OF VARIANCE

Following are the types of variances:

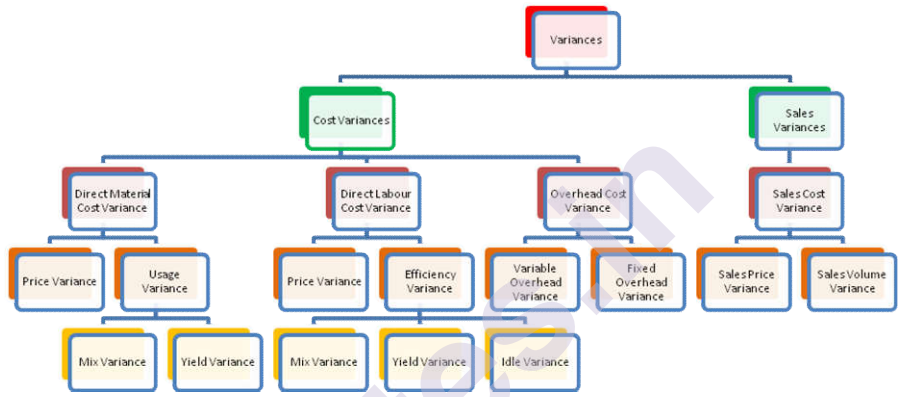
a) Controllable and Uncontrollable variance: Controllable variances are those that the department heads can regulate, whereas uncontrollable variances are those that are beyond their control. Controllability, on the other hand, is a subjective concept that fluctuates depending on the scenario. The standard may need to be revised if the uncontrollable deviations are considerable and persistent.

b) Favorable and Adverse Variance: Variations that are beneficial to the firm are referred to as favourable variances, while those that are detrimental to the company are referred to as adverse variances. When it comes to cost variances, favourable variations indicate that the actual cost

is lower than the standard cost. Adverse variances, on the other hand, indicate that the actual cost is higher than the standard cost. In the case of sales variance, however, the situation will be reversed. Actual sales are higher than budgeted, indicating a positive variance.In short, positive or favorable variance is denoted by the letter 'F,' while negative or adverse variance is denoted by the letter 'A.'

Classification of Variance

Variances may be classified into two categories viz., cost variances and sales variances. The cost variance may again be sub-divided into variances for each element of cost as shown in the following chart:



7.10. MATERIAL VARIANCES

7.10.1. Direct Materials Cost Variance:

The difference between the actual direct material cost incurred and the standard direct material cost provided for the output accomplished is known as direct materials cost variance. The standard cost of materials for actual production is calculated by multiplying the standard price by the standard quantity for actual output. The actual cost is derived by multiplying the actual price by its actual quantity consumed. The following formula can be used to compute the Direct Material Variance:

Direct Material Cost Variance = Standard Material Cost for actual output – Actual Material Cost

OR

Direct Material Cost Variance = (SQ X SP) – (AQ X AP)

Where,

SQ = Standard Material Quantity for actual output

SP = Standard Material Price per unit

AQ = Actual Material Quantity used

AP = Actual Material Price

Standard Material Cost for actual output = Standard Material Quantity for actual output X Standard Material Price per unit

Actual Material Cost = Actual Material Quantity used X Actual Material Price

Direct material cost variance occurs when the price of materials changes, or when the quantity of material utilised changes, or when both.The variance will be favourable if the standard cost is higher than the actual cost; however, if the actual cost is higher than the standard cost, the variance will be unfavourable or negative.

7.10.2. Direct Materials Price Variance:

The differential seen between actual and standard material price per unit applied to the actual quantity of goods acquired or consumed. The following formula can be used to compute the Direct Material Cost Variance:

Direct materials price variance = (Standard Price – Actual Price) x Actual Quantity,

OR

Direct materials price variance = (SP – AP)x AQ

If the standard price is higher than the actual price, the variance is favourable; if the actual price is higher than the standard price, the variance is negative or adverse.

Material price variance may arise due to the following reasons:

a) A change in the material's fundamental current value
b) A change in the purchase quantity or an uneconomical purchasing order size.
c) Failure to purchase materials in a timely manner.
d) A change in the quality or specification of the acquired material.
e) Using a cheaper or more expensive alternative material.
f) Changes in the system of taxes and duties,
g) Organizational acquisitions that are weak or strong, etc.

7.10.3. Direct Materials Usage Variance:

Material Usage Variance is the difference between the standard quantity for actual production and the actual quantity used, resulting in a portion of material cost. To put it another way, it's the difference between the standard quantity for actual output and the actual quantity multiplied by the standard price of material. The following is the material usage variance formula:

Direct materials usage variance = Standard Price x (Standard Quantity for actual output – Actual Quantity)

OR

Direct materials usage variance = SP x (SQ – AQ)

When the standard quantity is greater than the actual quantity the variance will be favourable, and vice versa.

Material usage variance will arise due to the following reasons:

a) Use of substandard or faulty materials.
b) Use of substandard plant and machinery, as well as poor or incorrect maintenance, resulting in breakdowns and increased material usage.
c) Inadequate inspection and supervision.
d) Material theft or pilferage.
e) Accounting problems, and so on.

7.10.4. Direct Materials Mix Variance:

Material Mix Variance is the portion of the material usages variance caused by a discrepancy in the standard and actual composition of the material mixture. It signifies that the source of variance is due to a difference in the actual material mix's ratio compared to the standard material mix's ratio. Changes in the composition of the materials mix are one of the reasons for variations in material utilization.

Material Mix variance = (Revised Standard Quantity – Actual Quantity) x Standard Price.

OR

Material Mix variance = (RSQ – AQ) x SP

Where,

RSQ = Revised Standard Quantity

Revised Standard Quantity =

$$\frac{\text{Standard Quantity}}{\text{Total Standard Quantity}} \text{ X Total of actual Quantity}$$

If the actual quantity is more than revised standard quantity, an adverse variance will occur and vice versa.

Material mix variance may arise due to the following reasons:

a) Actual mix can differ from standard mix.
b) Production department inaccuracy in using suitable mix.
c) Failure of one or more mix components to arrive at the correct moment.
d) Delays in raw material deliveries, etc.

7.10.5. Direct Materials Yield Variance:

The difference between the standard cost of production reached and the actual total quantity of materials used, multiplied by the standard weighted average price per unit, is known as Material Yield Variance.

Material yield variance= (Standard Production for Actual Mix – Actual Production) x Standard Cost Per Unit

Material Yield Variance = (Standard Yield – Actual Yield) x Standard output price

Or

Material Yield Variance = (Standard Quantity – Revised Standard Quantity) x Standard Price.

The material yield variance may be caused due to the following reasons:

a) Inadequate manner of operation
b) Inadequate quantity of material purchased
c) Improper handling, etc.

7.11. LABOUR VARIANCES

7.11.1. Direct labour cost variance:

It's the difference between the activity's set standard direct labour cost and the actual direct labour cost incurred. The formula is as follows:

Direct Labour Cost Variance = Standard Labour Cost for Actual Output – Actual Labour Cost

or

Direct Labour Cost Variance = (Std. hours for actual output X Std. Rate) – (Actual hours X Actual rate)

or

Direct Labour Cost Variance = (SH X SR) – (AH X AR)

7.11.2. Direct Labour Rate Variance: The fraction of the usage variance owing to the difference between the standard rate indicated and the actual rate paid is called labour rate variance. It can be calculated using the following formula:

Direct Labour Rate Variance = (Standard Rate – Actual Rate) X Actual Hours

Or

Direct Labour Rate Variance = (SR – AR) X AH

The variance will be favourable if actual rate is less than the standard rate and it will be adverse if actual rate is more than the standard rate.

Labour rate variance arises due to the following reasons:

a) A change in the hourly salary or piece rate
b) Overtime and night shift work in excess of or below the standard, or when the standard makes no provision.
c) Wage rates paid to casual labourers, which may be higher or lower.
d) New employees are not paid at full wage rates, and so on.

7.11.3. Direct Labour Efficiency Variance: The gap between the standard labour hours prescribed for actual output and the actual hours paid for is the labour efficiency ratio. This variation aids in the control of worker efficiency as well as labour costs. The following formula can be used to compute the variance:

Direct Labour Efficiency Variance = (Standard hours for actual production – Actual hours worked) X Standard Rate

Or

Direct Labour Efficiency Variance = (SH – AH) X SR

If actual time taken for doing a work is more than the specified standard time, the variance will be unfavourable and vice versa.

Direct Labour efficiency ratio arises due to one or more of the following reasons:

a) Faulty machinery and equipment
b) Inadequate supervision
c) Use of defective or non-standard materials
d) Inadequate worker training
e) Poor working conditions
f) Changeover of workers from one operation to another, often known as labour turnover.
g) Changes in manufacturing techniques
h) Time lost owing to a delay in receiving instructions, raw materials, or tools.
i) Power outages, etc.

7.11.4. Labour Idle Time Variance: Idle time variance in the workplace is a sub-variant of labour efficiency variance. It is the standard wage paid during idle hours owing to unusual circumstances such as strikes, lockouts, machinery breakdowns, power outages, raw material shortages, and so on. The abnormal idle time should be distinguished from the labour efficiency variance since it is caused by factors outside the workers' control. Otherwise, it will demonstrate worker inefficiency. This difference will always be negative or adverse.

It is calculated as follows:

Idle Time Variance = Idle Hours X Standard Rate

7.11.5. Direct Labour Mix Variance: Gang composition variation is another name for it. It's a portion of the variation in labour efficiency. Only when two or more different categories of workers are employed, and the composition of real grade workers differs from the standard composition of workers, does labour mix variance occur.

Direct Labour Mix Variance = (Revised Standard Hours – Actual Hours) X Standard Rate

Where,

RSH = Actual Total Hours Worked X Standard Ratio of Workers

Or

$$\text{RSH} = \frac{\text{Standard Hours of the grade}}{\text{Total Standard Hours}} \text{ X Total Actual Hours Worked}$$

Where, Actual Hours Worked = Actual hours – Idle Time

7.11.6. Direct Labour Yield Variance: Material Yield Variance is a comparable concept. It investigates how actual yield affects labour costs when output differs from the standard.

The formula for LYV is:

Direct Labour Yield Variance = (Actual yield – Standard yield) X Standard labour cost per unit of output

Or

Direct Labour Yield Variance = Standard Cost Per Unit × (Standard Output for Actual Mix – Actual Output)

7.12. SUMMARY

Standard costing is a management strategy for monitoring costs. We have used standards as performance indicators throughout the process. Any activity necessitates cost analysis and control. Material, labour, and overheads are all included in the price. Because of changes in usage, raw materials, technology, and production methods, we sometimes need to alter the standards. It is necessary to implement this under the supervision of a committee for the activity in order to ensure effective organisation. It is a continuous activity aimed at maximizing resource usage.

7.13. ILLUSTRATIONS:

Illustration 1)

A Manufacturing concern which has adopted standard costing furnished the following information:

Standard Material for 700 kg finished products	1000 Kg
Standard price of Material	Rs.1 per kg
Actual Output	2,10,000 kg
Actual Material Used	2,80,000 kg
Cost of Material	Rs.2,52,000

Calculate: Standard Quantity for actual output and Actual Price per Kg.

Solution:

Standard Quantity for actual output (SQ):

$$= \frac{Standard\ Input}{Standard\ Output} \times Actual\ Output$$

$$= \frac{1000}{700} \times 210000$$

= 3,00,000Kgs

Actual Price per Kg (AP) = $\frac{Actual\ Material\ cost}{Actual\ Material\ used}$ = $\frac{252000}{280000}$ = Rs.0.90 per kg

Standard Price (SP) = Rs.1 per kg

Actual Quantity (AQ) = 2,80,000Kgs

Illustration 2) (Material Variances)

From the following information, Calculate: Material Cost Variance, Material Price Variance, and Material Usages Variance.

Standard Quantity for 100 Units	800Kg
Standard rate per Kg	Rs.6.40
Actual Production	45,000 Units
Actual Material Used	3,50,000Kgs
Actual Material Cost	Rs.22,05,000

Solution:

Standard Quantity for actual output (SQ):

$$= \frac{Standard\ Input}{Standard\ Output} \times Actual\ Output$$

$$= \frac{800}{100} \times 45000$$

= 360000 Kgs

Actual Price per Kg (AP) = $\frac{Actual\ Material\ cost}{Actual\ Material\ used}$ = $\frac{2205000}{350000}$ = Rs.6.30 per kg

Standard Price (SP) = Rs.6.40 per kg

Actual Quantity (AQ) = 3,50,000Kgs

1) Direct Material Cost Variance = (SQ X SP) – (AQ X AP)
= (360000X 6.40) – (350000 X 6.30)
=2304000 – 2205000
=Rs.99,000 (F)

2) Direct materials price variance = Actual Quantityx(Standard Price – Actual Price)
= 350000 x (6.40 – 6.30)
= Rs.35,000 (F)

3) Direct materials usage variance = Standard Price x (Standard Quantity – Actual Quantity)
= 6.40 x (360000 – 350000)
= Rs.64,000 (F)

Verification: MCV = MPV + MUV

Rs.99,000 (F) = Rs.35,000 (F) + Rs.64,000 (F)

Illustration 3) (Material Variances)

The standard material cost for 1,000 kg of chemical Z is made up:

Chemical A 300 kg. @ Rs.4 per kg

Chemical B 400 kg. @ Rs.5 per kg

Chemical C 800 kg. @ Rs.6 per kg

In a batch 5,000 kg. of chemical Z were produced from a mix of

Chemical A 1,400 kg. @ Rs.5,880

Chemical B 2,200 kg. @ Rs.10,560

Chemical C 4,400 kg. @ Rs.28,600

Calculate: Material Cost Variance, Material Price Variance, Material Usages Variance, Material Mix Variance, Material Yield Variance.

Solution:

Material	Standard			Actual			Revised Standard
	Quantity	Price	Amount Rs.	Quantity	Price	Amount Rs.	Quantity
A	1500	4	6000	1400	4.20	5880	1600
B	2000	5	10000	2200	4.80	10560	2133
C	4000	6	24000	4400	6.50	28600	4267
-	**7500**	-	**40000**	**8000**	-	**45040**	**8000**

Revised Standard Quantity = $\frac{\text{Standard Quantity}}{\text{Total Standard Quantity}}$ **X Total of actual Quantity**

A= 1500/7500*8000=1600

B=2000/7500*8000=2133

C=4000/7500*8000=4267

Actual Price=Actual Price / Actual Quantity

A=5880/1400=Rs.4.20/-

B=10560/2200=Rs.4.80/-

C=28600/4400=Rs.6.50/-

1) Direct Material Cost Variance = Standard Material Cost for actual output – Actual Material Cost
= 40,000 – 45,040
= Rs.5040 (A)

OR
Direct Material Cost Variance = (SQ X SP) – (AQ X AP)
A = (1500X 4) – (1400X4.20) =Rs.120 (F)
B = (2000X 5)– (2200X4.80) =Rs.560 (A)
C = (4000X 6)– (4400X6.50) =Rs.4600(A)
Rs.5040 (A)

2) Direct materials price variance = (Standard Price – Actual Price) x Actual Quantity
A = (4 –4.20) x1400=Rs. 280(A)
B = (5–4.80) x2200=Rs. 440(F)
C = (6–6.50) x 4400=Rs.2200(A)
Rs.2040 (A)

3) Direct materials usage variance = Standard Price x (Standard Quantity – Actual Quantity)

A = 4x (1500 – 1400) =Rs. 400(F)

B = 5x (2000– 2200) =Rs. 1000(A)
C = 6x (4000– 4400) =Rs. 2400(A)
Rs.3000 (A)

4) Material Mix variance = Standard Price x (Revised Standard Quantity – Actual Quantity)

A = 4x (1600 – 1400) =Rs. 800(F)

B = 5x (2133– 2200) =Rs. 335(A)
C = 6x (4267– 4400) =Rs. 798(A)
Rs.333 (A)

5) Material Yield Variance = Standard Price x (Standard Quantity – Revised Standard Quantity)
A = 4x (1500 – 1600) =Rs. 400 (A)
B = 5x (2000– 2133) =Rs. 665(A)
C = 6x (4000– 4267) =Rs. 1602(A)
Rs.2667 (A)

Verification: MCV = MPV + MUV

Rs.5040 (A) = Rs.2040 (A) + Rs.3000 (A)

MUV = MMV + MYV

Rs.3000 (A) = Rs.333 (A) + Rs.2667 (A)

Illustration 4) (Material &Labour Variances)

The following information is available from the cost records of AB & Co. for the month of June, 2022.

Actual rate and prices are:

Material purchased 24,000 kg for Rs.1,05,600

Material consumed 22,800 kg

Actual wages paid for 5,940 hours Rs.29,700

Unit produced 2160 units.

Standard rate and prices are:

Direct Material rate is RS.4.00 per unit

Direct Labour rate is Rs.4.00 per hour

Standard input is 10 kg for one unit

Standard requirement is 2.5 hours per unit

Calculate all material and labour variances for the month June, 2022.

Solution:

Material Variances:

Standard Quantity for actual output (SQ):

$$= \frac{Standard\ Input}{Standard\ Output} \times Actual\ Output$$

$$= \frac{10}{1} \times 2160$$

= 21,600Kgs

Actual Price per Kg (AP) = $\frac{Actual\ Material\ cost}{Actual\ Material\ used}$ = $\frac{105600}{24000}$ = Rs.4.40 per kg

Standard Price (SP) = Rs.4.00 per kg

Actual Quantity (AQ) = 22,800 Kgs (Actually consume)

1) Direct Material Cost Variance = (SQ X SP) – (AQ X AP)
= (21600X 4.00) – (22800 X 4.40)
=86400 – 100320
=Rs.13,920 (A)

2) Direct materials price variance = Actual Quantityx(Standard Price – Actual Price)
= 22,800 x (4.00 – 4.40)
= Rs.9,120 (A)

3) Direct materials usage variance = Standard Price x (Standard Quantity – Actual Quantity)
= 4.00 x (21,600 – 22,800)
= Rs.4,800 (A)

Verification: MCV = MPV + MUV

13,920 (A)= 9,120 (A) +4,800 (A)

Labour Variances:

Standard Hours for actual output (SH):

$$= \frac{Standard\ Input}{Standard\ Output} \times Actual\ Output$$

$$= \frac{2.5}{1} \times 2160$$

= 5,400Hours

Actual Rate per Hours (AH) = $\frac{\text{Actual labour cost}}{\text{Actual Hours work}}$ = $\frac{29700}{5940}$ = Rs.5.00 per Hours

Standard Rate (SR) = Rs.4.00 per hours

Actual Hours (AH) = 5,940 Hours

1) Direct Labour Cost Variance = (SH X SR) – (AH X AR)
= (5400 X 4.00) – (5940 X 5.00)
=21600 – 29700
=Rs.8,100 (A)

2) Direct LabourRate variance = Actual Hours x(Standard Rate – Actual Rate)
= 5940 x (4.00 – 5.00)
= Rs.5,940 (A)

3) Direct Labour efficiency variance = Standard Rate x (Standard Hours – Actual Hours)
= 4.00 x (5400 – 5940)
= Rs.2,160 (A)

Verification: LCV = LRV + LEV

8,100 (A)= 5,940 (A)+ 2,160 (A)

Illustration 5) (Labour Variances)

The standard labour and the actual labour engaged in a week for a job are as under:

Particular	**Skilled Workers**	**Semi-Skilled Workers**	**Unskilled Workers**
Standard no. of Workers in the gang	320	120	60
Standard Wage rate per hour (Rs.)	3	2	1
Actual no. of workers	280	180	40
Actual Wage rate per hour (Rs.)	4	3	2

During the 40-hour working week the gang produced 18,000 standard labour hours of work.

Calculate: Labour Cost Variance, Labour Rate Variance, Labour Efficiency Variance, Labour Mix VarianceandLabour Yield Variance.

Solution:

Labour	Standard			Actual			Revised Standard
	Hours	Rate	Amount Rs.	Hours	Rate	Amount Rs.	Hours
Skilled	11520	3	34560	11200	4	44800	12800
Semi-Skilled	4320	2	8640	7200	3	21600	4800
Unskilled	2160	1	2160	1600	2	3200	2400
	18000		**45360**	**20000**		**69600**	**20000**

Standard Hours= Standard Hours /Total Standard output * Actual output

A=320*40/20000*18000=11520

B=120*40/20000*18000=4320

C=60*40/20000*18000=2160

Revised Standard Hours = $\frac{\text{Standard Hours}}{\text{Total Standard Hours}}$ **X Total of actual Hours**

A= 11520/18000*20000=12800

B=4320/18000*20000=4800

C=2160/18000*20000=2400

1) Direct Labour Cost Variance = Standard Labour Cost for actual output – Actual Labour Cost
= 45,360 – 69,600
=Rs.24,240/- (A)

2) Direct LabourRate variance = Actual Hours x(Standard Rate – Actual Rate)

Skilled = 11,200 x (3.00 – 4.00) = Rs.11,200/- (A)

Semi Skilled = 7,200 x (2.00 – 3.00) = Rs.7,200/- (A)

Unskilled = 1,600 x (1.00 – 2.00) = Rs.1,600/- (A)

= Rs.20,000/- (A)

3) Direct Labour efficiency variance = Standard Rate x (Standard Hours – Actual Hours)

Skilled = 3 x (11,520 – 11,200) = Rs.960/- (F)
Semi Skilled = 2 x (4,320 – 7,200) = Rs.5,760/- (A)
Unskilled = 1 x (2,160 – 1,600) = Rs.560/- (F)
= Rs.4,240/- (A)

4) Labour Mix variance = Standard Rate x (Revised Standard Hours – Actual Hours)

Skilled = 3 x (12,800 – 11,200) = Rs.4,800/- (F)
Semi Skilled = 2 x (4,800 – 7,200) = Rs.4,800/- (A)
Unskilled = 1 x (2,400 – 1,600) = Rs.800/- (F)
= Rs.800/- (F)

5) Labour Yield Variance = Standard Rate x (Standard Hours – Revised Standard Hours)

Skilled = 3 x (11,520 – 12,800) = Rs.3,840/- (A)
Semi Skilled = 2 x (4,320 – 4,800) = Rs.960/- (A)
Unskilled = 1 x (2,160 – 2,400) = Rs.240/- (A)
= Rs.5,040/- (A)

Verification: LCV = LRV + LEV

Rs.24,240/- (A) = Rs.20,000/- (A) + Rs.4,240/- (A)

LEV = LMV + LYV

Rs.4,240/- (A) = Rs.800/- (F) + Rs.5,040/- (A)

7.14. EXERCISES

A) Fill in the blanks:

1. Difference between standard cost and actual cost is called as _____.
2. Idle time variance is always _____.
3. Standard quantity for material P is 60 kg with a price of Rs.40, Actual quantity is 88 kg with a price of Rs.50, if actual output is 180kgs against the standard of 90kgs the standard quantity for actual output is _____.
4. Excess of actual cost over standard cost is a _____ variance.
5. Material price standard is set by _____ department.

(Answers: 1) Variance, 2) unfavourable, 3) 120 kgs, 4) Adverse, 5) Purchase)

B) State whether each of the following statement is True or False.

1. Ideal standard is difficult to achieve.
2. A cost variance is a difference between standard cost and actual cost.
3. A manager is blamed for non-controllable adverse variance.
4. Idle time variance is always adverse.
5. Purchase manager is responsible for material price variance.
6. Labour cost variance = Labour rate variance + Labour efficiency variance.
7. Controllable cost variance is always favourable.
8. Labour efficiency variance may arise due to defective method of operation.

(Answers: 1) True, 2) True, 3) False, 4) True, 5) True, 6) True, 7) False, 8) True)

C) Theory Questions.

1. What are the advantages and disadvantages of Standard Costing?
2. Write a note on types of Standards.
3. Write a note on classification of variance?
4. Write a note on Material Variances.
5. Write a note on Labour Variances.
6. What do you mean by Standard Costing? Explain the objectives of Standard Costing.
7. Write a note on Material Price Variance.

8

RESPONSIBILITY ACCOUNTING AND TRANSFER PRICING

Unit Structure:

8.1. OBJECTIVES

This unit's primary objectives are to familiarise you with:

- Recognize the idea of Responsibility Accounting.
- Describe the many methods used to gauge divisional performance.
- To discuss about the many responsibility centres.
- Recognize the idea of transfer pricing.
- To be familiar with the various transfer pricing techniques.

8.2. INTRODUCTION

The responsibility accounting, which is useful in exercising cost control, is one of the newer breakthroughs in the subject of management accounting. A form of accounting known as "responsibility accounting" recognises numerous responsibility centres across the organisation and reflects the intentions and activities of each of these centres by allocating specific revenues and costs to the one with the relevant duty. Additionally, it is known as activity accounting and profitability accounting.

8.3. MEANING AND CONCEPT OF RESPONSIBILITY ACCOUNTING

The word "responsibility accounting" refers to the accounting procedure that documents how effectively managers have carried out their duties. It is an information system that control reports by compiling and presenting expense and revenue data in accordance with established responsibility areas within a corporation. It is also known as activity accounting or profitability accounting.

The Responsibility accounting system Make the following important assumptions:

a) The responsibilities for which managers should be held accountable are outlined.
b) Managers are only given the tasks and responsibilities that they have a large amount of direct influence over it.
c) The manager should actively take part in setting the objective or budget plan that will be used to gauge their performance.
d) With efficient and effective performance, the goals established for each area of responsibility should be reachable.
e) Performance reports must to include pertinent data regarding each area of responsibility.
f) Managers of responsibility centres should work to meet the budgets and goals set for their individual areas of responsibility.

8.4. USES OF RESPONSIBILITY ACCOUNTING

An essential tool in the management control process is responsibility accounting, which concentrates on the managerial levels. It serves many purposes and offers numerous advantages. Here is a list of them:

i) **Performance Evaluation:** The greatest advantage might be that it is possible to evaluate individual managers on a cost basis when accountability is localised. When a manager is held accountable for everything he does, he becomes more watchful. The manager has access to information from the responsibility accounting system that aids in managing operations and assessing employee performance.

ii) **Delegating Authority:** Without adequate delegation of authority, large corporations can rarely survive. Responsibility accounting makes it happen by definition. Its core idea is decentralization of power, and delegation of authority follows**.**

iii) **Motivation:** Accounting information is used for planning and management in responsibility accounting. When managers are aware that they are being assessed, they are motivated to give their all to achieving the goals that have been established for them. It has strong stimulating effects. In actuality, responsibility accounting is built on inspiring individual managers to deliver their best work. The targets act as

objectives for accomplishment and serve to inspire management to boost revenues or save costs.

iv) **Corrective Action:** If a performance is unsatisfactory, the accountable party must be named. Corrective action cannot be taken until the offending subordinate has been identified. Under responsibility accounting makes taking corrective action simpler because authority structures are clearly defined. After determining the root causes of the issue, the control measure must be implemented right away for it to be effective.

v) **Management by Objectives:** Before the start of the term or period, the heads of divisions and departments gave clear objectives. They are held accountable for achieving these goals. Excesses are rewarded while deficiencies are penalized. Such a framework aids in creating the management by objectives philosophy (MBO).

vi) **Management by Exception:** Reporting on performance here focuses on deviations or exceptions from the plan. The responsibility accounting is filled with this concept. Managers benefit from investing their time on significant differences with the most room for improvement. The key to the system's effectiveness is the administrative focus on exceptional or unusual items of deviation as opposed to on all of them.

vii) **High Morale and Efficiency:** Once it is obvious that awards are conditional upon performance, it greatly raises morale. If an operational foreman is judged based on decisions in which he was not involved, this will lead to severe disappointment.

8.5. TYPES OF RESPONSIBILITY CENTERS

An area of responsibility that is under one person's authority is known as a responsibility centre. Typically, the responsibility centre types listed below are present;

1. **Cost center:**

A manager is held accountable for the costs incurred in a certain division of a company known as a cost centre. A cost centre only bears the expense of its operations. The cost variance, which is determined by comparing the actual cost to the budgeted cost for a particular period, serves as the basis for the cost center's performance rating. Although they do not have control over income, cost centre managers may have some or all of the cost in their area of the business. The most common type of responsibility centre is the cost centre. Production and service departments are categorised as cost centres in manufacturing businesses. A cost centre can also be described as a marketing division, a sales region, or a single salesperson. The costs that they and their employees can influence fall under the purview of the cost centre managers.

2. **Revenue center:**

A department inside an organisation known as a revenue centre is principally in charge of producing sales revenue. A revenue centre manager typically has authority over some of the marketing department's

costs but has no influence over costs or asset investments. By contrasting actual revenue with anticipated revenue, revenue centre performance is assessed. Examples of revenue centres include the marketing manager for a specific product line or a single salesperson.

3. **Profit center:**

A department inside a company known as a profit centre accumulates both revenue and expenses. You make a profit is the profit center's primary goal. Whether a profit centre has generated the projected amount of revenue determines how well it is performing. A profit centre is a division of the company that manufactures and markets the product. Managers of profit centres are more focused on finding ways to boost the center's revenue, whether through improved production or distribution techniques.

4. **Investment center:**

Profit and investment are both under the control of the Investment centre. The manager of the investment centre has responsibility over the center's assets, investments, and revenue. Additionally, he develops the inventory policy, which decides the investment in inventory, as well as the credit policy, which directly affects debt collection.

8.6. MEASURING DIVISIONAL PERFORMANCE

A responsibility center's performance can be evaluated using the methods listed below:

1) Variance Analysis: This method establishes standard costs and budgets as a baseline against which actual performance can be measured. Corrective action must be made whenever there is a difference between the two. The standard cost and budget set for each centre are used to evaluate the performance of the cost centre and revenue centre. On the basis of performance evaluation, efforts are made to raise revenue from the revenue centre while reducing cost from the cost centre.

2) Profit: The performance of a profit centre can be evaluated using this metric. It is advised that divisional revenue less divisional cost should be used to gauge the success of the profit division. As it is assumed that all costs, fixed or variable, are under the divisional manager's control, controllable profit is a far better indicator of performance. The total cost may be a good way to gauge a division's performance, but it is not a good way to gauge the performance of the divisional manager because that would mean holding him accountable for costs that he has no direct or indirect control over.

3) Return on investment (ROI):

This metric reflects the divisional profit as a percentage of firm investment. This is determined as:

$$ROI = \frac{Divisional\ profit}{divisional\ investment}$$

The asset turnover and net profit margin are two additional ratios that can be used to break down the ROI ratio.

$$ROI = \frac{Net\ Profit}{Sales} \times \frac{Sales}{Capital\ Employed}$$

The ROI formula recognises that the relationship between the division's net income and the asset employed in the development of that income, rather than the division's operating profit's absolute size, provides a basis for evaluating its success.

ROI has the following advantages:

a) It provides a better indicator of the profitability of the division by linking net income to investments made in the division.
b) It can serve as the foundation for other ratios that are helpful for analytical purposes.
c) Because it is based on financial accounting measurement, it is simple to understand.
d) It can be used to compare the outcomes of different firms as long as they are in the same sector and are similar in size.

ROI has the following disadvantages:

a) It is challenging to find a satisfactory definition of profit and investment. Profit encompasses a variety of ideas, including controlled profit, profit after taxes, and profit before tax, etc. Similarly, the term "investment" can refer to a variety of things, including gross book value, net book value, historical cost of an asset, current cost of an asset, and whether or not an asset includes intangibles.
b) In order to compare the ROI of various companies, it is essential that the companies utilise comparable stock valuation, fixed asset value, overhead allocation, and other accounting policies and methodologies.
c) ROI may persuade a divisional manager to create a high investment choice. The divisional manager may refuse additional investments that would lower the division's ROI but raise the worth of the company.

4) Residual income (RI): Residual income can be defined as the net income of a division, less the imputed capital charge on the asset used by the division. The needed rate of return is applied to the division's investment base to determine the capital charge, which is the lowest allowable rate of return. Theoretically, the rate of return ought to equal the division's cost of capital, but in most circumstances, it is a cutoff rate determined by the goals and strategies of the company. RI is determined by:

$$RI = Divisional\ profit - (Divisional\ Investment \times percent\ capital\ charge)$$

RI has following advantages:

a) As investments are not rejected only because they reduce the divisional manager's ROI, it averts suboptimal decisions.

b) By embracing possibilities that generate returns above the cost of capital, it maximises corporate growth and increases shareholder wealth.

c) Divisional managers are informed of the opportunity cost of money thanks to the cost of capital charge on divisional investments.

d) By applying the company's cost of capital to each division, it is guaranteed that decisions made by various divisions will not conflict with those of the organisation as a whole.

RI has following disadvantages:

a) Divisional profit and divisional investment are difficult to define in a way that is satisfying.

b) Determining an appropriate cost of capital may be challenging.

c) It could be challenging to identify controllable and uncontrollable factors at the divisional level.

Illustration 1) Division P&R are both considering an outlay on new investment projects.

Particular	**Division P**	**Division R**
Investment outlays	Rs.2,00,000	Rs.2,00,000
Net return on the new investment	Rs.32,000	Rs.22,000
Current ROI	18%	11%

The company's cost of capital is 13%. Should the project be accepted or rejected?

Solution:

i) Using ROI:

$$ROI\ on\ new\ investment = \frac{Net\ return\ on\ new\ investment}{new\ investment}$$

$$Division\ P = \frac{32000}{2{,}00{,}000} = 16\%$$

$$Division\ R = \frac{22000}{2{,}00{,}000} = 11\%$$

Division P should be rejected the new investment as its ROI is 16% which is less than the current ROI of 18%. Division R can accept the investment as its current ROI of 11% is equal to new ROI on new investments.

ii) Using RI:

Particular	Division P	Division R
Investment	2,00,000	2,00,000
Net income on new investment	32,000	22,000
Less: Imputed cost of Capital 13%	26,000	26,000
Residual Income	**6,000**	**(4,000)**

Division P should accept the investment as it will make RI of Rs.6,000 and Division R should be rejected it because it will give a loss of Rs.4,000.

8.7. MEANING OF TRANSFER PRICING

Transfer pricing is a problem that arises when goods or services are moved internally within sections of divisionalized businesses where profit or investment centres are established. In a decentralized organisation, a transfer price is the local value at which commodities and services are transferred between divisions. For products that are supplied from the selling division to the buying division, known as intermediate products, transfer prices are typically established. Final products are the goods that are produced by the purchasing department and distributed to customers.

8.8. OBJECTIVES OF SOUND TRANSFER PRICING

How should the transfer price of goods and services between divisions be priced is a concern. The selling division receives money through the interdivisional transfer of goods and services, and the purchasing division incurs costs. Since revenue for one division can only be generated at the expense of another, the pricing charge will have an impact on both divisions' profits. For instance, charging greater prices for such a transfer of goods and services will profit the selling division. But this will mean increased costs for the purchasing department. A number of requirements should be met when determining transfer prices.

a) Transfer prices ought to make measuring divisional performance more precise.
b) Transfer pricing should encourage the divisional manager to make decisions that will benefit the business as a whole and maximise the profitability of their division.
c) The transfer price should guarantee the preservation of divisional autonomy and power. Decentralization's primary goal is to provide these divisional managers more authority so they can assess the overall

success of a profit centre or investment centre. Therefore, it is improper to provide a divisional manager authority by putting them in charge of divisional operations and then revoke it by prescribing transfer prices that have an impact on the division's performance.

d) Transfer pricing should enable goal congruence, which in practice means that the divisional manager's goals and the company's overarching goals are aligned.

8.9. METHODS OF TRANSFER PRICING

Pricing the output of one division in comparison to another can be done in a variety of ways. The decision-making, product costing, and performance assessment of various organisational divisions will all be significantly impacted by the choice of an acceptable transfer price.

Transfer pricing techniques can generally be divided into two types.

They are:

(1) Cost-based and

(2) Market Price-based.

Each of the two procedures mentioned above has a number of variations, which are covered in more detail below.

1) Market Price Based

This method consists of the following methods:

a) Market Price

b) Adjusted Market Price, and

c) Negotiated Price

a) **Market Price:** Any price that can be used as a transfer price is one that is either a market price or the price of a comparable product that is on the market and whose details are known. At this market pricing, the selling and buying divisions are free to engage in unlimited sales and purchases. Trading with other managers or outsiders is unimportant to the managers of the selling and purchasing divisions. As long as the supplying unit is functioning at capacity, this is OK from the company's perspective. When there is a competitive external market for the transferred goods, the market price is relevant for determining the transfer price. This strategy has the advantage that it can be seen as an opportunity cost to a division as there is a choice as to whether or not to buy from an outside market. Furthermore, managers have control over their transfer price, making it easier to measure performance. This strategy also helps to ensure the divisions' profit independence, which is another benefit. The selling division does not transfer any profits to the buying section.

b) **Adjusted Market Price:** This pricing is based on the market price, but it has been modified to account for costs like sales commission and bad debts that shouldn't be incurred within the divisions.

c) **Negotiated Price:** When there is a foundation for negotiation between the divisional managers, this price may be offered. Typically, the agreed-upon price can be either the market price or the cost price. One basis, for instance, might be the contribution margin on the product being transferred that is split between the transferor and the transferee, or it might be the entire cost that the transferer or transferee could suggest, or the market price. Between these two figures, both divisions may be negotiated. Sometimes the agreed-upon price will be determined by the manufacturing cost plus a surcharge on top of the estimated market price.

2) **Cost Price Based:**

Cost Price is an additional approach that can be used to apply a transfer price when moving production across divisions. Companies may choose to employ some of the cost-based transfer pricing strategies listed below when there are no external markets or when information about external market prices is not easily accessible.

a) Absorption Cost
b) Cost Plus Profit Margin
c) Marginal Cost
d) Standard Cost
e) Opportunity Cost
f) Dual prices

Let us study about these methods in brief.

a) Absorption Cost: The complete cost incurred in producing a product is the basis for absorption or full cost. The selling division cannot realise a profit on the products moved when full cost alone is employed for transfer pricing. The drawback of this approach is that any additional costs brought on by inefficiency may be transferred to other divisions.

b) Cost Plus Profit Margin: Under absorption costing, the selling division cannot realise a profit on the transferred items when cost alone is employed for transfer pricing. A selling division is discouraged by this. Some businesses base their transfer prices on cost plus profit margin in order to get around this issue.This includes the item's purchase price plus any markup or additional profit margin. The selling division receives a profit contribution on the units moved using this manner. Performance evaluations based on divisional operating profits are advantageous for the transferring division as well. However, it also has the disadvantage of absorption costs, which means that any inefficiencies may also seep into other divisions.

c) Marginal Cost: The marginal cost is a different transfer pricing strategy that should be used. When moving output from one division to another division, all costs that alter due to changes in activity level should be considered when determining the transfer price. However, because it has no effect on profit or fixed expenses, this strategy is ineffective at inspiring divisional managers.

d) **Standard Cost:** Any discrepancies or inefficiencies in the selling division are transferred to the buying division if actual costs are used as the foundation for the transfer price. Standard costs are typically used as the foundation for transfer pricing in cost based systems to encourage accountability in the selling division and to identify differences across divisions. The buyer's risk is decreased by the use of standard charges. The buyer avoids being charged with the seller's cost overruns because they are aware that the usual charges would be passed.

e) **Opportunity Cost**: It stands for the chance that was lost because one line of action was chosen over another. As a result, if items are transferred internally, the organisation may forfeit a potential source of profit that would have come from an outside sale. In cases when the market is imperfect, an opportunity cost technique will often be utilised to define a range of transfer prices. If commodities are transferred internally, the transfer price should equal the difference cost to the selling division plus the implied opportunity cost to the company if the selling division has enough sales in the intermediate market that it would have had to forgo those sales otherwise. The equations are:

Transfer Price = Differential cost to the selling division + Implicit opportunity cost to company if goods are transferred internally.

f) Dual Prices: In a dual price transfer pricing scenario, the selling division makes a profit by selling the transferred goods at full cost plus profit margin. The market price, however, is the transfer price for the buying division. A unique centralised account could be used to account for the variance in transfer prices between two divisions. This approach would preserve cost information for successive buyer departments and would promote internal transfers by giving the selling divisions a profit on such transfers.

As commodities are transferred at a profit or markup, dual prices provide motivation and incentives to selling divisions. The most suitable base for the buying division might be thought of as market price. Thus, a dual pricing structure encourages both the selling and buying divisions to make decisions that are in line with the broader decentralisation objectives.

8.10. SUMMARY

A system of responsibility reporting and control at each managerial level is known as responsibility accounting, sometimes known as "Responsibility reporting."It is centred on functional activities, for which certain managers are responsible. When developing a system, one must consider both its process and structure. The four primary strategies or principles of responsibility accounting are as follows: I) Restructuring the organisation into cost, revenue, profit, or investment centres according to responsibility,(ii) dividing costs into those that are under your control and those that are not,(iii)Flexible budgeting, and (iv) Performance reporting..The first technique establishes the framework, while the other

three techniques handle responsibility accounting implementation. It has several uses and offers numerous benefits because the responsibility centers are the main emphasis. It is a crucial tool for management control. A responsibility accounting system provides data that aids in operation control and assesses subordinate performance. Corrective action, management by objectives, and authority delegation are made easier by it. Because the rewards are related to the achievement, it also boosts morale. In addition to other factors, the managers' active cooperation is essential to the system's success. Large decentralized organisations that could treat departments and divisions as managerial levels of responsibility have also adopted it. The success of individual divisions is primarily measured through responsibility accounting. The most widely used metrics for evaluating the performance of a division are Return on Investment and Residual Income.

Transfer price is the cost at which the providing division charges the user division for receiving its output. The choice of a suitable transfer price will have a big impact on the decision-making and performance assessment of different company divisions. Transfer prices can be set using a variety of techniques. These techniques fall into two categories: market price- and cost-based. The market price based consists of (a) market price, (b) adjusted market price, and (c) negotiated price methods. Cost based method may again be sub-divided into (a) absorption cost(b) Cost plus profit margin, (c) Marginal Cost, (d) Standard cost and (e) Opportunity cost methods. The divisional managers must remember organisational objective congruence regardless of the transfer price technique used because an action taken by one division should not have a negative impact on the group as a whole.

8.11. EXERCISES

A) Fill in the blanks:

1) In market-based transfer pricing, transfer price is calculated on the basis of _____.
2) Residual income indicates profitability of _____ center.
3) Manpower department is _____ center.
4) Whole organisation is a _____ center.
5) ROI indicates overall profitability of _____ center.
6) The manager of profit center has control over revenue, cost and _____.

(Answers: 1) Market price, 2) Profit, 3) Cost, 4) investment, 5) Investment, 6) Profit,

B) State whether each of the following statement is True or False.

a) ROI and RI both the methods are to be used in performance evaluation.
b) Transfer price is the price at which goods are transferred from one department to another department.

c) The negotiated transfer price is decided by mutual consultation by the transferer department and transferee department.
d) HR department is a profit center.
e) ROI is return on Fixed assets.
f) Production department is a investment center.
g) Cost variance is a difference between standard cost and actual cost.

(Answers: 1) True, 2) True, 3) True, 4) False, 5) False, 6) False, 7) True)

C) Theory Questions.

1) Write a note on ROI.
2) Write a note on RI.
3) What is responsibility accounting?
4) What are the different types of responsibility center?
5) Explain the various techniques to measure the performance of a responsibility center?
6) What are the different methods of Transfer pricing?
7) What is Transfer pricing? Objectives of sound Transfer pricing.

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9

ACTIVITY BASED COSTING AND ACTIVITY BASED MANAGEMENT

Unit Structure

9.0 OBJECTIVES:

- To study the Definitions of Activity Based Costing.
- To examine Stages in Activity Based Costing.
- To elaborate Purposes of Activity Based Costing.
- To understand Benefits of Activity Based Costing.
- To Know the cost Drivers
- To solve Problems on Activity Bases Costing.
- To understand the Activity Based Management
- To evaluate advantages of Activity Based Management

9.1 DEFINITIONS – STAGES IN ACTIVITY BASED COSTING

9.1.1.Definition:

CIMA defines 'Activity Based Costing **(ABC)**' as "An approach to the costing and monitoring of activities which involves tracing resource consumption and costing final outputs. Resources are assigned to activities, and activities to cost objects based on consumption estimates. The latter utilise cost drivers to attach activity costs to outputs."

According to Horngren, Foster and Datar 'ABC is not an alternative costing system to job costing or process costing. Rather ABC is an approach to developing the cost numbers used in job costing or process costing systems. The distinctive feature of ABC is its focus on activities as the fundamental cost objects. In contrast most traditional approaches used in job and process costing systems rely on general purpose accounting

systems, not tailored to the activities found in individual organisations. The ABC approach has the potential to provide managers with information they find more useful for costing purposes.

According to Dansby and Lawrence 'In ABC costs are not initially traced to departments. Instead, costs are first traced to activities and then to products: Activities causing overheads (or cost drivers) are identified. These activities are later used as a base for allocating overhead costs to products.

Activity Based Costing is based on the belief that in production process there are various activities which give rise to costs. ABC creates a link between activities and products by assigning a cost of activities to products based on an individual product.

9.1.2:Meaning of some terms used in ABC

a. **Activity** – Activity is an event that incurs cost.

b. **A Cost Object** – It is an item for which cost measurement is required e.g. a product or a customer.

c. **A Cost Driver** – It is a factor that causes a change in the cost of an activity.

There are two categories of cost driver.

i. **A Resource Cost Driver –** It is a measure of the quantity of resources consumed by an activity.

ii. **An Activity Cost Driver –**It is a measure of the frequency and intensity of demand, placed on activities by cost objects.

d. **Cost Pool -** It represents a group of various individual cost items. It consists of costs that have same cause effect relationship. Example Machine set-up.

9.1.3 Some examples of cost drivers:

Functional Areas	**Activities**	**Suitable Cost Drivers**
Material Management	Issue of Purchase order	No. of Purchase orders
	Inspection of materials	No. of Purchase orders
Stores Management	Storing of materials	Value of Material stored

	Servicing of requisitions	No. of requisitions
	Inspection and verification	no. of times inspected
	Stock taking	value of stock
Personnel Management	Recruitment of employees	No. of employees recruited
	Maintenance of Leave records and attendance	No. of employees
Marketing	Demand Creation	Increase in sales
	Advertising	Increase in sales
	Dispatches	No. of Orders
Research & Development	Research	No. of Research projects

9.1.4:The design of ABC system involves following stages:

(1) Identifying activities.

(2) Assigning costs to activity cost centres

(3) Selecting appropriate cost drivers

(4) Assigning the cost of activities to products .

These stages may be considered in detail:

1. Identifying Activities:

Identification of the functional areas is the first step for ABC. For example production will involve activities like ordering, receiving, material handling, packing, dispatching, use of machine, use of labour etc.

The activities may be basically fall into four categories as suggested by Cooper and Kaplan.

(a) Unit Level Activities or Primary Activities:

These are those activities for which the consumption of resources can be identified with the number of units produced. The cost of primary activities (like use of indirect materials and consumables, testing of every item produced) may be correlated to number of units produced (i.e. on volume-basis). The use of indirect materials/consumables increases with the number of units produced.

(b) Batch Level Activities:

The activities such as setting up of a machine or processing a purchase order are performed each time a batch of goods is produced. The cost of batch related activities varies with number of batches made, but is common (or fixed) for all units within the batch. These are manufacturing support activities (like material ordering, machine set-up costs, inspection of products etc).

(c) Product Level Activities:

These are the activities which are performed to support different products in product line example like designing of the product, keeping technical drawings of product, activities upto date, advertising of a specific product is called product level

(d) Facility Level Activities:

Certain activities cannot be related to a particular product, instead may be related to certain facilities like maintaining the building, security of plant, salaries of production manager, advertisement to promote organisation.

2. Assigning Costs to Activity Cost Centres:

The second stage assigns the cost to the activity cost centre or cost pool. The resources consumed by the activity are to be apportioned on some suitable basis to the cost centre. Resources utilized for advertising will be a part of the marketing department. Even cost of distribution will be a part of marketing department.

3. Selecting Appropriate Cost Drivers:

In the third stage the factors that influence cost of a particular activity are identified. The factors that influence the activity are called as cost drivers. Example recruitment of employees by personnel department the cost driver being no. of employees recruited, Purchasing activity by purchase department the cost driver being Number of orders etc. The organisation needs to be divided into functional areas and cost drivers of each functional area need to be identified. The table given in 4.1.3. Explains the cost drivers applicable for each functional area.

2. Assigning the Cost of the Activities to Products:

In this fourth and final stage the cost drivers cost is assigned to the service or product on which it was incurred. The cost driver should be measurable in a way that enables it to be identified with individual products.

3. CALCULATE ACTIVITY COST DRIVER RATES FOR EACH ACTIVITY,

The Activity Cost driver rate is calculated as follows:

$$\textbf{Activity cost driver rate} = \frac{\textbf{Total cost of activity}}{\textbf{Activity driver}}$$

9.2 PURPOSES AND BENEFITS OF ACTIVITY BASED COSTING.

9.2.1 :Purposes and Benefits of ABC:

1. ABC provides more accurate cost information for the product.
2. ABC aids management by providing meaningful information regarding the cost for decision making. It helps in decision making like transfer pricing, make or buy the product etc.
3. It provides accurate and reliable cost information of product and services. It helps in improving productivity and efficiency of the firm.
4. It helps in framing pricing policy for the firm. The data collected by ABC technique related to cost and overheads aids in deciding about pricing for various levels of output. Pricing policy of the company is more competitive as ABC provides accurate cost information related to the product
5. ABC will be more useful if there is significant size of batch level and product level activities.
6. Allocation of overheads or expenses can be ascertained by identifying the cost driver, the functional area and the product or service.
7. The focus of ABC is to find out the unit cost of each expense related to the product.
8. ABC technique provides due importance to non-manufacturing cost which constitute a substantial portion of total cost It can help in devising cost reduction strategy by eliminating unimportant cost or wasteful expenditure.
9. ABC helps creates cost consciousness and so identifying areas which needs improvement so that organisation becomes cost effective.
10. ABC is beneficial to organisation having multiple products offering. It can help organisation in decision of discontinuing certain product line or adding a new product line.

9.2.2 Limitations of Activity Based Costing(ABC)

1. It is not suitable for small organisations.
2. It is expensive in comparison with traditional costing system. The cost of maintaining ABC system should justify the benefits.
3. It is beneficial for organization with multiple products and not for organisations with limited products.
4. Selection a suitable cost driver may be difficult and inappropriate.
5. ABC is not beneficial to those organisations whose overheads form a small proportion of the total cost.
6. Allocation of all overhead cost to specific activities is a tedious job.
7. ABC implementation may require change in basic structure of calculation of data under other cost accounting system like marginal costing, standard costing etc.
8. ABC is a complex system to understand all stakeholders may not be comfortable with the system.

9.3 COST DRIVERS.

Definition

A Cost Driver is a factor that causes a change in the cost of an activity. For example, number of units of electricity consumed decided the electricity charge, The number minutes or seconds of talk time decides the telephone bill. So, the units of electricity consumed and the number minutes of talk time are called as cost drivers.

There are two categories of cost driver. A Resource Cost Driver and An Activity Cost Driver.

A Resource Cost Driver– It is a measure of the quantity of resources consumed by an activity.

An Activity Cost Driver–It is a measure of the frequency and intensity of demand, placed on activities by cost objects.

Some examples of cost drivers are

1. Number of customers
2. Number of set-ups
3. Number of machine hours
4. Number of purchase orders
5. Number of orders completed
6. Number of labor hours
7. Number of orders packed and deliver
8. Number of product returns from customers
9. Number of service calls.
10. Number of research projects.
11. Number of advertisements
12. Sales revenue per order.

Cost drivers are an integral part of ABC costing system. The cost incurred on a product or a service is decided by the resources utilized by the Cost driver. The cost driver is the cause of the cost of the product. A cost driver is factor which creates the cost.

Cost drivers can derive profitability of the resource utilized, profit/revenue to be derived from each customer etc which help management to make better decisions.

The major drawback of Cost drivers is that the fixed cost even have to be bifurcated in terms of Variable factors.

It is said that activities consume resources while customers ,products and channels of production consume activities.

For example if there is a Product A ,Number of units produced is 300 units ,having cost drivers like setup cost of production of Rs 10,000,Machine hour utilisation cost of Rs10,000,Customer servicing Cost of Rs 7,000.

Then the total cost of Product A =Setup cost+Machine Utilisation Cost +Customer Servicing Cost

Total cost of Product A=10,000+10,000+7,000=27,000

Cost per unit of product A = Total cost/Number of units = 27,000/300=Rs.90 per unit.

9.4 PROBLEMS ON ACTIVITY BASES COSTING.

Q.01. Tops Ltd. assemble two products from bought in components A and B. Details of manufacture are :

	A	B
Output in units	10,000	15,000
Component Numbers	8	4
Component Cost (Rs.)	4.5	3.6
Number of Production Runs	200	50
Machine Hours per 100 units	2.6	5.3
Items packed in cartons of Overhead Costs are budgeted at :	10	50
Component Purchasing and Handling		(Rs.) 14000
Production Control		18,000
Machine Set-up Costs		25,000
Machine Running Costs		64,355
Packing		31,200

Required :

a) Calculate the overhead recovery rates using Activity-Based Costing.

b) Work out the cost of production of the two components.

Solution:

Key: Calculate cost driver rates and apply them for activity consumption to find out cost.

Determination of recovery rates:

1. Cost per components = 14,000/12 = 1166.67
2. Cost per Production run = 18,000/250 = 72
3. Cost per set-up per production run = 25,000/ 250 = 100
4. Cost of Machine Running per hour = 64,355/ 1,000 = 61.29

A: 2.6/100 X 10,000 = 260
B: 5.3/ 100 X 15,000 = 795
=1,055

5. Packing cost per carton = 31,200/ 1,300 = 24

Carton A: 1,000

Carton B: **300**

= 1,300

Cost of Production

	Component A Rs.	Component B Rs.
Purchasing and Handling	9,333	4,667
Production Control	14,400	3,600
Set Up Cost	20,000	5,000
Machine Running Cost	15,935	48,726
Packing Cost	24,000	7,200
Total	83,668	69,193

Q.02. LG ltd has collected the following data for its two activities. Activity cost rate is calculated on the basis of cost driver capacity.

Activity	Cost Driver	Capacity	Cost (Rs.)
Power	Kwh	50,000 kwh	2,00,000
Quality Inspections	No of inspections	10,000 Inspections	3,00,000

The company makes three products Alpha, Beta and Theta.

Consumption of cost drivers reported for the year ended 31st March, 2017.

Product	Kwh	Quality inspections
Alpha	10,000	3,500
Beta	20,000	2,500
Theta	15,000	3,000

Prepare a statement of allocation of cost to each product under ABC.

Solution:

Key : Calculate cost driver rates and apply them for activity consumption to find out cost.

Cost per kwh = 2,00,000/ 50,000 = 4

Cost per Inspection = 3,00,000 / 10,000 = 30

Statement of Allocation of Cost under ABC

	Alpha **Rs.**	**Beta** **Rs.**	**Theta** **Rs.**
Power @ Rs. 4 per kwh	40,000	80,000	60,000
Quality Inspection	1,05,000	75,000	90,000
Total	1,45,000	1,55,000	1,50,000

Q.03. ACL Ltd has four different customers prompt, regular, careless, and defaulter. A single product is sold to them at different prices due to trade discount offered. Prepare customer profitability statement.

Details about four customers

	Prompt	Regular	Careless	Defaulter
Units sold	600	800	1,000	700
S.P. Rs.	25	25	25	25
Trade discount	Nil	8%	16%	12%
No of Sales visits	2	4	6	3
No of purchase orders	30	20	40	20
No of deliveries	10	15	25	14
KMS per journey	20	30	10	50
No of rush deliveries	–	–	1	2

Activity	Cost per Activity Rs.
Sales visits	210
Order placing	60
Product handling	10
Normal delivery cost	2 per km
Rushed delivery cost	200 per delivery

Solution:

Key : Calculate cost driver rates and apply them for activity consumption to find out cost.

Customer Profitability Statement

	Prompt Rs.	**Regular Rs.**	**Carless Rs.**	**Defaulter Rs.**
Activity				
Sales Visits @ 210	420	840	1,260	630
Order Placing @ Rs. 60 Per Order	1,800	1,200	2,400	1,200
Product Handling @ Rs. 10 Per Delivery	100	150	250	140
Delivery Cost Rs. 2 per km	40	60	20	100
Rushed Delivery Cost @ Rs. 200	-	-	200	400
Total Cost	2,360	2,250	4,130	2,470
Profit	12,640	16,150	16,870	12,930
Sales	15,000	18,400	21,000	15,400

Q.04. Siemens Ltd. manufactures two types of machinery model X 150 and X 170

It absorbs overheads on the basis of direct labour hrs. The budgeted overheads and direct labour hours for March, 2017 are Rs. 12,42,500 and 20,000 hours respectively. The information about the products is as follows:

X 150		X 170
Budgeted production	2500 units	3,125 units
Direct Material cost unit Direct Labour	Rs. 300 per unit	Rs. 450 per
X 150	3hrs @ Rs. 150	Rs. 450
X 170	4hrs @ Rs. 150	Rs. 600

Activities :	**Rs.**
Order processing	2,10,000
Machine processing	8,75,000
Product Inspection	1,57,500
Total	12,42,500

The data relating to these activities:

	Orders Processed	**Machine hrs. worked**	**Inspection hrs.**
X 150	350	23,000	4,000
X 170	250	27,000	11,000
	600	50,000	15,000

Calculate cost under ABC

Solution:

Key: Calculate cost driver rates and apply them for activity consumption to find out cost.

Siemens Ltd.

1. Order Processing per Order = 2,10,0000 / 60 = 350

2. Machine Processing per hr. = 8,75,000 / 50,000 = 17.50

3. Product Inspection per inspection hr. = 1,57,500 / 15,000 = 10.50

	X 150 **Rs.**	**X 170** **Rs.**
Budgeted Production (Units)	**2,500**	**3,125**
Direct Materials (2,500 X 300) / (3,125 X 450)	7,50,000	14,06,250
Direct Labour (2,500 X 450) / (3,125 X600)	11,25,000	18,75,000
Prime Cost (A)	18,75,000	32,81,250
Add : **Overheads**		
Order Processing @ Rs. 350 per order	1,22,500	87,500
Machine Processing @ 17.5 per hr.	4,02,500	4,72,500
Production Inspection @ Rs. 10.5 per hr.	42,000	1,15,500
(B)	5,67,000	6,75,500
Total (A + B)	24,42,000	39,56,750

Q.05. PTL plans to use. ABC to decide its cost. At present it allocates factory overheads to products on the basis of direct labour hours. Total factory overheads are as follows:

Department	**Factory overheads (Rs.)**
Product support	2,25,000
Production (Factory overheads only)	1,75,000
Total cost	14,00,000

The company performs four major activities in production support department. These activities along with their budgeted costs are as follows:

Production Support	**Budgeted cost activities (Rs)**
Set up	4,28,750
Production control	2,45,000
Quality control	1,83,750
Materials management	3,67,500
Total	12,25,000

The company supplies following details:

Products	No. of units	Direct labour hrs.	Set-ups	Production orders	Inspection	Material requisitions
A	10,000	25,000	80	80	35	320
B	2,000	10,000	40	40	40	400
C	50,000	1,40,000	5	5	0	30
	62,000	1,75,000	125	125	75	750

Required :

i) Cost as per direct labour hour basis

ii) Cost as per ABC

Solution:

Key : Calculate cost driver rates and apply them for activity consumption to find out cost.

Factory Overhead per hr. = 1,75,000 / 1, 75,000 = 1

Cost per set up = 4,28,750 / 125 = 3,430

Cost per Order = 2,45,000 / 125 = 1,960

Cost per Inspection = 1,83,750 / 75 = 2,450

Cost per requisition = 3,67,500 / 750 = 490

Cost as per ABC

	A **Rs.**	**B** **Rs.**	**C** **Rs.**
Product Support			
Set up Cost @ Rs. 3,430	2,74,400	1,37,200	17,150
Production Control @ Rs. 1,960 per Order	1,56,800	78,400	9,800
Quality Control @ Rs. 2,450 per Inspection	85,750	98,000	-
Material Management @ Rs. 490 per Requisition	1,56,800	1,96,000	14,700
Production			
@ Rs. 1 per hr.	25,000	10,000	1,40,000
	6,98,750	5,19,600	1,81,650

Cost as per direct labour hour basis

Cost per labour hour = 14,00,000 / 1,75,000 = 8

Total Cost

	A (Rs.)	**B (Rs.)**	**C (Rs.)**
Overheads per hr. Rs. 8	2,00,000	80,000	11,20,000
Total	2,00,000	80,000	11,20,000

Q.06. The budgeted overheads and cost drivers' volume of XYZ Ltd are as follows:

Cost Pool	**Budgeted overheads (Rs.)**	**Cost driver**	**Budgeted volume (Rs.)**
Material procurement	5,80,000	No of orders	1,100
Material handling	2,50,000	No. of movements	680
Set up	4,15,000	No of set up	520
Maint.	9,70,000	Main. hrs	8,400
Quality control	1,76,000	No. of inspections	900
Machinery	7,20,000	No. of machine hrs	24,000

The company has produced a batch of 2600 components of AX-15, its material cost was Rs. 1,30,000 and labour cost was Rs. 2,45,000. The usage activities of the said batch are as follows

Material orders	26	Maint. Hrs.	690
Material movement	18	Inspection	28
Setups	25	Machine hrs	1,800

Ascertain the cost driver rates. Ascertain the cost of batch of component using ABC.

Solution:

Key : Calculate cost driver rates and apply them for activity consumption to find out cost.

Calculation of Cost Driver Rates

1. Cost per Order = 5,80,000 /1,100 = 527.27
2. Material Handling per Movement = 2,50,000 / 680 = 367.65
3. Cost per set up = 4,15,000 / 520 = 798.08
4. Cost per Maintenance hr. = 9,70,000 / 8,400 = 115.48
5. Cost per Inspection = 1,76,000 / 900 = 195.56
6. Cost per Machine Hr. = 7,20,000 /24,000 = 30

Statement of Cost under ABC

Particulars	Rs.	Rs.
Direct Materials		1,30,000
Direct Labour		2,45,000
Prime Cost		3,75,000
Overheads		
Material Procurement (26 ´ 527.27)	13,709	
Material Handling (18 ´ 367.65)	6,618	
Set up (25 ´ 798.08)	19,952	
Maintenance (690 ´ 115.48)	79,681	
Inspection (28 ´ 195.56)	5,476	
Machinery (1,800 ´ 30)	54,000	1,79,436
		5,54,436

9.5 SUMMARY

CIMA defines 'Activity Based Costing(ABC)' as "An approach to the costing and monitoring of activities which involves tracing resource consumption and costing final outputs. Resources are assigned to activities, and activities to cost objects based on consumption estimates. The latter utilise cost drivers to attach activity costs to outputs." Activity Based Costing is based on the belief that in production process there are various activities which give rise to costs. ABC creates a link between activities and products by assigning a cost of activities to products based on an individual product. The design of ABC system involves stages like Identifying activities, assigning costs to activity cost centres, selecting appropriate cost drivers, assigning the cost of activities to products and calculating activity cost per unit. The identification of activities basically falls into four categories as suggested by Cooper and Kaplan. They are unit level activities or primary activities, batch level, product level activities and facility level activities. Benefits of ABC are ABC provides more accurate cost information for the product. ABC aids management by providing meaningful information regarding the cost for decision making. It helps in decision making like transfer pricing, make or buy the product etc. It helps in framing pricing policy for the firm. ABC helps creates cost consciousness and so identifying areas which needs improvement so that organisation becomes cost effective. **Limitations of Activity Based Costing are** It is not suitable for small organisation. It is an expensive

system as compared to traditional costing system and so may not justify the cost. It is of limited use if the overhead forms a small proportion of the total cost of production. A Cost Driver is a factor that causes a change in the cost of an activity. For example, number of units of electricity consumed decided the electricity charge, The number minutes or seconds of talk time decides the telephone bill. So the units of electricity consumed and the number minutes of talk time are called as cost drivers. There are two categories of cost driver. A Resource Cost Driver and An Activity Cost Driver. Some examples of cost drivers are Number of customers, Number of set-ups, Number of machine hour's etc. Cost drivers are an integral part of ABC costing system. The cost incurred on a product or a service is decided by the resources utilized by the Cost driver. The cost driver is the cause of the cost of the product. A cost driver is factor which creates the cost. The major drawback of Cost drivers is that the fixed cost even has to be bifurcated in terms of Variable factors. It is said that activities consume resources while customers, products and channels of production consume activities.

9.6 QUESTIONS

Q.01. Theory questions:

1. What is Activity based Costing (ABC)?
2. What are the advantages and limitations of ABC costing system?
3. What is a cost driver explain in detail with examples?
4. What are the steps or stages of ABC costing?
5. Explain in detail the four categories of identification of activity?

Q.02. Fill in the blanks:

1. The distinctive feature of ABC is its focus on activities as the ……. objects.
2. ABC stand for …….
3. ABC creates a …….. between activities and products
4. Activities are used as a base for …….. overhead costs to products.
5. ABC technique provides ……and …….. cost information.
6. ABC enables the management in formulating an effective ……. while fixing prices.
7. ABC helps in Identifying ……
8. ABC technique Assigning costs to activity ……
9. ABC helps in Selecting appropriate ……
10. ABC Assigning the cost of activities to ……..

Answers: **1.** fundamental cost **2.** Activity Based Costing **3.** link **4.** allocating **5.** accurate**,** reliable **6.** pricing policy **7.** Activities **8.** cost centres **9.** Cost drivers **10.** Products

Q.03 Complete the Following Table:

Sr. No.	Functional Areas	Activities	Suitable Cost Drivers
01	Material Management		
02	Stores Management		
03	Quality Control		
04	Personnel Management		
05	Marketing		
06	Research & Development		
07	Matching		

9.7 REFERENCES: RECOMMENDED BOOKS

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10

TARGET COSTING

Unit Structure

10.0 OBJECTIVES

After studying this unit, you will be able to:

- State the principles of Target costing
- Identify the Methodology involved in Target costing
- Discuss the Procedures of Target Costing
- State the advantages and disadvantages of Target costing

10.1 INTRODUCTION

In this Unit, we will study Target costing determines life cycle which should be sufficient to create specified functionality and quality while maintaining the product's intended profit margin. The evaluation, benefits and challenges involved in Kaizen costing.

It is always utilized to lower cost in the context of pricing in a competitive world by constant improvements and replacement of technology and processes. In general, the cost of any product is determined by analyzing the best structure of the country's main competition.

10.2 TARGET COSTING

Target costing is a cost management method. The gap between goal sales and target margin is known as target cost. It is, in this manner, the difference between assessed selling cost of a proposed item with determined usefulness and quality and the target margin.

It first emerged in Japan in the 1960s as a response to challenging market conditions. A proliferation of consumer and industrial products from western firms was overcrowding the market in Asia, and Japanese firms were also short on the resources and skills needed to develop new concepts, tools, and techniques required to compete with the toughest western competitors in terms of quality, cost, and productivity.

Target costing is widely used in Japan, with more than 80% of companies in the assembly industry and more than 60% of enterprises in the processing industry using it.

Target costing has come from a Japanese term “Gena Kikaku.”

The technique aims to create and sell products with the desired profit margin. The company must understand what value target customers place on various attributes and aspects of product quality while designing the product.

On the one hand, this pricing approach is used to suit client requests, while on the other side; the organization's profit goals are met.

The focus of target costing is on cost reduction at the planning and design stages of the product life cycle, because this is where the majority of the product cost is set.

Customers' preferences and the value they place on various qualities and quality indicators necessitate extensive marketing research. The company operates within the parameters of maximal attributes and quality it can provide, as well as the bare minimum acceptable to target customers.

During the cost-cutting process, cost-engineering techniques are used. Some of the major methodologies employed include the just-in-time approach, total quality control, value analysis (also known as value engineering), and so on.

Cooper defines target costing as “a disciplined process for determining and realizing a total cost at which a proposed product with specified functionality must be produced to generate the desired profitability at its anticipated selling price in the future”.

Furthermore, both the price and the cost are for a certain product functionality, which is established by a thorough understanding of the demands of customers and their willingness to pay for each function. There is an intrinsic acknowledgment that there are enough elements in the process that are fundamentally outside the control of the organization - the selling price is determined by the marketplace, which includes worldwide customers, competitors, and general economic conditions.

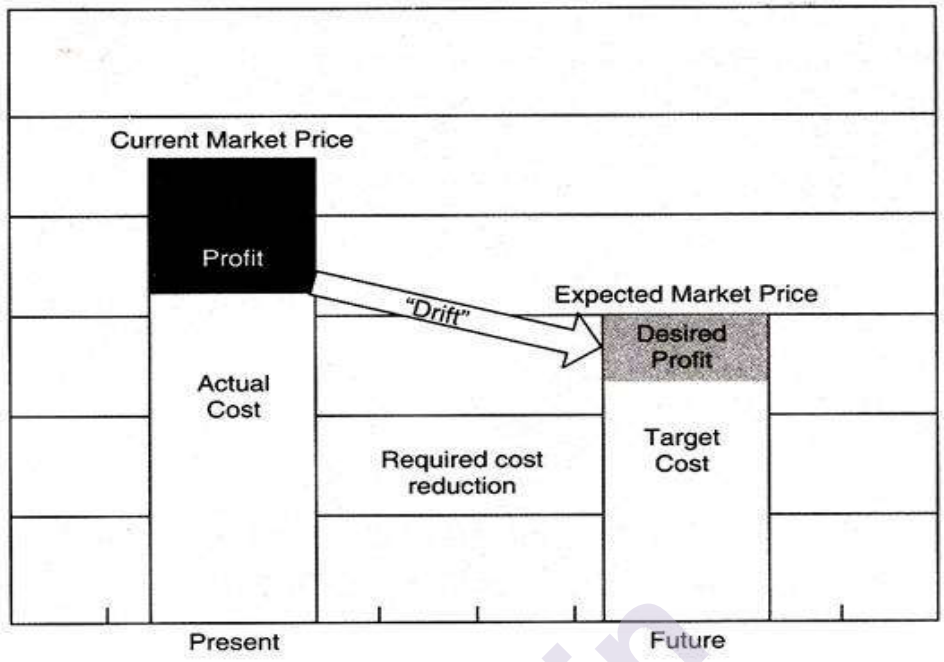

Fig 10.1 Target Cost Concept

10.3 MEANING AND PRINCIPLES OF TARGET COSTING:

Product costing is another name for target costing. It is a new technique, and today's accountants are changing from traditional costing to product costing, which takes into account original design and engineering costs, as well as manufacturing, distribution, and sales and service costs. In Japan, the concept of target costing is extensively used.

A target cost is the highest amount of cost that may be expended on a product while still allowing the company to earn the requisite profit margin at a given selling price. A specific selling price is used in target costing. It entails deducting a desired profit margin from a competitive market price to arrive at a target cost.

It is always utilized to lower cost in the context of pricing in a competitive world by constant improvements and replacement of technology and processes. In general, the cost of any product is determined by analyzing the best structure of the country's main competition.

Profit is added to the cost to determine the target price. Efforts are being made to hit the goal cost. Cost accounting, Product Development, and Engineering departments collaborate on this project.

CIMA – "Target cost is a product cost estimate derived from a competitive market price".

10.3.1 Formula used to calculate Target Costing:

Selling Price – Profit Margin = Target Cost

Example of Target Costing

ASM Ltd. is a big player that operates in different competitive market. It sells wrapped foods to customers. ASM can only charge 40 per unit. If the intended profit Margin of the company is 20% on the selling price, calculate the target cost per unit.

Solution:

Target Profit Margin = 20% of 40 = 8 per unit

Target cost = Selling Price – Profit Margin

= 40 – 8

= 32 per unit

So, target cost is Rs. 32 per unit.

10.3.2 Objectives of a Target Costing System:

1. Reduce the expenses of new items in order to maintain the required profit margin.
2. The new items meet the market's requirements for quality, delivery time, and pricing.
3. Make target costing a business-wide profit management activity to inspire all firm employees to reach the target profit during new product development.

10.3.3 Features of Target Costing

1. It is considered an important aspect of the creation and launch of new products.
2. Various sales forecasting methodologies are used to estimate a target selling price.
3. Given the link between price and volume, the goal selling price is used to determine target production volumes.
4. The goal of the target costing process is to identify cost-cutting targets.
5. When the permissible cost and the desired cost diverge, a reasonable amount of judgement is required.

10.3.4 Characteristics of Target Costing

(1) Opportunity Identification –

Opportunities for cost reduction can be easily recognized with the use of value engineering and value analysis. Value engineering is looking for ways to change the design in order to reduce costs without sacrificing product quality.

Similarly, value analysis entails excluding non-value-adding activities that could reduce costs without lowering product quality. As a result, the present cost is decreased to the goal cost. When production begins, it is expected that the overall cost will meet the target while simultaneously generating a profit.

(2) Estimated Cost –

The target cost is calculated by subtracting the target price from the goal income.

(3) An Important Aspect of the Design -

Target costs is a well-known component of the design and launch of new products.

(4) Price Target –

It is the product's expected market price. It is a target price that is calculated using various sales forecasting methodologies, taking into account product design criteria as well as competitive market conditions.

(5) Cost-cutting goal –

The cost-cutting target is set, which necessitates an estimate of the existing cost of the new product. It is built on the foundation of existing technologies and their numerous components. The cost reduction is determined by the difference between current and desired costs.

10.3.5 Target Costing – Approaches (With Equations)

The customer is at the center of the target costing system. Before launching a product (or a family of goods), a company uses the target costing strategy to define the optimum selling price, determine the feasibility of hitting that price, and then control expenses to guarantee that the price is met.

The target costing method differs significantly from the traditional approach to price fixing and cost control.

1. Conventional Approach:

The traditional pricing strategy is cost plus. The strategy is to design a product that can be manufactured at the lowest cost, then add a desired margin to the predicted cost to calculate the new product's selling price.

We may present this approach in an equation form as follows:

S = C + P

If the company believes the price is too high, it alters the design to lower the cost and, as a result, the required selling price. If the company is unable to determine the projected selling price, the product is released at the original design's estimated selling price.

Another common strategy is to design a product in such a way that it can be manufactured at the lowest possible cost, then match the cost to the expected selling price.

The profit margin is determined as presented in the following equation:

P = S-C

If the profit margin falls below an acceptable level, the product is modified to cut the cost as much as feasible until the required profit margin is reached.

The emphasis in both traditional approaches is on cost reduction rather than cost management. After the development stage, cost-cutting initiatives begin. Both methods result in manufacturing efficiencies that can be implemented beyond the product design stage. As a result, cost-cutting opportunities are limited.

According to one study, a cost reduction of up to 10% is possible. Managers are not compelled to predict how much the customer will pay for each feature of functionality and quality under traditional methodologies. Each product used to be thought of as a complete package of functionality and quality, with little room for customization.

2. Target Costing Approach:

Target costing is a method of costing that starts with the customer's need and willingness to pay and works backwards. The dependent variable in target costing is cost, whereas the dependent variable in traditional techniques is selling price or profit.

The relationship between the variables can be presented as follows:

C = S-P

The target costing method understands that price, cost, functionality, and quality all have a trade-off. At the product development stage, managers assess this trade-off and optimize product functionality and quality within the limits of expected selling price, target cost, target volume, and target launch date.

Product Development Discipline with Structure:

Understanding customers' needs, industry price dynamics, product complexity and life cycle analysis, and supplier interactions are all part of target costing, a highly structured product development discipline.

The target costing system necessitates the mapping of various client segments, and the cost and revenue analysis gives data to find the most profitable segment. The product development and design team identifies the optimal functionality and design bundle (in terms of margin and pre-determined target cost) that will be successful in a certain segment.

The Tata 'Rs 0.1-million automobile' is an example of the target costing strategy in action. The Rs 0.1 million car was designated one of the year's trendsetters by Business Week, and Ratan Tata was named one of the world's 'Most Important People'.

10.4. METHODS OF PRODUCT DEFINITION ANALYSIS:

Comparison between Traditional Cost Management Approach and Target Costing Approach

The cost of a product is regarded as a dependent variable resulting from decisions made concerning the product's functions, features, and performance capabilities under the Traditional Cost Management Approach. Because cost estimation occurs late in the development cycle, costs are often greater than planned.

The target costing technique, on the other hand, is considerably different.

Target costing is built on three pillars:

1) market-driven pricing, or product orientation toward client affordability.

2) product cost is treated as an independent variable, and

3) Efforts made during the development phase of the process to achieve the goal cost at the outset.

10.4.1 Target Costing vs. Standard Costs: What's the Difference?

The following are the differences between target costing and standard costs:

Target costing and standard expenses should not be misconstrued as one and the same. There is a distinction to be made between the two terms.

Standard costs are predetermined costs established by industrial engineers or cost accountants based on an internal examination of usual situations.

Target costs, on the other hand, are based on external market study and playing competitors.

Target costing depends primarily on quantitative methodologies; however non-quantitative methods are often employed:

10.4.2. Analysis of Values

1. The Value Concept:

It can be useful to know what the term 'value' means in this context. In truth, the term 'value' has diverse connotations for different people. For example, "value" signifies the quality of the product to a designer, "value" is the price a salesman can get for the product in the market to a salesman, and "value" means return on capital used to top management.

An industrial product, on the other hand, may have the following value concepts:

i) Usefulness:

This refers to the features that the items should have in order to offer the intended service. A watch, for example, is used to keep track of time. It is offering its full use value if it delivers fairly accurate time.

The quality of performance is used to determine the usage value. To determine whether a product is worth the money spent on it, divide its value for the individual concerned by the price paid for it.

A product can be used for a variety of purposes.

As a result, its utility value can be separated into three groups:

(a) Value for primary usage;

(b) Value for secondary use; and

(c) Value of auxiliary use.

Paint, for instance, has various usage values. Its principal application value is when it is used to protect a surface. It has a secondary use value when used to draw lines on the road for pedestrians to cross.

When it pleases the aesthetic sense, it has a secondary utility value. Such a functional classification would aid in determining which paint to employ while keeping the goal in mind. If this is not done, it is possible that expensive enamel paint will be used where plain paint would have been more prudent.

(ii) Value for Money:

If the product is manufactured in-house, the value is calculated in terms of cost. It is a term used to describe the expense of production. When a product is purchased from a third party, it refers to the cost of the purchase.

(iii) Value of Exchange:

It refers to the amount of money a product might sell for. It is crucial for the sales department since the profit is the difference between the selling price (i.e., exchange value) and the product's cost.

As a result, the sales department must determine the product's worth to customers in comparison to other products on the market. It will assist the management in determining the product's selling price.

(iv) Self-esteem:

The prestige value is another term for this. Certain things or articles are valuable solely because they are appealing or have desirable characteristics. A gold watch has a higher perceived value for its owner than a regular watch, despite the fact that its functionality is similar to that of a regular watch. A gold watch may be a waste of money for certain people. It does, however, have a value for someone who desires to impress others and so gain personal gratification.

The technique, also known as value engineering, focuses on improving value by resulting in a rigorous and in-depth examination of products at the design stage. The various components can be altered or uniformed. It's also possible to use less expensive production processes or technologies.

Such a study exposes the fields in which avoidable expenses exist, and once these areas have been identified, actions can be taken to eliminate or, if not possible, reduce such unwelcome expenditures, all while maintaining quality.

2. Total Quality Management:

It is a quality control method created by the Japanese. Total quality control also includes quality inspection efforts across the board, rather than just inside certain divisions.

3. Economic Order Quality Analysis and Just-in-Time Material Requirement Planning:

Firms began utilizing cost-cutting approaches in place of the conventional way of keeping certain stocks on hand. The just-in-time approach, material requirement planning, and calculation of economic order quantity are some of the techniques that help reduce material and consequently product prices.

Market analysis, competitive analysis, and product mapping are just a few examples. For this aim, a market feature table might be prepared.

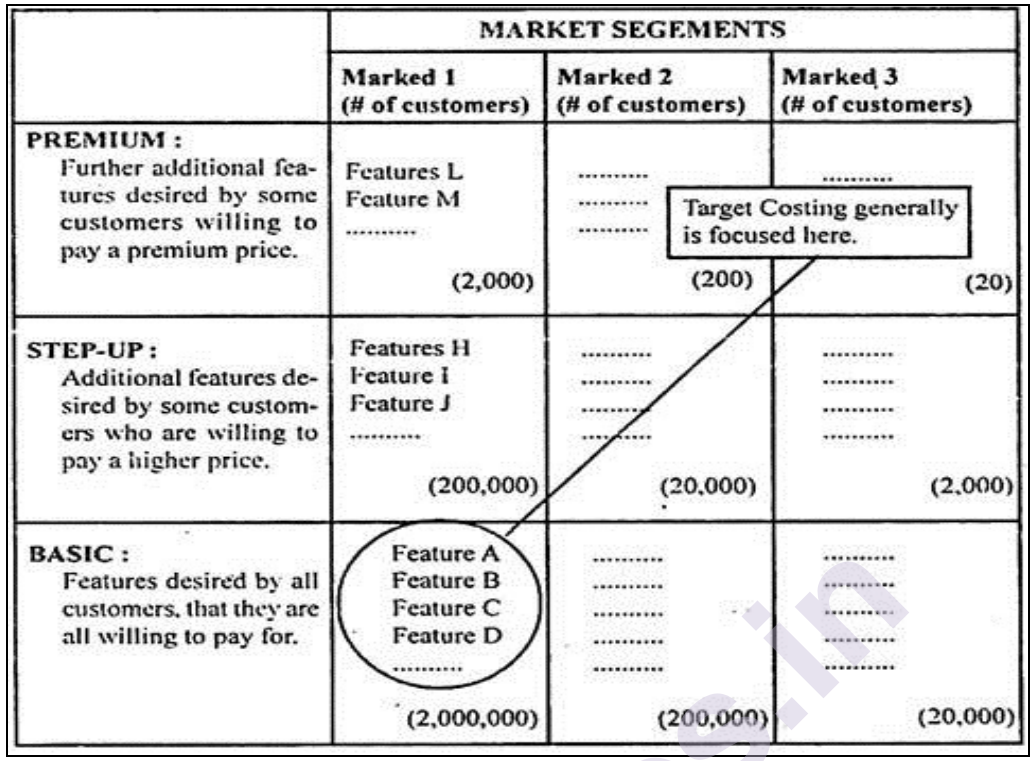

Fig :10.2 Market analysis

The objective of the table above is to map the attributes needed by various market segments in one location. It aids in focusing on truly material qualities or functionalities at a high level market for the possible product is divided into "natural" market groups – which may be defined by geographical locations, client types of business, customer wealth, and so on.

Each market segment's required attributes are divided into three categories:

i) Basic –

All customers in the category want these, and they're willing to pay for them.

(ii) Take a step forward –

These are additional or optional features desired by a few customers in the segment who are willing to pay a higher price for them.

(iii) Premium –

This is the most expensive option.

Only a small number of high-end clients are willing to spend even a higher price for additional amenities.

The chart also shows the market siz+e in each category in terms of the number of potential units that can be sold or the potential revenue. Passenger automobiles, writing pens, and a variety of other consumer durables are examples of such commodities in real life. In such circumstances, specific market share can be captured by responding to the wants of the identified clients; as the goal price will be greater, a higher target cost is irrelevant. However, in general, the fundamental product aimed at a certain segment of the market will have to be sold at a lower price in order to reach that segment of the market.

5. Market Price Determination Methods - Experience Curves or Learning Curves:

This method plots the product's historical market price as a function of the industry's cumulative sales of that product. If there is a straight line, it is a very good predictor of short-term prices.

If the product is cellular telephone network equipment, the price of the equipment divided by the number of customers it can service is plotted against the total number of cell-phone subscribers in the world in 'More than curve.'

6. Using Activity-Based Costing to Calculate the Price:

Following the determination of the overall goal cost, cost targets are established for each of the components, subsystems, and parts that make up the set of total costs to be included. Value engineering can be used in this situation as well. A matrix is built that connects different product attributes to the various product pieces.

The ABC analysis of material control can be used to determine which elements demand more attention in cost-cutting efforts.

7. Techniques for Brainstorming:

Think tanks and think banks can be established to generate new ideas and unconventional solutions to vexing issues. Brainstorming sessions can be held by a group of brilliant people from many fields, which may include employees, suppliers, outside specialists, and so on, to consider problem areas and provide new cost-cutting solutions.

There is a perpetual need for product improvement and cost reduction. As soon as a product is released and accepted in the market, prices tend to fall. Profitability rises as a result of increased sales, even when profit margins are low.

As a result, target costing is an excellent strategy for guaranteeing that the company has lucrative items that are well matched to the needs of its customers. The entire procedure is straightforward, rational, and simple to carry out. The most important concerns should be prioritized; this will aid in uniting the various elements of the organization.

10.5 PRINCIPLES OF TARGET COSTING:

Target costing is a new costing approach that requires working backwards from the selling price to the overall cost. The target costing principle is as follows:

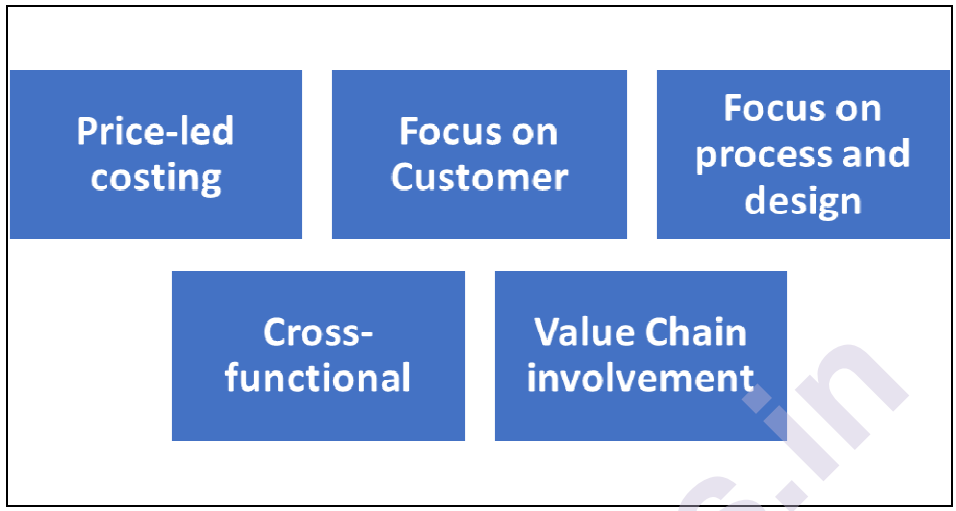

Fig 10.3 Principles of Target Costing

1. Price-led costing:

Target costing establishes the target cost by determining the market price at which a product can be sold. The target cost, or the cost at which the product must be created, is calculated by subtracting the target profit margin from the target price. It's worth noting that with a target costing strategy, the price is set first, followed by the target product cost. Under classic cost-plus pricing, the product cost and selling price are established in the opposite order.

2. Focus on Customer:

Management should listen to the company's customers in order to be successful at target costing. What products are they looking for? What characteristics are essential? What is the maximum amount they are ready to spend for a specific level of product quality? Customer feedback must be aggressively sought by management, and products must then be produced to meet customer demand and provided at a price that they are prepared to pay. In a nutshell, target costing is a market-driven approach.

3. Focus on process and design:

Target costing relies heavily on design engineering. Engineers must create a product from the ground up in order for it to be manufactured at the desired cost. This activity includes specifying the raw materials and components to be used, as well as labor, machinery, and other aspects of the manufacturing process. In other words, a product must be developed to be manufactured.

4. Cross-functional:

To ensure that the product is manufactured as effectively as possible, every aspect of the manufacturing process must be reviewed. Touch labor, technology, global sourcing in procurement, and every component of the manufacturing process must be developed with the desired cost of the product in mind.

5. Value Chain involvement:

Market research, sales, design engineering, procurement, production engineering, production scheduling, material handling, and cost management are just a few of the functions that must be involved in order to manufacture a product at or below its target cost. Individuals with knowledge in all of these fields can make significant contributions to the target costing process. Furthermore, a cross-functional team isn't just a group of experts who offer their knowledge and then go; they're in charge of the complete product.

6. Life-Cycle Costs:

When determining a product's target cost, analysts must ensure that all of the product's life-cycle costs are considered. Product planning and concept design, preliminary design, comprehensive design and testing, production, distribution, and customer service are all included in these expenditures. Traditional cost-accounting methods have tended to focus solely on the production phase of a product's life cycle, neglecting to account for the product's other costs.

7. Value-Chain Orientation:

A new product's predicted cost may be higher than the goal cost. Then, in order to reduce the estimated cost, attempts are made to eliminate non-value-added costs. In some circumstances, a comprehensive examination of the company's whole value chain might aid managers in identifying cost-cutting options.

10.6 METHODOLOGY OF TARGET COSTING:

The process of target costing involves:

1. Determining the target price in light of market conditions and competition;

2. Determining the profit margin target;

3. Identifying the maximum permissible cost that must be met;

4. Estimating the likely cost of existing products and processes;

5. Determining the amount that existing costs must be lowered by.

Planning, Development, and Production Phases of Target Costing

Target costing is a market-driven approach to costing.

The following are the three phases of this methodology:

1. **Planning**:
All rivals' products must be evaluated in terms of price, sales, quality, technology, and service, among other factors, before determining a target cost and determining the market share of one product.

2. **Development:**
After reviewing and studying various cost-cutting techniques and Activity-based costing, the organization's cost structure must be finalised, and then an appropriate design must be established.

3. **Production:**
Production targets are set, and efforts are made to meet them at the lowest possible cost without compromising quality, technology design, or manufacturing procedures.

10.4 PROCEDURES OF TARGET COSTING

Fig 10.4Methodology of Target Costing

1. **Set a selling price**:

We must establish a precise selling price that is in line with the market and the needs of our clients. It can serve as a market and competitor benchmark.

2. **Set target profit**:

We must adhere to our company's profit target, which is set by top management.

3. **Calculate target cost**:

Calculate target cost by subtracting the goal profit from the selling price determined in the previous step.

4. **Calculate cost gap**:

A cost gap exists when the actual cost exceeds the desired cost. As a result, we must compare the actual and target costs during production.

5. **Necessary action to close the gap**:

We must examine the cost of production from beginning to end in order to determine the core reasons of the gap. The gap is frequently caused by an inefficient process that has to be improved. In this instance, we must continue to track the progress of the procedure throughout time

10.6 ADVANTAGES OF TARGET COSTING:

(1) Favourable Influence on Profitability:
Target costing has a positive impact on the organization's profitability throughout the product life cycle.
(2) Company Competitive Future:
Because the product is created and manufactured according to market criteria, this costing aids in the creation of a company's competitive future.

(3) Top to Bottom Commitment:
It aims to identify challenges and supports top-to-bottom commitment to process and product innovation.

(4) Valuable Edition to Life Cycle –
This costing might be an excellent addition to life cycle items.

(5) Management Control System –
It employs a management control system to aid manufacturing plans and find market opportunities that may be converted into real savings in order to maximise value.

Some more different benefits are:

1. It helps in guaranteeing that products are better coordinated to their client's necessities.
2. It helps with adjusting cost of components to customer's ability to pay for them. In the process quality stands improved.
3. It upholds decrease of improvement pattern of the product.
4. It is valuable for decrease of expenses of costs generously.
5. It improves teamwork among all internal organisations involved in product conception, marketing, planning, development, production, selling, and distribution.
6. It aids in the engagement of customers and suppliers in order to build the best product and integrate the complete supply chain more effectively.

Disadvantages of Target Costing:

1. Low Budget Design:

The design team will have a difficult time completing their work due to the product's cost requirement. They must collaborate with other departments to guarantee that the product stays under budget. They must limit their innovation if it results in a cost increase.

2. Depend on market price:

Because we calculate the target cost by subtracting the market price from the margin, if the market price is incorrect, the entire system will collapse. We normally have to rely on market prices obtained through market research, thus any flaws in the study will have an impact on our pricing. Because some products are comparable yet have different attributes, we cannot utilise their selling price.

3. Cheaper material or technology:

Some businesses may use low-quality materials, resulting in low-quality products for their clients. The company buys obsolete equipment to save money, but it has long-term consequences because we stayed with them for a few years (fixed asset useful life).

4. Production cost unrealistic, and estimation cost is too low:

The design team may come up with an extremely restrictive production budget to meet the goal cost. As a result, the production staffs are under a lot of pressure. If there is a slight negative variance, the target cost will not be met. To do the assignment flawlessly, the crew would need to erase any mistakes or errors, which would only happen on paper.

5. Failure of proper estimation of the quantity:

Even if we achieve the desired cost, we may not be profitable if the sales volume falls short of the budget. This occurs when the profit margin is insufficient to pay the whole fixed costs.

10.6.1 Implementation of Target Costing:

1. Conduct market research

To comprehend and establish a customer's wants, the company performs market research. This aids in making practical modifications to existing items as well as designing new products based on the customer's perceptions and expectations.

2. Identifying the market

The data gathered through market research proves to be a boon to the company. It provides information on the different sorts of products accessible on the market, the level of competition it may encounter, the number of competing companies it will have to deal with, and the prices at which the products are now available.

It is also critical to obtain an estimate of the amount that a client perceives to be reasonable pricing so that modifications can be made.

3. Specifications of the product

Obtaining information about a customer's preferences is a time-consuming process because their demands and needs differ from one another. The company considers the typical requirement and transforms it into a concrete item known as a product.

4. Product development

By examining client wants, prevalent market dynamics, competitor models, appropriate technology, process capabilities, design alternatives, and service requirements, the company creates a product that it believes is acceptable for the current market conditions.

5. Calculate the cost, profit margin, and pricing.

The market survey is what sets a product's target selling price. Standard margin is also included in the desired selling price by the business organizations.

6. The process of value engineering

If you want to hit the desired cost, go through the value engineering process.

7. Make improvements to the designs

The firm can do a small-scale trial production to ensure the desired profit margin, cost, and product performance. It comes to a close when the target cost and product design are in sync.

8. Formal approval

The top management receives a detailed report about the design of a particular product, costs to be incurred, and elements of cost and production process for a formal approval so that the company can say yes to commercial production.

9. Maintaining accounts

It is vital to maintain separate accounts for each product design so that you can verify whether total expenses exceed the target cost for any product.

For a formal permission so that the company can say yes to commercial production, top management receives a full report regarding the design of a particular product, costs to be incurred, and components of cost and manufacturing process.

10. Implementing target costing

The organization gathers the essential data in regard to the costs paid for each design, and this data is collected individually. It maintains a tight eye on the total cost in order to keep it within the intended range.

10.8 SUMMARY

- **Target cost** = Target selling price (-) Target profitmargin
- Target costing is a method for defining product cost goals that are based on market norms.
- Target costing is a cost-cutting strategy. The gap between goal sales and target margin is known as target cost. It is thus the gap between the goal margin and the expected selling price of a proposed product with defined functionality and quality.

10.9 QUESTIONS

A. Descriptive Questions

Short Questions

1. Explain the meaning and principles of Target costing.
2. What are the phases in Target costing?
3. Write a note on Target Costing.

Long Questions

1. Explain the advantages and disadvantages of Target Costing.
2. Explain the Methodology of Target Costing.

B. Multiple Choice Questions

1. Target costing has been derived from a ……. Term.

a. Indian
b. Greek
c. American
d. Japanese

2. …….. is a new costing approach that requires working backwards from the selling price to the overall cost.

a. Kaizen costing
b. LCC
c. Marginal Costing
d. Target Costing

Answers

1-d, 2-d,

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11

LIFE CYCLE COSTING

Unit Structure:

11.0 OBJECTIVES

After studying this unit, you will be able to:

- Describe the characteristics of Life cycle costing
- Identify the various phases involved in Life cycle costing
- Identify the various phases of Product Life Cycle Costing
- State the advantages and disadvantages of Life cycle costing

11.1 INTRODUCTION

In this Unit, we will learn how LCC (Life Cycle Costing) is an important election of options that have an impact on both current and future expenses. From the time of invention until the time of abandonment, life cycle costing is a method that tracks and aggregates the real costs and profits linked to a cost object. Cost and revenue are tracked on a product per product basis throughout numerous calendar periods in life cycle costing.

11.2 LIFE CYCLE COSTING

Life cycle costing is also named as whole life costing. It is a procedure to decide the absolute cost of ownership. The methodology is organized one which tends to provides information to all components of cost.

A combination of financial, engineering, managerial, and other disciplines is used to complete life cycle costing. Life cycle costing focuses on the complete life cycle cost to arrive at the ideal choice.

11.3 MEANING AND PHASES OF LIFE CYCLE COSTING

Meaning of Life Cycle Costing:

The method used to appraise the total life cycle cost of procurement is called "life cycle costing". In other words, life cycle costing is a procurement interaction which thinks about the overall cost, i.e., amount of procurement and life cycle ownership cost of a product.

Traditional costing systems disclose cost object benefits on a calendar basis (for example, month to month, quarterly, and every year), whereas life cycle costing does not. Life cycle costing includes tracing costs and revenue of an expense object (For example, a product, a project, etc.) during the course of several months (i.e. projected life of the cost object).

Phases of Life Cycle Costing:

Life cycle costing is a three step process. The primary stage in life cost planning stage is Designing Life Cycle Costing Analysis, Selecting and Developing Life Cycle Costing Model, applying Life Cycle Costing Model lastly recording and exploring the Life Cycle Costing Results. The next stage is to organize Life Cost analysis followed by last stage of Implementation and Monitoring Life Cost analysis.

LCC Analysis is a multi-disciplinary movement. An analyst, engaged with life cycle costing, should be completely acquainted with separate cost components associated with the life cycle of asset, derivation of cost information to be gathered and monetary standards to be applied.

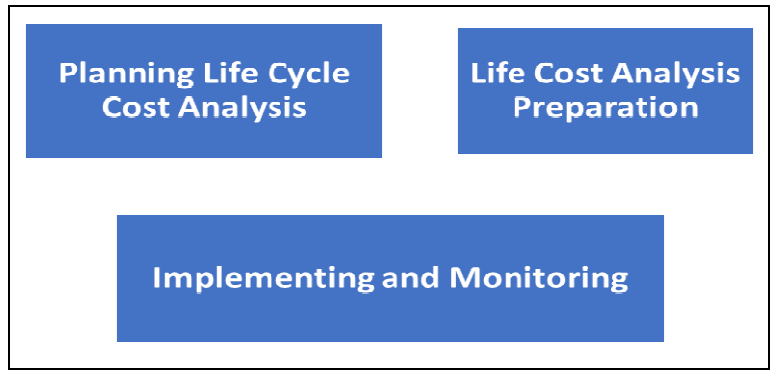

Fig 11.1 Phases of Life Cycle Costing:

Stage 1: Planning Life Cycle Cost Analysis:

The Life Cycle Costing process commences with development of an idea, which addresses the plan, and scope of the analysis.

The idea should be:

i) Characterize the goals in terms of outputs needed to help an administrative decision.

ii) Make the definite timetable with respect to arranging of time-frame for each stage, operating, specialized and maintenance support needed for the resource.

iii) Distinguish any hidden conditions, suppositions, limitations and difficulties (like least resource performance, accessibility necessities or most extreme capital expense limitation) that may confine the scope of worthy choices to be assessed. Recognize elective strategies to be evaluated.

iv) Recognize elective approaches to be evaluated. The list of proposed choices might be refined as new choices are distinguished or as existing alternatives are found to disregard the issue limitations.

v) Give an estimate of assets required and a detailing plan for the investigation to guarantee that the LCC results will be accessible to help the dynamic cycle for which they are required.

Subsequent stage in LCC Analysis arranging is the determination or advancement of a LCC model that will fulfil the goals of the examination. LCC Model is fundamentally a bookkeeping structure which empowers the assessment of an asset segments cost.

Stage 2: Life Cost Analysis Preparation:

The Life Cost Analysis is basically an instrument, which can be utilized to control and deal with the continuous expenses of an asset or part thereof. It depends on the LCC Model created and applied during the Life Cost Planning stage with one significant contrast: it utilizes information of real expenses.

The making of the Life Cost Analysis includes audit and advancement of the LCC Model as a "real-time" or real cost control instrument. Estimates of capital costs will be supplanted by the original costs paid. Changes may likewise be needed to the cost breakdown and cost components to mirror the resource segments to be observed and the degree of detail required.

Targets are set for the operating expenses and their recurrence of event dependent on the assessments utilized in the Life Cost Planning stage. These objectives might change with time as more exact information is obtained, from the real asset operating expenses or from the operating expense of comparable other asset.

Stage 3: Implementing and Monitoring:

The Life Cost Analysis is implemented by continuously evaluating an asset's real performance during its operation and maintenance in order to identify areas where cost savings can be made and to also give feedback for future life cost planning.

11.4 PRODUCT LIFE CYCLE PHASES

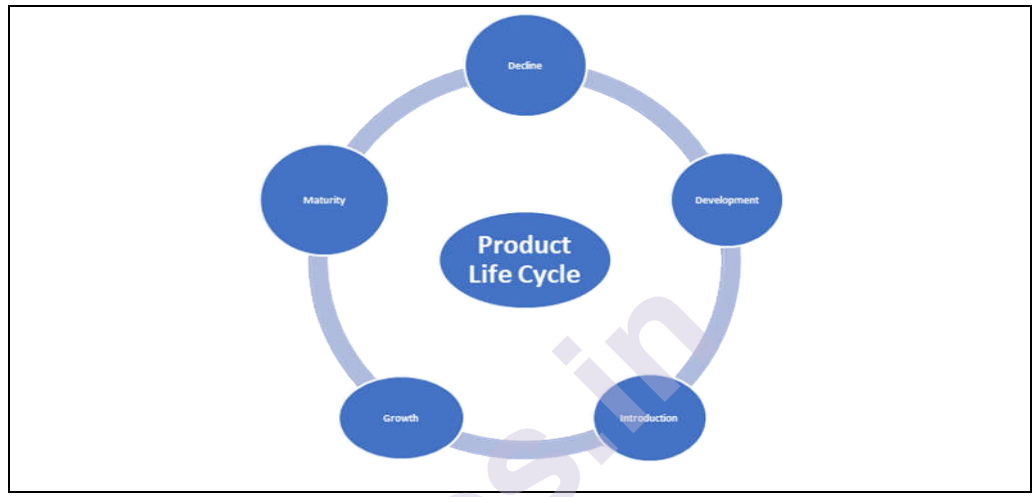

Fig 11.4 Product Life Cycle Phases

Product Life Cycle has Five Phases:

1. Development–

The product is in the research and development stage, which incurs costs but generates no revenue. Target costing can be utilized in conjunction with life cycle costing in this case.

2. Introduction–

The product is launched onto the market. Potential buyers will be unfamiliar with the product or service, and the company may need to spend more money on advertising to bring the product or service to the market's attention.

A company may be permitted to determine its pricing strategy for a new product if it is new to the market and a competitor has not yet launched a similar product.

a) If a market penetration strategy is chosen, the goal should be to offer the product at a low price as early as feasible in order to gain a substantial part of the market. As a result, this pricing strategy is predicated on cheap prices and huge volumes.

b) The goal of a market skimming strategy is to sell at a high price in order to maximize gross profit per unit sold. The product will be purchased exclusively by clients willing to pay a high price for a "one-of-

a-kind" item, and sales volumes will be minimal. The selling price will gradually decrease, albeit it will be maintained as high as feasible for as long as possible. This method is frequently employed by high-tech professionals.

3. Growth–

As demand grows; the product acquires a larger market. The product begins to generate a profit as sales revenue raises.

4. Maturity–

As demand for the product grows, it will eventually slow down and enter a period of relative maturity. It will continue to make money. As a means of maintaining demand, the product may be updated or improved.

5. Decline - The market will have purchased enough of the product and will thus approach saturation. Demand will begin to decline. It will eventually become a loss-maker, at which point the company should opt to stop selling the product or service.

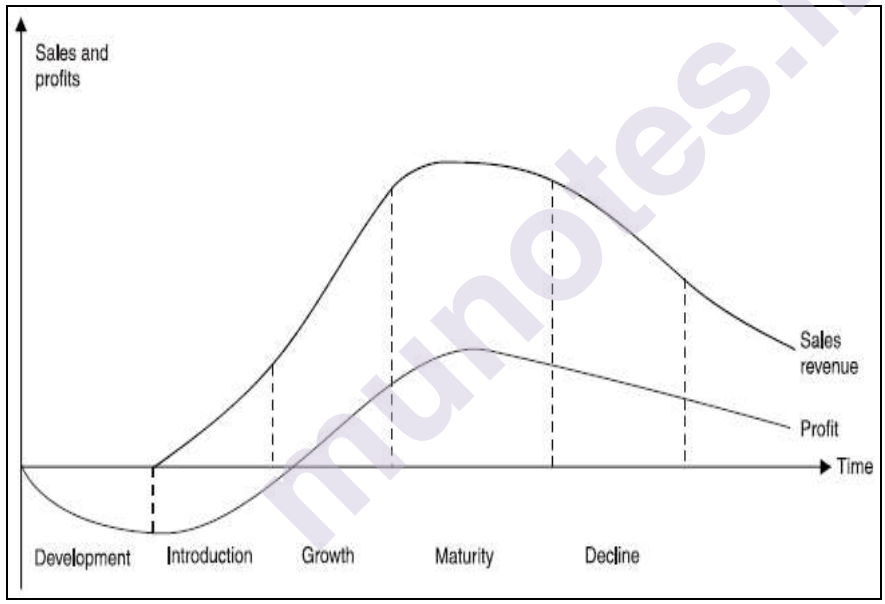

Fig 11.3 Product Life Cycle Phases

FUNDAMENTALS OF PRODUCT LIFE CYCLE COSTING

A product purchased at the lowest initial cost is not always the least expensive in the long run. The product's total cost of ownership is high, and it usually outweighs the purchase price. As a result, cost of ownership should be addressed in any purchase analysis; otherwise, decisions may turn out to be incorrect in the long run.

Life cycle costing is a method for estimating the total cost of a procurement over its entire life cycle. To put it another way, life cycle costing is a procurement method that examines an item's full total cost, which includes the purchase and life cycle ownership costs. Whole life costing is another phrase for life cycle costing. It's a method for

calculating the total cost of ownership. The strategy is well-structured and covers all aspects of cost. It can be used to create a spend profile for a product or service throughout the course of its expected life.

The following items are included in a life cycle cost analysis:

1. Life Cycle Assessment: The analysis and value of a product's or service's environmental consequences that are created or necessitated by its existence.
2. Whole Life Cost: The overall cost of ownership for an asset throughout its entire life cycle, sometimes known as 'cradle to grave' or 'womb to tomb.'

The results of such an analysis are utilized to assist management in the decision-making process when there are multiple options from which to choose. Because the accuracy of this tool may deteriorate over time, it is useful when long-term assumptions apply to all solutions and hence have the same impact.

Aircraft, computers, military systems, heavy industrial equipment, automobiles, hospital facilities, buildings, tractors, heat pumps, copying machines, air-conditioners, refrigerators, audio-visual equipment's, medical equipment's, diesel engines, and electric items are all examples of where the technique is useful.

Factors that Influence the Technique's Use

1. Rising inflation, though the strategy is equally beneficial in a recession.
2. Budget restrictions: Most businesses face financial constraints, which makes this strategy beneficial.
3. Raising user understanding of cost effectiveness
4. Increasing competitiveness: In today's economic environment, there is particularly fierce competition.
5. High maintenance costs: Maintenance costs have been rising. The importance of life cycle costing in establishing, decreasing, and controlling expenses cannot be overstated.

Applications

1. Determination of the most advantageous procurement strategy;
2. Determination of cost drivers;
3. Selection among various options;
4. Selection of procurement sources;
5. Strategic decision-making and design trade-off;

6. Optimization of training needs;
7. Forecasting;
8. Improvement of comprehension of basic design associated parameters in product design and development;
9. Policy

Benefits of Product Life Cycle:

The advantages can be divided into four categories, each of which has been briefly explained:

1. Purchase option evaluation:

Competing bids can be compared based on their total cost of ownership. Analysis is especially important when it comes to service contracts and equipment purchases.

2. Increased cost awareness:

Management gains insight into the elements that influence cost and the resources needed to complete the transaction. It is possible to identify cost drivers so that management attention is focused on the most cost-effective areas of purchasing. Furthermore, increased awareness of cost drivers identifies places in existing goods that can benefit from management intervention.

3. More precise cost forecasting:

The whole cost of a procurement can be more accurately forecasted, resulting in better decision-making at all levels. Furthermore, the research allows for more precise forecasting of future spending and capital investments.

4. Cost vs. performance trade-off:

In making purchasing selections, cost is not the only element to consider. Other considerations to consider include overall fitness vs requirement, product quality, and service levels to be delivered. This analysis compares the costs of several purchasing alternatives with their various features.

Principles of Product Life Cycle:

The cost of ownership of an object or service is incurred over the course of its entire life, not just at the time of purchase. The following are the three primary categories of costs that must be considered during the planning stage:

- **Acquisition costs:**

These are the expenses incurred between making the decision to proceed with the procurement and receiving goods or services for operational usage.

- **Operational costs:**

These are expenses incurred during the asset's or service's operational life.

- **End-of-life costs:**

These are related with the asset or service's disposal, termination, or replacement. Instead of incurring further costs, the asset may have a resale value.

The cost of an asset that has been purchased usually does not alter. Although the notion of life cycle costing may be applied to both complicated and basic projects, a more developed strategy is necessary for large projects.

11.5 ADVANTAGES OF LIFE CYCLE COSTING

The advantages of LCC are as below:

i) Evaluation of purchase alternatives:

Contending recommendations can be assessed based on entire life cost. Investigation is significant especially for service agreements and equipment buying choices.

ii) Better expense mindfulness:

The management gets knowledge into the variables driving expense and assets needed for the buying. Recognizing cost drivers is possible with the goal that administration effort is coordinated towards the purchase. Also, further developed familiarity with cost drivers features existing things which would profit from involvement of management.

iii) More exact expense forecasting:

Full expense related with an acquisition can be better assessed, leading to further developed dynamic at all levels. Also, the investigation prompts more precise forecasting of future consumption and capital investments.

iv) Performance adjustment against cost:

Cost isn't the sole factor to be considered in buying choices. Different factors, for example, generally wellness against necessity and nature of the items and levels of service to be given are additionally applicable. This analysis gives an expense adjustment against the differing attributes of buying choices.

11.6 DISADVANTAGES OF LIFE CYCLE COSTING

The procedure of life cycle costing is, on occasion, criticized on the grounds that:

i) It is considered to be exorbitant;
ii) It is marked as tedious;
iii) Accuracy of information is questioned; and
iv) Collecting information for investigation is a hectic job.

These disadvantages might apply for a small firm. In addition, cost saving advantage analysis is consistently attractive prior to executing any method at all. In nutshell, the advantages far surpass the disadvantages and a full scale exertion should be made to apply this method deliberately.

Case 1: A dip in business in noticed by a soap manufacturer in sales .The sales team meeting was conducted and certain improvement areas like more advertising, sales promotion, free gifts were suggested by the members. Bharat a sales team member was firm that the product is redundant and needs to be replaced. The taste of the consumer has changed and so the product needs to be replaced. As a team leader how can you apply the life cycle costing concept to the argument of Bharat?

Solution:

Bharat's arguments are centred on Life Cycle Costing Concept. The product goes through three step process. The primary stage in life cost planning stage is Designing Life Cycle Costing Analysis, Selecting and Developing Life Cycle Costing Model, applying Life Cycle Costing Model lastly recording and exploring the Life Cycle Costing Results. The next stage is to organize Life Cost analysis followed by last stage of Implementation and Monitoring Life Cost analysis. Bharat has a valid reason for discontinuing the product as no amount of marketing and promotion is going to revive the economic life of the product

11.7 FEATURES OF LIFE CYCLE COSTING:

a. Product life cycle costing traces a product's costs and revenues over numerous calendar periods during the course of its life cycle.

b. Product life cycle costing tracks research and development expenditures as well as the total magnitude of these costs for each particular product, which is then compared to revenue.

C. Different threats and opportunities exist at different stages of the product life cycle, necessitating different strategic responses.

d. A product's life cycle can be extended by discovering new uses or consumers, or by boosting current users' consumption.

Illustration 1:

A company is planning a new clothes production. We get the information from market to sell at 20,000 units at 41.00/unit. The mark-up of 40% is on product cost.

(i) Design and development costs 1, 00,000

(ii) Manufacturing costs 20/unit

(iii) End of life costs 40,000

The company estimates that if it were to spend an additional 30,000 on design, manufacturing costs/ Unit could be reduced.

Required

(a) Calculate target cost of the product?

(b) Calculate the original lifecycle cost per unit and is the product worth making on that basis?

(c) What is the maximum manufacturing cost per unit, if the additional amount were spent on design? That could be tolerated to earn its required mark-up?

Solution:

(a) Cost + Mark-up = Selling price

100% 40% 140%

30 12 42

(b) The original life cycle cost per unit = (1, 00,000 + (20,000 x 20) + ` 40,000)/20,000 = ` 34

This cost per unit is more than the intended cost per unit, indicating that the product is not worth producing.

(c) Maximum total cost per unit = 30.

(1, 00,000 + 30,000 + 40,000)/20,000

= 17.00

Therefore, the maximum manufacturing cost per unit would have to fall from 20 to (30 - 17) = 13

11.7 Stages of Product Life Cycle:

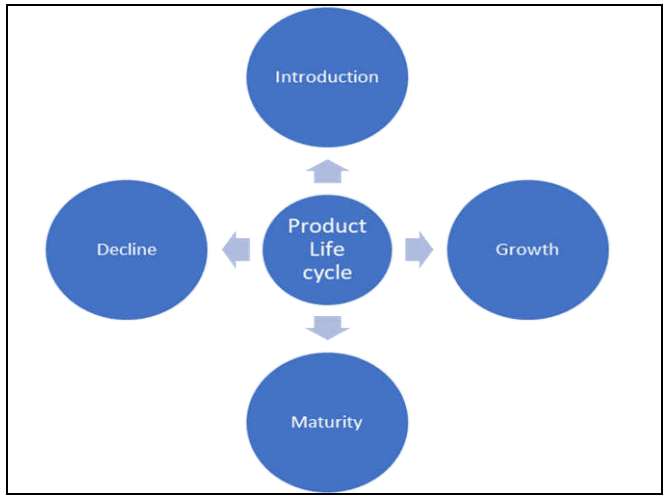

Fig 11.4 Stages of Product Life Cycle

A comparative analysis of these phases is given below:

Particulars	Introduction	Growth	Maturity	Decline
Sales	Initial stage and hence low.	Rise in sale at increasing price	Rise in sale at decreasing price	Saturation stage and hence sales start decreasing
Prices	Either high / low	Generally retained	Prices fall closer	Products may
	– Skimming pricing / Penetration pricing	at high price. However, due to any change in market conditions, prices may have to be reduced	to cost	have to be sold at throw away prices.
Ratio of promotion expenses to sales	Highest at this stage	Amount of Sales OH increases. But the ratio of Sales OH to sales decreases due to huge spike in the Sales.	Normal at this point. The same shall also be industry standard.	Since, the demand is low at this stage, no need to spend on any promotional activities
Competition	Negligible	Entry of large number of competitors	Fierce competition	Withdrawal of products and hence competition disappears
Major cost	R&D, Design, Promotion costs etc	Manufacturing, distribution and support costs		Plants re-used, sold or scrapped

Various stages of Product Life Cycle:

Stages	**Activity description**
1) Market research	To understand and identify the customer requirements and how much he is ready to pay for it and how many units he will buy i.e., Product, Price and Quantity
2)Design specification	To identify details such as life of a product, maintenance cost, maximum manufacturing costs, quantity required, delivery period, performance etc.,
3) Design	Drawings and process schedules, which define the product
4) Prototype	To produce small quantity called prototype and make adjustments / improvement till the product meets the specification
5) Developments	To analyses, modify and tests the product manufactured as prototypes
6) Tooling	To build / arrange a production line consisting necessary machinery, tools etc.,
7) Manufacture	This involves, Purchase of raw material and use of labour for making or assembling of a product
8) Selling	To create demand for the product and awareness through campaigns
9) Distribution	To move the product from factories to various locations to meet the demands
10) Support	To ensure that necessary spares and expert servicing professionals are made available at the respective places to satisfy the customers grievance which may arise over the life of a product
11) Decommissioning / Replacement	When manufacturing comes to an end, the plant erected for the manufacturing activities should be sold, scrapped or re- used.

Illustrations

Phase of Product life cycle

Identify the phase of product life cycle with reason in each of the following cases:

Case	**Phase**	**Reason**
There is a lot of competition and quantity sold is increasing at 10%, 8% and 6% in the last 3 years	Maturity	Rise in sale at decreasing rate
Until last year, there was no competition and suddenly during the year there are many new players entered the market and sales for the company has beenrising	Growth	1) Entry of new competitors 2) Increase insales
Huge inventory are piled up at the godown and a substitute product is also available in the market at a lesser price	Decline	1) Hugeinventory 2) Availability of substitutes

Life cycle income statement & Pricing decision

XYZ Ltd., provides data on its new product as follows:

Total cost of R&D and Design incurred during year 1 are Rs.5,00,000 and Rs.3,20,000 respectively.

Other costs to be incurred are as follows:

Function	Costs per unit (Rs.)
Production	30
Marketing	18
Distribution	11
After sale service	15

Sales related information are as follows:

Particulars	Option I	Option II	Option III
Selling price / unit (Rs.)	300	400	500
Sales Quantity (units)	4000	3500	2500

Required:

Compute the net income generated over life cycle of the product in all three options and suggest which option should be chosen by the Company?

Solution

Income statement

Particulars	Cost per unit	Option I	Option II	Option III
Sales Qty		4000	3500	2500
S.P per unit		300	400	500
Sales revenue		**12,00,000**	**14,00,000**	**12,50,000**
Life cycle costs				
R&D		5,00,000	5,00,000	5,00,000
Design		3,20,000	3,20,000	3,20,000
Production	30	1,20,000	1,05,000	75,000
Marketing	18	72,000	63,000	45,000
Distribution	11	44,000	38,500	27,500
After sales service	15	60,000	52,500	37,500
Total life cycle costs		**11,16,000**	**10,79,000**	**10,05,000**
Life cycle net income		**84,000**	**3,21,000**	**2,45,000**

The Company may go for Option II, since the net income in the case is better when compared with the other options.

11.8 SUMMARY

- Life cycle costing is a procedure to decide the absolute cost of ownership.
- The stages in life cost planning stage consists of designing Life Cycle Costing Analysis, Selecting and Developing Life Cycle Costing Model, applying Life Cycle Costing Model lastly recording and exploring the Life Cycle Costing Results. The next stage is to organize Life Cost analysis followed by last stage of Implementation and Monitoring Life Cost analysis.

11.9 QUESTIONS

Short Questions

1. Define Life Cycle Costing..
2. Explain the advantages of LCC
3. Explain the limitations of LCC

Long Questions

1. What is a LCC? Explain the phases of LCC?
2. Explain the advantages and disadvantages of LCC.

B. Multiple Choice Questions

1. Life cycle costing is also named:
a. whole life costing
b. pure life costing
c. social costing
d. profit costing

2. Life cycle costing is a ……. step process.
a. One
b. Two
c. Three
d. Four

3. The primary stage is life cost planning stage which consists of…….'a. Recording and exploring the Life Cycle Costing
a. Applying Life Cycle Costing Model
b. Selecting and Developing Life Cycle Costing
c. Designing Life Cycle Costing Analysis

4. The most basic form of economic value is use ……:
a. Value
b. Exchange
c. Profit
d. social

Answers

1-a, 2-c, 3-d, 4-a,

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12

ENVIRONMENTAL COSTING

Unit Structure

12.0 OBJECTIVES

- To understand the concept of Environmental Costing
- To study the benefits of Environmental Costing
- To evaluate the challenges of Environmental Costing
- To examine direct and indirect Environmental Costing
- To assess different types of Environmental Costing

12.1 INTRODUCTION

The United Nations put emphasis on the issue of climate change in 1992, drew a convention on it, and began drafting environmental regulations as a result. One of the results of all of these exercises is environmental costing. Business organisations need to consider their duty to the world, so a new type of accounting called environmental costing has been introduced and developed.

Corporate behaviour is regulated to reduce harmful environmental effects. Understanding environmental costing is crucial to assisting in this.

By using environmental cost management, your company can keep tabs on the expenses related to the environmental impact of its daily operations. Air pollution, manufacturing emissions, wet land impact, and waste disposal are just a few of the ways your business might have an adverse effect on the environment.

The costs associated with accounting for environmental costs include labour costs as well as the effects on the environment that your business will have in the present and the future

12.2 DEFINITIONS – ENVIRONMENTAL COSTING

Corporate businesses are struggling to identify their genuine profits—those that are environmentally sustainable. Companies must take the environment into consideration for this. In order to establish what degree of profit (if any) would remain if they attempted to leave the planet in the same condition at the end of the accounting period as it was at the beginning, they should take into account its most severe external environmental consequences.

Costs associated with the actual or potential deterioration of natural resources as a result of economic activity are known as environmental costs.

These costs can be seen from two different angles: either as (a) costs caused, which are costs connected to economic units that are actually or potentially causing environmental deterioration through their own activities, or as (b) costs borne, which are costs incurred by economic units regardless of whether they are the ones responsible for the environmental impacts.

There are five tiers of environment costs:

1. Conventional costs- Raw materials, operating and maintenance expenses, as well as direct costs related to capital investments.

2. Hidden costs - Regulatory costs that aren't publicly disclosed, such as those associated with tracking down environmentally responsible suppliers and monitoring and reporting on emissions and environmental activities.

3. Contingent costs, including fines and penalties for breaking rules, as well as ongoing liabilities from failing to clean up contaminated sites.

4. Costs of relationships and image - Less obvious costs and advantages related to customer perceptions, employee relations, and community relations.

5. Societal costs: These are the expenses that organisations place on society and the environment but for which they cannot be held legally accountable or made whole by the legal system.

Management frequently lacks awareness of the scope of environmental costs and is unable to spot areas where money can be saved. Environmental expenses can be divided into two groups:

Internal costs:

These expenses have a direct effect on a company's income statement. There are numerous varieties, including:

- Enhanced controls and systems to prevent penalties and fines.
- Costs of waste removal.
- Product return fees (For instance, in the EU, businesses are required to offer facilities for customers to recycle returned goods like batteries and printer cartridges. The cost of these "take backs" must be covered by the seller of such items.
- Regulatory expenses, like taxes (e.g. companies with poor environmental management policies often have to bear a higher tax burden)
- Upfront expenses like acquiring permits (e.g. for achieving certain levels of emissions)
- Back-end expenses like decommissioning fees after the project is finished

External costs:

These are costs that are borne by society as a whole rather than the business that initially created them.

For example,

- carbon emissions
- usage of energy and water
- forest degradation
- health care costs
- social welfare costs

Governments are using taxes and regulations to turn these external costs into internal costs, though they are becoming more and more aware of them. Companies that degrade forests, for instance, might be required to implement a tree replacement programme, or they might be given lower tax breaks on vehicles that have a high environmental impact. Additionally, some businesses are voluntarily shifting some external costs to internal costs.

The US Environmental Protection Agency

The US Environmental Protection Agency makes a distinction between four types of costs:

(i) Traditional costs: the price of raw materials and energy that have an impact on the environment.
(ii) Potentially hidden costs: costs that are recorded by accounting systems but are later disguised as "general overheads".
(iii) Costs that will be incurred in the future, such as clean-up expenses.
(iv) Image and relationship costs: costs that are intangible by definition, such as those associated with creating environmental reports.

The Sustainable Development Division of the United Nations

(i) According to the UN Division for Sustainable Development, environmental costs include Environmental protection-related costs (such as those associated with pollution prevention efforts) and (ii) Production-related costs associated with wastage of resources like labour, capital, and materials,

(ii) More and more organisations need to take into account environmental cost management accounting as part of their overall strategy. Let's examine the reasons for this and the best ways to put it into practise.

The concept of cost-benefit analysis, or CBA, was developed in the field of study known as welfare economics. It assists in addressing issues relating to the relative merits of various outcomes from a societal perspective. The utilitarian criteria of the eighteenth century are used in welfare economics. These researchers made an effort to "compare outcomes on the basis of what benefits the greatest number of people in each situation.

Stages of Cost-Benefit Analysis:

1. Defining the Project or Policy: Economists must understand whose welfare is being taken into account and the time period in question in addition to identifying the choice that will be examined.

2. Identifying the Policy or Project's Physical Impacts Determine the effects of the results (in units). Several instances of this would be: The project will require 500 hours of human labour or will result in a reduction in landfill pollution of 3 billion tonnes.

3. Assessing Effects Consider the marginal social benefit or cost of a particular action or inaction when evaluating its impact. Follow the link for detailed information on valuation.

4. Discounting of Cost and Benefit A benefit is deemed to be more valuable the sooner it is received, which is a crucial concept to understand with CBA. The further out in time a cost is incurred, the less harmful it is viewed as being. Because of this, all expenses and gains must be discounted to account for current values. It would be incorrect to treat receiving a million dollars today and 75 years from now as being on an equal footing. Future values are converted into present values using a discount rate.

5. Using the Net Present Value Test: The sum of the benefits in present value less the sum of the costs in present value is known as net present value (NPV). If the NPV exceeds 0 In other words, the project should be approved if the discounted benefits outweigh the discounted costs.

6. Sensitivity Analysis is used: The phrase "recalculating NPV when the values of certain key parameters are changed" is used to describe this type

of analysis (Hanley, 79). Knowing which parameter the NPV is most sensitive to is crucial because there is uncertainty in CBA. As an illustration, suppose a company installs 3 filters to cut down on water pollution and the pollution is reduced by 30%. In a sensitivity analysis, the effects of a change in the number of filters would be examined. This would be a very strong indication that the percentage of water pollution is very sensitive to the number if 4 filters reduced the water pollution by 70%. Hanley refers to the common parameters that should be reviewed which include:

- Physical input quantities and quality discount rate.
- Project lifespan, physical quantities, and output qualities.

12.3 PURPOSE OF ENVIRONMENTAL COSTING

Knowing whether a firm has been upholding its environmental obligations is helpful. Basically, a business must fulfil the following environmental obligations.

a) Regulatory Standards: Meeting or surpassing regulatory requirements.

b) Removing Pollution: Removing already-existing pollution and safely discarding any hazardous materials.

c) Information: Informing potential and present investors of the scope and makeup of the management's precautionary measures (disclosure required if the estimated liability is greater than a certain percent say 10 per cent of the companies net worth)

d) Operation: Conducting business in a way that prevents environmental harm.

e) Promotion: Highlighting a business with a strong environmental stance.

Control over material and operational efficiency improvements brought on by the fiercely competitive global market.

g) Cost Increase Control: Maintain control over rises in the price of raw materials, waste disposal, and potential liabilities.

12.4 Advantages of Environmental Costing

i) Discloses Utilisation of Natural Resources:

Environmental accounting is useful in displaying the country's usage of its natural resources, the expenditures associated with doing so, and the income generated from doing so in a transparent manner.

ii) Social Responsibility of Corporations:

The contribution made by various corporations or companies to upholding their social obligations can be measured with the use of environmental accounting.

iii) Environmental protection:

A company does not exist in a vacuum. It requires the support of social and natural systems in order to maximise prosperity. A corporate enterprise's use of the environment's resources can be measured with the use of environmental accounting. In any case, it must be demonstrated that a corporate enterprise does not contaminate, pollute, or threaten the environment while conducting its operations. In actuality, our nation has passed a lot of regulations to safeguard the environment.

12.5 PROBLEMS ON ENVIRONMENTAL COSTING

- Financial implications,
- A lack of experienced labour,
- A lack of established standards for environmental accounting,
- A low adoption rate,
- A lack of specialised environmental accounting principles, etc.

12.6 CARBON FOOTPRINT CALCULATOR

Based on the volume of carbon dioxide (CO2) released as a result of your business operations, your carbon footprint is a gauge of your environmental impact. You can use the Carbon Footprint Calculator to determine your environmental impact. Next, reduce your carbon footprint by implementing these seven tactics:

- **Increase your energy efficiency:**

Greenhouse gas emissions are produced in the process of producing electricity and natural gas and delivering them to your door. You can save energy and lessen your impact on the environment by installing energy-efficient building systems and equipment. For advice specific to your industry, check out the Commercial or Industrial energy efficiency tools.

- **Install green energy:**

Clean, renewable energy sources like solar and wind can significantly lessen your environmental impact while lowering your energy costs. There are numerous federal, state, and local incentives available to reduce the cost of installing renewable energy. For details on incentives offered in your area, consult the Database of State Incentives for Renewables and Efficiency (DSIRE).

- **Be water wise:**

The heating of the water used in your facility and the treatment of waste water consume energy and produce emissions. Reduce the temperature of the water heater and fix any leaks. Reduce water consumption by installing low-flow showerheads and aerated faucets; this is particularly effective in lodging and multi-family facilities. Consider heat recovery in buildings with high hot water demand, such as hospitals and restaurants. Hospitals and restaurants should think about heat recovery to harness the

energy from waste fluids to heat or pre-heat water in facilities with high hot water demand.

- **Utilize less, recycle more:**

Your environmental impact extends beyond energy use and business operations. It is necessary to produce, ship, and then dispose of every piece of machinery and equipment in your facility, all of which have an impact on the environment. Look for ways to reduce your usage; it could be as easy as printing on both sides of the page or improving your preventive maintenance schedule to extend the life of your equipment. erect a corporate recycling programme.

- **Less travel:**

Driving to and from work by employees contributes significantly to air pollution. Encourage (or pay for) the use of public transportation, encourage carpooling, and whenever possible, permit employees to work from home. Utilize web conferencing, email, and other low-emission communications to reduce business travel. If you manage a fleet of vehicles, only use them when necessary and seek out models that are fuel-efficient.

- **Think about local sourcing:**

Whether it's office supplies or manufacturing raw materials, all businesses need resources to operate. These resources must be delivered to your door, which requires energy use and emissions. Utilizing local vendors can lessen your impact on the environment and could even result in financial savings. This practise is known as "near Transport goods more effectively. If your company delivers goods, think about ways to cut back on shipping emissions. In general, ground shipments—by truck or rail—are more fuel-efficient than air shipments. Less fuel will be consumed by fewer full ground shipments than by numerous light loads. If you don't have enough inventory to fill entire shipments, think about collaborating with other nearby companies.

12.7 SUMMARY:

- Corporate businesses are struggling to identify their genuine profits—those that are environmentally sustainable.
- Costs associated with the actual or potential deterioration of natural resources as a result of economic activity are known as environmental costs.
- Costs that will be incurred in the future, such as clean-up expenses.
- According to the UN Division for Sustainable Development, environmental costs include Environmental protection-related costs (such as those associated with pollution prevention efforts).
- Environmental accounting is useful in displaying the country's usage of its natural resources, the expenditures associated with doing so, and the income generated from doing so in a transparent manner.

- Based on the volume of carbon dioxide (CO2) released as a result of your business operations, your carbon footprint is a gauge of your environmental impact.

12.8 QUESTIONS

A. Descriptive Questions:

Short Answers:

1. Explain the concept of Environmental Costing
2. Definition of Environmental Costing
3. Explain the Environmental Priorities
4. Explain the purpose of Environmental costing?
5. How Preventing Environmental Damage?

Long Questions:

1. Explain the advantages of CBA.
2. Which are the five tiers of environment costs?
3. Write in detail Carbon Footprint Calculator?
4. Explain the Environmental Planning
5. How different types of Environmental Costing?

B. Multiple Choice Questions:

1. The best way to manage the costs associated with environmental impact is to integrate all of your ……..tasks

a. **accounting**

b. costing

c. economical

d. financial

2. …….. including fines and penalties for breaking rules, as well as ongoing liabilities from failing to clean up contaminated sites

a. Conventional costs-

b. Contingent costs

c. Hidden costs

d. Traditional costs

3. Costs associated with the actual or potential deterioration of natural resources as a result of economic activity are known as :

a. societal cost

b. external costs

c. internal costs

d. environmental costs

4. The sum of the benefits in present value less the sum of the costs in present value is known as :

a. GPA

b. SPV

c. FV

d. NPV

5. Which are costs incurred by economic units regardless of whether they are the ones responsible for the environmental impacts

a. Costs hidden

b. Costs horne

c. costs borne

d. Costs lorne

Answers:

1- a,2- b,3- d,4- d,5- c

B. Fill in the blanks:

1. Environmental costs can be seen from two different angles …… and ……..
2. The heating of the water used in your facility and the treatment of waste water consume …….. and …….emissions
3. Costs that accounting systems record but then disguise as "……" are potentially hidden costs
4. Encourage your staff to participate in the company's …….priorities.
5. An environmental policy may be hindered by an ……..complexity

Answers:

1- costs caused and costs borne

2- energy and produce

3- Overheads

4- Environmental

5- EMS's

C. True or false

1. An ongoing, systematic approach is not necessary for an environmental management system to function properly.

2. Raw materials, operating and maintenance expenses, as well as direct costs related to capital investments.

3. Costs borne, which are costs connected to economic units that are actually or potentially causing environmental

4. Corporate behaviour is regulated to reduce harmful environmental effects.

5. The organisation has an environmental impact that its environmental cost management aims to reduce**.**

True: 2, 4 and 5

False: 1, and 3

12.9 REFERENCES

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13

SERVICE COSTING

Unit Structure:

13.0 OBJECTIVES:

- To study Meaning of Service Costing.
- To understand features of Service Costing.
- To assess Cost classification- simple and composite cost units
- To explore Preparation of cost sheet for Motor Transport Service.
- To evaluate Cost sheet for Hospital and Hotel Organisation.

13.1 MEANING AND FEATURES OF SERVICE COSTING.

13.1.1 Meaning:

Service costing is a type of operation costing which is used in organizations which provide services instead of producing goods. It ascertains the total cost and the per unit cost measure of the intangible product. It is used by service providers like railways, buses, hospitals, hotels, water supply, telephone call service, electricity providers etc.

In ascertaining service cost all direct and indirect cost related to the providing of service are accumulated and divided by a quantifiable unit of service to determine the per unit cost of the service.

For example hotel industry providing room for public will find the total cost of providing the service and find out the occupancy rate in terms of a unit known as room days i.e the number of days the room should be occupied under normal conditions. The total cost will be divided by the total room days and the per unit cost of the room per day will be ascertained.

CIMA defines Service Costing as 'cost accounting for services or functions (e.g., canteens, maintenance, personnel). These may be referred to as service centres, departments or functions.' Service Costing is also

known as 'operating costing' is used for establishing costs of services rendered or services offered for sale and no items are produced.

Service costing is used in:

I. External services:

a. External services are services provided by a company to external or third party e.g. car hire services, air transport services, courier services, hotel ,hospital, etc.

II. Internal services:

a. Internal services are services provided within the organisation or internal departments of a company, e.g. the costs of the vans or Lorries used in distribution departments, the costs in computer departments or costs for staff canteens.

Service costing differs from product costing such as job or process costing in the following ways:

1. The unit of measurement of cost is Composite cost units
2. The output is Intangible.
3. It can be used for both internal and external services
4. There is a Low level of direct costs as a proportion of total costs since for most services it is difficult to identify many attributable direct costs. For example, cost of direct materials consumed will be relatively small.

13.2 COST CLASSIFICATION- SIMPLE AND COMPOSITE COST UNITS

13.2.1 Meaning :

Cost Unit in Service Costing **measures the cost of business operations in a service industry is a complex activity where all the cost parameters are to be considered while deciding a suitable unit for costing.**

There are two different kinds of cost unit ascertained under service costing:

13.2.2 Simple Cost Unit

The cost unit, which uses only one single parameter for measurement of the service cost, is termed as a simple cost unit.

The different types of service organizations and their simple cost units are mentioned below:

Nature of service organization	Cost Unit
Water Supply	Per Kilolitre
Canteen	Per Meal / Per Person / Per Staff
Road Maintenance	Per Kilometre
Street Lighting	Per Lamp / Per Point
Boiler House	Per 1000 Ibs
Gas	Per Cubic Meter / Per Kilogram
Private Transport	Per Kilometre / Per Hour / Per Trip / Per Passenger

13.1

13.2.3 Composite Cost Unit

The most commonly used cost unit in service costing is the composite cost unit. Here, the measurement of two parameters is combined to form a single cost unit.

Following are the different types of service organizations and their composite cost units:

Nature of service organization	Cost Unit
Hospital	Per Bed-Day / Per Patient-Day
Hotel	Per Room-Day / Per Room-Night / Per Bed-Day
Electricity	Per Kilowatt-Hour
Entertainment in Cinema or Theatre	Per Ticket-Show
Boiler House	Per Cubic Centimeter-Liter
Passenger Transport	Per Passenger-Kilometer / Per Passenger-Mile
Goods Transport	Per Tonne-Mile / Per Quintal-Kilometer

13.2 CALCULATION OF COST PER UNIT:

The formula for computing the cost of each service unit (i.e., cost per unit) is given below:

$$\textit{Cost per Service Unit} = \frac{\textit{Total Costs for the Period}}{\textit{Number of service Units in the Period}}$$

13.3 PREPARATION OF COST SHEET FOR MOTOR TRANSPORT SERVICE.

13.3.1 Transportation:

The term 'Transport' includes all modes of transport like Air, Water, Rail and Road. However, the present discussion is confined to Road transport only. Road transport includes both passenger transport and goods transport. It may be carried out by Trucks, Buses, Tempos, and Taxis etc.

Computation of 'Cost Unit' in Road Transport Business:

Operating costs are expressed in terms of running kilometers or passenger kilometers or Ton-kilometers.

1. A running kilometer is one kilometer distance travelled by a vehicle, irrespective of the load carried.
2. A passenger kilometer is 'carrying one passenger over a distance of one kilometer'.
3. A Ton-kilometer is 'carrying a load of one ton over a distance of one kilometer'.

In goods transport, there are two possible methods of calculating ton kms viz.:

1. Absolute Ton-kms, and

2. Commercial Ton Kms.

Absolute Ton-kms – Actual distance travelled x load carried

Commercial Ton kms = Total distance travelled x average load carried.

For example – if a vehicle carries 30 Tons over 10 kms, 10 Tons over 50 kms and 5 Tons over 15 kms,

Absolute Ton – kms = (30 x 10) + (10 x 50) + (5 x 15) = 845 Ton kms

Commercial Ton Kms = 75 x15 = 1125 commercial Ton kms.

Normally customers are charged on the basic of commercial Ton kms.

13.3.2 Proforma of Transport Organisation Cost Sheet.

Operating Cost Sheet for Transport Organisation for the Month …….				
Vehicle No:xxxxx	No. of Trips: xxxx		Distance Travelled: xxxx	
Particulars of Expenditure			Amount Rs.	Per Unit Rs.
Fixed Cost				
	Manager's salary		xxx	
	Accountant's salary		xxx	
	Driver's salary		xxx	
	Cleaners salary		xxx	
	Garage mechanic salary		xxx	
	Administrative overhead		xxx	
	Garage rent		xxx	
	Insurance premium		xxx	
	Road tax and permit fee		xxx	
	Depreciation		xxx	
	Hire Charges		xxx	
	Interest		xxx	
		(a)	xxx	xxx
Running Expenses:				
	Petrol/Diesel		xxx	xxx
	Lubricating oil and other sundries		xxx	xxx
	Tyres and tubes		xxx	xxx
	Spares		xxx	xxx
	Repair and maintenance		xxx	xxx
	Drivers wages		xxx	xxx
	Cleaners wages		xxx	xxx
		(b)	xxx	xxx
Total Operating Cost		**(a)+(b)**	xxx	xxx

13.3.3 Practical questions with solutions:

Q.01. A Lorry starts with a load of 20 MT of Goods from Station 'A'. It unloads 8 MT in Station 'B' and balance goods in Station 'C'. On return trip, it reaches Station 'A' with a load of 16 MT, loaded at Station 'C'. The distance between A to B, B to C and C to A are 80 Kms, 120 Kms and 160 Kms, respectively. COMPUTE "Absolute MT- Kilometer" and "Commercial MT – Kilometer".

(MT = Metric Ton or Ton).

Solution:

Weighted Average or Absolute basis – MT – Kilometer:

= (20MT×80Kms)+(12MT×120Kms)+(16MT×160Kms)

= 1,600+1,440+2,560=5,600MT-Kilometer

Simple Average or Commercial basis – MT – Kilometer:

= [{(20+12+16)/3}MT×{(80+120+160)Kms]

= 16MT×360Kms=5,760MT–Kilometer

13.4 COST SHEET FOR HOSPITAL AND HOTEL ORGANISATION.

13.4.1 Hospital Cost Sheet :

Hospitals provide a variety of services to patients under one roof 24×7. It is a human and technology heavy organization requiring a large capital investment. The civil structure ,the operation theatre,equipments,surgical instruments etc needs a heavy capital expenditure. Service costing really matters in Hospital Industry as it is necessary to provide a cost effective service to patients and gain their loyalty. Traditionally, hospitals used bed occupancy as the yardstick of measurement of performance. With the advancements in medical technology, the average length of stay (ALOS) is reducing and hence bed occupancy is not the main performance measure any longer. It is calculated on the basis of cost per patient day.

13.4.1.1 The proforma Operating Cost Sheet of a Hospital is given below:

Hospital operating cost statement for the month……			No. of patient days: xxxx
Particulars of Expenditure			Amount(Rs)
Fixed Cost			
	Salaries to staff		xxx
	Premises Rent		xxx
	Repairs and Maintenance		xxx
	General Administrative expenses		xxx
	Cost of oxygen,x-rayetc		xxx
	Depreciation		xxx
		(a)	xxx
Variable Costs:			
	Doctor's Fees		xxx
	Food		xxx
	Medicines		xxx
	Diagnostic Services		xxx
	Laundry		xxx
	Hire charges for extra beds		xxx
		(b)	xxx
(i)	Total Operating Cost	**(a)+(b)**	xxx
(ii)	No. of Patient days		xxx
	Cost per patient day	**(i)/(ii)**	xxx

13.4.2 .Hotel Cost Sheet :

13.4.2.1 Meaning:

Hotel industry is a service industry which basically provides food and accommodation to its customers. Hotel and lodges, providing daily accommodation facility to general public, have mushroomed all over the country due to the impetus provide by modern civilization to 'travel' both on personal and commercial work. The cost are divided into Fixed and variable expenses.

13.4.2.2. The proforma Operating Cost Sheet of a Hotel Firm is given below:

Operating Cost sheet of a Hotel:		
Particulars	Amount (Rs)	Amount (Rs)
(A) Fixed Charge		
Salaries to staff	**XX**	
Repairs and Renovation	**XX**	
Depreciation	**XX**	
Interior decoration	**XX**	
Sundries	**XX**	
Laundry contract cost	**XX**	
Rent	**XX**	**XX**
(B)Running Charges(Variable Cost)		
Power	**XX**	
Attendant salaries	**XX**	**XX**
Total Operating cost	**(i)**	**XX**
No. of Room Days	**(ii)**	**XX**
Cost per Room days	**(i)/(ii)**	**XX**

13.4.2.3. Practical Questions and solutions :

Illustration: A company runs a holiday home. For this purpose, it has hired a building at a rent of Rs.10,000 per month along with 5% of total taking. It has three types of suites for its customers, viz., single room, double rooms and triple rooms.

Following information is given:

Type of suite	Number	Occupancy Percentage
Single room	100	100%
Double room	50	80%
Triple room	30	60%

The rent of double room suite is to be fixed at 2.5 times of the single room suite and that of triple room suite as twice of the double room's suite.

The other expenses for the year 2018 are as follows:

Particulars	Rs.
Staff Salaries	14,25,000
Room attendant's wages	4,50,000
Lighting, heating and power	2,15,000
Repairs and renovation	1,23,500
Laundry charges	80,500
Interior decoration	74,000
Sundries	1,53,000

Provide profit @ 20% on total taking and assume 360 days in a year.

You are required to calculate the rent to be charged for each type of suite.

Solution:

Working Notes:

Total equivalent single room suites

Nature of suite	Occupancy (Room-days)	Equivalent single room suites (Room-days)
Single room suites	36,000 (100 rooms X 360 days X 100%)	**36,000** (36,000 X 1)
Double rooms suites	14,400 (50 rooms X 360 days X 80%)	**32,400** (14,400 X 2.5)
Triple rooms suites	6,480 (30 rooms X 360 days X 60%)	**32,400** (6,480 X 5)

Statement of total cost:

Particulars	Rs.
Staff Salaries	14,25,000
Room attendant's wages	4,50,000
Lighting, heating and power	2,15,000
Repairs and renovation	1,23,500
Laundry charges	80,500
Interior decoration	74,000
Sundries	1,53,000
	25,21,000
Building rent [(10,000 x 12 Months) + 5% on total taking]	1,20,000 + 5% on total takings
Total Cost	26,41,000 +5% on total takings

Profit is 20% of total takings

Total takings= 26,41,000+25%(5%+20%) of total takings Let R be rent for single room suite

Then 1,04,400 R = 26,41,000 + (0.25 × 1,04,400 R)

Or,1,04,400R = 26,41,000 + 26,100R

Or,78,300R =26,41,000 Or,R = Rs. 33.73

Rent to be charged:

Rent to be charged for single room suite = Rs. 33.73

Rent for double rooms suites Rs.33.73 X 2.5 = Rs. 84.33

Rent for triple rooms suites Rs. 33.73 X 5 =Rs. 168.65

13.5 SUMMARY

CIMA defines Service Costing as 'cost accounting for services or functions (e.g., canteens, maintenance, personnel). These may be referred to as service centres, departments or functions.' Service Costing is also known as 'operating costing' is used for establishing costs of services rendered or services offered for sale and no items are produced. Service costing deals with the operating cost of products which does not have any

physical form but satisfies consumer needs and wants. The service costing can be performed internally, to determine the operating cost of the supporting activities in manufacturing industries. Else, it can be carried out externally, by the companies dedicated to rendering such services. The cost unit, which uses only one single parameter for measurement of the service cost, is termed as a simple cost unit.eg per mile , per staff, per lamp, per point etc.The most commonly used cost unit in service costing is the composite cost unit. Here, the measurement of two parameters is combined to form a single cost unit.eg per bed-day, per patient day, per room-day, per ticket show etc. Service costing cost are divided into fixed ,variable and semi variable cost.

13.6 QUESTIONS

13.6.1 Theory Questions:

1. What is Service Costing and state its features?
2. Explain with examples simple cost unit and composite cost unit in service costing?
3. Prepare a tentative format of Transportation Cost sheet and explain its units of accounting.
4. Prepare a tentative format of Hotel Industry Cost Sheet and explain its units of accounting.
5. Prepare a tentative format of Hospital Industry Cost Sheet and explain its units of accounting

13.6.2 Fill in the blanks:

1. Service costing is used in organizations which provide ……. instead of producing goods.

2. The cost unit, which uses only …….parameter for measurement of the service cost, is termed as a simple cost unit.

3. ……. transport includes both passenger transport and goods transport.
4. ……costs are expressed in terms of running kilometers or passenger kilometers
5. In operating cost sheet format, all the business costs are classified according to their …
6. ……= Actual distance travelled x load carried
7. **……** = Total distance travelled x average load carried

Answers: 1. **services 2. single 3. Road 4. Operating 5. behavior 6. Absolute Ton-kms 7. Commercial Ton kms**

13.6.3.Match the following:

Group "A"	Group "B"
1. Canteen	a. Per Kilometer
2. Road Maintenance	b. Per Lamp / Per Point
3. Street Lighting	c. Per Meal / Per Person / Per Staff
4. Hospital	d. Per Passenger-Kilometer
5. Hotel	e. Per Bed-Day / Per Patient-Day
6. Entertainment in Cinema or Theater	f. Per Room-Day
7. Passenger Transport	g. Per Ticket-Show

Answers:

1. – c
2. – a
3. – b
4. – e
5. – f
6. – g
7. – d

13.6.4 .Practical Questions and solutions

Q.01. Sanjay Transport Company supplies the following details in respect of a truck of 5-tonne capacity:

Cost of truck	Rs. 90,000
Estimated Life	10 Years
Diesel, oil, grease	Rs. 15 per trip each way
Repairs and Maintenance	Rs. 500 Per Month
Driver's Wages	Rs. 500 Per Month
Cleaner's wages	Rs. 250 Per Month
Insurance	Rs. 4,800 Per Year
Tax	Rs. 2,400 Per Year
General supervision charges	Rs. 4,800 Per Year

The truck carries goods to and from city covering a distance of 50 miles each way.

While going to the city freight is available to the extent of full capacity.

Assuming that the truck runs on an average 25 days a month, work out:

(i) Operating cost per tone-mile, and

(ii) Rate per ton per trip that the company should charge if profit of 50% on freightage is to be earned.

Solutions:

Operating Cost statement:

Particulars	Rs.	Per Month Rs.	Per Tonne-mile Rs.
1. Fixed Cost:			
Driver's Wages	500		
Cleaner's wages	250		
Insurance	400		
[4800/12]	200		
Tax [2400/12]	400	1,750	
General supervision charges			0.233
2. Running Cost:			
Diesel, oil, grease	750		
Repairs	500		
and Maintenance	750		
Depreciation		2,000	0.267
3. Total		3,750	3750/7500= 0.500

Calculation of Freight Rate:

Cost Per ton-mile: Rs. 0.50

Profit Per ton-mile: Rs.0.50

Freight Rate per ton-mile **Rs. 1.0**

Freight Rate per trip 300 X 1.0 = Rs. 300

Ton-mile are calculated as under

= (50 X 5) + (50 X 1) X 25 =7500 ton-miles

Q.02. The Kangaroo Transport operates a fleet of lorries. The records for lorry L-14 reveal the following information for September, 1990:

Days Maintained	30
Days operated	25
Days Idle	5
Total hours operated	300
Total kms covered	2,500
Total tones carried	200 (4 Tonne- load per trip, journey empty)

The following information is made available:

A. Operating costs for the month

Petrol Rs.400, oil Rs.170, grease Rs.90, wages to driver Rs.550, wages to khalasi Rs.350.

B. Maintenance costs for the month.

Repairs Rs.170, overhead Rs.60, Tyres Rs.150, Garage charges Rs.100.

C. Fixed costs for the month based on the estimates for the year : Insurance Rs.50, License, Tax etc. Rs. 80, Interest Rs.40, other overheads Rs.190.

D. Capital costs:

Cost of acquisition Rs.54,000

Residual value at the end of 5 years life is Rs.36,000. Prepare a Cost Sheet and performance statement showing:

(a) Cost per day maintained;

(b) Cost per day operated ;

(c) Cost per kilometer;

(d) Cost per hour;

(e) Cost per commercial tonne

Solution:

Operating Cost sheet

	Rs.	**Rs.**
1. Operating Cost:		
Petrol	**400**	
Oil	**170**	
Grease	**90**	
Wages to driver	**550**	
Wages to khalasi	**350**	**1,560**
2. Maintenance costs:		
Repairs	**170**	
Overhead	**60**	
Tyres	**150**	
Garage charges	**100**	**480**
3. Fixed Cost:		
Insurance	**50**	
License, Tax etc.	**80**	
Interest	**40**	
Other overheads	**190**	**360**
4. Depreciation:		
54,000 – 36,000 = Rs. 1,800 / 5 **5 Years**	**3600/12**	**300**
Total		**2,700**

Performance Statement:

(a) Cost per day maintained: Rs. 2700 /30 = Rs. 90

(b) Cost per day operated : Rs. 2700 / 25 days = Rs.108

(c) Cost per kilometer: Rs 2700/ 2500km = Rs. 1.08

(d) Cost per hour: Rs 2700/ 300hrs = Rs. 9.00

(e) Cost per commercial tone:

Outward = 4 tonnes X 25 days X 50 Kms = 5,000

Return = 0 X 25 Days X 50 kms. = Nil

Total **5,000**

Cost per commercial tone: = Rs. 2700/5000 = Re. 0.54

Q.03. Mr. Sohan Singh has started transport business with a fleet of 10 taxis. The various expenses incurred by him are given below:

(a) Cost of each Taxi Rs.75,000.

(b) Salary of Office staff Rs.1,500. p.m.

(c) Salary of garage staff Rs.2,000. p.m.

(d) Rent of garage Rs.1,000. p.m.

(e) Drivers salary (per taxi) Rs.400. p.m.

(f) Road Tax and Repairs per taxi Rs.2,160. p.a.

(g) Insurance premium @ 4% of cost p.a.

The life of a taxi is Rs.3,00,000 km. and at the end of which it is estimated to be sold at Rs.15,000. A taxi runs on an average 4,000 km. per litre of petrol costing Rs.6.30 per litre. Oil and other sundry expenses amount to Rs.10 per 100 km. Calculate the effective cost of running a taxi per kilometer. If the hire charge is Rs.1.80 per kilometer, find out the profit Mr. Sohan Singh may expect to make in the first year of operation.

Solution:

Hire charges earned in the 1st year of operation:

A taxi runs on an average 4,000 km. per month of which 20% it runs empty

i.e., effective running will be 3,000 km. per month.

(i.e., 4,000 – 20% of 4,000)

Hence, total hire charges earned in the 1st year on 10 Taxis = 3,200 x 12 months x 10 Taxis. = 3,84,000 km. at Rs.1.80 = Rs.6,91,200.

Statement of Operating of a Taxi per km.

	Particulars	Basis of apportionment	Amount per month (Rs.)
A	**Fixed Cost:**		
	Salary of office staff	1500 /10	150.00
	salary of garage staff	2000 / 10	200.00
	Rent of Garage	1000 / 10	100.00
	Driver's salary	per taxi	400.00
	Road tax & Repairs	2160/12	180.00
	Insurance @ 4% of 75,000	3000 / 12	250.00
			1,280.00
	Total (A)	**1280 / 4000**	**0.32**
B	**Variable Cost:**		
	Depreciation		
	75000-15000 / 3,00,000 km.		0.20
	Petrol	6.30 / 9	0.70
	oil & other sundry Exp.	10 / 100	0.10
	Total (B):		**1.00**
	Operating Cost per km(A + B)	**.32 + 1.00**	**1.32**
	Effective cost of running a taxi per km.	1.32 X 4,000/3,200	1.65
	Operating Cost per month per taxi	4,000 X 1.32	5,280
	operating Cost per annum per taxi	5,280 X 12	63,360
	operating Cost per annum for 10 taxies	63,360 X 10	6,33,600
	Hire Charges earned in 1st Year		6,91,200
	Profit in the first year of operation		**57,600**
OR			
	Effective cost per km.	1.32 X 4,000/3,200	1.65
	Hire charges per km		1.80
	Profit per km.		0.15
	Profit in First year = 3,84,000 effective km. @ Rs. .015		**57,600**

Q.04. Mr. X owns a bus which runs according to the following schedule:

(i) Delhi to Chandigarh and back, the same day.

Distance covered: 150 kms. one way.

Number of days run each month: 8

Seating capacity occupied 90%.

(ii) Delhi to Agra and back, the same day.

Distance covered : 120 kms. one way.

Number of days run each month: 10

Seating capacity occupied 85%

(iii) Delhi to Jaipur and back, the same day.

Distance covered: 270 kms. one way.

Number of days run each month: 6

Seating capacity occupied 100%

(iv) Following are the other details: **Rs.**

Cost of the bus	6,00,000
Salary of the driver	2,800 p.m.
Salary of the conductor	2,200 p.m.
Salary of the part time Accountant	200 p.m.
Insurance of the Bus	4,800 p.m.
Diesel consumption 4 kms. Per liter at	6 per liter
Road tax	1,500 p.a.
Lubricant oil	10 per 100 kms.
Permit fee	1,000 p.m.
Repairs and Maintenance	315 p.m.
Depreciation of the bus	@20% p.a.
Seating Capacity of the bus	50 persons

Passenger tax is 20% of the total takings. Calculate the bus fare to be charged from each passenger to earn a profit of 30% on total taking.

The fares are to be indicated per passenger for the journeys:

(i) Delhi to Chandigarh

(i) Delhi to Agra

(iii) Delhi to Jaipur

Solution:

Total running Kms. Per month.

Place	**Distance (km.)**	**Trip per day**	**days per Month**	**Km. Per month**
Delhi to Chandigarh	150	2	8	2,400
Delhi to Agra	120	2	10	2,400
Delhi to Jaipur	270	2	6	3,240
				8,040

Passenger Km. per month

Delhi to Chandigarh & back =	50 seats X 90% X2,400	1,08,000
Delhi to Agra & back =	50 seats X 85% X2,400	1,02,000
Delhi to Jaipur & back =	50 seats X 100% X3,240	1,62,000
		3,72,000

Operating cost statement (per month)

Particulars	Basis of Apportionment	Amount Rs.	Total Rs.
A. <u>Fixed Costs:</u>			
Salary to Driver		2800	
Salary to Conductor		2200	
Salary to Part-time Accountant		200	
Insurance	4800 / 12	400	
Road tax	1500 / 12	125	
Permit fee		315	
Repairs & Maintenance		1,000	
Depreciation	6,00,000 X 20%X 1/12	10,000	

Total (A)			**17,040**
B. Variable Cost			
Diesel	8040 X 6/4	12,060	
Lubricant Oil	8,040 X 10/ 100	804	
Total (B)			**12,864**
Total Cost Per Month	(A+ B)		**29,904**
Add: Passenger Tax	20% of total takings		
Profit	30% of total takings		
	50% of total takings		
	i.e. 100% of Total Cost		**29,904**
Total Takings			**59,808**

Q. 05. Sheela Hotel has three category of accommodation one room suites, two room suites and three room suites.

Following are the details of information pertaining to the operation of the Hotel :

a) Annual Expenses are as thus:

Staff Salaries : Rs. 10,00,000. Repairs and Renovations : Rs. 1,72,000. Interior Decoration : Rs. 4,00,000. Sundries : Rs. 1,31,040.

Laundry contract cost : Rs. 2,00,000.

Room Attendants' Salaries :

Rs. 8 per day per single room, Rs. 12 per day per double room and Rs. 16 per day per three room suite occupied in summer.

Rs. 12 per day per single room, Rs. 18 per day double room and Rs. 24 per day per three room, suite occupied during winter.

Lighting :

Rs. 40 for one room suite per month if occupied for full month for both summer and winter.

Rs. 60 for two room suite per month and Rs. 80 for three room suite per month, if occupied for full month, for both summer and winter.

Power :

Rs. 20 for one room suite, Rs. 30 for two room suite and Rs. 40 for three room suite, per month if occupied for full month for both summer and winter.

Depreciation :

Building @ 5% on Rs. 56,00,000. Furniture & Fixture @ 10% on Rs. 4,00,000

Air conditioning Equipment @ 10% on Rs. 8,00,000.

b) There are 200 one room suites, 60 two rooms' suites and 40 three rooms suites in the Hotel.
c) Normally 80% of one room, 60% of two room and 50% of three room suites are occupied in summer. During winter 50% of one room, 40% of two room and 20% of three room suites are occupied.
d) Summer may be assumed for 8 months and winter for 4 months duration. Normal days in a month may be taken at30.
e) Profit is 20% so that interest on investment may also be covered in such profits.

The rent of two room suite is to be fixed at 1& half times of one room suite and that of three room suite at double the one room suite.

You are required to prepare an operating cost statement of Sheela Hotel for the year and suggest the rent which should be charged for each type of suite on the basis of above information.

Solution:

Operating Cost Sheet

	Rs.	Rs.
Staff Salaries	10,00,000	
Repairs & Renovations	1,72,000	
Interior Decoration	4,00,000	
Sundries	1,31,040	
Laundry Contract Cost	2,00,000	
Depreciation on Building (5,60,000 X. 5%)	2,80,000	
Depreciation on Furniture (4,00,000 X. 10%)	40,000	
Depreciation on Equipment (8,00,000 X. 10%)	80,000	23,03,040
Power		
Single Room	33,600	
Double Room	11,520	
Three Room	7,680	52,800
Lighting		
Single Room Double Room Three Room	67,200	
Room Attendants Salary	23,040	
Summer Winter	15,360	1,05,600
Total Cost 80%		4,87,680
(+) Profit 20%		2,18,880
Sales 100%		31,68,000
		7,92,000
		39,60,000

Rent for Single Room = 39,60,000 / 79,200 = Rs. 50 per day

Rent for Double Room = Rs. 75 (50 X1.5)

Rent forThree Room = Rs. 100 = (50 X2)

W.N. 1:

Calculation of Room Days

Summer	=	No of Rooms	X	% Occupied	× Days in Month	X	No. of Month
Summer Single	=	200	X	80%	X 30 X 8	=	38,400
Single Winter	=	200	X	50%	X 30 X 4	=	12,000
							50,400
Double Summer	=	60	X	60%	X 30 X 8	=	8,640
Winter	=	60	X	50%	X 30 X 4	=	2,880
							11,520
Three Summer	=	40	X	50%	X 30 X 8	=	4,800
Winter	=	40	X	20%	X 30 X 4	=	960
							5,760

Let Rent of single Room be *x*. = 50,400				
Rent of Double Room	=	1.5*x*. (11520 □ 1.5)	=	17,280
Rent of Three Room	=	2*x* . (5760 □ 2)	=	11,520
Room Days				79,200

W.N. 2 :

Room Attendant Salary = Room days X Daily Rate

Summer **:**

Single	=	38,400 X 8	=	3,07,200
Double	=	8,640 X 12	=	1,03,680
Three	=	4,800 X 16	=	76,800
				4,87,680

Winter :

Single	=	(12,000 X 12)	=	1,44,000
Double	=	(2,880 X 18)	=	51,840
Three	=	(960 X 24)	=	23,040
				2,18,880

W.N. 3 :

Lighting Room days =

$$\frac{\text{Monthly Charge}}{\text{No. of Days in month}}$$

Summer & Winter:

Single = 50,400,X 100 / 30 days = 67,200

Double = 11,520 X 60 / 30 days = 23,040

Three = 5,760 X 80 /30 days = 15,360

1,05,600

W.N. 4 : Power

Summer & Winter

Single = 50,400,X 20 / 30 days = 33,600

Double = 11,520 X 30 / 30 days = 11,520

Three = 5,760 X 40 /30 days = 7,680

52,800

Hospital:

Q.06. Public Health Centre runs an Intensive Care Unit. For this purpose, it has hired a building at a rent of Rs. 5,000 p.m. with the understanding that it would bear the repairs and maintenance charges also.

The unit consists of 25 beds and 5 more beds can be comfortably accommodated when the occasion demands. The permanent staff attached to the unit are as follows:

2 Supervisors, each at a salary of Rs. 500 per month. 4 Nurses, each at a salary of Rs. 300 per month.

2 Ward Boys, each at a salary of Rs. 150 per month.

Though the unit was open for the patients all the 365 days in a year, scrutiny of accounts in 2003 revealed that only 120 days in a year, the unit

had the full capacity of 25 patients per day and for another 80 days it had on an average 20 beds only occupied per day. But there were occasions when the

beds were full, extra beds were hired from outside at a charge of Rs. 5 per bed per day this did not come to more than 5 beds extra above the normal capacity any one day. The total hire charges for the extra beds incurred for the whole year amounted to Rs. 2,000.

The unit engaged expert doctors from outside to attend on the patients and the fees were paid on the basis of the number of patients attended and time spent by them on an average worked out to Rs. 10,000 per month in 2003. The other expenses for the year were as under :

Repairs and maintenance (F)	Rs. 300 p.m.
Food supplied to patients (V)	Rs. 44,000p.a.
Janitor and other services for them (V)	Rs. 12,500p.a.
Laundry charges for their bed linen (V)	Rs. 28,000p.a.
Medicines supplied (V)	Rs. 35,000 p.a.
Cost of oxygen, X-ray, etc. other than directly borne for treatment of patients (F)	Rs. 54,000 p.a.
General administration charges allocated to the unit (F)	Rs. 49,550 p.a.

a. If the unit recovered an overall amount of Rs. 100 per day on an average from each patient, what is the profit per patient day made by the unit in2016?

b. The units want to work on a budget for 2017 but the number of patients requiring intensive care is a very uncertain factor. Assuming that same revenue and expenses prevail in 2017 in the first instance workout the number of patient days required by the unit to breakeven.

Solution:

Patient Days

120 days 25 Beds = 3000

Extra Hire charges = 2,000

Total Patient days = 5,000

Operating Cost Sheet for 2016

	Rs.	Rs.
Income Received from patients (100 X 5000)		5,00,000
(–) Variable Cost		
Extra Bed hire charges	2,000	
Food supplied to Patients	44,000	
Janitor & Other Services	12,500	
Laundry Charges	28,000	
Medicines Supplied	35,000	
Expert doctor fees (10,000 X 12)	1,20,000	(2,41,500)
Contribution		2,58,500
(–) Fixed Cost		
Rent (5,000 X 12)	6,000	
Salary Supervisor's salary (2 X 500 X 12)	12,000	
Salary Nurse (2 X 300 X 12)	14,400	
Salary Ward Boys (2 X 150 X 12)	3,600	
Repair & Maintenance (300 X 12)	3,600	
Cost of Oxygen	54,000	
General Administration charges Profit	49,550	(1,97,150)
		61,350

BEP = Fixed cost / Contribution X Total Income

= 1,97,150 / 2,58,500 X 5,00,000

= Rs. 3,81,335

BEP for patient day = 3,81,335 / 100

= Rs. 3813.35

Exercise:

01.Mr. Patil owns a bus which runs according to the following schedule:

(i) Pune to Mumbai and back, the same day.

Distance covered: 180 kms. one way.

Number of days run each month: 10

Seating capacity occupied 90%.

(ii) Pune to Nashik and back, the same day.

Distance covered : 140 kms. one way.

Number of days run each month: 9

Seating capacity occupied 85%

(iii) Pune to Karad and back, the same day.

Distance covered: 120 kms. one way.

Number of days run each month: 6

Seating capacity occupied 100%

(iv) Following are the other details: **Rs.**

Cost of the bus	6,00,000
Salary of the driver	3,000 p.m.
Salary of the conductor	2,000 p.m.
Salary of the part time Accountant	500 p.m.
Insurance of the Bus	4,500 p.m.
Diesel consumption 4 kms. Per liter at	6 per liter
Road tax	1,500 p.a.
Lubricant oil	10 per 100 kms.
Permit fee	1,500 p.m.
Repairs and Maintenance	315 p.m.
Depreciation of the bus	@20% p.a.
Seating Capacity of the bus	50 persons

Passenger tax is 20% of the total takings. Calculate the bus fare to be charged from each passenger to earn a profit of 30% on total taking.

The fares are to be indicated per passenger for the journeys:

(i) Pune to Mumbai

(i) Pune to Nashik

(iii) Pune to Karad

02. Pano Card Club runs a holiday home. For this purpose, it has hired a building at a rent of Rs.15,000 per month along with 5% of total taking. It has three types of suites for its customers, viz., single room, double rooms and triple rooms.

Following information is given:

Type of suite	Number	Occupancy Percentage
Single room	200	100%
Double room	100	80%
Triple room	60	60%

The rent of double room's suite is to be fixed at 2.5 times of the single room suite and that of triple rooms suite as twice of the double rooms suite.

The other expenses for the year 2019 are as follows:

Particulars	Rs.
Staff Salaries	16,50,000
Room attendant's wages	6,50,000
Lighting, heating and power	4,15,000
Repairs and renovation	2,13,500
Laundry charges	1,20,500
Interior decoration	1,24,000
Sundries	2,52,000

Provide profit @ 20% on total taking and assume 360 days in a year.

You are required to calculate the rent to be charged for each type of suite.

13.7 RECOMMENDED BOOKS

Recommended Books

1. Advanced Cost Accounting Jain and Narang
2. Advanced Cost Accounting B. K. Bhar
3. Advanced Cost and Management Accounting Saksena Vaishtha
4. Cost and Management Accounting: Problems and Solutions P. V. Rathnam
5. Advanced Cost Accounting N. K. Prasad
6. Advanced Costing and Management Accountancy Subhash Jagtap
7. Advanced Cost Accounting Sharma, Nigam
8. Cost Accounting Wheldon
9. Cost Accounting: A Management Emphasis Horngreen.

Journal

1. The Management Accountant- Journal of ICWA

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