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DEPARTMENT OF COMMERCE (CORPORATE SECRETARYSHIP)

SUBJECT NAME: COST ACCOUNTING

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CORE PAPER XIII – COST ACCOUNTING-SYLLABUS

UNIT – I COST ACCOUNTING

Definition, meaning and objectives- Advantages and Importance- Distinction between Cost and Financial Accounting - Elements of Cost and Preparation of Cost Sheets and Tenders.

UNIT – II MATERIALS

Stores record- purchase records- purchase order- Goods received note- Bin cardStores Ledger - Inventory Control- ABC Analysis – Economic Ordering Quantity – Maximum, Minimum and Reordering levels – Methods of Pricing Issues - Perpetual Inventory System.

UNIT – III LABOUR

Importance of Labour Cost Control- Various Methods of Wage Payments - Calculation of Wages - Methods of Incentives (Bonus) Schemes - Recording Labour time- Treatment of “OVER TIME” and “IDLE TIME”- Labour Turn Over (L.T.O)

UNIT – IV OVERHEADS:

(Factory, Administration, Selling and Distribution) Definition and Meaning of Overheads – Classification – Apportionment of Overheads – Redistribution (Secondary Distribution) – Absorption of Overheads including “Machine Hour Rate”.

UNIT – V Methods of Costing:

Unit Costing – Job Costing (Excluding Contract Costing)– Process Costing – Simple Process Accounts (Excluding Inter Process Profits and Equivalent Production, Joint Product) – Operation and Operating Costing.

Unit 1:

Unit Structure

1.1 Learning outcomes

1.2 Meaning and definition of cost Accounting

1.3 Objectives of cost accounting

1.4 Advantages and limitations of cost accounting

1.5 Difference between cost accounting and financial accounting

1.6 Elements of cost

1.7 Preparation of cost sheet, tenders and quotations

1.1. LEARNING OUTCOMES

- Students will understand the basic underlying differences between different branches of accounting.
- They will be able to understand the reason for preparing cost accounting
- They will be able to understand all the basic costs which should be included before fixing the selling price of a product.

- It helps them to apply the technique in any kind of process in their life where they want to fix a cost for a product.

1.2 MEANING AND DEFINITION OF COST ACCOUNTING

Definition:

ICMA defines Cost accounting as, 'The process of accounting for cost from the point at which the expenditure is incurred or committed to the establishment of its ultimate relationship with cost centres and cost units. In its widest usage, it embraces the preparation of statistical data, the application of cost control methods and the ascertainment of profitability of activities carried out or planned'.

Meaning:

Cost accounting is a method of managerial accounting which aims to capture the total production cost of a business by measuring the variable cost as well as the fixed costs in each phase of production.

A company's internal management department uses cost accounting to define both variable and fixed costs associated with the manufacturing process. It will first individually calculate and report these costs, then compare input costs with production results to assist in assessing financial performance and in making potential business decisions.

Types of Cost Accounting

- Standard Costing
- Activity-Based Costing
- Lean Accounting
- Marginal Costing

1.3 OBJECTIVES OF COST ACCOUNTING

Objectives of cost accounting are ascertainment of cost, fixation of selling price, proper recording and presentation of cost data to management for measuring efficiency and for cost control and cost reduction, ascertaining the profit of each activity, assisting management in decision making and determination of break-even point.

The aim is to know the methods by which expenditure on materials, wages and overheads is recorded, classified and allocated so that the cost of products and services may be accurately ascertained; these costs may be related to sales and profitability may be determined. Yet with the development of business and industry, its objectives are changing day by day.

Following are the main objectives of cost accounting:

- To ascertain the cost per unit of the different products manufactured by a business concern;

- To provide a correct analysis of cost both by process or operations and by different elements of cost;
- To disclose sources of wastage whether of material, time or expense or in the use of machinery, equipment and tools and to prepare such reports which may be necessary to control such wastage;
- To provide requisite data and serve as a guide for fixing prices of products manufactured or services rendered;
- To ascertain the profitability of each of the products and advise management as to how these profits can be maximised;
- To exercise effective control if stocks of raw materials, work-in-progress, consumable stores and finished goods in order to minimise the capital locked up in these stocks;
- To reveal sources of economy by installing and implementing a system of cost control for materials, labour and overheads;
- To advise management on future expansion policies and proposed capital projects;
- To present and interpret data for management planning, evaluation of performance and control;
- To help in the preparation of budgets and implementation of budgetary control;
- To organise an effective information system so that different levels of management may get the required information at the right time in right form for carrying out their individual responsibilities in an efficient manner;
- To guide management in the formulation and implementation of incentive bonus plans based on productivity and cost savings;
- To supply useful data to management for taking various financial decisions such as introduction of new products, replacement of labour by machine etc.;
- To help in supervising the working of punched card accounting or data processing through computers;
- To organise the internal audit system to ensure effective working of different departments
- To organise cost reduction programmes with the help of different departmental managers;

- To provide specialised services of cost audit in order to prevent the errors and frauds and to facilitate prompt and reliable information to management; and
- To find out costing profit or loss by identifying with revenues the costs of those products or services by selling which the revenues have resulted.

1.4 ADVANTAGES AND LIMITATIONS OF COST ACCOUNTING

Main advantages of cost accounting are given below:

- Profitable and unprofitable activities are disclosed and steps can be taken to eliminate or reduce those activities from which little or no benefit is obtained or to change the method of production in order to make such activities more profitable.
- It enables a concern to measure the efficiency and then to maintain and improve it. This is done with the help of valuable data made available for the purpose of comparison. For example, if material spent upon a pair of shoes in 2009 comes to Rs 160 and for a similar pair of shoes the amount is Rs 180 in 2010, the increase may be due to increase in prices of material or more wastage in the use of materials or inefficiency at the time of buying or unnecessarily high prices paid.
- It provides information upon which estimates and tenders are based. In case of big contracts or jobs, quotations cannot be given unless the cost of completing the contracts can be found out.
- It guides future production policies. It explains the cost incurred and profit made in various lines of business and processes and thereby provides data on the basis of which production can be appropriately planned,
- It helps in increasing profits by disclosing the sources of loss or waste and by suggesting such controls so that wastages, leakages and inefficiencies of all departments may be detected and prevented.
- It enables a periodical determination of profits or losses without resort to stocktaking.
- It furnishes reliable data for comparing costs in different periods, for different volumes of output, in different departments and processes and in different establishments. This helps in maintaining costs at the lowest point consistent with the most efficient operating conditions.
- The exact cause of a decrease or an increase in profit or loss can be detected. A concern may suffer not because the cost of production is high or prices are low but also because the output is much below the capacity of the concern. This fact is revealed by cost accounts only.

- Cost Accounting discloses the relative efficiencies of different workers and thereby facilitates the introduction of suitable plans of wage payment to reward efficiency and to provide adequate incentive to the less efficient workers. A good system of costing promotes prosperity of the business and thus ensures greater security of service and adequate reward to workers.
- It enables the creditors and investors to judge the financial strength and creditworthiness of the business. A sound business concern with a good system of costing can attract more investors than a similar concern without an adequate system of costing.
- Helpful to the Government. It facilitates the assessment of Excise Duty and Income Tax and the formulation of policies regarding industry, export, import, taxation etc. It also facilitates the preparation of national plans for economic development.
- It provides ready figures for use by the Government for application to problems like price fixation, price control, tariff protection, wage level fixation, payment of dividends or settlement of disputes.
- Helpful to Consumers. The ultimate aim of costing is to reduce cost of production to the minimum and maximise the profits of the business. A part of the benefit resulting from the reduction of the cost is usually passed on to consumers in the form of lower prices. Besides, the installation of a costing system will infuse confidence in the minds of the public about the fairness of the prices charged.
- Efficiency of Public Enterprises. Costing has a more important role to play in public enterprises than in private enterprises. In public enterprises, primary objective is not to earn profit but it is to serve the society by providing quality goods at cheaper rates. Therefore, whatever limited information the usual profit and loss account can give in case of a private enterprise, is not available in case of a public enterprise.
- The efficiency of a public sector can, therefore, be best judged by comparing its cost of production with the cost of production of its counterpart in the private sector. Public enterprises lack the personal initiative and interest of private enterprises. A good system of costing ensures efficient and effective control through a proper analysis of their working.
- It provides for graded financial control over expenditure and avoids conflict of authority. It measures efficiency and profitability of the undertaking to justify its running in the public sector. It helps management in fixing reasonable selling prices for the products manufactured or services rendered by public enterprises.

Limitations of Cost Accounting:

Cost accounting like other branches of accountancy is not an exact science but is an art which has developed through theories and accounting practice based on reasoning and common sense. Many theories can be proved or disproved in the light of conventions and basic principles of cost accounting. These principles are not static but changing with the change of time and circumstances.

Following are the main limitations of cost accounting:

- Cost accounting lacks a uniform procedure. It is possible that two equally competent cost accountants may arrive at different results from the same information. Keeping in view this limitation, all cost accounting results can be taken as mere estimates.
- There are a large number of conventions, estimates and flexible factors such as classification of costs into its elements, issue of materials on average or standard price, apportionment of overhead expenses, arbitrary allocation of joint costs, division of overheads into fixed and variable costs, division of costs into normal and abnormal and controllable and non- controllable and adoption of marginal costs and standard costs due to which it becomes difficult to have exact costs.
- Moreover, no one cost is suitable for all purposes and under all circumstances. Virtually its calculation depends on the use to which the data are required to be put to. Because of inclusion of some items of cost on estimated basis it is difficult to have actual true cost. On this basis when the valuation of stock is done, that will not be based on true facts and naturally the profit calculated from the cost records will not be true.
- For getting the benefits of cost accounting many formalities are to be observed by a small and medium size concern due to which the establishment and running costs are so much that it becomes difficult for these concerns to afford its cost. Thus, cost accounting can be used only by big concerns.
- Contribution of cost accounting for handling futuristic situations has not been much. For example, it has not evolved so far any tool for handling inflationary situation.

1.5 DIFFERENCE BETWEEN COST ACCOUNTING AND FINANCIAL ACCOUNTING

BASIS FOR COMPARISON	COST ACCOUNTING	FINANCIAL ACCOUNTING
Meaning	Cost accounting is a system	Financial accounting is a system

	through which an organisation keeps the track of various costs incurred in the business in production activities.	that captures the records of financial information about the business to show the correct financial position of the company at a particular date.
Information type	Records the information related to material, labour and overhead which are used in the production process.	Records the information which are in monetary terms.
Nature of cost	Both historical and pre-determined cost	Only historical cost.
Users	Information provided by cost accounting is used only by the internal management of the organisation like directors, supervisors, managers, etc.	Users of information include internal and external parties like creditors, shareholders, customers etc.
Valuation of stock	At stock	Cost or Net Realizable Value, whichever is less.
Mandatory	No, except for manufacturing firms it is mandatory.	Yes for all firms.
Time of reporting	Details provided by cost accounting are frequently prepared and reported to the management.	Financial statements are reported at the end of the accounting period, which is normally 1 year.
Profit Analysis	Generally, the profit is analysed for a particular product, job, batch or process.	Income, expenditure and profit are analysed together for a particular period of the whole entity.
Forecasting	Forecasting is possible through budgeting techniques.	Forecasting is not at all possible.

1.6 ELEMENTS OF COST

“A classification has to be made to arrive at the detailed costs of departments, production orders, jobs or other cost units. The total cost of production can be found without such analysis, and in many instances an average unit cost could be obtained but none of the advantages of an analysed cost would be available”. Harold. J. Wheldon.

Simple ascertainment of total cost cannot satisfy the various requirements of decision making. For effective control and managerial decision making, data is to be provided on the basis of analysed and classified costs. In order to satisfy this objective, cost is analysed by elements of cost i.e., by nature of expenditure.

The elements of cost are:

1. Materials
2. Labour
3. Expenses
4. Overheads

The above elements of cost are explained below:

Materials:

“The material cost is the cost of commodities supplied to an undertaking”- I.C.M.A.

Materials cost is of two types, viz.:

- Direct materials cost
- Indirect materials cost.

(i) Direct Materials Cost:

Direct material cost is “The cost of materials entering into and becoming constituent elements of a product or saleable service”. Thus, materials which can be identified with units of output or service are known as direct materials.

Cotton used in production of cloth, leather used in the case of production of leather goods and lime in the production of chalk, etc., are the examples of direct materials. Any materials purchased and used for a specific job are also direct materials.

(ii) Indirect Materials:

“Materials used for the product other than the direct materials are called indirect materials. In other words, materials cost which cannot be identified with a specific product, job, process is known as indirect material cost.

Small tools, stationery used in works, office stationery, advertising posters, and materials used in maintenance of plant and machinery are a few examples of indirect materials.

Labour:

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

“The labour cost is the cost of remuneration (wages, salaries, commissions, bonus, etc.) of the employees of an undertaking” – I.C.M.A.

Labour cost is also divided into direct and indirect portions:**(i) Direct Labour Cost:**

It is also called ‘Direct-wages’. Direct labour cost is the cost of labour directly engaged in production operations. E.g., workmen engaged in assembling parts, carpenters engaged in furniture making, etc.

(ii) Indirect Labour Cost:

Indirect labour cost is the remuneration paid for labour engaged to help the production operations, e.g., inspectors, watchmen, sweepers, store keepers, etc. The remuneration paid to these persons cannot be traced to a job, process or production order. The labour costs of idle time, overtime, holidays, etc., are also taken as indirect costs. Similarly, clerical and managerial staff, salesmen, distribution employees are also included in the orbit of 'indirect labour'.

Expenses:

Expenditure other than material and labour is the third element of cost.

It is defined by I.C.M.A. as- "The cost of service provided to an undertaking and the notional cost of the use of owned assets".

Expenses are of two types:

- Direct expenses
- Indirect expenses.

(i) Direct Expenses:

These are the expenses which can be directly identified with a unit of output, job, process or operation. They are specifically incurred for a job, or unit or process and in no way they are connected with other jobs or processes. The direct expenses are also known as chargeable expenses.

Some examples are:

- (a) Hire charges of special plant used for a job.
- (b) Royalty on products.
- (c) Cost of special patterns, designs or plans for a particular job or work order, etc.

(ii) Indirect Expenses:

Indirect expenses are expenses other than indirect material and indirect labour, which cannot be directly identified with units of output, job, process or operation. These expenses are incurred commonly for jobs and processes. E.g., rent, power, lighting, depreciation, bank charges, advertising, etc.

Direct and Indirect Costs:**Direct Cost or Prime Cost:**

The aggregate of all the direct costs i.e., Direct Materials, Direct Labour or wages and Direct expenses is termed as- 'Prime Cost' or 'Direct cost'. Thus prime cost or direct cost is the sum of all the elements of costs which can be specifically identified with particular products or jobs and allocated to such output.

Indirect Cost or 'Overhead' or 'On Cost' or 'Burden':

The aggregate of all the indirect costs i.e., Indirect Material, Indirect labour and Indirect expenses is variously termed as 'On cost' or 'overhead' or 'Burden'. Over heads or on cost or

indirect cost cannot be identified with specific products or jobs. So it is apportioned to the output on some reasonable basis.

I.C.M.A., defines overheads as follows:

“The aggregate of indirect materials cost, indirect wages cost (indirect labour cost) and indirect expenses”. I.C.M.A. has stated in the note appended to this definition – ‘on cost’ and “Burden” as synonymous terms which are not recommended.

Overhead:

On the basis of functions overhead is classified as:

- Factory overhead
- Administration or office overhead, and
- Selling and Distribution overhead.

(i) Factory Overhead:

This is the aggregate of indirect material, indirect wages and indirect expenses incurred in the factory. Examples of indirect factory expenses are rent, power, depreciation lighting and heating incurred in the factory.

(ii) Administration or Office Overhead:

All the indirect administration expenses, come under this category. Salaries of office staff, accountants, directors’ fees, rent of office building, stationery expenses incurred in the office lighting and bank charges, etc., are the examples.

(iii) Selling and Distribution Overhead:

This includes indirect selling and distribution expenses. Examples are salaries of salesmen, selling commission, advertising, warehouse rent, maintenance of delivery vans, warehouse staff expenses, warehouse lighting, etc.

1.7 PREPARATION OF COST SHEET, TENDERS, QUOTATIONS.

PREPARATION OF COST SHEET:

1. Calculate Prime cost, Factory cost, Cost of Production, Cost of sales and Profit from the following particulars.

Direct materials	1,00,000
Direct wages	25,000
Direct expenses	5000
Wages of foreman	2500
Electric power	500
Lighting factory	1500
Lighting office	500
Rent factory	5000

Rent office	2500
Salary to salesman	1250
Advertising	1250
Income tax	10,000
Sales	1,89,500

Particulars	Amount
Direct materials	1,00,000
Direct wages/direct labour	25,000
Direct expenses	5000
Prime cost	1,30,000
Add: Factory Overheads	
Wages of foreman	2500
Electric power	500
Lighting factory	1500
Rent factory	5000
Total Factory OH	8500
Factory cost	1,39,500
Add: Office Overheads	
Lighting office	500
Rent office	2500
Income tax	10,000
Total Office Overheads	13,000
Cost of Production	1,52,500
Add: Sales and distribution OH	
Salary to salesman	1250
Advertising	1250
Total Selling and distribution OH	2500
Cost of sales	1,55,000
Profit	34,000
Sales	1,89,500

Profit= Sales- Cost of sales

2. From the following data, prepare a cost sheet, showing profit for the month. It is customary to fix the selling price by adding 20% to the total cost.

PARTICULARS	Rs	PARTICULARS	Rs
Materials used:	"	Labour used:	"
In manufacturing	80,000	For production	25,000

In primary packing	20,000	For factory supervision	5000
In the factory	2000	Office salaries	6000
In the office	4000	Salesman's salaries	8000
In the selling	5000	Expenses:	
In secondary packing	6000	Direct	2000
Depreciation:		Factory	6000
Factory	4000	Office	4000
Office	3000	Selling	5000
Distribution Vans	2000	Distribution	2000

Particulars	Amount
Direct materials	80,000
Direct wages/direct labour	25,000
Direct expenses	2000
Prime cost	1,07,000
Add: Factory Overheads	
Primary packing	20,000
Depreciation factory	4000
Materials in factory	2000
Factory supervision	5000
Factory expenses	6000
Total Factory OH	37,000
Factory cost	1,44,000
Add: Office Overheads	
Materials in office	4000
Depreciation office	3000

Office salary	6000
Office expenses	4000
Total Office Overheads	17,000
Cost of Production	1,61,000
Add: Sales and distribution OH	
Secondary packing	6000
Distribution vans	2000
Salary to salesman	8000
Selling expenses	5000
Distribution expenses	2000
Total Selling and distribution OH	23,000
Cost of sales	1,84,000
Profit	36,800
Sales	2,20,800

UNIT 2- MATERIALS

Unit Structure

2.1 Learning outcomes

2.2 Purchase records, Purchase order and Goods received note

2.3 Inventory Control

2.4 Economic Ordering Quantity

2.5 ABC Analysis

2.6 Computation of stock levels.

2.7 Methods of Pricing Issues

2.8 Perpetual Inventory System

2.1 LEARNING OUTCOMES

- Helps students to understand how to keep a record of the purchase history.
- Makes students understand how the inventory is kept is stock always, how stock levels are maintained and so on.
- Gives a clear picture of how to price the products when the raw materials are purchased at various rates.

2.2 PURCHASE RECORDS, ORDERS AND GOODS RECEIVED NOTE

Materials Control Account:

This account shows the total number of transactions relating to materials, for example the total receipt as per invoice and the total number of transfers to stores ledger control as per 'goods received notes'. However, the account is sometimes dispensed with, and only the stores ledger control account is maintained.

Stores Ledger Control Account:

This account is debited for receipt of materials as per the goods received notes and is credited for issue of materials as per materials-requisition or materials analysis sheet. The balance represents the total of stores accounts.

Goods Receipt Notes

The goods receipt note is an internal document produced after inspecting delivery for proof of order receipt. Generally produced by your stores team. It's used by stores, procurement, and finance to raise any issues, update your stock records, and to be matched against the original purchase order and supplier invoice, to allow payment to be made.

Manually processing paperwork such as goods receipt and delivery notes can take a large amount of staff time in data entry and distribution to various departments. Paper copies of notes can be mislaid, supplier payments delayed and stock control systems out of date.

2.3 INVENTORY CONTROL

Inventory control can be defined as the system used in a manufacturing concern to control the firm's investment in stock. The system involves the recording and monitoring of various stock levels, forecasting future demands and deciding when and how much quantity to order. The overall objective of inventory control is to minimise the costs associated with stock.

Inventory Control Items:

(A) Inventory Control Terminology:**(i) Lead time:**

This is a period of time between ordering and replenishment.

(ii) Economic Order Quantity [EOQ]:

This is a calculated reorder quantity which minimizes the balance of cost between carrying costs and ordering costs.

(iii) Buffer Stock or Minimum Stock or Safety Stock:

This is a stock allowance to cover the demand of materials during the lead time. This is the level below which stock is not allowed to fall.

(iv) Maximum level:

This is a stock level calculated as the maximum desirable stock to be maintained and is an indicator to the management to show when stocks have risen too high.

(v) Reorder level:

This is the level of stock at which a further replenishment order should be placed. This stock level is dependent on the lead time and the rate of consumption during the lead time.

(vi) Reorder Quantity:

The quantity of the replenishment order.

2.4 ECONOMIC ORDER QUANTITY

Economic order quantity (EOQ), refers to the optimum amount of an item that should be ordered at any given point in time, such that the total annual cost of carrying and ordering that item is minimized. EOQ is also sometimes known as the optimum lot size.

1. From the following particulars, calculate the EOQ.

Annual requirements 10,800kgs

Cost of purchasing and receiving one order Rs. 1,000

Annual carrying cost Rs. 20.

Solution:

$$EOQ = \frac{2AB}{CS}$$

$$EOQ = \sqrt{\frac{2 * 10,800 * 1000}{20}}$$

$$= \sqrt{\frac{2,16,00,000}{20}}$$

$$EOQ = 103 \text{ units}$$

2. Calculate the re-order quantity from the following particulars:

Annual usage 20,000 units

Buying cost per order Rs. 10

Cost per unit Rs.100

Cost of carrying inventory 10% of cost

Solution:

$$EOQ = \frac{2AB}{CS}$$

$$EOQ = \sqrt{\frac{2 * 20,000 * 10}{100 * 10 / 100}}$$

$$EOQ = \sqrt{\frac{4,00,000}{10}}$$

$$EOQ = 200 \text{ units}$$

3. From the following figures, calculate Economic Order quantity:

Annual Consumption of materials = 4000 units

Cost of buying per order = Rs. 5

Cost per unit = Rs. 2

Storage and carrying cost = 8% on average inventory

Solution:

$$EOQ = \frac{2AB}{CS}$$

$$EOQ = \frac{\sqrt{2*4000*5}}{2*8/100}$$

$$= \frac{\sqrt{40,000}}{0.16}$$

EOQ = 500 units

2.5 ABC ANALYSIS

Activity-based costing (ABC) is a costing method that assigns overhead and indirect costs to related products and services. This method recognizes the relationship between costs, overhead activities, and manufactured products, assigning indirect costs to products less arbitrarily than traditional costing methods. However, some indirect costs, such as management and office staff salaries, are difficult to assign to a product.

The ABC calculation is as follows:

1. Identify all the activities required to create the product.
2. Divide the activities into cost pools, which includes all the individual costs related to an activity—such as manufacturing. Calculate the total overhead of each cost pool.
3. Assign each cost pool activity cost drivers, such as hours or units.
4. Calculate the cost driver rate by dividing the total overhead in each cost pool by the total cost drivers.
5. Divide the total overhead of each cost pool by the total cost drivers to get the cost driver rate.
6. Multiply the cost driver rate by the number of cost drivers.

2.6 COMPUTATION OF STOCK LEVELS

1. From the following information, calculate
 - a) Maximum stock level
 - b) Minimum stock level
 - c) Reorder level
 - d) Average stock level

Minimum consumption - 240 units per day

Maximum consumption - 420 units per day

Normal consumption - 300 units per day

Reorder quantity - 3600 units

Reorder period - 10 to 15 days

Normal reorder period - 12 days

Ans:

$$\begin{aligned}\text{Reorder level} &= \text{Maximum consumption} \times \text{Maximum reorder period} \\ &= 420 \times 15 \\ &= 6300 \text{ units}\end{aligned}$$

$$\begin{aligned}\text{Maximum stock level} &= \text{Reorder level} + \text{Reorder quantity} - (\text{Minimum consumption} \times \\ &\quad \text{Minimum reorder period}) \\ &= 6300 + 3600 - (240 \times 10) \\ &= 9900 - 2400 \\ &= 7500 \text{ units}\end{aligned}$$

$$\begin{aligned}\text{Minimum stock level} &= \text{Reorder level} - (\text{Normal consumption} \times \text{Normal reorder period}) \\ &= 6300 - (300 \times 12) \\ &= 6300 - 3600 \\ &= 2700 \text{ units}\end{aligned}$$

$$\begin{aligned}\text{Average stock level} &= \frac{\text{maximum stock level} + \text{minimum stock level}}{2} \\ &= \frac{7500 + 2700}{2} \\ &= 5100 \text{ units}\end{aligned}$$

2. From the following information calculate maximum, minimum and average stock levels .

Normal consumption per day	500 kgs
Minimum consumption per day	200 kgs
Maximum consumption per day	800 kgs
Lead time	10 to 16 days
Reorder quantity	3000 kgs

$$\begin{aligned}\text{Reorder level} &= \text{Maximum consumption} \times \text{Maximum reorder period} \\ &= 800 \times 16 \\ &= 12800 \text{ units}\end{aligned}$$

$$\begin{aligned}\text{Maximum stock level} &= \text{Reorder level} + \text{Reorder quantity} - (\text{Minimum consumption} \times \\ &\quad \text{Minimum reorder period}) \\ &= 12800 + 3000 - (200 \times 10) \\ &= 15800 - 2000 \\ &= 13800 \text{ units}\end{aligned}$$

$$\begin{aligned}\text{Minimum stock level} &= \text{Reorder level} - (\text{Normal consumption} \times \text{Normal reorder period}) \\ &= 12800 - (500 \times 13)\end{aligned}$$

$$= 12800 - 6500$$

$$= 6300 \text{ units}$$

$$\text{Average stock level} = \frac{\text{Maximum stock level} + \text{Minimum stock level}}{2}$$

$$= \frac{13800 + 6300}{2}$$

$$= 10050 \text{ units}$$

2.7 METHODS OF PRICING ISSUES

Pricing of materials refers to valuation of materials issued by the stores department for the production process. Pricing of materials should be done by adopting the method which is suitable for nature of materials and business itself. The methods applied for pricing of materials are as follows:

TYPES:

1. Cost Price Methods
 - FIFO-First In First Out
 - LIFO-Last In First Out
 - Specific Price
 - Base Stock
 - HIFO-Highest In First Out
2. Average Price Methods
 - Simple Average
 - Weighted Average
 - Periodic Simple Average
 - Periodic Weighted Average
 - Moving Simple Average
 - Moving Weighted Average
3. Notional Price Methods
 - Standard Price
 - Inflated Price
 - Re-use Price
 - Replacement Price

1. From the following transactions, prepare separately, the stores ledger account, using the following methods- LIFO, FIFO.

Date	Particulars	Amount
Jan 1	Opening balance	100 units @ Rs. 5 per unit
Jan 5	Received	500 units @ Rs. 6 per unit
Jan 20	Issued	300 units

Feb 5	Issued	200 units
Feb 6	Received back from work order, Issued on Feb 5	
Feb 7	Received	600 units @ Rs. 5 each
Feb 20	Issued	300 units
Feb 25	Returned to supplier	50 units purchased on 7 th feb
Feb 26	Issued	200 units
Mar 10	Received	500 units @ Rs. 7 per unit
Mar 15	Issued	300 units

Stock verification on 15th March revealed a shortage of 10 units.

FIRST IN FIRST OUT- FIFO method

Date	Par	Received			Issued			Balance		
		Qty	Rate	Amt	Qty	Rate	Amt	Qty	Rate	Amt
Jan 1	Bal	-	-	-	-	-	-	100	5	500
Jan 5	Rec	500	6	3000	-	-	-	100	5	500
								500	6	3000
Jan 20	Iss	-	-	-	100	5	500			
	-	-	-	-	200	6	1200	300	6	1800
Feb 5	Iss	-	-	-	200	6	1200	100	6	600
Feb 6	Rec	200	6	1200	-	-	-	300	6	1800
Feb 7	Rec	600	5	3000	-	-	-	300	6	1800
								600	5	3000
Feb 20	Iss	-	-	-	300	6	1800	600	5	3000
Feb 25	Ret	-	-	-	50	5	250	550	5	2750
Feb 26	Iss	-	-	-	200	5	1000	350	5	1750
Mar 10	Rec	500	7	3500	-	-	-	350	5	1750
								500	7	3500
Mar 15	Iss				300	5	1500	50	5	250
								500	7	3500
								50	5	250
								490	7	3430

Closing stock= 50 units @ Rs. 5= Rs. 250

490 units @ Rs. 7= Rs. 3430.

2. LAST IN FIRST OUT- LIFO METHOD

Date	Par	Received			Issued			Balance		
		Qty	Rate	Amt	Qty	Rate	Amt	Qty	Rate	Amt
Jan 1	Bal	-	-	-	-	-	-	100	5	500
Jan 5	Rec	500	6	3000	-	-	-	100	5	500
								500	6	3000
Jan20	Iss	-	-	-	300	6	1800	100	5	500
								200	6	1200
Feb 5	Iss	-	-	-	200	6	1200	100	5	500
Feb 6	Rec	200	6	1200	-	-	-	100	5	500
								200	6	1200
Feb 7	Rec	600	5	3000	-	-	-	100	5	500
								200	6	1200
								600	6	3000
Feb20	Iss	-	-	-	300	6	1800	100	5	500
								200	6	1200
								300	6	1800
Feb25	Ret	-	-	-	50	6	300	100	5	500
								200	6	1200
								250	6	1500
Feb26	Iss	-	-	-	200	6	1200	100	5	500
								200	6	1200
								50	6	300
Mar10	Rec	500	7	3500	-	-	-	100	5	500
								200	6	1200
								50	6	300
								500	7	3500
Mar15	Iss	-	-	-	300	7	2100	100	5	500
								200	6	1200
								50	6	300
								200	7	1400

Closing stock- 100 units @ Rs. 5 per unit- Rs. 500

200 units @ Rs. 6 per unit- Rs. 1200

50 units @ Rs. 6 per unit- Rs. 300

200 units @ Rs. 7 per unit- Rs. 1400

3. Show the stores ledger account as it would appear when using Highest In First Out method:

April 1 Balance in hand- 300 units @ Rs. 20

April 2. Purchased- 200 units @ Rs. 22

April 4. Issued 150 units

April 6. Purchased 200 units @ Rs. 23

April 11 Issued – 150 units

April 19 Issued – 200 units

April 22 Purchased – 200 units at Rs. 24 April 27 Issued – 250 units

DATE	PARTICULARS	RECEIPTS			ISSUES			BALANCE		
		QTY	RATE	RS	QTY	RATE	RS	QTY	RATE	RS
Apr 1	Balance b/d	-	-	-	-	-	-	300	20	6000
Apr 2	Purchased	200	22	4400	-	-	-	300	20	6000
		-	-	-	-	-	-	200	22	4400
Apr 4	Issued	-	-	-	150	22	3300	300	20	6000
		-	-	-	-	-	-	50	22	1100
Apr 6	Purchased	200	23	4600	-	-	-	300	20	6000
		-	-	-	-	-	-	50	22	1100
		-	-	-	-	-	-	200	23	4600
Apr 11	Issued	-	-	-	150	23	3450	300	20	6000
		-	-	-	-	-	-	50	22	1100
		-	-	-	-	-	-	50	23	1150
Apr 19	Issued	-	-	-	50	23	1150	200	20	4000
		-	-	-	50	22	1100	-	-	-
		-	-	-	100	20	2000	-	-	-
Apr 22	Purchased	200	24	4800	-	-	-	200	20	4000
		-	-	-	-	-	-	200	24	4800
Apr 27	Issued	-	-	-	200	24	4800	150	20	3000
		-	-	-	50	20	1000	-	-	-

Closing stock = 150 units x Rs20 = Rs. 3,000

4. SIMPLE AVERAGE METHOD

The following transactions took place in respect of an item:

- 2 March- Received 200 units @ Rs. 2 per unit
- 10 March – Received 300 units @ Rs. 2.40 per unit
- 11 March – Issued 250 units
- 18. March – Received 250 units @ Rs. 2.60 per unit.
- 20. March- Issued 200 units

Record the transactions in stores ledger, using simple average rate method.

Date	Par	Receipts			Issues			Balance		
		Qty	Rate	Amt	Qty	Rate	Amt	Qty	Rate	amt
Mar 2	Rec	200	2	400	-	-	-	200	-	400
Mar 10	Rec	300	2.40	720				500	-	1120
Mar 11	Iss				250	2.2	550	250	-	570
Mar 18	Rec	250	2.60	650	-	-	-	500	-	1220
Mar 20	Iss	-	-	-	200	2.5	500	300	-	720

Simple average is calculated as follows:

$$\text{Price} = (2 + 2.4) / 2 = 2.2$$

The price of first goods received is not taken into account for calculating the amount for the next issues because, the goods would have been left the godown already.

5. WEIGHTED AVERAGE METHOD

Date	Par	Receipts			Issues			Balance		
		Qty	Rate	Amt	Qty	Rate	Amt	Qty	Rate	amt
Mar 2	Rec	200	2	400	-	-	-	200	2	400
Mar 10	Rec	300	2.40	720				500	2.24	1120
Mar 11	Iss				250	2.24	560	250	2.24	570
Mar 18	Rec	250	2.60	650	-	-	-	500	2.44	1220
Mar 20	Iss	-	-	-	200	2.44	488	300	2.44	732

Closing stock- 300 units @ Rs. 2.44 – Rs. 732

2.8 PERPETUAL INVENTORY SYSTEM

Perpetual inventory is a method of accounting for inventory that records the sale or purchase of inventory immediately through the use of computerized point-of-sale systems and enterprise asset management software. Perpetual inventory provides a highly detailed view of

changes in inventory with immediate reporting of the amount of inventory in stock, and accurately reflects the level of goods on hand. Within this system, a company makes no effort at keeping detailed inventory records of products on hand; rather, purchases of goods are recorded as a debit to the inventory database. Effectively, the cost of goods sold includes such elements as direct labour and materials costs and direct factory overhead costs.

A perpetual inventory system is distinguished from a periodic inventory system, a method in which a company maintains records of its inventory by regularly scheduled physical counts.

UNIT 3- LABOUR

Unit Structure

3.1 Learning outcomes

3.2 Importance of Labour Cost Control

3.3. Various Methods of Wage Payments

3.4. Calculation of Wages

3.5. Methods of Incentives

3.6. Recording Labour time

3.7. Treatment of “OVER TIME” and “IDLE TIME”

3.8. Labour Turn Over

3.1. LEARNING OUTCOMES

- Students are able to identify how the wages are calculated according to the time worked and output produced.
- A Brief explanation about the different types and methods of wage payments.
- Able to understand how wages are calculated under overtime and idletime.

3.2 LABOUR COST CONTROL

Labour cost refers to the amount of money paid to the people who are engaged in the production of goods. In manufacturing businesses, often management will break down labour cost into direct cost and indirect cost.

Employees of any organization, as its precious wealth and backbone, play an important role in its developmental and productive activities. The development and progress of the organization, to a greater extent, are influenced by the effective and systematic utilization of available human resources. In the same analogy, if this resource is not utilized properly, it is sure that its manufacturing and marketing activities are bound to be retarded.

In other words, it is the human resource which is capable of either annihilating an organization which otherwise is doing well or putting an organization on an even keel which otherwise is on the way to extinction. It is these factors which necessitate to lay emphasis on

the labour related aspects such as recruitment, training, placement, payment of wages and incentives, etc.

Labour cost is another important element of total cost of any organization and it works out to 40 to 60% of total cost in most of the corporate undertakings. By keeping these labour costs at the minimum level, it is possible to lower the total labour cost, conversion cost, production cost and the cost of sales which enables the company to offer its products to the customers at a comparatively lower prices which in turn ensures higher demand for the products.

As a result, the company is in a position to earn a higher amount of profit. On the other hand, if the labour costs are not controlled properly, it will have an adverse impact on both the cost economies and profit.

Minimization of labour cost through control does not necessarily mean paying less to the employees. It means obtaining maximum work from the employees by providing them all the facilities – both monetary and non-monetary.

Because, an employee who is satisfied with his employer's remuneration, work environment, fringe benefits, etc., is able to devote his full attention to the overall welfare of the company.

This analysis clearly brings the point to the fore that systematic utilization of the labour force is a necessity. The companies must, therefore, try to accomplish this objective by proper planning and implementation of its policies, programmes, etc., starting from recruitment.

3.3 METHODS OF WAGE PAYMENT

Total wages earned by the employees is termed as remuneration. Time wages or Piece wages earned plus other financial incentives constitute the earning of employees. Productivity mainly depends on labour and other things like better equipment, production planning are contributory factors to higher productivity. Good wage system along with effective incentive system will encourage the labour force to give their best to the employer.

Methods of remuneration

- Time rate system
- Piece rate system

Piece rate system

- Straight piece rate
- Differential piece rate

Differential piece rate

- Taylor's differential piece rate
 Low piece rate applicable for below standard output- 80%
 High piece rate applicable for above standard output- 120%
- Merrick's differential/multiple piece rate
 <83%- ordinary piece rate
 83-100%- 110% of o p r
 >100%- 120% of o p r
- Gantt' task and Bonus plan.
 Output is below standard, guaranteed time wages – Below 100%
 Output is at standard, time rate + 20% bonus- At 100%
 Output is above standard, High piece rate- Above 100%

The output of a worker X is 100 units in 40 hours per week. Graduated time rate is Rs. 4 per hour. Ordinary piece rate is Rs. 2 per unit. Show the earnings of the worker under piece rate and time rate system.

$$\begin{aligned} \text{Piece rate} &= \text{No. of. piece} \times \text{Rate per piece} \\ &= 100 * 2 = \text{Rs.200.} \end{aligned}$$

$$\begin{aligned} \text{Time rate} &= \text{Hours worked} \times \text{Rate per hour} \\ &= 40 * 4 = \text{Rs.160.} \end{aligned}$$

A worker is paid at rs.2 per unit for the unit for the units produced by him . His hourly wage rate is Rs.3 per hour. In a working day of 8 hours the worker has produced 10 units . Calculate the wages of the worker according to time rate and piece rate system.

$$\begin{aligned} \text{Piece rate} &= \text{No. Of. Piece} \times \text{Rate per hour} \\ &= 2 * 10 = \text{Rs. 20} \end{aligned}$$

$$\begin{aligned} \text{Time rate} &= \text{Hours worked} \times \text{Rate per hour} \\ &= 8 * 3 = \text{Rs. 24} \end{aligned}$$

TAYLOR'S DIFFERENTIAL PIECE RATE

From the following particulars, Calculate the earnings of workers A & B under straight piece rate system and Taylor's Differential piece rate system.

Standard time allowed 25 units per hour

Normal time rate Rs. 50 per hour

In a day of 8 hours A produced 150 units and B produced 250 units.

Ans:

Calculation of piece rates:

Standard production for 1 hour= 25 units

Standard production for 8 hours= $25 \times 8 = 200$ units

Rate per hour= Rs. 50

Straight piece rate= $50/25$ units= Rs. 2 per unit

Low piece rate= $2 \times (80/100) =$ Rs. 1.6 per unit

High piece rate= $2 \times (120/100) =$ Rs. 2.4 per unit

Calculation of Earnings of workers:

A- Under straight piece rate

Units produced * Rate per unit= $150 \times 2 =$ Rs. 300

B- Under straight piece rate

Units produced * Rate per unit= $250 \times 2 =$ Rs. 500

A- Under Taylor's differential piece rate

Standard production is 200 units

Actual production is 150 units

Efficiency is BELOW standard

Piece rate= Low piece rate at 80%

Wages= $150 \times 1.6 =$ Rs. 240

B- Under Taylor's differential piece rate

Standard production is 200 units

Actual production is 250 units

Efficiency is ABOVE standard

Piece rate= High piece rate at 120%

Wages= $250 \times 2.4 =$ Rs. 600

MERRICK'S MULTIPLE PIECE RATE SYSTEM

Calculate the earnings of 3 workers A, B and C under the Merrick's plan using the following information:

Standard prod- 120

A- 90 units

B- 100 units

C- 130 units

Ordinary piece rate- 0.10

Ans:

Performance of workers- Actual prod/Standard prod * 100

- A. $90/120 * 100 = 75\%$
 B. $100/120 * 100 = 83.33\%$
 C. $130/120 * 100 = 108.33\%$

<83% - ordinary piece rate

83-100% - 110% of o p r

>100% - 120% of o p r

- A. $90 * 0.10 = \text{Rs. } 9$
 B. $100 * 0.10 * 1.10 = \text{Rs. } 11$
 C. $130 * 0.10 * 1.20 = \text{Rs. } 15.6$

GANTT'S Task and Bonus plan

The following particulars are applicable to a work process:

Time rate- Rs. 5 per hour, 40 hours per week

High task- 40 units per week

Piece rate above high task- Rs. 6.5 per unit

- A. 35 units
 B. 40 units
 C. 41 units
 D. 52 units

Calculate the wages under Gantt's task and bonus plan.

Output is below standard, guaranteed time wages – Below 100%

Output is at standard, time rate + 20% bonus- At 100%

Output is above standard, High piece rate- Above 100%

Level of Performance

- A. $35/40 * 100 = 87.5\%$
 B. $40/40 * 100 = 100\%$
 C. $41/40 * 100 = 102.5\%$
 D. $52/40 * 100 = 130\%$

Wages

- A. Below standard, so time wages- $40 \times 5 = \text{Rs. } 200$
 B. $40 \times 5 + 20\% (40 \times 5) = 200 + 40 = \text{Rs. } 240$
 C. High piece rate- $41 \times 6.5 = \text{Rs. } 266.5$
 D. $52 \times 6.5 = \text{Rs. } 338$

Guaranteed time rate- Re. 1 per hour, 8 hours per day

High piece rate- Re. 0.20 per unit

Standard output- 10 units per hour- $10 \times 8 = 80$ units

In a day of 8 hours,

- A. 70 units
 B. 80 units
 C. 90 units

Performance of workers

- A. $70/80 \times 100 = 87.5\%$
 B. $80/80 \times 100 = 100\%$ (At standard)
 C. $90/80 \times 100 = 112.5\%$

Wages

- A. Time rate- $8 \times 1 = \text{Rs. } 8$
 B. $8 + 20\% \ 8 = \text{Rs. } 9.6$
 C. $90 \times 0.20 = \text{Rs. } 18$

3.5 METHODS OF INCENTIVES

From the following particulars, calculate earnings of a worker under:

1. Halsey plan
2. Rowan plan
3. Halsey-weir plan.
 - Wage rate- Rs. 2 per hour
 - Production per hour- 4 units
 - Dearness allowance- Re. 1 per hour
 - Standard time fixed- 80 hours
 - Actual time taken- 50 hours
 - Production- 250 units

Halsey Plan

$$\text{Earnings} = T \times R + (50/100)(S - T) R + D.A$$

$$\begin{aligned}
 &= 50 \times 2 + 0.5(80-50) \times 2 + 50 \times 1 \\
 &= 100 + 30 + 50 \\
 &= \text{Rs. 180}
 \end{aligned}$$

Rowan Plan

$$\begin{aligned}
 \text{Earnings} &= T \times R + (S-T)/S \times T \times R + D.A \\
 &= 50 \times 2 + 0.375 \times 50 \times 2 + 50 \times 1 \\
 &= 100 + 37.5 + 50 \\
 &= \text{Rs. 187.50}
 \end{aligned}$$

Halsey-Weir Plan

$$\begin{aligned}
 \text{Earnings} &= T \times R + (30/100) (S-T) \times R \\
 &= 50 \times 2 + 0.3 (30) \times 2 \\
 &= 100 + 18 \\
 &= \text{Rs. 118}
 \end{aligned}$$

Barth's Variable Sharing Plan

From the following details, Calculate the earnings of worker under Barth's Variable sharing plan.

Standard time- 25 hours
 Actual time- 20 hours
 Standard rate per hour- Rs. 12

$$\begin{aligned}
 \text{Earnings} &= \text{Rate per hour} \times \sqrt{\text{Standard time} \times \text{Actual time}} \\
 &= 12 \times \sqrt{25 \times 20} \\
 &= 12 \times 22.36 \\
 &= \text{Rs. 268.33}
 \end{aligned}$$

3.7. TREATMENT OF OVERTIME AND IDLE TIME

Calculate the overtime and idle time wages payable to a workman from the following data:

Days	Hours worked
Monday	8
Tuesday	12
Wednesday	10
Thursday	10
Friday	9

Saturday	4
Total	53

Normal working hours- 8 per day; Normal rate- Re. 0.50 per hour

Overtime rate: Upto 9 hours in a day at single rate and over 9 hours in a day at double rate

Days	Total hrs worked	Normal working hrs	Overtime	
			Single rate	Double rate
Mon	8	8	-	
Tue	12	8	1	3
Wed	10	8	1	1
Thu	10	8	1	1
Fri	9	8	1	-
sat	4	8	-	-
Total		48	4	5

Normal working hours – $48 * 0.50 = \text{Rs. } 24$

Overtime- single rate- $4 * 0.50 = \text{Rs. } 2$

Double rate= $5 * 1 = \text{Rs } 5$

Total wages= Rs. 31

3.8 LABOUR TURNOVER

R company gives the following information:

Number of employees in the beginning- 200

Number of employees at the end- 240

Number of employees resigned- 20

Number of employees discharged- 5

Number of employees replaced- 18

Calculate labour turnover by applying all three methods.

Average number of employees=(No of workers in the beginning + No of employees in the end) / 2

$= 200+240 / 2$

Average no of employees = **220**

Seperation method= (No of employees resigned+discharged) / average no of employees * 100
 = $20 + 5 / 220 * 100 = 11.36\%$

Replacement method= No of workers replaced / avg no of workers * 100
 = $18/220 * 100$
 = **8.18%**

Flux method= no of seperations+ no replaced / avg employees * 100
 = $25+18/220 * 100 = 43/220 * 100$
 = 19.54%

UNIT 4- OVERHEADS

Unit structure:

- 4.1 Learning outcomes**
- 4.2 Definition and Meaning of Overheads**
- 4.3 Classification of overheads**
- 4.4 Apportionment of Overheads – Redistribution**
- 4.5 Absorption of Overheads**
- 4.6 “Machine Hour Rate”**

4.1 LEARNING OUTCOMES

- Students will be able to identify the different heads of expenses.
- Will be able to classify the expenses

4.2 MEANING AND DEFINITION OF OVERHEADS

The indirect cost constitutes the 'overhead' which is the total of indirect material indirect labour and indirect expenses. CMA define an indirect cost as "expenditure on labour materials or services which cannot be economically identified with a specific saleable cost unit"

According to Whelden "overhead may be defined as the cost of indirect material indirect labour and Such other expenses including services as cannot conveniently be charged to a specific unit. Alternatively overheads are all the expenses other than direct expenses"

4.3. CLASSIFICATION OF OVERHEAD COSTS

Cost classification is the process of grouping of cost accounting to their characteristics and establishing a series of special groups according to which costs are classified. The first refers to determination of various groups according to which are to be classified. The second refers to the process of actually classifying the cost and accumulating according to the group.

1. Identification of group in which overheads are sub grouped
2. The process of classification of various items of overheads into cost or another of the groups Determination of classifying groups.

The method of classification of overheads depend on nature and size of the business.

The various bases for classification are as under:

- (1) Manufacturing overhead
- (2) Administration overhead
- (3) Selling overhead
- (4) Distribution overhead,

4.4 DISTRIBUTION OF OVERHEADS

It is that portion of marketing costs incurred un warehousing saleable product and in delivering product to customers. It includes all expenses incurred from the time product in made in the factory until it destination. The examples of distribution expenses are carriage outward, warehouse at off salaries, warehouse rent, packing required for transport and insurance, etc.

RESEARCH DEVELOPMENT OVERHEADS

- Fixed overhead costs
- Variable overhead costs
- Semi variable overhead costs
- Cost segregation i.e..., Determination of Degree of Variability of Expenses salaries, warehouse rent, packing required for transport and insurance, etc.

PRIMARY DISTRIBUTION OF OVERHEADS

- Primary distribution of overheads is the process of allocating and apportioning the costs on suitable basis to ail the departments or cost centers Primary distribution is done without distinction between production and service departments.
- In order to ascertain the correct cost of cost centres and cost units, suitable cases have to be adopted for allocation and apportionment of overhead The under mentioned are some of the bases adopted for apportionment of manufacturing overheads.
- Direct allocation Wherever traceable, overheads are too he directly allocated to particular departments Examples are power, overtime premium of particular departments
- Labour hours Overheads are apportioned on the basis of direct labour hours of different departments
- Machine: Overheads are distributed on the basis of machine hours worked in each department indirect maternal and maternal handling charges.

SECONDARY DISTRIBUTION OF OVERHEADS

In the primary distribution of overheads, the overhead expenses are distributed among all the departments or cost centers, whether it is production department or service department.

In fact the production departments are engaged in producing goods whereas service departments assist them in the process of production. Hence ultimately the service department costs need to be spread over the production department and only then the overheads can be charged to production.

This process of apportioning service department expenses among the production departments is called secondary distribution of overheads. In other words, secondary distribution is the reapportionment of service department expenses among the production departments after completion of primary distribution. While making secondary distribution, some common bases of apportionment are taken.

1. Explain different kinds of overhead absorption rates.

The "X" machine shop has 3 cost centres A, B, C each having distinct set of machines.

	A	B	C	Total
(a) No. of workers	400	400	800	1,600
(b) No. of machine hours	50,000	50,000	60,000	1,60,000
(c) Percentage of H.P.	40	25	35	100
(d) Value of assets (Rs. in lakhs)	20	35	30	85
(e) Direct wages (Rs. in lakhs)	16	20	24	60
(f) Indirect wages (Rs. in lakhs)				18
(g) Supervisory salaries (Rs. in lakhs)				7
(h) Depreciation (Rs. in lakhs)				8.50
(i) Insurance (Rs. in lakhs)				4.25
(j) Electricity charges (Rs. in lakhs)				12
(k) Welfare expenses (Rs. in lakhs)				9
(l) Office and other expenses (Rs. in lakhs)				16

Work out a composite machine hour rate for each of the cost centers.

Solution:

COMPUTATION OF MACHINE HOUR RATE OF COST CENTER

Particulars	Basis	A	B	C
Indirect wages	Workers	4.5	4.5	9
Supervisory salary	Workers	1.75	1.75	3.5
Depreciation	Assets	2	3.5	3
Insurance	Assets	1	1.75	1.5
E.B	% of hp	4.8	3	4.2
Welfare expenses	Workers	2.25	2.25	4.5
Office and expense	Direct wages	4.27	5.33	6.4
		<u>20.57</u>	<u>22.08</u>	<u>32.1</u>

Total		50000	50000	60000
Total machinehour		<u>41.14</u>	<u>44.16</u>	<u>53.5</u>
Machine hour rate				

2. The following annual charges are incurred in respect of a machine in a shop where no manual labour and work done by 5 machines of same type.

	Rs.
(a) Rent and rates (proportional to floor space occupied) for shop	4,800
(b) Depreciation on each machine	500
(c) Repairs and maintenance for 5 machines	1,000
(d) Power (as per meter) at 5p per unit for shop	3,000
(e) Electric charges for light in shop	540
(f) Attendants : 2 for 5 machines and each paid Rs. 60 per month.	
(g) For the 5 machines, there is 1 supervisor paid at Rs. 250 p.m	
(h) Sundry supplies - lubricants, jute etc., for the shop	450
(i) Hire purchase instalment payable for machine (including Rs. 300 as interest) 1,200	

The machine uses 10 units of power per hour. Calculate machine hour rate.

Solution:

COMPUTATION OF MACHINE HOUR DATE

Particulars	Rs	Rs
Rent and rates 4800×1	960	
5		
Lighting charges 540 ×1	108	
5		
Attendant salary 1440×1	288	
5		
Supervision 3000×1	600	
5		
Sundry supplies 4500×1	90	

<u>5</u>		
Standing charges/year	2046	
Hour rate /machine	1200	1.705
Machine expenses		
Depreciation $500 \div 1200$		0.4167
Repairs $200 \div 1200$		0.1666
Power		0.5
Comprehensive machine hour rate		<u>2.7884</u>

Working notes

Total amount of power=rs 3000

Rate/hour=rs.050

Total working hour= $\frac{3000}{0.5}$ =6000hrs

0.5

Hours/machine= $\frac{6000}{5}$ =1200hrs

5

3. A company has three production departments and two service departments.

The expenses of the departments for a particular period are given below :

Production departments :

A – Rs.6,300 ; B – Rs.7,400 ; C – Rs.2,800

Service departments :

X – Rs.4,500 ; Y – Rs.2,000

It was decided to apportion the service departments expenses as follows :

	Production depts			Service depts	
Service depts :	A	B	C	X	Y
X	40%	30%	20%	–	10%
Y	30%	30%	20%	20%	–

Solution:**SECONDARY OVERHEAD DISTRIBUTION**

Particulars	A	B	C	X	Y
Primary distribution	6300	7400	2800	4500	2000
X- 40:30:20:10	<u>1800</u> 8100	<u>1350</u> 8750	<u>900</u> 3700	<u>4500</u> -----	<u>450</u> 2450
Y- 30:30:20:20	<u>735</u> 8835	<u>735</u> 9485	<u>490</u> 490	<u>490</u> 490	<u>(2450)</u> -----
X- 40:30:20:10	<u>196</u> 9031	<u>147</u> 9632	<u>98</u> 4288	<u>(490)</u> ---	<u>49</u> 49
Y- 40:30:20:10	<u>15</u> 9046	<u>14</u> 9646	<u>10</u> 4298	<u>10</u> 10	<u>(49)</u> ----
X- 40:30:20:10	<u>4</u> 9050	<u>4</u> 9650	<u>2</u> 4300	<u>(10)</u> ---	---- -----

4.5 ABSORPTION OF OVERHEADS

The last step in the process of accounting for manufacturing overhead is 'Absorption' of the overhead. The process of charging the overhead cost of a cost center to the cost units is called overhead absorption.

According to I.C.M.A., overhead absorption is "the allotment of overhead to cost units by means of rates separately calculated for each cost center." The terms 'overhead absorption', 'recovery', 'charge' and 'application of overheads' are used interchangeably. Allotment of overhead to cost units is of great importance as each unit of output should share a reasonable portion of overhead, besides bearing the cost of direct material and wages. Overhead absorption is accomplished by overhead rates.

OVERHEAD RATES

Absorption of overheads is the 'charging' of overheads of a department or a cost center to the cost units which pass through the department or cost centre. In order to equitably charge the overhead expenses to cost units a suitable base must be adopted. The base selected is used to calculate a uniform 'Rate' to absorb the overheads which is called 'Absorption rate'. The absorption rate is calculated by dividing the overhead by the units of base selected such as units of production, labour hours, machine hours, etc. The overhead cost of products or jobs is arrived at by multiplying the rate by units of base contained in the job product or process, etc.

1. Kannan industries Ltd., has four departments. A,B and C are production departments and D is the service department. The actual expenses for a month were as follows:

	Rs.		Rs.
Rent	10,000	Supervision	15,000
Repairs to plant	6,000	Insurance of stock	5,000
Depreciation	4,500	Power	9,000
Lighting charges	1,000		
Employer's liability for insurance		Rs. 1,500	

The following information is also available:

	Dept A	Dept B	Dept C	Dept D
Area (sq. feet)	1,500	1,100	900	500
Number of lights	75	11	9	5
Number of employees	200	150	100	50
Total wages (Rs)	60,000	40,000	30,000	20,000
Value of plant(Rs)	2,40,000	1,80,000	1,20,000	60,000
Value of stock(Rs)	1,50,000	90,000	60,000	–

Apportion the costs to four departments on the most equitable method.

Solution:

PRIMARY DISTRIBUTION OF O/H

Particulars	Basics	A	B	C	D	Total
Rent	Area	3750	2750	2250	1250	10000
Depreciation	Plant	1800	1350	900	450	4500
Repairs of plant	Plant	2400	1800	1200	600	6000
	No of-lights	750	110	90	50	1000
Lighting	No of-Employees	6000	4500	3000	1500	15000
Supervisory	Value of-Stocks	2500	1500	1000	–	5000
Fireinsurance	Plant	3600	2700	1800	900	9000
Power	Employees	600	450	300	150	1500
Insurance	Direct	–	–	–	20000	20000
Wages						
Total-overhead		21400	15160	10540	24900	72000

3. Kannan industries Ltd., has four departments. A,B and C are production departments and D is the service department. The actual expenses for a month were as follows:

	Rs.		Rs.
Rent	6,000	Supervision	9,000

Repairs to plant	3,600	Insurance of stock	3,000
Depreciation	2,700	Power	5,400
Lighting charges	600		
Employer's liability for insurance		Rs. 900	

The following information is also available:

	Dept A	Dept B	Dept C	Dept D
Area (sq. feet)	300	220	180	100
No. of workers	48	32	24	16
Number of employees	200	150	100	50
Total wages (Rs)	8,000	6,000	4,000	2,000
Value of plant (Rs)	24,000	18,000	12,000	6,000
Value of stock (Rs)	15,000	9,000	6,000	–

Apportion the costs to four departments on the most equitable method.

Solution:

PRIMARY DISTRIBUTION OF O/H

Particulars	Basis	Total	A	B	C	D
Rent	Area	6000	2250	1650	1350	750
Repairs	Plant	3600	1440	1080	720	360
Depreciation	Plant	2700	1080	810	540	270
Lighting-charges	Area	600	225	165	135	75
Supervision	Employees	9000	3600	2400	1800	1200
Insurance-On stock	Stock	3000	1500	900	600	–
Power	Plant	5400	2160	1620	1080	540
Employees-Insurance	Employees	900	360	240	180	120
Wages	Direct	2000	–	–	–	2000
Total-overhead		33200	12615	8865	6405	5315

4.6. MACHINE HOUR RATE

Calculate the machine hour rate for machine A

Cost of machine	–	Rs.16,000
Estimated scrap value	–	Rs.1,000
Effective working life	–	10,000 hours

Running hours for a 4 weekly period – 160 hours
 Average repairs and maintenance for a 4 weekly period – Rs. 120
 Average standing charges for a 4 weekly period – Rs.40
 Power 4 units per hour at a cost of 25 paise per hour.

Solution:

MACHINE HOUR RATE

Particulars	Cost/hour
Standing charges $40 \div 160$	0.25
Machine expenses	
Depreciation	1.5
16000-100	
<hr/>	
10000	
Repairs $120 \div 160$	0.75
Power 4×0.25	1
Machine hour rate	<hr/> 3.5

UNIT 5- METHODS OF COSTING:

Unit structure:

- 5.1 Learning outcomes
- 5.2 Unit Costing – Job Costing
- 5.3 Process Costing
- 5.4 Simple Process Accounts
- 5.5 Operation and Operating Costing.

5.1 LEARNING OUTCOMES

- Able to learn how to apply different methods of cost for different products.
- Will be able to find out how loss is a normal part of the production production process.
- Will find out how the businesses can control the abnormal loss of materials.

5.2 UNIT AND JOB COSTING

Meaning of Job Costing:

CIMA defines Job Costing as “that form of specific order costing which applies, where work is undertaken to customers special requirements and each order is of comparatively short duration (Compared with those to which contract costing applies). The work is usually carried out within a factory or workshop and moved through processes and operations as a

continuously identifiable unit. The term may also be applied to work such as property repairs and the method may be used in the costing of internal capital expenditure jobs”.

A job is a specific order for work usually carried out within a factory or workshop and moves through activities and operations as a continuously identifiable unit. Job costing is used in engineering jobs, construction companies, printing jobs, automobile servicing, ship building, furniture making, fabrication jobs etc.

A job is a cost unit which consists of a single order or contract. Job costing is a system in which the elements of cost incurred are specifically identifiable with the item being made to a customer’s specific requirements.

The costs of each job are recorded in Job Account. The unit of cost in job costing is the cost of the job itself. The cost of completed job will be the materials used for the job, the direct labour employed and the production overheads charged to it.

Features of Job Costing:

- It is a Specific Order Costing.
- The job is carried out or a product is produced to meet the specific requirements of the order. It may be related to single unit or a batch of similar units.
- It is concerned with the cost of an individual job or batch regardless of the time taken to produce it, but normally short duration jobs.
- Costs are collected to each job at the end of its completion.
- The costs of each job is ascertained by adding materials, labour and overheads.
- Only prime cost elements are traceable and the overheads are apportioned to each job on some appropriate basis and sometimes it is difficult to select a suitable method of absorption of overheads to individual jobs.

5.3 PROCESS COSTING

DEFINITION: According to ICMA. London, “process costing is that form of operation COSTING, where standardised goods are produced.”

2) FEATURES OF PROCESS COSTING:

- Production is continuous, in a series of stages called processes.

- Each process is deemed as a cost centre and costs are accumulated for each process separately along with output, finished and in progress.
- Products and processes are completed.
- The output of one process becomes the raw material to the next process, usually till the final product is completed.
- The cost of previous process is transferred to the next process along with the output. Sometimes, the transfer may be at a transfer price inclusive of profit.
- There may be process losses of the input. They may be normal or abnormal or both.
- Completed and semi-finished outputs have to be expressed in common terms for cost determination.
- Since production is of identical units, the total cost of process is divided with the units of outputs to obtain average cost per unit.
- Two or more products may be produced unavoidably in the same process. They may be of equal importance or of disproportionate values.
- It is not possible or necessary to trace or identify specific lots of material inputs with product or output.

3) PROCESS LOSSES:

- A. **Wastage:** According to terminology of cost accounting ICMA, London, “waste is discard substance having no value.” Charles T.Horngren days “Wastage is material that is l9s, evaporates or shrinks in a manufacturing process or is a residue that has no measurable recovery value.” This wastage has neither value recovery value nor has any use.
- B. **SCRAP:** According to ICMA terminology, “Scrap is discarded material having some recovery value which is usually disposed of without further treatment.
- C. **NORMAL PROCESS LOSS:** It is the process loss which is unavoidable and uncontrollable. It is to be expected in normal conditions of the process. As a part of cost control, management estimates such loss in advance on the basis of past experience. THE normal loss should be absorbed by good units produced.
- D. **Abnormal process loss:** When process loss is in excess of predetermined loss, such additional loss is called abnormal loss or abnormal wastage. Such loss may be caused by abnormal reasons such as substandard material, faulty tools and equipment, plant breakdown etc.

Computation of Abnormal loss

- Quantity of abnormal loss = normal output-actual output
- Normal output = Input – Normal loss
- If actual output is less than normal output the balance is a positive figure, representing abnormal loss in units.
- Value of abnormal loss = Normal cost of normal output ÷ normal output × units of abnormal loss.
- Normal cost of normal output = Expenditure of the process – scrap value of normal loss

E. Abnormal gain: When process loss is less than the predetermined normal loss, the additional output resulting the reform is called abnormal gain. Abnormal Gain can occur because of superior quality material, better workmanship, improved method, tools and equipment, etc.,

Computation of abnormal gain

- Quantity of abnormal loss = Normal output – actual output
- Normal output = Input – normal loss
- If actual output is more, the balance is a negative figure, representing abnormal gain in units.
- Value of abnormal gain = Normal cost of normal output ÷ normal output × units of abnormal gain
- Normal cost of abnormal gain = Expenditure of the process – scrap value of normal loss.

5.4. SIMPLE PROCESS ACCOUNTS

Sum 1:-

Prepare process account from the following details.

	RS.	RS.
Material	40,000.	6,000
Labour	15,000.	16,000
Expenses. (Direct)	5,000.	3,000

Production over headRs. 60000 to be allocated to Process I and II on the basis of 150% of Direct wages. Production during the period 2,000 units.

Solution:-

Process-1A/ C

Particulars	Qty.	Rate	Value	Particulars	Qty.	Rate	Value
To material.	2000		40000	By process-2 a/c.	2000	41.25	82,500
To labour.			15000				
To expenses.			5000				
To production O.H.			22,500				
	<u>2000</u>		<u>82,500</u>		<u>2000</u>		<u>82,500</u>

Process-2 A/C

Particulars	Qty.	Rate	Value	Particulars	Qty.	Rate	Value
To Process I a/c	2000		82500	By finished goods	2000	65.75	1,31,500
To material.			6000				
To labour.			16000				

To expenses.			3000				
To production O.H.			24,500				
	<u>2000</u>		<u>1,31,500</u>		<u>2000</u>		<u>1,31,500</u>

ABNORMAL LOSS PROCESS ACCOUNT

Sum 2:-

In the manufacturer of product 'B' 1000 kgs. of material at Rs. 8 per kg was supplied to the first process. Labour cost amounted to Rs.2000 and production overhead incurred was Rs.1000. The normal loss has been estimate at 10% which could be Sold at RS.2 per kg. The actual production of the process was 880kg. Show Process I accounts.

Solution:-

Process-I

Particulars	Qty.	Rate	Value	Particulars	Qty.	Rate	Value
To material.	1,000		8,000	By normal loss	100	2	200
To labour.			2,000	By abnormal			
To production O.H.			1,000	loss	20	12	240
				By output	880	12	10560
	<u>1,000</u>		<u>11,000</u>		<u>1000</u>		<u>11,000</u>

ABNORMAL GAIN PROCESS ACCOUNT

Sum 3:-

Product A is obtained after it passes through three distance processes. 2,000 kgs of material at Rs.5 per kgs were issued to process 1. Direct wages amount to Rs .900 and production overhead incurred was Rs.500. Normal loss is estimated at 10% of input, The wastages is sold at Rs.3 per kg . The actual output is 1,850 kgs prepare Process I account.

Solution:-

Process-I

Particulars	Qty.	Rate	Value	Particulars	Qty.	Rate	Value
To Input	2,000	5	10,000	By normal loss	200	3	600
To wages.			900	By output	1850	6	11,100
To production O.H.			500				
To abnormal gain	50	6	300				

	<u>2050</u>		<u>11,700</u>		<u>2050</u>		<u>11,700</u>

ABNORMAL LOSS AND GAIN PROCESS ACCOUNTS

Sum 4:-

From the following information, prepare process cost accounts and normal loss, abnormal loss or gain accounts.

	Process-A	Process
B		
Material.	30,000.	
3,000		
Labour.	10,000.	
12,000		
Overhead.	7,000.	
8,600		
Input (units).	20,000.	
17,500		
Normal loss.	10%.	4%
Sales of waste per unit (RS.).	1.	2
Final output form process B (units).	nil	
17,000		

Solution:-

Process-A

Particulars	Qty.	Rate	Value	Particulars	Qty.	Rate	Value
To Input	20,000		-	By normal loss	2000	1	2000
To material			30,000	By abnormal			
To labour			10,000	loss	500	2.5	1250
To overhead			7,000	By output	17,500	2.5	43,750
	<u>20,000</u>		<u>47,000</u>		<u>20,000</u>		<u>47,000</u>

Process-B

Particulars	Qty.	Rate	Value	Particulars	Qty.	Rate	Value
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To Input Process A	17,500	2.5	43,750	By normal loss	700	2	1400
To material			3,000	By finished goods	17,000	3.9256	66,735
To labour			12,000				
To overhead	200	3.9256	8,600				
To abnormal gain			785				
	<u>20,000</u>		<u>68,135</u>		<u>20,000</u>		<u>68,135</u>

Sum 5:-

Product 'A' is obtained after it passes through the three distinct processes. Prepare process account from the following.

Total	Process-1.	Process-2.	Process-3
Material.		15,084.	5200
5924			3960.
Wages.		18,000.	4000.
8000			6000.
Production overhead.		18000.	-.
-			-.

1,000. units of material @ Rs. 6 per unit were introduced in the process I. production overhead is to be distributed as 100% on wags.

Process	Total output unit.	Normal loss	Value of scrap per unit
I.	950.	5%.	4
II.	840.	10%.	8.
III.	750.	15%.	10.

Solution:-**Process-I**

Particulars	Qty.	Rate	Value	Particulars	Qty.	Rate	Value
To Input Process	1000	6	6000	By normal loss	50	4	200
To material			5200	(1000×5/100)			
To wages			4000	By process II	950	20	19,000
To production O.H			4000				
	<u>1000</u>		<u>19200</u>		<u>1000</u>		<u>19,200</u>

Process-II

Particulars	Qty.	Rate	Value	Particulars	Qty.	Rate	Value
To Input Process	950	20	19000	By normal loss	95	8	760

A			3960	(1000×10/100)			
To material			6000	By abnormal			
To wages			6000	loss	15	40	600
To production O.H				By process III	840	40	33,600
	<u>950</u>		<u>34,960</u>		<u>950</u>		<u>34,960</u>

Process-III

Particulars	Qty.	Rate	Value	Particulars	Qty.	Rate	Value
To Input Process	840	40	33,600	By normal loss	126	10	1260
A			5924	(840×15/100)			
To material			8000	By finished			
To wages			8000	goods	750	76	57000
To production O.H	36	76	2736				
To abnormal gain							
	<u>876</u>		<u>58,260</u>		<u>876</u>		<u>58,260</u>

5.5. OPERATION AND OPERATION COSTING

Operation Costing is a refined method of Process Costing. In Process Costing, each process or stage of production is costed separately. The manufacture of a product may consist of several operations. In Operation Costing, costs are collected for each operation instead of each process or stage of manufacture.

This will facilitate better control of costs than in Process Costing. The procedure of operation is similar to that of Process Costing. Materials, labour and other expenses are collected separately for each operation. At the end of accounting period, the unit operation cost may be computed by dividing the total operation cost by total output.

The cost of each such operation is called 'operation cost'. Operation Costing is applied where standardized goods or services result from a sequence of repetitive and more or less continuous operations to which costs are collected and averaged over the units produced during the period.

When the goods are processed through different operations, rejection may arise at the end of each such operation and to determine the cost of each operation for a specified quantity of output, due consideration will be given to the cumulative effect on conversion cost of the rejection of each such operation. Operation Costing is applied where continuous operations or processes produce identical units of output.