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COST ACCOUNTING
(From the academic year 2019-20)
B.COM., B.COM CA., B.B.A

SYLLABUS

Unit – I
Definition, Scope and nature of cost accounting – cost concepts – classification – objectives and advantages – demerits of cost accounting – methods and techniques – cost unit – cost centres – cost sheet.

Unit – II
Materials cost – purchase procedure – stores procedure – receipt and issue of materials – Storage organization and layout – Inventory control – levels of stock, perpetual inventory. ABC Analysis, EOQ – Stores ledger – pricing of material issues, FIFO, LIFO, Simple Average & Weighted Average.

Unit – III
Labour cost – Time recording and time booking – methods of remuneration and incentive schemes – overtime and idle time – labour turnover - types – causes and remedies.

Unit – IV
Overheads – collection, classification, allocation, apportionment, absorption – recovery rates – Over & Under absorption – cost sheet and cost reconciliation statement.

Unit – V
Job costing, Contract costing, Process costing (Normal loss, Abnormal loss and gains only) – operating costing.

Theory: 25%, Problem: 75%

Reference Books:
1. Cost Accounts   - S.P.Jain and Narang, Kalyani publications.
2. Cost Accounts   - Das Gupta, Sultan Chand Publication, New Delhi
3. Principles and Practice of Cost Accounting – N.Sarkar
4. Cost Accounting   - S.P. Iyengar, Sultan Chand Publication, New Delhi.
5. Cost Accounting   - R.S.N. Pillai, Sultan Chand Publication, New Delhi.
6. Cost Accounting   - M.C. Agarwal, Sahitya, Bhavan Publications.

UNIT – I
# INTRODUCTION TO COST ACCOUNTING

Definition of cost:

Cost is ‒The amount of expenditure incurred on or attributable to a given thing‖ - LC.M.A. London

Cost = Usage x price

Definition of cost Accountancy:

ICMA London has defined Cost Accounting as ‒the .application of costing and cost accounting principles, methods and techniques to the science, art and Practice of cost control and the ascertainment of profitability. It includes the presentation of information derived there from for the purpose of Managerial decision – Making‖.

Classification of Cost Accountancy

Cost Accountancy			
Costing	Cost Accounting	Cost control	Cost audit
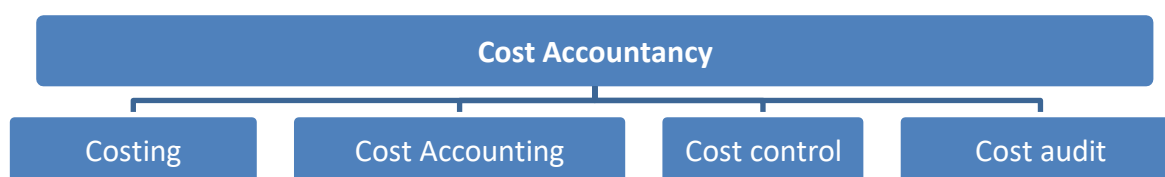
Definition:

i) Costing:

   a) Costing is "the techniques and process of ascertaining costs"- I.C.M.A

   b) Costing has been defined as "the classifying recording and appropriate allocation of expenditure for the determination of costs, the relation of these costs of sales value, and ascertainment of probability - Wheldon

ii) Cost Accounting: Cost Accounting is the process of accounting for .costs. It begins with recording of income and expenditure and ends with the preparation of periodical statements.

iii) Cost Control: Cost Control is exercised through a variety of techniques such as standard costing, budgetary control, Inventory control etc..

iv) Cost Audit: Cost Audit is "the verification of cost accounts and a check on the adherence to the cost accounting plan".

Functions (uses) of cost audit:

   ➢ To verify that cost accounts have been properly maintained and' compiled.
   ➢ To see that costing plan laid down is carried out
   ➢ To detect errors and prevent frauds.

Objects of Costing:

   a) **Ascertainment of costs:** Costing is to ascertain cost of each product, process or operation and to ensure that all expenses have been absorbed in the cost of products, the techniques and process of costing are used.

   b) **Cost Control:** Costing systems are installed in order to control the costs. This may be achieved with the help of certain techniques likes standard costing, budgetary control,

   c) **Guide to fix setting price:** Costing helps to serve as a Guide to price fixing.

   d) **Guidelines for Management:** Costing helps management in conducting its business with utmost efficiency. Costing provides Cost data. Cost data provides guidelines for the formulation of business policy and policy decision like a) introduction or discontinuance of a product, b) Utilisation of idle plant capacity, c) make or buy decision, d) selling goods in global market.

   e) **Other objectives of costing:**
      ❖ To ascertain the cost per unit of different product

❖ To organise cost reduction programmes
❖ To ascertain the profitability of each of the products
❖ To exercise effective control of stock of raw materials, work in progress, consumable stores and finished goods.
❖ To organise internal audit system.
❖ To provide specialised service of cost audit

Financial Accounting: Financial accounting is a systematic way of recording 7the financial transactions of business. Its purpose is the preparation of Profit & Loss a/c and Balance sheet.

Cost Accounting: Cost accounting is the branch of accounting which gives detailed cost information to management for various purposes.

Differences between Financial Accounting and Cost Accounting:

Sl. No.	Financial Accounting	Cost Accounting
1	It gives general information about the profit & Loss a/c and Balance sheet of a business to the owners and outsiders.	It gives cost information to to management for the purpose of cost control planning and decision making.
2	These accounts have to be prepared according to the requirement of companies Act and Income tax Act	These accounts are kept voluntarily.
3	It classifies, records and analyses the transactions according to the nature.	It records the expenses according to the purposes for which the costs are incurred.
4	It deals with actual facts and figures.	It deals partly with facts and figures and partly with estimates.
5	It shows net profit or net loss of the business as a whole.	It shows profit or loss of each product.
6	It shows all expenses	It shows only production expenses.
7	It is the accounting system for the above business.	It is only part of the financial accounts.
8	Monetary transactions are recorded.	Both monetary and nonmonetary transactions are recorded.
9	It does not provide for adequate control over costs.	It provides for detailed system of control over cost.
10	It is concerned with external transactions.	It is concerned with internal transactions.
11	These accounts are related with commercial transactions of the business.	These accounts are related with manufacture of goods and services.
12	It gives reports only at the end of the year.	It gives reports as and when required.
13	The costs are reported in aggregate in financial accounts.	The cost are splited into unit wise.
14	It does not provide information about efficiency of labour, plants and machinery.	If gives information about the efficiency of labour, plant and machinery.

Advantages of Costing:

1) Costing shows the profitable and unprofitable activities and helps the management to eliminate or reduce the unprofitable activities.
2) It helps the management to maintain a systematic record of analysed and classified costs. So that cost data are available as and when required.
3) It guides future production policies.
4) It helps in increasing profits by showing sources of waste or loss.
5) It gives information upon which estimated and tenders are based.
6) It enables a concern to measure the efficiency and then to maintain and improve it
7) The exact cause of a decrease or an increase in profit or loss can be detected.
8) Costing helps in controlling costs with the help of standard costing and budgetary control,
9) It helps the management to fix selling, prices of various goods.
10) Cost audit will help in prevention of errors and frauds.
11) It guides future production policies.
12) It enables the periodical determination of profits and losses without stock taking.
13) It gives an efficient check on stores, labour and machines.
14) It Informs the management about optimum profitability, idle time of labour and idle capacity of machines.
15) It gives management with valuable data for planning, budgeting and control of costs.
16) It provides the use of budget and enables the management to rectify inefficiencies.
17) It helps the management to take right decision for product mix, introduction of a new product etc.
18) It enables the creditors and investors to assess foe financial position and creditworthiness of business.
19) It facilitates the assessment of excise duty, income tax.

Characteristics of a good (ideal) costing system.

A good costing system is to achieve the objectives of a costing system and brings all the advantages to the business.

The following are the main characteristics of which good costing system should possess:

1) **Suitability:** A costing system is formed according to the nature, requirements, conditions and size of business.
2) **Simplicity:** The system of costing should be simple and easy to under- stand by an average person.
3) **Flexibility:** The system of costing must be flexible so that it may be changed according to be changed conditions.
4) **Economical:** The system of costing should not be expensive, The benefits to be obtained from the system must be more than its costs.
5) **Comparability:** It facilitates facts and figures are compared with past figures.
6) **Accurate and Timely Information:** The system must give accurate and timely information to the management so that the management is able to take decision in order to control cost.
7) The system must reduce clerical work.
8) The system must provide adequate-wage system and procedure.
9) The system should by formulated for the collection, allocation, apportionment and absorption of overhead in order to find out cost accurately.
10) All forms, and performs necessary to the system should be uniform in Unit size and quality of paper.
11) A good costing system should be clearly stated the duties and responsibilities of cost accountant.

Practical difficulties in Installing a costing system:

i. **Lack of support and co-operation from top management:**In most of the organisation, there is no support and co-operation for the introduction of costing system from top management.

ii. **Lack of trained staff:** There is a shortage of cost accountant to handle cost works functions.

iii. **Expensive:** The cost of operating a system may be heavy, Hence it is not suitable for small organisation.

iv. **Non-co-operation at other levels of organisation:** The departmental head, supervisors, foremen, and operating force may not extend their support to system.

v. **Resistance from the existing accounting staff:** Because they feel that they will lose their importance due to introduction of posting system in a concern.

12. Limitations of cost accounting

1) Lack of uniform procedure .
2) There are a large number of conventions, estimations and flexible factors.
3) All cost accounting results can be taken as mere estimates.
4) It is not suitable for small and medium size concern. It can be used only by big concerns.
5) It is argued that the introduction of costing is unnecessary and waste
6) It fails to produce the desired results.

Objection against cost accounting.

1) It has been argued that expenditure incurred in installing a costing system would be an unnecessary expenditure.
2) **Inapplicability:** There is no separate system of costing applicable to all type of business, costs.
3) **Failure In many cases:** It is argued that the introduction of costing system failed to produce the desired results.
4) **Mere mutter of forms and rulings:** It is argued mat costing system degenerates into a matter and rulings.
5) **Expensive:** The system involved more expenses and not economical.

METHODS OF COSTING

The method of costing refers to the techniques and process used in ascertainment of cost of production. There are different methods of costing for different industries.

There are two basic methods of costing.

1) Job costing 2) Process costing

All other methods of costing improvements or combination of the above two basic methods.

Job costing: In this method costs are collected and accumulated for each job or work order separately. Each work is done according to customer's specification. Each job has a separate identity and makes a cost unit.

Examples: This method is used by   i) Printing press ii) Repair Shops

iii) foundries iv) General engineering workshops, v) Painting and decorating.

Contract costing: This method is based on principles of job costing. Contract is a big job a separate account is kept for individual contract.

Examples : This method is used by i) Construction work, ship building constructional engineers etc.

Batch costing: This is an extension of job costing. A batch may represent a number of small orders passed through the factory in batch. Each batch is treated as. A cost unit and costs are accumulated for each batch separately.

Example: i) Biscuits manufacture, ii) garments manufacture, iii) Toys, iv) shoes

iv) Bicycle spare parts.

Process costing: In this method costs are separately collected and accumulated for each process. This is suitable for industries where product passes through different processes for

completion. The finished product of one process becomes the raw material of the next process.

Examples: Textile mills, Chemical works, sugar mills, paper nulls, soap manufacturing.

Operating costing: This is the application of process costing. This method is used to find out the cost of services rendered. This is suitable for industries which render services rather than producing goods. Examples: Transport undertakings, power supply companies, hospitals, hotels.

Unit costing (or) Single output costing: This method is used when production is uniform continuous and units are identical. It consists of only single product two or three types of similar products.

This methods is applied in the following types of industries.

PRODUCT NAME	COST UNIT
Brick works	One thousand
Coal mines	Per tone
Steel works	Per tone

MULTIPLE COSTING (OR) COMPOSITE COSTING:

It is an application of more than one method of costing in respect of the same product. This method is used in industries where a number component parts are separately produced and assembled to product final product.

Example: i) Television, radio manufacturing ii) Scooter and other mo vehicles,

iii) Refrigerator manufacture, iv) Locomotive works, v) automobiles, vi) Aeroplanes, vii) Manufacturing cycles.

Types of costing: Following are the main types of costing for ascertainment of costs.

Uniform costing: Where the same costing principles and practices used by several industries for common control or comparison of costs, is known as uniform costing.

Marginal costing: It is ascertainment of marginal cost by differentiating between fixed and variable cost. It is used to ascertain the effect charges in volume or type of output or profit.

Standard Costing: A companions is made between actual cost with predetermined cost and find out any variance is analysed by cause and to take suitable corrective action.

Historical costing: In this type costs are ascertained after they have been incurred.

Absorption costing: In this type, both, fixed and variable costs: are charged to operations,, processes, or products.

Dared costing: In this type all direct costs are charged to operations or products and all indirect costs (overhead) are written off against the profit of period are charged.

COST UNIT

Cost unit is defined as "The unit of quantity of product service, or time in relation to which cost may be ascertained or expressed".

Example: Tonne in case of coal. 1000 bricks in case of brick manufacturing

It is the unit of product service or time in relation to which cost may be ascertained.

ELEMENTS OF COST

Elements of cost are three types:

1. Materials   2. labour   3, Other Expenses

Materials: materials cost are divided into two

1. Direct Materials 2. Indirect Materials.

Direct Materials: They are those materials which can be identified and can be measured and directly charged to a particular product.

Example: Timber in furniture making, bricks in building a house, paper used in note books, leather in shoe making cloth in garments, clay in bricks.

Direct Labour: They are those Labours which can be conveniently identified or attributed wholly to a particular job, product or process expended in converting raw materials into furnished goods.

Example : Wages paid to workers who are directly engaged i production:

Direct expenses or chargeable expenses: Include all expenditure other than direct material or direct labour that are specifically incurred for a particular product or Process. Example : Excise duty, Royalty, cost of rectifying defective work, surveyor's fee, Expenses of designing or drawing a model.

(Prime cost=Direct material + Direct labour + Direct expenses)

The aggregate of Direct material Direct labour and Direct Expenses are called prime cost.

Overhead or on cost: The Aggregate of indirect material, Indirect labour and Indirect expenses is termed as overhead. Overheads cannot be conveniently be charged to specific cost unit.

(Overheads = Indirect Materials + Indirect labour + Indirect Expenses)

Division of overheads:

Overheads are divided into 3 groups.

1. Production overhead
2. Administration overhead
3. Selling and Distribution overhead.

Production overhead or works overhead or factory overhead: It includes all indirect cost which is connected with the manufacture of a product.

It consists of 3 elements:

Indirect material: Example Lubricants, soaps, Water powder, Cotton waste, thread.

Indirect wages: Wages of supervisor, Salary of works   manager, Foreman salary.

Indirect expenses: Factory rent, Rates, Deprecation on Machinery, Power light, heat, Insurance of factory building.

Administration overhead: These are the expenses incurred in the gement and administration of the business.

Examples:

Indirect Materials: Office forms, Stationery, Printing.

Indirect Labour: Office manager salary, clerk salary, Audit fee.

Indirect Expenses: Rent & Rates of office building, Electric?*-legal charges. Depreciation on office furniture.

Selling and Distribution overheads:

Selling overheads are incurred in promoting and securing orders.

Examples:

Indirect Material: Printing & Stationery, order form. **Indirect**

Labour: Salaries of Salesman,, Sales manager. **Indirect**

Expenses: Advertisement, Showroom expenses,

Distribution overheads: Distribution overheads are incurred from the time of the product is complete and put in storage for despatch until it reaches customer.

Example: Packing costs, salaries of despath clerk, Warehouse Rent, Depreciation oh delivery van.

Definition of cost: as the amount of expenditure incurred on or attributable to a given thing or to ascertain the cost of a given thing.

Cost Centre: A cost centre is the smallest segment of activity or area of responsibility for which costs are accumulated.

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Cost sheet

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Definition: Cost sheet is ‒a document which provides for the assembly of the detailed cost of a cost centre or cost unit‖. - I.CM. A. London.

Cost sheet is a statement which is prepared at given Intervals of time and gives information regarding the element of cost incurred in production: It gives total cost and cost per unit of product manufactured during the period. Cost sheet is prepared under output or unit costing method.

Purposes:

1. It shows the total cost and cost per unit of production.
2. It shows the different elements of cost.
3. It facilitates comparisons with previous years.
4. It helps in the fixation of selling price.
5. It helps in the preparation of estimates for submission of tenders for contracts.

Production Statement: It is a statement which shows total costs, sales and profit or loss during the period.

Specimen of a cost sheet for the period ended 31-12

	Total cost Rs.	Cost per unit
Direct materials	XXX	XXX
Direct Labour	XXX	XXX
Direct Expenses	XXX	XXX
Prime cost	**XXX**	**XXX**
Add Factory overhead	XXX	XXX
Factory cost	**XXX**	**XXX**
Add Office & Administration overhead	XXX	XXX
Cost of Production	**XXX**	**XXX**
Add Selling & Distribution overhead	XXX	XXX
Total cost (or) cost of sales	**XXX**	**XXX**

Problem: From the following particulars of maufacturing of a company Prepare a statement showing a) Cost of materials used b) Prime cost c) works cost d) cost of production e) percentages of works expenses to wages, percentages of general expenses to works cost

Stock of material 1.1.1999	Rs.25000
Stock of finished goods 1.1.1999	Rs.51000
Purchase of materials	Rs.5,75,000
Production wages	Rs.3,90,000
Works overhead charges	Rs.86,000
Office and General charges	Rs.72,000
Stock of materials 31.12.1999	Rs.30,000
Stock of finished goods 31.12.1999	Rs.48,000 Sale
of finished goods	Rs.12,20,000

Solution:

Cost Sheet for the year 31.12.1999

		Total cost Rs.
Opening stock of raw material	25000	
Add: purchase of material	575000	
	600000	
Less: closing stock raw materials	30000	
A) Raw material consumed		570000
Production wages		390000
B) Prime cost		**960000**
Add: Works overheads		86000
C) Works cost		**1046000**
Add: Office and general expenses		72000
D) Cost of production		**1118000**

Add: Opening stock of finished goods		51000
		1169000
Less: Closing stock of finished goods		48000
		1121000
Add: Selling and distribution overhead		**Nil**
Total cost		**1121000**
Profit (b.f.)		99000
Sales		**1220000**

Percentage of works expenses to wages = wages expenses / wages X 100

= 86000/390000 X 100 = 22.05%

Percentage of general expenses to work cost

= General expenses / Works cost X 100

= 72000 / 1046000 X 100 = 6.88%

Problem:2

Mr. Mithilesh Kumar furnished the following data relating to die manufacture of X

Standard product during the month of April 2001. Rawmaterial consumed   Rs. 30,000

Direct Labour charges   Rs. 15,000

Machine hours worked   1500 hours.

Machine hour rate   Rs.8

Administrative overhead 30% on works cost Selling

overhead   75 paise per unit

Units produced   15000

Units sold 12000 of   Rs. 10 per unit

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

a) Cost per unit   b) Profit per unit sold and profit for the period.

Solution: Cost Sheet For the Period 2001 (Units produced = 15000)

	Total cost	**Cost per unit**
Raw material consumed 30000/ 15000 = Rs.2	30000	2.00
Direct labour charges	15000	1.00
Prime cost	**45000**	**3.00**
Add: Works overhead (1500hours X Rs.8)	12000	0.80
Works cost	**57000**	**3.80**
Add: Office & Administration overhead 30% on works cost 57000 X 30/ 100	17100	1.14
Cost of Production	74100	4.94
Less: closing stock 3000units X Rs.4.94	14820	---
Cost of goods sold for 12000 units*	59280	4.94
Add: selling overheads 75 paise per unit 12000 unitss X 75 paise	9000	0.75
Total ccost	68280	5.69
Profit for the period	51720	4.31
Sales 12000 units X Rs. 10	120000	10.00

* 15000units produed - 3000 units closing stock = 12000 units sold

Per unit = Total cost / Number of units

 Profit per unit = 51720 / 12000units = Rs.4.31

Units – II
MATERIALS

The term Material refers to all commodities consumed in the Process of manufacturing.

Purchase of materials:

I. **Centralised Purchasing:** All purchases should be made by the purchasing department. They are under the control of purchase manager.

II. **Decentralised purchasing:** Heads of various departments make their own purchases.

The Purchase Procedure:

I. **Purchase Requisition:** It is a form used as a formal request to the purchasing department for, the purchase of a material. It contains the name of the department requiring materials, description of materials, Quantity etc. This form is prepared by the storekeeper for regular stock of materials.

II. **Selection of Supplier:** On the basis of purchase requisition the purchasing department should make arrangement for getting Quotation from various suppliers. On receipt of the Quotations from the suppliers should be compared and the supplier who offer best quality at the lowest price should be selected.

III. **Purchase Order:** The purchasing department should place orders with those suppliers who will provide best quality of goods at the lowest price.
Purchase order is a written authorisation to the supplier to su the. specified materials at a price and terms mentioned therein.

IV. **Receipts of materials:** In large concerns, all incoming materials an received by receving department. This department check the quantity against copy of the purchase order and suppliers advice note. Thereafter a goods received note is prepared in triplicate.

V. **Inspection of materials:** In large concerns, seprate inspection and testing department to test the quality of materials purchased. Samples may be tested before the goods are finally approved.

VI. **Returns to supplier:** Where goods received are not of the type ordered or are damaged or are not satisfactory these may be returned to-supplier immediately.

VII. **Approval of Invoices:** The supplier's invoice should be checked before the payment is made. It should.be checked with the purchase requisition, order,.Goods Received Note, inspection report against quantity, price etc., should be charged correctly.

MATERIAL CONTROL

Material control is defined as safeguarding of company's property in the form of materials by a proper system of recording and also to maintain them at the maximum level.

OBJECTS OF MATERIALS CONTROL:

1. **No overstocking:** Investment in materials must be kept as low as possible.
2. **Minimum wastage:** proper storage facilities must be provided for different type of materials in order to avoid losses arises due to theft, deterioration.
3. **Economy in purchasing:** Materials should be purchased at favourable
4. price.
5. **No under stocking:** Investment in materials under stocking will lead to delay or stoppage in production. It may result in to loss of profit.
6. **Information about materials:** This system should give complete and up to date accounting information about the availability of materials.

Stock levels: In order to avoid under stocking and overstocking a scientific system of stock level is to be adopted in the business. The stock levels are

a) Maximum stock level,

b) Minimum stock level,

c) Re-order level,

    d) Average stock level,
    e) Danger level

I.   **Maximum stock level:** It means the maximum quantity of an item of, materials which ban be held in stock at any time.

Formula: Maximum stock level=Reorder level + Re-order Quantity - [Minimum consumption x Minimum re-order period]

II.   **Minimum stock level:** This represents the minimum quantity of materials which must be maintained in hand at all times.

Formula: Re-order level - (Normal Consumption x Normal re-order period)

III. **Re-order level:** If is the level of materials at which a new order f material is placed. This level is above minimum level but below maximum level.

Formula: Reorder level = (Maximum consumption x Maximum Re-order period)

(i) Re-order Quantity: It is the quantity for which order is placed wh material; reaches at re-order level.

IV. **Average stock level:**

Formula : Average stock level=Minimum stock level +1/2 of Re-order Quantity
<div align="center">(or)</div>
<div align="center">=Minimum stock level + Maximum stock level \ 2</div>

V.   **Danger level:** It is a level of which issue of material are stopped and issues are made only under specific instructions. It is below the minimum level, (emergency)

Formula: Danger level: Average Consumption x Maximum re-order period for emergency purchase.

Problem:1 Two Components X and Y are used as follows Normal

Usage   - 600 Units per week each.
Maximum usage   - 900 Units per week each.
Minimum Usage   - 300 Units per week each.
Reorder Quantity   - X4800 units, Y 7200 units.
Reorder period: - X=4to6Weeks
                        Y = 2 to 4 weeks.

Calculate for each Component:

A)   Reorder Level B) Minimum Level C) Maximum Level D) Average Stock Level

Solution:

Reorder Level = Maximum Consumption x Maximum Reorder period.

Component X :   900 units x 6 weeks =5400 units.
Component Y :   900 units x 4 weeks = 3600 units.

Minimum Stock Level = Reorder Level - [Normal Consumption x Normal Reorder Period]

X = 5400 units (600 units x 5 weeks) = 5400 - 3000 units=2400 units.

Y= 3600 units- (600 units x 3 weeks) = 3600-1800= 1800 units

Maximum Stock Level: Reorder level+Reorder Quantity - (Minimum consumption x Minimum Reorder period]

X=5400 units + 4800 Units - [300 units x 4 weeks] 10200 units -1200 = 9000 units

Y = 3600 units + 7200 units - (300 units x 2 weeks) 10800 units - 600 units =10200 units.

Average Stock Level: Minimum Stock Level +1/2 Reorder quantity X= 2400 units=l/2 x4800 units= 2400+ 2400 =4800 Units. (OR)

= Minimum level+Maximum Level / 2

= 2400 + 9000 / 2 = 11400 units / 2 = 5700 units.

y = 1800 units+1/2 of7200 units. = 1800 + 3600 = 5400 units
<div align="center">(OR)</div>
1800+10200 / 2 = =12000 / 2 = 6000 units.

Problem : 2

Normal usage : 50 units per week .
Minimum Usage: 25 units per week

Maximum usage: 75 units per week

Reorder quantity: 300 units,   Reorder period = 4 to 6 weeks.

Calculate: Minimum level and Maximum level

Solution:

Reorder level: Maximum consumption x Maximum Reorder period. 75 units x 6 weeks = 450 units

Minimum stock level: Reorder level - (Normal consumption x Normal Reorder period)

       =450 units - (50 units x 5 weeks) 450 units-250 units   =   200 units

Maximum Stock level:(Reorder levels + Reorder Quantity) – Maximum consumption x Maximum Reorder period.

       =(450units + 300 Units) - (25 units x 4 weeks)

       =750 units -100 .units = 650 units.

Average Stock Level: Minimum stock Level +1/2 Reorder Quantity

       =200 units+ 150(300/2)= 350 Units.

                      [Or]

Minimum level + Maximum Level / 2 = 200+650 / 2 = 425 units

Economic Ordering Quantity (E.O.Q): The quantity material to be ordered at one time is known as economic ordering quantity. This quantity is fixed in such a manner as to minimise the cost of ordering and carrying the stock.

Formula: E.O.Q = $\sqrt{\dfrac{2AB}{CS}}$

A = Annual usage

B = Buying cost per order

C = Cost of per unit of material

S = Rate of storage and carrying cost.

The E.O.Q is determined keeping in view the ordering cost and carrying costs. Carrying Cost:- It is the cost of holding the 'materials in the store and icludes

  I.   Cost of storage, space
  II.   Cost of spoilage in stores
  III. Cost of ins for storing materials
  IV.   Cost of maintaining the materials
  V.   Clerical cost
  VI.   Insurance Cost.

Ordering Cost: It is the cost of placing orders for the purchase of Materials and includes cost of stationery, postage, cost of staff in Purchasing dept.

Problem 3:

X Co; purchases 1600units of certain component from Y Co; the average annual usage is l600units. The order cost is Rs.100 and the carrying cost is Rs 8 per unit. Calculate E.O.Q.

Problem:5

Two Components X and Y are used as follows:

Normal Usage   -600 Units per week each.

Maximum usage   -900 Units per week each.

Minimum Usage   -300 Units per week each.

Reorder Quantity   -X 4800 units,Y 7200 units.

Reorder period: -X= 4 to 6 Weeks

                     Y= 2 to 4 weeks.

Calculate for each Component a) Reorder Level b) Minimum Level c) Maximum Level d) Average Stock Level

Solution:

Reorder Level =   Maximum   Consumption   x   Maximum   Reorder   period.

Component X =   900 units x 6 weeks =5400 units.

Component Y =   900 units x 4 weeks = 3600 units.

Minimum Stock Level = Reorder Level - (Normal Consumption x Normal Reorder Period)

X - 5400 units (600 units x 5 weeks) = 5400 - 3000 units = 2400 units.

Y= 3600 units- (600 units x 3 weeks) = 3600 4800=1800 units

Maximum Stock Level = Reorder level + Reorder Quantity - [Minimum consumption x Minimum Reorder period]

X - 5400 units + 4800 units - [300 units x 4 weeks]

10200 units - 1200 = 9000 units

Y = 3600 units + 7200 units - (300 units x 2 weeks)

10800 units. 600 units =10200 units.

Average Stock Level = Minimum Stock Level +1/2 Reorder quantity X= 2400units=l/2 x4800 units = 2400 + 2400=4800 Units

                    (OR)

= Minimum level + Maximum Level / 2

= 2400 + 9000 =11400 units = 5700 units

y= 1800 units+ 1/2 of 7200 units   = 1800+ 3600 = 5400 units [Or]

1800+10200 / 2 =12000 / 2 = 6000units.

BILL OF MATERIAL

Sometimes all the materials required for a particular job are listed on a single document is known as a Bill of material. It is a master requisition listing all the materials requested for a particular job.

Merits:

1. Clerical errors is reduced.
2. Costing Job is earlier. It is a material requisition to which is in printed document.

Material Transfer Note: Any materials transferred from one job to another should be recorded on a materials transfer note.

ABC Analysis (Always Better Control):

ABC analysis is also known as proportional parts value analysis. It is an analytical method of stock control. This technique of stock control according to value method. Under this technique of material control, materials are listed in A, B and C categories in descending order based on value consumptions.

Item A - has low percentage but of high value. Item B

- has large percentage but of low value.

Item C - falls between item A and B and less importance

Thus ABC analysis measures and significance of each item of material (ie) very close control is exercised over me Item A because it has high value and adequate control is needed for Item B and little control is essential for Item C.

Perpetual Inventory:

It is a continuous stock taking system. Under this system certain numbers of items are counted daily or at frequent intervals.

Definition:

Perpectual inventory system as, "a system of records maintained by the controlling department which reflects the physical movement of stocks and their current balance - ICMA. It is a method of recording stores balances after every receipts and issue to facilitate regular checking to avoid closing down for stock taking. This system consists of three.

Bin Card: A card is attached to each bin, drawer containing materials, It ts called as Bin card., This card shows quantity of materials received, issued and balance of stock.

Stores Ledger: This ledger contains an account for each item of materials in stock It shows both quantity and value of materials received, issued and stock.

Continuous stock taking: It means physical verification of the stock records with actual stock.

Advantages of the prepectuat inventory system:

1. Difference of unite are detected easily.

2. Bin cards and stores ledger give ready reference.
3. over stocking and under stocking can be avoided.
4. Deterioration and obsolescence can be avoided.
5. It is not necessary to stop production to carryout stock taking,
6. It is very easy to prepare final accounts without physical inventory being taken.
7. Continuous stock taking will make the storekeeper and stores accountant more vigilant in their work.
8. Planning of production can be done according to the availability of material in stores.

BINCARD

Bin is a place, rack or cupboard where materials have been kept. Each bin is attached a card to show the stack position of the bin. This. is known as bin card. It is also known as bin tag or stores card. These cards are maintained by the store keeper. It shows quantities of each materials received, issued and balance of stock. It shows Description code of number of material, bin number, maximum, minimum. Bin serves the purpose of providing ready reference.

Stores ledger: This ledger contains an ccount for each item of material in stock which gives information about that material both quantity a Value. It is maintained by cost accounting department This ledger show the Dalance in hand at any time.

Difference between Bin card and Stores Ledger

S. No.	Bin card	Stores Ledger
1	It is kept inside the stores	It is kept outside the stores.
2	It records Quantity only.	It records both quantities and Values.
3	It is mairrtoined by the store keeper.	It is maintained by costing Dept.
4	Entries are made by the store keeper.	Entries are made by the cost clerk.
5	It shows physical information.	It gives both physical as well as value information.
6	postings are made before die transactions.	Postings are made after the trans-actions.
7	Entries are made along with each transactions.	Entries are made periodically.

Methods of pricing material Issues:

When pricing materials issued to production from stores there are six methods are followed for pricing material issues,

1. First in First Out (RFC) Method
2. Last in First out (LIFO) Method
3. Simple average price Method
4. Weighted average price Method
5. Base stock method.
6. Highest m first out (HJFO)

I. **First in First out Method: (FIFO):**

Under this method materials which are purchased first are issued first Materials are issued at the oldest cost price listed in stores ledger account It uses the price of the first batch of materials purchased for all issues untill all units from this batach have been issued After the first batch is fully issued, the price of die next batch received becomes the issue price.

Advantages:

b. Materials are issued at actual cost.

    c. closing stock valuation is at cost as well as at the latest market price.

    d. This method simple to operate and esay to understand.

    e. When prices are falling, method gives better result.

    f. This method is based on that materials which are received first are issued first.

Disadvantages:

    a. Materials are not priced at the current market price.

    b. This method produces unfair results as between one job and another.

II. **LAST IN FIRST OUT METHOD (LIFO):** This method is just oppsite of FIFO. Under this method, materials received last are issued first Issues are made from the latest purchase.

Advantages:

    a. Materials cost represents cost price.

    b. As materials are issued at actual cost, it does not result any unrealised profit

    c. It is suitable when prices are rising.

Disadvantages:

    a. This method is not realistic

    b. This method may lead to clerical errors.

    c. This system is not accepted by income tai Department.

III. **Simple Average Price Method:** Simple average price is the average of the prices of different lots of material to purchased.

Issue price = Total price / No. of Prices

Advantages:

1) It is easy to calculate and simple to understand.

2. It reduces clerical work.

Disadvantages:

1) Costs cannot be recovered fully. This system is not generally adopted.

Weighted Average Price Method: It is a price obtained by dividing tie total cost of materials in the stock by total ooanity of materials in the stock and issues are priced accordingly.

Issue Price =   Total cost* / Number of Quantity

(*Total Cost = Quantity x Rate)

1. **FIFO, (First in First out Method)**

    Problem No: 1

    The following transactions took place in request of Material during the month of September 2015.

Date	Particulars	Quantity	Rate per unit
Sept. - 1	Received	500	10
Sept. - 10	Received	300	12
Sept. - l5	Issued	700	---
Sept. - 20	Received	400	14
Sept. - 25	Issued	300	---
Sept. - 27	Received	500	11
Sept. - 30	Issued	200	---

You are request to write up stores Ledger under FIFO, LIFO, Simple Average Method and Weighted Average Cost Method.

Solution:

STORES LEDGER ACCOUNT (FIFO METHOD)

Date	Particulars	RECEIPTS	ISSUES	BALANCE

		Qty	Rate	Amount	Qty	Rate	Amount	Qty	Rate	Amount
Sept. 1	Goods rec. note No.	500	10	5000	---	---	---	500	10	5000
Sept. 10	Goods rec. note No.	300	12	3600	---	---	---	500	10	5000
								300	12	3600
Sept. 15	Requisition slip No.	---	---	---	500	10	5000			
					200	12	2400	100	12	1200
Sept. 20	Goods rec. note No.	400	14	5600	---	---	---	100	12	1200
								400	14	5600
Sept. 25	Requisition slip No.	---	---	---	100	12	1200			
					200	14	2800	200	14	2800
Sept. 27	Goods rec. note No.	500	11	5500	---	---	---	200	14	2800
								500	11	5500
Sept. 30	Requisition slip No.	---	---	---	200	14	2800	500	11	**5500**

Answer: closing stock 500 units Rs. 5500

II.   LAST IN FIRST OUT METHOD (LIFO)

Date	Particulars	RECEIPTS			ISSUES			BALANCE		
		Qty	Rate	Amount	Qty	Rate	Amount	Qty	Rate	Amount
Sept. 1	Goods rec. note No.	500	10	5000	---	---	---	500	10	5000
								300	12	3600
Sept. 10	Goods rec. note No.	300	12	3600	---	---	---	300	12	3600
Sept. 15	Requisition slip No.	---	---	---	300	12	3600			
					400	10	4000	100	10	1000
Sept. 20	Goods rec. note No.	400	14	5600	---	---	---	100	10	1000
								400	14	5600
Sept. 25	Requisition slip No.	---	---	---	300	14	4200	100	10	1000
								100	14	1400
Sept. 27	Goods rec. note No.	500	11	5500	---	---	---	100	10	1000
								100	14	1400
								500	11	5500
Sept. 30	Requisition slip No.	---	---	---	200	11	2200	100	10	**1000**
								100	14	**1400**
								300	11	**3300**

Answer : Closing stock 500 units of Rs. 5700

III.   SIMPLE AVERAGE METHOD (STORES LEDGER ACCOUNT)

Date	Particulars	RECEIPTS			ISSUES			BALANCE	
		Qty	Rate	Amount	Qty	Rate	Amount	Qty	Amount
Sept. 1	Goods rec. note No.	500	10	5000	---	---	---	500	5000
Sept. 10	Goods rec. note No.	300	12	3600	---	---	---	800	(5000+3600)=8600
Sept. 15	Requisition slip No.	---	---	---	700	11*	7700	100	(8600-7700)=900
Sept. 20	Goods rec. note No.	400	14	5600	---	---	---	500	(900+5600)=6500
Sept. 25	Requisition slip No.	---	---	---	300	13*	3900	200	(6500-3900)=2600
Sept. 27	Goods rec. note No.	500	11	5500	---	---	---	700	(2600+5500)=8100
Sept. 30	Requisition slip No.	---	---	---	200	12.50*	2500	500	(8100+2500)=**5600**

Answer: closing stock 500 units of Rs. 5600

Sept. 15 = 10+12 / 2 =22 / 2 = Rs. 11*   Sept 25 = 12+14 / 2 = 26 / 2 = Rs. 13*
Sept. 30 = 14 + 11 / 2 = 25 / 2 = Rs. 12.50*

IV.   WEIGHTED AVERAGE COST METHOD (STORES LEDGER ACCOUNT)

Date	Particulars	RECEIPTS			ISSUES			BALANCE	
		Qty	Rate	Amount	Qty	Rate	Amount	Qty	Amount
Sept. 1	Goods rec. note No.	500	10	5000	---	---	---	500	5000
Sept. 10	Goods rec. note No.	300	12	3600	---	---	---	800	8600
Sept. 15	Requisition slip No.	---	---	---	700	10.75*	7525	100	1075
Sept. 20	Goods rec. note No.	400	14	5600	---	---	---	500	6500
Sept. 25	Requisition slip No.	---	---	---	300	13.35*	4005	200	2670
Sept. 27	Goods rec. note No.	500	11	5500	---	---	---	700	8170
Sept. 30	Requisition slip No.	---	---	---	200	11.67*	2334	500	**5600**

Answer: closing stock500unitsbfRs.5836

Issue price = Total cost / Total Quantity   Total Cost = (Total Quantity x
Rate per unit) Sept. 15 = 8600 / 800 = Rs. 10.75* Sept 25 = 6675 / 500 = Rs.
13.35*
Sept. 30 = 8170 / 700 = Rs. 11.67*

5) BASE STOCK METHOD: It is the minimum stock which is not to production. The stock in excess of base stock is to be issued second L kaee fire, careless handling loading and unloading any one of the method. e.g. FIFO, [or] LIFO. It is alsp known as safely stock.

6) HIGEST IN FIRST OUT METHOD: In this method issued are always valued at the highest price of the receipts. This rate continues until the material at the high price is exhausted after which the next highest price is used.

7) REPLACEMENT OF PRICE METHOD: Under this method, material are charged at the market price on the date of issue. Replacement price is nothing but the price at which materials issued will be replaced i.e., market price.

Advantages:

1. Materials are issued at the current market price.
2. This is method is simple to operate as no calculations are required.

Disadvantages:

1. Issues are not priced at actual cost, thus resulting in unrealised profit or loss.
2. The valuation of stock is not at the current prices.
3. The replacement price may not be easily available.

8) Standard Price Method:

In this method a standard price is calculated and all materials issued are valued at this price. Standard price is a notional price and is not actual cost price.

Standard prices are fixed for each item of material and where prices of materials fluctuate heavily, standard prices should not be fixed on a long-term basis.

Under this method all receipts are posted in Stores Ledger Account at actual cost and issues   are   priced   at   a   pre-determined   a   standard   rate   for   each   material.

Unit – III
LABOUR

Labour represents human contribution to production and is second important element of cost

Definition:

Direct Labour is that ‖which can be identified with and alloca to cost centres or cost unit‖. I.C.M A., London.

‖Direct Labour is all labour expended in altering the construction, composition or condition of the product‖. - Wheldon

Indirect labour is of general character and cannot be conveniently identified with a particular cost unit. It helps and facilitates production indirectly. Examples are foreman, supervisor, cleaner, inspector; clerk, etc.

Types of Labour: 1) Direct Labour 2) Indirect Labour.

1) **Direct Labour:** Direct Labour is that, "Which can be identified with and allocated to cost centres or cost units. Thus Direct labour is engaged in converting rawmaterials into finished goods, (e.g) machine operator, shoe- maker, tailor.

2) **Indirect labour:** are those labour which cannot be conveniently identified with a particular cost unit. (e.g) supervisor, foreman, peon, clerk, etc.

Distinguish between Direct and Indirect labour:

Direct labour is that labour which can be conveniently identified or attributed wholly to a particular job, product or process. Thus direct labour includes all labour expended in converting raw materials into finished goods.

Indirect labour is one which is of a general character and cannot be conveniently identified with a particular job, product or process.

Examples of Indirect Labour

1. Labour employed in Service Departments like Power House, Internal Transport Service, Gate and Security.
2. Labour employed on maintenance work.
3. Storekeeping workers and other such personnel.

Organisation of Labour Department

There are mainly five departments in an organisation dealing with labour:

1. Personnel Department
2. Time Recording Department.
3. Payroll Department
4. Engineering Department and
5. Cost Accounting Department

1. **Personnel Department:** it plays a very important role as it is primarily concerned with the proper selection and training of workers and placing them to jobs for which they are best suited. This department is a service department and renders only advisory functions.

2. **Time Recording Department:** The recording of time put in by a worker is required for two purposes, (i.e) for time keeping and time booking.
   ❖ *Time keeping* is the recording of time for the purpose of attendance and wage calculations.
   ❖ *Time booking* is the recording of die time for purposes of cost analysis and apportionment of labour costs over various jobs.

3. **Payroll Department:** The important functions of this department in controlling and accounting for labour costs may be listed as follows:
   a) To compute the wage and to prepare the payroll for each department
   b) To compute the payroll deductions.

c) To disburse salary and wage payments.

4. **Engineering Departments:** This department helps in maintaining control over working conditions and production methods for each job, department. It performs the following functions.
a) Preparation of plans and specifications for each job.
b) Safe and efficient working conditions.
c) Preparation of time and motion studies of labour.
d) Making job analysis and setting piece rates.
5. **Cost Accounting Department:** This department is responsible for the accumulation and classification of all cost data of which labour, is one of the elements. This department is responsible for analysing the payroll in order to render, routine and special labour cost reports revealing the amount of normal and abnormal idle time, direct and indirect labour, overtime and variances from budgeted labour costs. These reports inform management of the effectiveness of labour policies and permit necessary action to be taken to retain proper control of labour costs.

Problem:1 Labour Cost per man per day of 8 hours
From the following particulars ascertain Labour cost per day of 8 hours Basic Pay -
Rs. 200 per month
Leave Pay-5%
Employer Contribution to provident fund 8% of (a) and (b) Employer's
contribution to E.S.I. -2.5% of (a) and (b)
Pro rate amenities Rs. 17.95 per head per month
Working hours in a month-200hours.
Solution:

Statement of Labour Cost per man per day of 8 hours

Particulars	Per month Rs.	Per day 8 hours
Basic pay	200	
Leave pay 200x5 / 100	10	
Employer's contribution to P.F. 8% of (a) and (b) 210x 8 / 100	16.80	
Employer's contribution to E.S.I. - 2.5% of of (a) and (b) 210 x 2 ½ / 100	5.25	
Amenities	17.95	
Total labour cost per man of 200 hours of one month	250	10
Total labour cost per man of 8 hours = 250 x 8 / 200 = Rs. 10		

Problem: 2
From the following particulars given below, Calculate Labour
cost per man per day of 8 hours:
Basic SalaryRs.5perday
Dearness Allowance 20 paise per every point over 100 cost of living index for the workers.
Current Cost of Living index is 800 points.
Leave Salary 5% of (1) and .(2)
Employer's contribution to P.F. 8% of (1) and (2)
Employer's contribution to State Insurance 5% of (1), (2) and (3) Number
of working days in a month 25 days.

Solution: Statement of Labour Cost per man per day of 8 hours :

	Per day of 8 hours: (Rs.)
Basic salary	5.00
D.A. 20 paise per every point over 100 cost of having index for a month of 25 days Per day=700 points x 20/100x1/25 (800 points-100 points=700 points)	5.60
Leave Salary 5% of (1) and (2) (5+5.60=10.60 x 5/100)	0.53
Employer's Contribution to P J?. 8% of (1) and (2) (10.60x8/100)	0.85
Employer's Contribution to state * Insurance of 5% of (1), (2) and (3) (5+5.60+ 0.53= 11.13x5/100)	0.56
Labour Cost per man per day of 8 hours	**12.54**

Time keeping

Time keeping Department is to keep a record of each worker entering and leaving time in the factory.lt is considered important to record the time, of workers entering arid leaving the factory. It is the recording of each worker's time of coming in and going out of the factory for the prurpose of attendance and wage calculations.

The objects of time-keeping :
1. To mark attendance of each worker to satisfy legal requirements.
2. To prepare wage sheets.
3. To maintain discipline in the factory.
4. To ascertain the labour cost chargeable to jobs.
5. To control labour cost.
6. To have a correct record of   attendance for meeting statutory requirements.
7. Overhead distribution, if it is based on wages or labour hours.

Methods of Time-keeping:
The methods of time-keeping can be broadly classified into two categories:
(a) Manual methods and (b) Mechanical methods.
a) Manual Methods: There are two manual methods. These are:
Attendance Register or Muster Roll: This is the oldest method of time keeping. This register may be kept in time office ot with the foreman   in the department Attendence may be marked by the time-keeper or the foreman. Under this method a register is maintained for worker's attendance. This method is very simple and cheap to operate. But it can be used in very, small factories. Records may not be accurate. Chances of disputes and mistakes will arise.
Token or Disc Method: Under this system, every worker is allotted a disc or token bearing his identification number. All such discs are hung on a board at the entrance of the factory. As and when a worker enters, he removes his disc from the board and puts it into the box or hangs it on another board which is specially kept for this purpose.

After the expiry of the time, the first box is removed and replaced by another for late comers. Alternatively, workers coming late may be required to report at the time office so that the exact time of their arrival can be noted. After the factory gates are closed, the, time clerk marks the attendance in register on the basis of tokens in the boxes. The absentees are indicated by the missing tokens in the box.

This system is improvement on the attendance register method. It is difficult to check one worker inserting two discs into the box, one of himself and the other of his friend. It involves a large amount of clerical work and there is a possibility of mistakes.

Mechanical Methods: It is classified into three.

i. Time Clock Method: Under the mechanical methods, time clocks are used to record the worker's attendance. In this system the attendance is recorded on a clock card. When a worker enters the gate, he picks up his card from the "out" rack, inserts it into the clock and the time is stamped at the relevant space. He takes his card out and keeps it in the "In" rack. This process is reversed when he goes out of the factory.

Thus every worker is allotted a card which bears the worker's identification number. These cards are kept in racks lying outside the factory gate. There are usually two racks denoting 'out' and 'in' racks. The cards left in the 'Out' racks indicate absent workers.

Advantages:

1. It provides for correct recording of attendance.
2. Changes of false and fraudulent entries are reduced.
3. Work in connection with the preparation of wage sheets becomes is very easy.
4. The clocks produce a definite record.

ii. Dial Tune Recorders:

This consists of a mechanism with a dial having a number of holes about the circumference. When a worker enters the factory, he presses the dial arm into a hole which denotes his particular number and die time is recorded automatically on an attendance form placed inside.

This attendance sheet forms a part of the payroll and there is no-need of copying out the record. But this method has the following defects

a) The time of worker's arrival and departure are widely separated on the paper, making the calculation of worker's total time cumbersome.

b) The capacity of this machine is very much limited as the number of holes is only about 150.

iii. Key Recorder System: This is a mechanism with a number of keys, each key bearing the number of a worker. When a worker enters the factory, he inserts his particular key in the key-hole and gives a turn, the ticket number and the clock time are recorded on a sheet of paper.

Time Booking:

It is a process of recording the time spent by a worker on differ jobs carried out by. In during his period of stay m the factory,

The objects of time booking:
1. To ascertain die cost of work done.
2. To ensure that time for which worker has been paid is properly utilised.
3. To provide a basis for the appointment of over-heads, and
4. To ascertain the idle time so as to control it.

Time booking may be done manually or mechanically depending, upon the size of the organisation. Large organisations, use time recording clocks for recording time on each job.

Methods of Time Booking

There are five methods of Time booking. They are

1. **Daily Time Sheet System:** This is a daily record of the work done by a worker, showing the jobs on which he worked and the time spent against each. One sheet is allotted to each worker and a daily record is made therein. This can be used in small organisations where the number of workers as well as the number of jobs are very much limited.
2. **Weekly Time Sheet:** This is similar to Daily Time sheet. The difference is that instead

of recording the work done for a day only, record of time for all jobs is done weekly. Here Weekly Time Sheets are kept. The weekly time sheet gives a consolidation of the total hours worked during the week and this total can be checked against the total shown in the clock cards. This methods is useful-where there are a few jobs in a week.

3. **Job cards:** This card is prepared for each job. This card is allotted to each worker whenever a worker takes up a particular job. Worker enters this card the time of starting the job as well as tune of finishing the job.

4. **Time and Job Card:** This system provides a card which consists of two sections, one to be filled up as a job and the other as a time card. This card records the attendance time and the time spent on different jobs on the same form. It consists of two sections - one for recording attendance and the other for recording the work time. Thus, tins records both the attendance time and work time of a worker on the same sheet.

5. **Labour Cost Card:** This is a type of circulating job card it meant to record the time taken on the job by all the workers employed on it Instead of allotting one card to each worker, the same card is passed round and the time taken by each worker on that job is recorded on it Thus, this card gives the total labour cost of a job.

6. **Piece-Work Card:** Where workers are paid on piece rate system, piece- work card is used. Such a card is maintained for each job separately.

7. **Wages Abstract:** This is a summary prepared weekly or monthly, showing the amount of time spent by a worker on different jobs. This shows an analysis of wages paid during a period of time on different jobs.

    The Wages Abstract is a medium of allocation of labour cost to different jobs. It provides a basis for writing job ledger.

Write short notes on: (a) Out workers, (b) Casual workers

   a) **Out workers:** Out workers are those workers who work outside the factory on behalf of the company.

   b) **Casual Workers:** These are temporary workers who are appointed on daily basis in order to meet increase in production or to replace the absentee workers. These are known as casual workers. Such workers are known as casual workers as they are not regular workers of the organisation.

Overtime Wages

Work done beyond the normal working hours is known as overtime work. According to the Indian Factories Act, no worker should be allowed to work for more than 9 hours a day or 48 hours a week. Suppose a worker works for more than 9 hours in a day or more than 48 hours in a week he has to be paid for his overtime at double the normal rate of wages. Overtime work involves extra cost as it has to paid at double of pauses of idle time

Treatment of Overtime Costs.

1. If overtime is required to make up any shortfall in production or for meeting urgent orders, the overtime premium should be treated as overhead cost of the department concerned.

2. When the customer agrees to bear the entire charge of overtime due to urgency of work, it should be charged direct to the job or work order concerned.

3. Where overtime is worked due to seasonal nature, it should be treated as general overhead.

4. Overtime worked on account of abnormal conditions like floods, earth quakes, etc., should be transferred to Costing Profit and Loss Account.

5. Overtime work is work done beyond normal working hours. The Factories Act provides for payments of overtime wages at double the norms rate wages.

Control of overtime:

1. All overtime work should be duly authorised by higher officials.

2. Overtime cost should be recorded separately and shown against the department

incurring it. It will help in proper planning in future.

3. If overtime is due to limited capacity of plant, new plant may be installed.

<div align="center">

Idle time
</div>

Give reasons for idle time, How do you treat idle time in cost accounting.

Meaning of Idle time: Idle time is that time for which wages are paid but no production is obtained. Idle time may be defined as that time for which are paid but no production is obtained. This is the time which cannot be attributed directly to any productive work. Idle time may represent loss of time of labour, machines of equipments due to lack of material, breakdown of machinery, failure of power supply, etc.

Causes of idle time:

a) Productive Causes.
b) Administrative causes
c) Economic causes

I. **Productive causes:** The productive causes may further be classified as follows:
   1. Idle time due to machine break down.
   2. Power failures.
   3. Workers waiting for raw materials and tools.
   4. Workers waiting for work.
   5. Workers waiting for instructions.

In all the above cases, idle time can be controlled by proper planning in advance.

II. **Administrative causes:** Idle time is frequency caused by administrative decisions. Sometimes administrative decisions are also responsible for idle time. For example, in case of a surplus capacity of plant and machinery, management may decide not to work fully and there may be some idle time. Therefore, such idle time arises out of abnormal situations, and it cannot be helped.

III. **Economic causes:** Idle time, may arise due to sever competition or seasonal nature of industries. Idle time may arise due to seasonal nature of industries. For example, in the case of woollen goods, ice-cream industry, production cannot be evenly distributed throughout the whole year. It is not possible to employ a number of workers in the busy season and to leave them during slack season.

Normal Idle Time: It refers to that loss of time which is generally unavoidable and is incidental to production.

For example:
   a. Time taken from the factory gate to the department where worker is engaged and the reverse journey at the end of the day.
   b. Time which elapses between completion of one job and commencement of the next.
   c. Time spent in machine maintenance.
   d. Tea breaks (if any), personal needs, etc.

Thus, normal idle time is of such a nature that it cannot be avoided and its cost is an expense which the employer must bear.

Treatment of Normal Idle Time:
   a) It is directly charged to factory overhead account.
   b) Wage rate may be inflated so as to make allowance for normal loss of labour time.

Abnormal Idle Time: This type of idle time arises due to inefficeient of management bad luck or reasons beyond control.

Examples: Strikes and lockouts, major breakdown of machinery, fire, flood, power failure delay in material supply, etc. Measurement of Labour Turnover here are three different methods of measurement of labour turnover

Treatment of Abnormal Idle Time: Cost of abnormal idle time should be collected separately and written off to costing profit & loss Account. It cannot be regarded as a cost of production.

Control of Idle Time: For control purpose, idle time should be divided into three categories:

  i.   *Idle time controllable by foremen,* e.g., waiting for instructions, waiting for tools, faulty tool setting, interrupted flow of work, etc.

  ii. *Idle time beyond the control of foreman but controllable from the standpoint of factory,* e.g, shortage of raw material, power failure.

  iii. *Idle time essentially beyond control,* e.g., unforeseen accidents, shortage of work due to economic conditions, failure of power supply, work stoppage due to strike, etc.

The different causes which lead to idle time should be properly analysed and responsibility should be fixed on appropriate persons to control it.

Labour Turnover

What do you understand by Labour Turnover? How is it measured? What are the causes? What are the remedial steps you would suggest to minimise its occurrence?

Labour Turnover: It is rate of displacement of labour employed in an organisation. It is a normal feature in every business organisation that some workers leave their jobs and some new workers take their place. This mobility or change in the labour force is known as labour turnover, labour turnover may be defined as the number of workers left during the period in relation to the average number of workers on the roll during the period. In the other words,

MEASUREMENT OF LABOUR TURNOVER

There are three different methods of measurement of labour turnover:

i.   Separation Rate Method: This is the most commonly used method. Under this method, measurement is made by dividing the total number of separations during a period by the average number of workers on the roll during the period.

Labour Turnover = No. of workers left during a period / Average No. of workers in the period x 100

Average number of workers is calculated as under:

No. of workers in the beginning of period + Number at the end / 2

Multiplying the labour turnover formula by 100; gives the rate in percentage. The period for which labour turnover rate is calculated may be one month, six months, one year period.

Replacement Rate Method: This method calculates labour turnover rate by taking into consideration only the number of workers joined.

Formula:

Labour Turnover = No. of replacement in a period / Averge number of workers in the period X 100

While calculating the number of replacements, new workers recruited because of expansion should not be taken into account

Flux Rate Method: This method takes into consideration both the number of workers left as well as number of new workers who have joined .

Formula:

Labour Turnover = No. of workers left + No.of workers replaced / Average No. of workers x 100

This method is a combination of method 1 and method 2

CAUSES OF LABOUR TURNOVER

The causes of high labour turnover may be classified in two categories:

  (i)   Avoidable; and
  (ii) Unavoidable

Avoidable Causes:

1. Redundancy due to seasonal fluctuations, contraction m the market lack of proper planning.
2. Low wages and allowances
3. Unsatisfactory working conditions.
4. Disputes between rival trade unions.
5. Dissatisfaction with the job.
6. Lack of facilities like transport, medical, accommodation, etc.
7. Strained relationship with supervisors or fellow workers.

Unavoidable Causes:
1. Change of service for personal betterment,   ,
2. Retirement due to old age and ill health,
3. Death,
4. Discharge on disciplinary grounds on continents long absence,
5. Marriage or pregnancy.

Effect of High Labour Turnover

Effects of Labour Turnover will increase cost of production. There are two types of Cost. (i) Preventive cost (ii) Replacement cost

I. **Preventive Costs:** Preventive costs refer to all those expenses and costs which are incurred by a firm to keep the labour force contented so that excessive labour turnover may be prevented The major items of preventive costs are:
1. Personal administration.
2. Cost of medical services.
3. Cost of welfare activities and schemes.
4. Pension and or provident fund schemes.

II. **Replacement Costs:** Replacement costs include all such losses, wastage arising because of the inexperienced new labour farce replacing the existing ones as well as die cost of recruitment and training of the new workers. It includes the following elements:
   a. Loss of output due to sometime taken in obtaining new labour,
   b. Loss of output and quality due to inefficiency of new labour,
   c. Employment department expenses,
   d. Cost of training of new workers,
   e. Cost of tool and machine breakages,
   f. Cost of scrap and defective work, and
   g. Cost of accidents.

Reduction of Labour Turnover: Labour turnover rate may be reduced by taking preventive remedial measures and by removing avoidable causes. The various steps are given below
1. A satisfactory wage system.
2. Improving working conditions.
3. Strengthening the welfare measures.
4. A satisfactory policy for transfers and promotions,
5. Labour participation in management.
6. Efficient and impartial personnel administration.
7. A sound personnel policy for recruitment induction and training of labour
8. A satisfactory level of amenities add welfare measures like canteen facilities, medical services, recreation etc.

9. A satisfactory security scheme like family pension, provident fund, accident compensation, etc.

10.A satisfactory policy for transfers and promotions.

11.Labour participation m management and joint consultation scheme.

Time & Motion Study

What do you understand by Time and Motion Study?

Time study aims at determining the proper speed of movements made by the workers and motion study aims at eliminating unnecessary movements.

Time study: It may be defined as "the art of observing and recording the time required to do each detailed element of an industrial operation" Its main object is to determine the standard time required to carry out a job most efficiently.

Motion Study: This study deals with one aspect of methods study, i.e., to eliminate unnecessary movements of men and material. "Motion study is the science of eliminating wastefulness resulting from using unnecessary, ill- directed and inefficient motions". It is a detailed study and analysis of die movements of an operation in performing an operation for the purpose of eliminating unnecessary and useless motions:

Write notes on the following: (a) Job Evaluation and (b) Merit Rating

I. **Job evaluation:** Job evaluation may be defined as the rating of various jobs according to the responsibility and skill required from them. The basic object of job evaluation is to ascertain the relative worth of each job through an objective evaluation so that relative remuneration can be fixed for different jobs.

II. **Merit Rating:** Merit rating is a systematic evaluation of the personality and performance of each employee by his supervisors or some other labour qualified persons. It is a system by which the performance of an employee is objectively evaluated and compared with that of others in his work group.

Methods of Wage Payment

There are mainly three methods of labour remuneration:

> a) Time Rate System
>
> b) Piece Rate System
>
> c) Incentive Schemes.

If a worker may be paid on the basis of time mat he spends on his job is known as Time Rate. If he may be paid on the basis of quantity of work done by him is known as piece rate.

Time Rate System: This is the oldest of the wage payment systems. In this system time is made the basis of payment. Labour is paid for the time worked irrespective of the volume of production during that time. The formula for calculating wages under this system is:

Time Rate (T.R) = Hours worked x Rate per hour

Payment may be based upon the hour, the day or the week, or it may be at the fixed salary rate.

Wages = Time spent x Rate per hour (T x R)

E.g.: Mr. X is paid at the rate of Rs. 10 per hour. During the month he spends 200 hours. Calculate Mr. X earnings.

Earnings=200 hours x Rs. 10 per hour = Rs. 2000 per month.

Types of Time Rates :

a) Times Rates at Ordinary Levels: In this system, time is made the basis of payment irrespective of quantity of work done by a worker payment is made at a rate on attendance by hour, week or a month.

Formula:

Time Rate = hours worked x Rate per hour

Time Rate at High Levels: Under this system, the worker is paid at a wages which is substantially higher than the rate prevailing in that area or industry. **Graduated Time Rates:** This system provides for variation in the wage

according to changes in the cost of living index. The rates are to be adjusted periodically according to index.

Advantages:

1. The workers are assured of minimum wages which gives them a sense of security.
2. The calculation of the amount of wages is simplified.
3. Workers avoid over-speeding arid thus cause less daniage to equipment.
4. Quality of work produced this method does not give weight to the volume of work done.
5. Trade unions generally oppose tins mode of payment.

Drawback:

1. It does not distinguish between efficient and inefficient workers.
2. There is no incentive to work more.
3. From costing point of view, it creates difficulties in the calculation of labour cost per unit as the output is quite fluctuating.
4. It needs extra provision for supervision so that workers do not waste their same.

Piece Rate System: Under this system a worker is paid a fixed amount per unit produced irrespective of the time taken. A rate per unit of output is fixed and wages are calculated as follows:

Piece rate = No. of units produced x Rate per unit (N x R)

Earnings = No. of Units produced x Rate per unit (N x R)

Example: Mr. X is paid at the Rate of Rs. 4 per unit He produced 500 unit during the month. Calculate his total earnings?

Earnings = 500 Units x Rs. 4 per unit=Rs. 2000 per month.

Advantages:

1. It distinguishes between efficient and inefficient workers.
2. It provides a strong incentive because remuneration is in direct ratio to the worker's effort.
3. Costing is simplified because the exact cost of labour per unit is known in advance.
4. Strict supervision is not necessary.

Drawbacks:

1. Workers try to produce maximum quantity to increase, their wages. In the process quality of products is ignored.
2. Minimum amount of wages is not guaranteed.
3. High speed has injurious effect on the health of workers and also on equipment and machinery.
4. Trade unions generally oppose this mode of payment.
5. It involves maintenance of larger records tor payroll.

Incentive Wage Plan: Incentive may be defined as "the stimulation of effort and effectiveness by offering monetary inducement or enhanced facilities" An incentive may be monetary, i.e., cash benefit, or non-monetary.

Principles of a Good Incentive Scheme:

1. The scheme should be simple and easily understandable by workers
2. The scheme should be fair, to both employer and employee.
3. The cost of operating the scheme should be reasonably low,
4. The standard of performance should be scientifically set and should be within the reasonable reach of an average worker.
5. No limit should be put on the earnings of workers.
6. The scheme should have the approval of workers and the union.
7. The scheme bonus provide a satisfactory system of supervision and production

control.

8. The scheme must be relatively permanent.
9. Indirect workers should also be included under this scheme.
10. Workers should be properly educated.

Incentive Schemes

Under Incentive schemes, time rate and piece rate systems are combined in such a way that workers are induced to increase their productivity. Various Incentive plans are

1. Halsey Plan:

This plan was first introduced by F.A. Halsey, a mechanical engineer in America, in 1891. This is a simple combination of time and piece basis of payment. Under this plan, bonus is paid on the basis of time saved. The amount of bonus depends upon die time saved by the worker. Where,

Time saved = standard time - Actual Time taken

A standard time is set for each job. If a worker takes the standard time to do it or even exceeds the standard time limit, he gets normal wages calculated at die time rate. If he completes his job in less than the standard time, he gets a bonus equal to 50% of the value of time saved. Therefore, die total earnings of a worker under this system are wages for the actual time spent plus a bonus equal to 50% of the. Value of time saved.

The formula: Bonus 50% of [Time saved x Time rate]

Total earnings - Time rate x Time taken +50% [Time saved x Time rate] Example:

Time rate = Re. 1.00; Time allowed = 7 hours

Time taken = 6 hours and Time saved = I hour. Bonus

= 50% [Time saved x Time rate]

= 50% [1 hour x Re. 1.00]

= 50% [Re. 1.00]- 50 paise

Total earnings - (6 hour \ Re. 1.00 + 50 paise - Rs. 6.50.

Advantages:

1. It is easy to understand and simple to operate.
2. This plan provides a strong incentive to improve efficiency.
3. The worker earns bonus on every job individually and the time saved by a worker on one-job is not set off against the excess tune taken on some other job.
4. It guarantees minimum wages according to time rate and thus provides a sense of security to workers.
5. The benefit of time saved is equally distributed between workers and employers.
6. It provides a strong incentive to increase production.

Disadvantages:

1. Incentive is not as strong as with piece rate system. Generally, the harder the worker works, the lesser he gets per unit.
2. It does not give full protection to employer against wrong rate setting.
3. Workers do not welcome the sharing principle.

Problem : 1

Rate per hour = Rs.4 Time
allowed for Job = 40 hours
Time taken = 32 hours

Solution:

Time saved = 40hours-32hours = 8hours

Bonus = 50% of time saved = 8 hours = 4 hours

Bonus = 50% Time saved x Rate per hour
= 4hoursxRs.4=Rs. 16

Time wages = Actual time taken x Rate per hour
= 32 hours x Rs.4 = Rs. l28

Total Earnings = Rs. 128+ Rs. 16 = Rs. 144.

Problem: 2

Calculate   earnings   of   a   worker,   Under   Halsey   Premium   Plan
Time allowed = 70 hours

Time taken	= 60 hours
Rate per hour	= Rs. 3
Time saved	= Standard Time - Actual time
	= 70 hours - 60 hours =10 hours
Bonus	= 50% Time Saved x Rate per hour
	= 10hours / 2 x Rs.3 =Rs. 15
Wages	= Actual time x Rate per hour
	= 60 hours x Rs. 3 = Rs. 180
Total Earnings	= Actual wages + Bonus = 180 + 15 = Rs. 195

2. **Halsey Weir Plan:** This system was introduced by G.T. Weir and is a modified form of the original Halsey plan. The only difference between the two is that under the Halsey Weir plan the bonus is equal to 30% of time saved.

E.g:

Standard time	= 40 hours
Actual time	= 34 hours
Rate per hour	= Rs.10

Calculate Halsey weir plan?

Bonus	=	30% of Time saved x Rate per hour	
40 – 34 hours	=	6 hours x 30 / 100 x Rs.l0	= Rs. 18
Wages	=	34 hours x Rs.10 = Rs. 340	
Total Earnings	=	Rs.340 + 18 = Rs.358	

3. **Rowan Plan :** This plan was introduced by David Rowan and is similar to Halsey Plan, except in the calculation of the amount of bonus. Bonus is that proportion of the wages of the time taken which the time saved bears to the standard time. Its formula is :

Bonus = Time saved / Standard time x time taken \ Rate per hour Total earnings
= (Time taken x Rate per hour x Bonus
Suppose Time Rate = Re. 1.00 per Hour; Standard time -8 hours; Time
taken = 6 hours; Time saved = 2 hours.
% of Time saved to Standard time =2/8 - 25% Bonus
= 25% of Rs. 6 = Rs. 1.50.
Total earnings = 6 hours x Re. 1.00 + Rs. 1.50 = Rs. 7.50.

Advantages:
1. It provides a guaranteed minimum wage as well as incentive for efficiency.
2. It provides the employer an incentive to increase production facilities as he receives a large share in savings achieved.
3. The Rowan plan provides a better bonus than the Halsey 50% scheme.
4. Up to 50% of the time saved, it provides a higher bonus than under Halsey Plan. It offers protection to the employer when standard has not been properly fixed,
5. As die bonus increases at a decreasing rate, at higher levels of efficiency, the worker is not induced to rush through the work.

Disadvantages:
1. It is more complicated and costlier than the Halsey system.
2. It is not easily understood by workers and leads sometimes to disputes.
3. It does not provide adequate incentives beyond a certain level.
4. Where time saved is more than 50% of the standard, time, the total earnings start decreasing.

Bonus = Time saved / Standard Time   x Rate per hour x Actual time

Problem: 3

Calculate Earnings under Rowan scheme:

Standard Time   =   100 hours
Time taken   =   80 hours
Rate per hour   =   Rs.10

Bonus = time saved / standard time x Actual time x Rate per hour
                = 20 hours / 100 hours x 80 hours x 10 = Rs.160 Time
wage   = Actual time x Rate per hour

                = 80 hours x Rs. 10 = Rs.800
Total Earnings   = Rs.800 +160=Rs. 960 .

Problem: 4

Calculate Halsey and Rowan Premium plan from the following data: Time
allowed   = 96 hours
Time taken   = 80 hours
Rate per hour   = Rs. 2

Solution:

Halsey Plan:

Bonus   = 50% Time saved = 96-80=16 / 2 = 8 hours
                = 8 hours x Re.2 = Rs. 16
Total Earnings   = Rs. 160 (80 x 2) +16 = Rs.176.

Rowan Plan:

Bonus   = 16 / 96 x 80 x 2 = Rs. 26.66
Time wages   = 80x2=160
Total Earnings   = 160 + 26.66=Rs. 186.66

Problem: 5

 A worker takes 12 hours to complete a. job on daily wages and 9 hours on a scheme of payment by results. His day rate is Rs. 4 per hour. The material cost of the product is Rs. 6 and the overheads are recovered at 150% of total direct wages. Calculate Factory cost of the product under.

a) Piece Work Plan, b) Rowan Plan, c) Halsey Plan.

Solution:

   a) Wages under piece work plan:
                9 hours @ Rs.4 per hour = Rs. 36

   b) Wages under Rowan plan:
        Bonus   = 3/12 x Rs.9 x 4 = Rs.9.00
        Time wages   = 9 hours x 4 = Rs. 36.00 Total
        Earning   = Rs. 45   (Rs.36 + 9)

   c) Wages under Halsey plan:
                Bonus   = 50% 3 hours x Rate per hour
                        = 1 1/2 hours x 4 = Rs.6
        Time wages = 9 hours x 4 = Rs. 36.00

Taylor's Differential Piece Rate System: This system was introduced   by Taylor, who was the father of Scientific Management Under this plan no time basis wages are guaranteed, but two piece rates are fixed, low piece rate and high piece rate . The lower rate is for those who are not able to achieve the standard output and higher rate is for those whose output is at or above the standard. Under this system, the standard job is established after careful time and motion study and two piece rates are set.

The features of the scheme:

   1) Day wages are not guaranteed.
   2) A standard time for job established.
   3) Two piece work rates are fixed. If the worker does the work in less than the standard

time, he receives the higher piece rate, whereas if he takes longer time he receives the lower piece rate.

Suppose Standard Production =100 units per day.

Piece Rates:
1) 10 paise per unit for 100 units or more.
2) 8 paise per unit for less than 100 units.

Therefore a worker producing 100 units will get Rs.10 and one producing 110 units will get Rs. 11. On the other hand, a worker producing 90 units will get at the lower rate of 8 paise per unit, (90 x 0.08) i.e., Rs. 7.20.

Advantages:
1) This method is simple to understand and calculation of wages is not difficult. It also provides a strong incentive to efficient workers.
2) It is advantageous from the point of view of the employer since it helps much in increasing production by offering higher rates to more efficient workers.
3) It attracts efficient workers.
4) Where the overhead's are high its incidence per unit cost is reduced because of increased production.

Disadvantages:
1) It penalises very slow or inefficient workers.
2) It does not guarantee, the minimum day wages and this insecurity affects the morale of workers.
3) Labour cost will differ between the two levels of performance because of two different rates.
4) It makes differences between efficient and inefficient workers and thus creative rivalry.
5) This system is unfair to beginners who cannot attain the standard output immediately.

Problem: 6
Standard production   -200 Units per day
Low piece rate   - 8 paise per unit .
High piece rate   -10 paise per unit

Mr. X who produced 240 units and Y produced 190 units. Calculate their Earnings under Taylor's Differential piece rate system?

Solution:
Standard output = 200 units per day
X Produced - 240 units he will get high piece rate. X
earnings = 240 units x 10 paise = Rs. 24
Y produced = 190 units he will get low piece rate Y
earnings = 190 units x 6 paise=Rs. 15.20

Problem: 7
Calculate earnings of worker Mithilash and Sailesh under straight piece rate system and Taylor's Differential piece rate system from the following particulars.
Normal rate per hour   =Rs. 18.00
Standard time per unit = 10 seconds
Differentials to be applied:
80% of piece rate below standard 120% of
piece rate at or above standard
Worker Mithilesh produced 2700 units per day and worker Sailesh produced 3200 units per day,
Per day = 8 hours
Solution:
Standard production 10 seconds= 1 unit

Standard production one minute 60 seconds / 10 seconds = 6 units
standard production per hour (60 minutes)
        = 6 units x 60 minutes =360 units
standard production per day of 8 hours
        = 360 units x 8 hours =2880 units.

Normal rate per hour   = Rs. 18.00
Normal piece rate   = Rs. 18.00 / 360 units = 0.05 piece Low
piece rate   = 5 paise x 80 / 100 x 0:04 paise
High piece rate   = 5 paise x 120 / 100 x 0.06 paise

Earnings of worker Mithilesh:

a) Under straight piece rate system
Number of units produced x Rate per unit
        = 2700 units x 0.05 paise =Rs. 135

b) Under Taylor's Differential piece rate system
        = 2700 units x 0.04 paise =Rs. 108

Merrick's Differential Piece Rate System: It is a modified version of the Taylor's scheme and is also known Multiple Piece Rate System. Workers producing below die standard output are not penalised by the low piece rate. This plan lays down three rates, one for the beginner, the second for die developing workers and the third for die highly efficient workers.

a) Upto 83% of the standard output, the workers are paid at the ordinary piece rate i.e., the lowest of the three rates.
b) Those, whose output exceeds $3% of the standard but does not reach 100%, axe paid at 110%of the ordinary piece rate.
c) Those whose output is 100% or above, get the highest rate which is 120% of the ordinary piece rate.

Features of the scheme:

a) Up to 83% of the standard output, workers are paid at the on piece rate.
b) 83% to 100 % of the standard output, at 110% ordinary piece rate and
c) above 100% at 120% of the ordinary rate.

The earnings increase with increased efficiency, performance above the standard will be rewarded by more than one higher differential piece rate. This plan is effective for high-level production.

Problem: 8

Calculate the earnings of worker. Sundar, Sankar, Mani straight piece rate system and Merrick multiple piece rate system the following particulars:

Normal rate per hour   = Rs. 18

Output per day of hours is as follows:
Worker Sundar = 380 units. Worker
Sankar = 460 units. Worker Mani =
540 units.
Solution:
Standard output per minute = 1 unit
Standard output per hour 1 x 60 minutes = 60 units.
Standard output per day of 8 hours = 60 units x 8 hours = 480 units Normal
rate per hour   = Rs. 18.00
Normal Output per hour = 60 units.
Normal piece rate   = 18.00 /60 units = 0.30 paise.

Calculation of Efficiency of workers:
% of Efficiency   = Actual output / Standard Output   x 100
Worker Sundar output per day 380 units.
Sundar's Efficiency = 380 units/ 480 units x 100 = 79%
Worker Sankar output per day 460 units
Sankar's efficiency = 460 units / 480units x 100 = 96%

Worker Mani output per day 540 units
Mani's Efficiency = 540 units / 480 units x 100 = 112.5 %
Earnings of Worker Sundar
Under Straight piece rate system:
      380 units x 0.30 paise = Rs. 114
Under Merrick Multiple system:
      380 units x 0.30=Rs. 114
Worker Sankar Earnings:
Under Straight piece rate:
      460 units x 0.30 = Rs. 138
Under Merrick System:
      460 x 0.33paise = Rs. 151.80
Worker Mani Earnings:
Under Straight piece rate:
      540 units x 0,30 = Rs. 162.
Under Merrick System:
      540 units x 0.36 paise =Rs. 194.40

Emerson's Efficiency Plan: This is an American scheme which combines guaranteed fixed day wage with a differential piece rate. This system guarantees time wages even to those whose output is below standard. Standard output is fixed to represent 100% efficiency. A bonus is paid to a worker whose output exceeds 66 2/3 % of the standard output. The bonus increases gradually at a stated rate so that at 100% efficiency bonus would rise to 20%. Beyond this, bonus would increase at l% of basic rate for every 1% increase in output.

Features of the scheme:
A certain standard output is fixed for a worker for each job. A worker who is able to attain two - thirds of standard output is deemed a normal worker and gets only guaranteed time rate. A worker who goes above the two-thirds standard, is paid, in addition to his normal wage, a bonus the rate of which increases as the extent of the excess of the output over two-thirds standard increases.

Advantages:
1) The system is simple to understand and easy calculation. It provides incentives for beginners also.
2) The disparity in wages among workers under the other systems is also reduced here.
3) It provides security to the worker as day wage is guaranteed.

Disadvantages:
The incentive is quite small to attract very different and ambitious workers.

Problem: 9
      Standard Output per day of 8 hours is 32 units. Actual output of a workers for 8 hours is 40 unite Rate per hour is Rs.8. Calculate wages payable for worker according to the Emerson's Efficiency plan.
      Level of Efficiency = Actual Output / Standard Output x 100.
                = 40 units / 32 units x 100 = 125% efficiency
                20% Bonus = 25% Bonus
= Rs. 64.00 3-31
Bonus is payable 45% efficiency

(i.e) upto 100% Efficiency	=	20% Bonus
Above 100% Efficiency	=	25% Bonus

25% [125 - 100%]
Time wages for 8 hours of

Rs.8 per hour (8x8)	=	Rs. 64.00
45 / 100 x 64.00	=	Rs. 28.80
Total Earnings payable to worker =		**Rs. 92.80**

Gand's Task and Bonus Plan: This plan is a combination of time rate, piece rate and

bonus. It guarantees wages according to time basis. A high standard is
set and if this standard is achieved or exceeded, payment is made at a high piece rate. This piece rate is so fixed so as to include a bonus of 20% over the time rate of the worker. A worker who is not able to achieve the-standard or whose efficiency is below 100%, gets wages at time rate and is not entitled to bonus.

The main feature as of this system are:
1. It is a combination of time rate, differential piece rate and bonus.
2. Day wages are guaranteed.
3. A standard task is set, on which a bonus may be earned if completed within the standard time.
4. The bonus is a fixed percentage on the time taken.
5. A worker who attains the standard is paid a bonus, usually of 20% on his time rate. Where he goes above the standard he gets at a higher piece rate oh the worker's whole output.

Thus under this system, both time and piece rates are set and normal wages are paid at the time rate or piece rate, Whichever is higher, in addition, a bonus is also given if the work is completed within standard time.

Advantages:
1. It is simple to understand and easy to operate.
2. It provides an incentive to the efficient worker as well as security for less efficient by guaranteeing the time rate.
3. It is useful where the overheads are very high.
4. It encourages better supervision and planning as under this scheme, foreman also receives bonus.

Disadvantages: Guaranteed time rate Wage may act as a disinc for improved production in case rate is fixed at a high level.

ESSENTIALS OF A GOOD WAGE SYSTEM

Simplicity: The method should be simple and easy to understand by workers so that workers so that workers can calculate their own wages.

Minimum wage: A good system should guarantee minimum wage to give workers a sense of security.

Incentive: The scheme of payment should provide sufficient incentive to workers to work more taking into account the quality of production.

Flexibility: The system should be flexible enough so that changes may be introduced, if necessary.

Satisfaction: The system should be satisfactory from the point of view of both worker and the employer.

Law labour turnover and absenteeism: A good system should reduce labour turnover and absenteeism.

Economical: It should be economical in operation.

Approval of Trade Union: It should be acceptable to trade union.

UNIT – IV
OVERHEAD

Definition: Overhead is defined as ‑the aggregate of indirect Material cost, Indirect wages, and indirect expenses‖.

It is the total of all indirect expenditure.

> Overhead = Indirect material + Indirect wages + Indirect expenses

ICMA defines overhead as total cost of indirect materials, wages and expenses.

Overheads costs cannot be allocated but it can be apportioned and absorbed on‑an equitable basis.

It is also known as "On cost", "burden", indirect expenses.

Cost Allocation and Apportionment

Cost Allocation: It means the allotment of whole items of cost to cost centre or cost units.

Cost Apportionment: It involves allotment of proportion of items of cost to cost centres or cost units.

CLASSIFY OVERHEAD
OVERHEAD CLASSIFICATION

OVERHEAD

FUNCTION WISE	ELEMENTS WISE	BEHAVIOUR WISE
1. Factory Overhead 2. Administration Overhead 3. Selling Overhead 4. Distribution Overhead	1. Indirect materials 2. Indirect Labour 3. Indirect Expenses	1. Fixed 2. Variables 3. Semi- VAriable
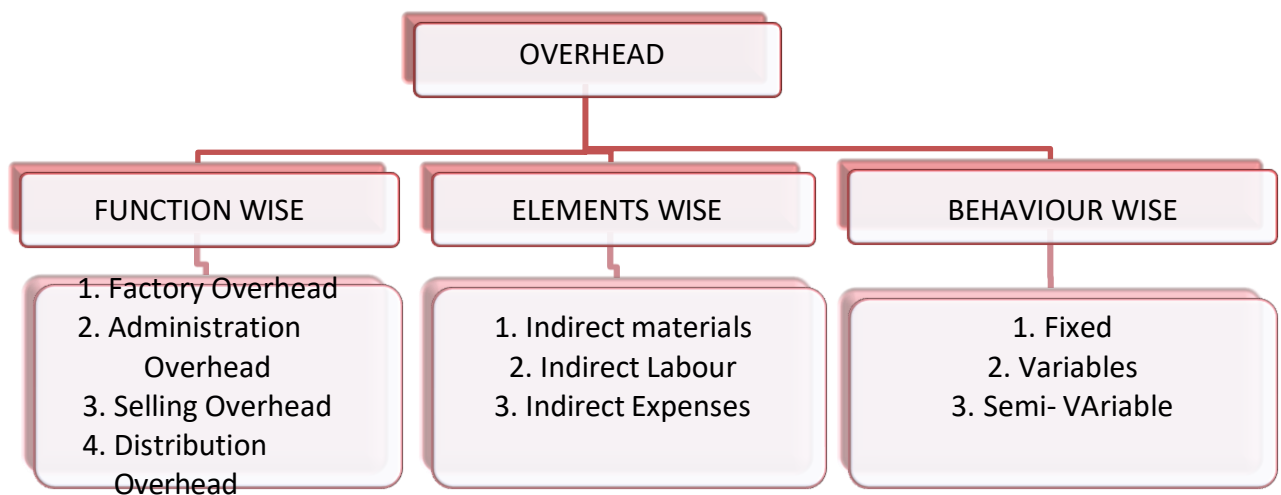
Function Wise Classification: This classification is made on the basis of four major function in a concern. i) Factory Overhead ii) Administration Overhead iii) Selling Overhead iv) Distribution Overhead.

I. **Factory Overhead:** It is all indirect expenditure incurred in connection with manufacturing operations. It consists of indirect material, indirect labour and indirect expenses incurred in producing an article.
   Examples: Power, Factory rent, Lighting & Heating Foreman Salary, Depreciation on Plant & Machinery.

II. **Administration Overhead:** It includes all those costs which are incurred in general and financial management of a concern.
   Examples: Audit fees, legal charges, postage/ telegrams and telephone] printing & stationery, Depreciation, of office building, Director's fee, office rent, salary to office staff.

III. **Selling Overhead:** It refers to those indirect costs which are associated with marketing and selling activities.
   Examples: Advertisement costs, Bad debts, sales office expenses, sho room expenses, salesman salaries.

IV. **Distribution Overhead:** It means the expenses incurred from the stage of product is completed in the works till the product reaches its distribution. **Examples:** Packing, godown rent, Depreciation, on delivery van, carriage outwards.

Element Wise Classification: On this basis, overheads are classified under three groups.
i) Indirect Material ii) Indirect labour iii) Indirect expenses

I. **Indirect Material:** are those material its cost cannot be allocated to specific cost unit but which can be apportioned to or absorbed by and does not form a part of finished goods.
   Examples: Lubricants, cotton waste, consumable stores.

II. **Indirect Labour:** The wages of Indirect labour which cannot be allocated but which can be apportioned to or absorbed by cost centre or cost unit is known as indirect labour.
   Examples: salary of supervisor, wages for maintenance workers overtime, holiday pay, employee's contribution to provident fund.

III. **Indirect Expenses:** are those expenses which cannot be allocated but which can be apportioned to or absorbed by cost centres or cost units.
   Examples: Rent, rates, insurance, taxes, welfare expenses, lighting and heating, Depreciation an plant Sc. machinery printing, stationery, telephone, telegram etc.

Behaviour Wise Classification:
According to his behaviour, overheads are grouped into i) Fixed ii) Variable iii) Semi variable.

I. **Fixed Costs:** These costs remain fixed in total and do not increase or decrease when the volume of production increases or decreases. But the fixed cost per unit increases when the volume of production decreases and fixed cost per unit decreases when the volume of production increases. It is also known as period cost.
   Examples: Rent, insurance on building, salary to staff, Depreciation of plant and machinery postage, stationery.
   Example:
   For 10000 output
   Total Fixed overhead Rs. 1,00,000

   Fixed cost per unit   =   1,00,000 / 10,000 units = Rs.10 per unit
   suppose output is increased to = 20,000 units
   Total Fixed overhead   =   1,00,000
   Fixed cost perunit   =   1,00,000 / 20000 units   = Rs. 5 per unit

II. **Variable Costs:** These cost will change in proportion to the volume of production

(ie) when volume of production increases total variable cost also increases and when volume of production decreases total variable cost also decreases. But variable cost per unit remains fixed.

Examples: Direct Material Cost, Direct Wages, Power, Royalties, Royalities, Fuel, Spoilage, Indirect Material, Indirect Labour, Idle Time etc.

Example:
Output 10000 units
Variable overhead = Rs.1,00,000
Per unit = Rs. 1,00,000 /10000 units = Rs.10 If the
output increases to 20,000 units
Variable overhead = 1,00,000 / 10,000 units x 20,000 = Rs.200000
Variable overhead per unit = 2,00,000 / 20,000 units = Rs. 10
Variable Cost = Prime cost + All variable-overheads

III. **Semi-variable Costs:** These are certain items of cost which are part fixed and partly variable. These are called semi variable costs.
Examples: Telephone, compensation to salesman, repairs and maintenance, depreciation of plant & machinery.

Bases of Apportionment:
The following are main bases of overhead apportionment:

I. **Direct Allocation:** Overheads are directly allocated to various depart- ments on the basis of expenses for each department respectively.
E.g.: Indirect Material, Indirect Wages. Power & Light (when separate metres ate installed)

II. **Direct Labour:** Under this basis the overhead expenses are distributed to various dept, in the ratio of a total number of labour / hours worked in each Debt.
E.g.: Salary of supervisor, Administrative expenses.

III. **Direct Wages:** According to this basis, expenses are distributed amongst the departments in the ratio of direct wages.
E.g.: Contribution to provident fund workers compensation workers insurance.

IV. **Electric Light** - Number, of light points

V. **Electric Power** - Kilowatt hours.

VI. **Floor Area:** This basis is adopted for the apportionment of certain expenses like rent, rates on building lighting and heating.

VII. **Capital Values:** In this method the Capital value of certain assets like machinery and building are used for the apportionment of certain expenses. **E.g.:** Rent taxes of building, Depreciation of plant.

Cost Classification:
This is the process of grouping costs according to the common characteristics.
Cost may be classified accounting to various characteristics nature, functions, variability etc.

Departmentalisation of Overhead Expenses:
In a factory there are two types of departments a) production department
b) service department.
Manufacturing processes carried out m the product. A service department provides service for the benefit of other departments.
Departmentalisation of overhead expenses refers to the apportionment of overhead between production and service departments and the reapportionment of all service, department overheads to the production departments.

Primary distribution of overhead
Common expenses have to be apportioned or distributed between production and service department on some equitable basis. The process of distribution is usually known as primary

distribution.

Problem: 1 Primary Distribution Overhead

Moorthy Company Ltd is divided into four Department A, B and C are production Departments and D is service Department. The actual costs for a period are as follows:

	Rs.		Rs.
Rent	5000	Supervision	3000
Repairs to plant	1400	Fire Insurance for stock	800
Depreciation on plant	2800	Power	2000
Employer's liability for insurance	2200	Light	300
Stores overhead	5000	Welfare expenses	4500

The following information available in respect of four departments.

Overhead	Dept. A	Dept.B	Dept. C	Dept.D
Area (Sq. Meters)	2000	1500	1000	500
No. of Employees	500	400	350	250
Direct wages	4000	2500	3000	1500
Value of plant	6000	4800	3600	2400
Value of stock	2000	3000	2000	1000
H.P. Plant	15	10	10	5
Direct material	1200	800	300	200

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

Solution:

Overhead	Basis of apportionment	Total Amount	Production Department			Service Department
			Dept. A	Dept. B	Dept. C	Dept.D
Rent	Floor area 4 : 3 : 2 : 1	5000	2000	1500	1000	500
Repairs to plant	Plant value 5: 4 : 3: 2	1400	500	400	300	200
Depreciation	Plant value 5: 4 : 3: 2	2800	1000	800	600	400
Employer's liability for Insurance	Direct wages 8 : 5 : 6 : 3	2200	800	500	600	300
Stores overhead	Direct material 12 : 8 : 3 : 2	5000	2400	1600	600	400
Supervision	No. of employees 10 : 8 : 7 : 5	3000	1000	800	700	500
Fire insurance stock	Direct material 12 : 8 : 3 : 2	800	200	300	200	100
Power	H.P. plant 3 : 2 : 2 : 1	2000	750	500	500	250
Light	Floor area 4 : 3 : 2 : 1	300	120	90	60	30
Welfare expenses	No. of employees 10 : 8 : 7 : 5	4500	1500	1200	1050	750
Total overhead		**27000**	**10270**	**7690**	**5610**	**3430**

Secondary Distribution of Overhead:

Service department costs are to be reapportioned to the production departments or cost centres where production is going on. This Process of apportionment of overhead expenses is known as second Distribution.

Apportionment for reciprocal basis

Each service department has to receive and give their cost each other on the basis of agreed ratio. There are three methods which may be used for the reciprocal basis.

     i.   Simultaneous Equation Method
    ii.   Repeated distribution Method
   iii.   Trial and Error Method.

1. Simultaneous Equation Method:

In this method, the total overhead cost for each service department is expressed in the form of algebraic equation with the help of percentage of distribution of the service cost.

Draw backs: It needs a large number of calculations and is not suitable where there are more than two service department.

2. Repeated Distribution Method:

Under this method overhead of service departments are redistributed to the production department as well as service department on the basis of agreed percentage. This process is repeated till the amount of service departments are exhausted.

3. Trial and Error method:

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

Problem: 4

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

Production Departments: **Rs.**
X   - Rs-1000;   Y - Rs.900   and Z - Rs.600 =   2500

Service Departments:
A – Rs. 200; B - Rs.l50
                                       =   350

Total   2850

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

	X	Y	Z	A	B
Service Dept A	20%	40%	30%	---	10%
Service Dept B	30%	20%	30%	20%	---

Prepare a statement showing the apportionment of two service department expenses to production departments under Repeated distributed Method.

Solution: Repeated Distributed Method:

	X	Y	Z	A	B
As per overhead summary	1000	900	600	200	150
Service Dept. A Rs.200 X:Y:Z:B 2:4:3:1	40	80	60	(-) 200	20
Service Dept. B Rs.170 X:Y:Z:A 3:2:3:2	51	34	51	34	(-) 170
Service Dept. A Rs.34 X:Y:Z:B 2:4:3:1	7	14	10	(-) 34	3
Service Dept. B Rs.3	1	1	1	---	---
X:Y:Z 3:2:3					
	1099	**1029**	**722**	**---**	**---**

Simulation Equation Method:

Let X = Total overhead of Department A Let

Y = Total overhead of Department B X = 200

+ 20y / 100 (or) 200 + 0.2 y

Y = 150 + 10x / 100 (or) 150 + 0.1x

To eliminate decimals multiplying both equation by 10 10x –

2y = 2000-------------------- (1)

x + 10y = 1500--------------(2)

Multiplying equation (1) by 5

50x – 10y   = 10000

x + 10y   =   1500

49x   = 11500

X   =   11500 / 49 = 234.9 or 235

Substitute this value in equation (1) 235X –

2y   = 2000:   2Y = 2347 - 2000

2Y = 234 : Y = 347 / 2 = 173.5 Rs.174

	Total	X	Y	Z
As per distribution summary	2500	1000	900	600
Service Dept. A – 90% 235 (235 x 90/100) 2:4:3	211	47	94	70
Service Dept. B – 80% 174 (174 X 80 / 100)3:2:3	139	52	35	52
TOTAL	**2850**	**1099**	**1029**	**722**

Absorption of Overheads:

    Overhead absorption is the process of charging to the product or cost   centre all   the   overheads   allocated   and   apportioned   to it.

Definition: Overhead   absorption   is   the   "allotment   of   overhead   to cost units".   -I.C.W.A

Meaning: Distribution of overhead expenses allotted to a particular department over the units produced in that department.

Methods of absorption:

1. Direct Material cost percentage rate
2. Direct labour percentage rate
3. Prime cost percentage rate

4. Direct labour hour rate.
5. Machine hour rate
6. Rate per unit of production.

1. Direct Material cost percentage rate: Under this method factory overhead are absorbed on the basis of direct materials consumed in producing the product.

overhead rate = Overhead expenses / Direct material cost x 100

E.g.: Factory overhead   Rs. 20000
Direct material   Rs. 80000
Overhead Rate   = 20000 / 80000 x 100 = 25 %

Advantages: It is easy and simple to use.

Disadvantages:
1. It ignores time factor.
2. There is no logical relationship between manufacturing cost and cost of raw materials used.
3. This method does not make distinction between skilled and unskilled workers.

2. Direct labour percentage rate:
This is another simple and easy method. In this method percentage of factory overheads to direct labour cost is calculated as follows:

Overhead rate = Factory overhead / Direct labour cost x 100

E.g.: Factory overhead = Rs.5000
Direct wages   =Rs. 50,000
Overhead Rate = 5000 / 50000 x 100 = 10%

Advantages:
i. Labour rate do not change frequently. Hence this method gives stable results.
ii. Simple and easy to use.

Disadvantage:
i. When workers are paid as piece basis. This, method will not give satisfactory result.
ii. Where the labour is not the main factor of production absorption of overhead is not equitable.

3. Percentage on Prime Cost Method:
This method takes both direct material and direct wages for the absorption of overhead. Overhead rate in his method is calculated by dividing the factory overhead by the prime cost.

E.g.: Factory overhead   =Rs. 30000
Prime cost   =Rs. 60000
Overhead rate   = 30000/ 60000 x 100 = 50%

Advantages:
i. This method is simple and easy
ii. It does not require any special accounting records to be kept for its operation.

Disadvantage:
i. This method combines the limitation of both direct material and direct labour method.
ii. It does not give proper labour method.

4. Direct Labour Hour Rate: The direct labour hour rate is the overhead cost of a direct worker working for one hour. This rate is determined by dividing the overhead expenses by the total number of direct labour hours.

= Factory overhead / direct labour hours (Direct wages) x 100 Factory overhead   =Rs. 20000
Direct labour hours   =Rs. 4000

$$=20000 / 4000 \times 100 = 50\%$$

Thus for a job requiring direct wages Rs. 100, overheads to be absorbed by that job shall be 50% Rs.50.

Advantages:

  i.   It gives due consideration to time factor.
  ii. It is most suitable where labour constitutes the major factor of production.
  iii. This rate is not affected by the method of wage payment.
  iv. Labour rates one more stable than material prices.

Disadvantages: Additional records of labour must be maintained if this method is to be used. It will lead to increase the clerical work.

5. **Machine Hour Rate:** This, method is applicable where work performed mainly on machines.

   Machine hour rate means the cost of running a machine for one hour. Under tins method overheads are charged to production on the basis of the number of hours a machines are used for a particular job. Thus machine hour rate means the expenses incurred in running a machine for one hour. Machine hour rate is obtained by dividing the amount of factory overhead by the number of machine hours.

E.g.: Overhead for machine A   - Rs.10,000

No. of machine hours   -

5,000

Machine hour rate $= 10,000 / 50000 = Rs.2$ per hour.

Advantages:

1. It is a scientific and accurate method of allotting overhead expenses of each job.
2. It gives a basis for the measurement of the monthly cost of idle machine.
3. It gives useful data for estimating the cost production and helps in the fixation of selling price.

Disadvantage:

1. This method can be used only in those departments where work is done by machines.
2. It is difficult to estimate total machine hours in advance.

Problem: 5 Work out the machine hour rate of a saw mill from the following information of a wood working shop:

a) Purchase price of the saw mill Rs. 90000
b) Railway freight and installation charges Rs.,100
c) Life of the saw mill is 10 years and 2000 working hours per year.
d) Repair charges 50% of depreciation.
e) Consumption of electric power 10 units per hour @70 paise per unit.
   Lubricating oil Rs.20 per day of 8 hours.
f) Consumable stores 100 per day of 8 hours
g) Wages of machine operator Rs. 40 per day of 8 hours

Solution: Computation of Machine Hour Rate

Depreciation:

Cost price saw mill   90000

Add Installation charges & Railway fright   10000

Total Cost Price   Rs.   100000

Life of saw mill   =10 years

Working hours one year   =2000 hours
10 years working hours   =20000 hours

	Per hour
Depreciation per hour = Cost Price / Estimate life hours (100000 / 20000hours)	5.00
Repair charges -50% Depreciation Rs. 5.00 / 2 = Rs. 2.50	2.50
Power (10 Units x 70 paste) = Rs.7.00	7.00
Lubricating oil expenses Rs. 20 / 8 hours=Rs. 2.50	2.50
consumable stores = Rs. 40 /8 hours - Rs. 5.00	5.00
Machine Hour Rate	**22.00**

Problem: 6
Calculate Machine Hour Rate from the following:
   a) Cost of Machine Rs. 20,000
   b) Estimated scrap value Rs. 1000
   c) Repairs & Maintenance charges per month Rs. 225
   d) Standing charges allocated to machine per month Rs.150
   e) Effective working life of machine 1000 hours.
   f) Running time per month 150 hours.
   g) Powers used by machines; 10 units per hour 50 paise per unit.

Solution: Computation of Machine Hour Rate

	Rate Per Hour
Standing charges:	
Standing charges per month	
Running time per moth 150 hours	
Standing charges per hour = Rs.150/150 hours = 1.00	1.00
Variable expenses:	
Depreciation = Cost Price – Scrap Value / Estimate Life of Machine (Rs. 20000 – Rs. 10000 / 10000hours)	1.90
Repair & Maintenance charges Rs. 225 per month (225/ 150 hours)	1.50
Power (10 units x 0.50 paise)	5.00
Machine Hour Rate	**9.40**

Rate per unit of production:
It is the simplest of all the methods total overheads of a department are divided by the number of units produced to give an overhead rate of per unit of output.
E.g.:
Production overhead   = Rs. 20000
Number of units produced   = 2000
Overhead rate   = Rs. 20000/ 2000 =Rs.10 per unit

Overhead Rate
Overhead rate may be either (i) Actual rate ii) Predetermined rate.
Actual rate: This is the rate of overhead absorption which is calculated by dividing actual overheads to be absorbed by actual quantity
                    Overheads = Actual overheads / Actual Quantity
Predetermined Overhead Rate: This is the rate of overhead absorption which is calculated in advance of expenses incurred. This is calculated by dividing the predetermined expenses by predetermined quantity.
                    = Predetermined Expenses / Predetermined Quantity
Under and over absorption of overhead
          Absorption of overhead may be based on actual rate or Predetermined rate, under
Actual rate method of absorption costs are fully absorbed. But in
case of predetermined rates, overhead are not fully absorbed. (ie) overehaed are not equal

actual overhead incurred. It may be over or under absorption of overheads.

Over Absorption: Over absorbed means that the amount of overheads absorbed are more than actual overhead incurred.
E.g.:

Overheads Absorbed	Rs. 50000
Less: Actual overheads	Rs. 48000
Over absorption	**2000**

Under Absorption: It means the amount of overhead absorbed is Less than actual overhead incurred.

E.g.:

Overhead Absorbed	50000
Less: Actual overhead	54000
Under absorption	**4000**

CAUSES OF OVER AND UNDER ABSORPTION:
   a) Errors in estimating overhead expenses.
   b) Unexpected changes in the method of production affecting the amount of overheads.
   c) Error in estimating the quantity of production.
   d) Unforeseen changes in the production capacity.
   e) Seasonal fluctuations in overhead in certain industries.

b) **Accounting treatment of over and under absorption:**
The under or over absorbed overhead may be adopted in the following three ways:
Write off to costing profit and Loss account: When the amount of over or under absorbed overheads is not large, the simple method is to write off to costing profit & loss account.
Use of supplementary Rates: Where the amount of over or under absorption is large this method is significant. A supplementary rate is calculated to adjust
amount of under or over absorbed overheads in the cost of work in progress, finished stock and cost of sales.

   This rate is calculated by dividing the amount of over [or] under absorption by the actual base:

   In case of under absorption, overhead is adjusted by a plus rate since the amount is to be added, while over absorption is adjusted by a minus rate since the amount is to be deducted.
Carry over to the next year accounts: Under this method, the balance in under and over absorbed overhead account at the end of the year carried to next year.

Administration Overhead
   Administration overhead is the indirect expenditure incurred formulating policies, planning and controlling the functions, directing a motivating the personnel of an organisation in the attainment of its objectives.
E.g.: Office salaries, postage, telephone, stationery, audit fee etc.
Accounting Treatment (Apportionment): There are three methods of accounting of administration overheads.

   1. **Apportionment to Production and Selling Function:**
   Under this method office and administrative overheads are not treated separately but are apportioned to production and selling function on some suitable basis.
   2. **Addition as a separate item of cost:** In this method administration overhead is added as a separate element to the cost units and shown in the cost sheet.
Adm. overhead Rate = Administration overhead / works cost x 100
   3. **Transfer to Costing Profit & Loss a/c:** In tins method administration overhead are

closed by transfer to costing profit & loss a/c at the end of

year.

SELLING AND DISTRIBUTION OVERHEAD

i. **Selling Overhead:** It is the cost of seeking and to create and stimulating demand and of securing orders.

E.g.: Advertisement cost, salesman salary, show room expenses, after sales service cost

ii. **Distribution Overhead:** It is the cost incurred in placing the sold goods   in possession of customers. It includes all expenditure incurred from time   of product is complete until it reaches its destination.

E.g.: Packing costs, insurance of goods in transit, warehouse expenses.

Differences between Selling Overhead and Distribution Overhead:

S. No.	Selling Overhead	Distribution Overhead
1	It is incurred for promoting sales.	It is incurred in moving goods from the company's godown to customer's place.
2	The object of selling overhead is to solicit the! orders and to make efforts to find and retain customers.	The object of distribution expenses is the safe delivery of the product to the customer.

Absorption of Selling and Distribution Overhead:

The following methods are usually adopted for the absorption of selling and distribution, expenses.

a) **A Rate per unit:** under this method the total estimated selling and distribution overhead is divided by the estimated number of units to be sold. This gives rate per unit sold.

b) **A percentage of selling price:** on the basis of past records a percentage of selling and distribution overheads to sales is determined.

c) **A percentage on works cost:** In this method a percentage of selling and distribution overhead for works cost is ascertained. This percentage is used to recover selling & Distribution overhead.

Control of Factory Overheads:

Control of factory overheads involves following steps:

i. **Overheads should be classified according to variability:** (fixed, variable and semi-variable)

ii. **Overhead cost should be budgeted by each classification and department:** The budgets are determined with reference to budgeted level of activity of that department.

iii. Actual overheads should be collected and classified in the same frame work as budget.

iv. Due to introduction of standard costing, the variance between actual and standard costs are analysed and reported for corrective action.

UNIT – V
UNIT OR OUTPUT COSTING BATCH & JOB COSTING

It is defined as ―the unit of quantity of product, service or time in relation to which cost may be ascertained or expressed‖. Cost unite are the ‗things‘ that the enterprise is set upto provide.

For example, in a sugar mill the cost per tonne of sugar may be ascertained. The cost units may be:

Units of Production: Tonnes of materials, pairs of shoes, gallons of liquids, jobs, contracts, etc.

Units of Service: Cinema seats, passenger miles, tonne-kilometres, kilowatt hours, consulting hours, etc.

A few more example of cost units:

Industry	Normal Cost Unit
Steel	Tonne
Cement	Tonne
Brick manufacturing	1000 bricks
Transport	Passenger – kilometre or Tonne - kilometer

Job Costing (or Job-Order Costing):

In this method costs are collected and accumulated for each job or work order separately. This is because in each job work is done according to customer‘s specifications. Each job has a separate identity and makes a cost unit The industries where this method of costing is used are:

    I. Repair shops
    II. Printing press
    III. Painting and decording
    IV. Production of made to order articles, etc.

Contract Costing:

This method is based on the principles of job costing. If a job is big, it is known as a contract. Contract is a big job and job is a small contract. Each contract is taken as a separate cost unit for the purpose of cost ascertainment Contract costing is most suited to:

1. Construction work
2. Ship building
3. Architects
4. Constructional engineers, etc.

Batch Costing:

Like contract costing, it is also a variation of job costing. In this method, orders for identical products, are arranged in convenient groups or batches. Each batch is treated as a cost unit and costs are accumulated for each batch separately. It is used in the production of:

    i. Ready-made Garments
    ii. Shoes
    iii. Toys
    iv. Bicycle parts
    v. Biscuits and Confectionary

Single Output or Unit Costing:

This method, is used when production is uniform and consists of only a single product or two or three types of similar products or different grades of the same product This method is applied in the following types of industries:

    i. Mines

ii. Oil drilling
iii. Steel works
iv. Brick works

Job Costing

Job costing:

Job costing is also known as job order costing. It is a method of costing in which costs are accumulated for each job.

Under this method, costs are collected and accumulated according to jobs, contracts, projects, or work orders. Each job has a separate identity and therefore, it becomes essential to analyse and segregate costs according to each job or order. This method is also known as specific order, production order.

Job costing, also known as job order costing, is a method of costing in which costs are accumulated for each job or work order undertaken.

Characteristics of Job Costing:

1. The production is always against customer's orders and not for stock.
2. Each job has its own characteristics and needs special treatment.
3. There is no uniformity in the flow of production from department to department.
4. The department through which the job has to be processed depends purely on the nature of each job.
5. The work-in-progress differs from period to period according to the number of jobs on hand. Therefore, cost is ascertained for each job.
6. Job costing is applicable to engineering concerns, printing presses, repair shops, automobile garages.
7. There is no uniformity in the flow of production from one department to another.
8. It is the nature of each job which determines the departments through which it is to be processed.
9. The main purpose of job costing is to determine the profit or loss made on each job.
10. Job costing is applicable to repair shops, printing press, engineering companies, etc.

Costing Procedure:

I. **Job Order Number:** Job costing accumulates costs by specific jobs, a number must be assigned to each job.

II. **Production Order:** It is a written order to the foreman to proceed with a job. It gives the foreman instruction relating to the job and also authorises him to start the work.

III. **Job Cost Sheet:** Cost of for each job are accumulated on job cost sheets. The various elements of cost are treated as shown below:

   a) **Materials:** Materials are issued to the job on the basis of bill of materials or stores requisitions.
   b) **Labour:** The information regarding direct labour cost of different jobs can be drawn from time and job cards. Wages paid to indirect labour form a part of factory overhead.
   c) **Overhead:** Overheads are usually charged at predetermined rates. Separate charges are made for factory, administration and selling & Distribution overheads.

IV. **Completion of Job:** when the work on a job is completed, a completion report is end to costing department. The cost under each element of cost is ascertained and totalled to compute the total cost of the job concerned.

V. **Profit or Loss on each Job:** The total cost of each job is compared against its price to determine the profit or loss of each job.

Difference between Job Costing and Process Costing:

S. No	Job Costing	Process Costing
1	Production is against specific orders.	Continuous or mass production of homogeneous products.
2	Costs are collected and accumulated for each job separately.	Costs are collected and accumulated process-wise.
3	Costs are calculated only when a job is completed.	Process costs are calculated at the end of cost period.
4	There is no transfers from one job to another unless some surplus there is work.	The product moves from one process to another, so cost of one process is transferred to another process.
5	There may or may not be work-in-process at the beginning or close of the accounting period.	There is always some work-in-process as the production is continuous.
6	Control is very difficult because each job differs and production is continuous.	Control is very easier because there is standardised and production is mass production.
7	Costs are calculated when a job is completed	Costs are calculated at the end o specific period.

Advantages:

1. It gives a detailed analysis of costs of materials, labour and overheads.
2. It enables the management to detect which jobs are more profitable than others, which are less profitable and which are incurring losses.
3. It provides a basis for estimating the cost of similar jobs taken upon future.
4. It also helps in future production planning.
5. Spoilage and defective work can be easily identified and responsibility may be fixed on departments.
6. It estimates have been prepared in advance, actual can be compared with estimates for controlling costs.
7. In case of Government contracts on cost-plus basis, it gives cost data which determines contract price.

Limitations:

1. It involves more clerical work. This leads to more expensive.
2. With the increase in clerical work, the chances of errors also increase.
3. Job costing is an actual costing method. It does not give for the control of cost unless it is used with standard costing system.
4. Determination of predetermined overhead rates may involve budgeting of overhead expenses.

Illustration: 1

The following direct costs were incurred on Job No. 565 of Standard Electricals Company

	Rs.
Materials	4010
Wages: *Dept.* A- 60hours @Rs.3 p.h.	
B - 40 hours @ Rs.2 p.h.	
C - 20 hours @ Rs. 5 p.h.	

Overhead expenses for these three departments were estimated as follows:

Variable overheads:

Dept. A Rs.5,000 for 5,000 labour hours B Rs.
3,000 for 1,500 labour hours C Rs. 2,000
for 500 labour hours

Fixed overheads:

Estimated at Rs.20,000 for 10,000 Normal working hours.

You are required to calculate the cost of job No.565 and calculate die price to give profit of 25% on selling price.

Solution:

Job Cost Sheet (*Job No. 565*)		
	Amount Rs.	**Amount Rs.**
Direct materials		4010
Wages: *Dept.* A 60 hrs. x Rs. 3	180	
B 40 hrs. x rs. 2	80	
C 20 hrs. x Rs. 5	100	**360**
Overhead–Variable:		
Dept. A 60 x Rs. 5000 / 5000 hrs.	60	
B 40 x Rs. 3000 / 1500 hrs.	80	
C 20 x Rs. 2000 / 5000 hrs.	80	**220**
Fixed overheads:		
120 hours @ Rs. 20000 / 10000 hrs.		240
Total cost		**4830**
Profit 25% on selling price		1610
Selling price		**6440**

Illustration:

A factory uses job costing. The following data are obtained from its books for the year ended 31st December 2016.

	Rs.		Rs.
Direct materials	90000	Selling and distribution overheads	52500
Direct wages	75000	Administrative overheads	42000
Profit	60900	Factory overheads	45000

Prepare a job cost sheet indicating the prime cost, works cost, production cost, cost of sales and sales value.

In 2002, the factory receives an order for a number of jobs. It is estimated that direct materials required will be Rs.1,20,000 and direct labour will cost   Rs.   75,000.

What should he the price for these jobs if factory intends to earn the same rate of profit on sales assuming that the selling and distribution overheads have gone up by 15% ? The factory recovers overheads as a percentage of direct wages and

administration and selling and distribution overheads as a percentage of works cost, based on cost rates prevailing in the previous year.

Solution:

Production statement for the year ended 31st Dec. 2016

	Rs.
Direct materials	90000
Direct wages	75000
Prime cost	**165000**
Factory cost	45000

Work cost	210000
Administrative overheads	42000
Cost of production	**252000**
Selling and Distribution overheads	52500
Cost of sales	**304500**
Profit	60900
Sales	**365400**

Note:

% of factory overheads to directly ages:

= 45,000 / 75,000 x 100 = 60%

%of administration overheads to works cost:

=42,000 / 2,10,000 x 100 = 20%

Selling and distribution overheads   Rs. 52,500

Add 15% increase   7,875

60,375

% of Works cost =   60,375 / 2,10,000 x 100 = 28.75%

% of profit to sales -   60,900 / 3,65,400 x 100 = 16.67%

Job Cost Sheet

(Statement Showing Estimated Cost and Price of Jobs in 2016)

	Rs.
Direct materials	120000
Direct wages	75000
Prime cost	**195000**
Factory cost (60% of direct labour)	45000
Work cost	**240000**
Administrative overheads (20% of works cost)	48000
Cost of production	**288000**
Selling and Distribution overheads (28.75% of works cost)	69000
Cost of sales	**357000**
Profit (16.67% of sales)	71400
Sales	**428400**

PROCESS-COSTING

Process costing is used where the production moves from one process to the next until its final completion and there is a continuous mass production of identical units through a series of processing operations. It is applied for a various industries like Chemicals and Drugs, Oil Refining, Food Processing, Paints and varnish, Plastics, Soaps, Textiles, Paper etc.

CIMA defines process costing as follows: "The costing method applicable where goods or services result from a sequence of continuous or repetitive operations or processes. Costs are averaged over the units produced during the period."

Process costing method may also be adopted in firms that, produce, a variety of products, provided mat the overall production process can be broken down into sub-operation of a continuous repetitive nature like automobiles, toy, plastics etc.

Features of Process Costing:

1. The process cost centres are clearly defined and all costs relating to each process cost centre are accumulated.

2. The cost and stock records for each process cost centre are maintained accurately. The records give clear picture of the units mtroduced in the process cost centre and also units

passed to the next process.

3. The total costs of each process are averaged over the total production of that process, including partly completed units.
4. The charging of the cost of the output of one process as the raw materials input cost of the following process.
5. Appropriate method is used in absorption of overheads to the process cost centres.
6. The process loss may arise due to wastage, spoilage, evaporation, etc.
7. Since the production is continuous in nature, there will be closing work-in- progress which must be valued separately.
8. The output from the process may be a single product, but there may also be a by-products and / or Joint products.

JOB COSTING VS. PROCESS COSTING:

S.No.	Job Costing	Process Costing
1	It is concerned with the cost of an individual Job or batch regardless of the time taken to produce it.	It is impossible to identify individual Jobs and Costs are calculated on time basis for all units of output in that time.
2	A 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.	All the products are identical there is a continuous flow of production. It is applied to a large number of units.
3	Standardisation of controls is comparatively difficult as each job differs and more detailed supervision and control is necessary.	Proper control is relatively easy as there are standard applied for costs, process loss, time of production, etc.
4	Costs are collected to each Job at the end of its completion.	Costs are accumulated and collected tor each process at the end of specified accounting period and transferred to next prccess/department till the last process is completed.
5	Only Prime Cost element 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	Process Costing system is easier to operate than Job costing system because the detailed work of allocating costs to many individual job is unnecessary. Many of the costs that are indirect in a Job Costing system may be regarded as direct in process costing system.
6	Work-in-process may or may not exist at the end of accounting period.	Normally, there will be opening and closing work-in-progress for the accounting period.
7	The costs of each Job is ascertained by adding materials, labour and overheads.	The unit cost is the average cost of the process for a given period.
8	It is a specific order costing.	It is used to ascertain the cost of a product at each process.

PROCESS LOSSES AND GAINS

Normal loss:

The loss expected during the normal course of operations, for unavoidable reasons is called normal loss and this is due to inherent result of the particular process and thus uncontrollable in the short run. Management, overtime, are usually able to identify an average percentage of normal losses expected to arise from the production process.

The normal losses are absorbed by the completed production. The cost of normal losses should be borne by the goods production. If any value can be recouped from sale of scrap or wastage or spoilage etc., then this would be credited to the process account thus reducing the overall cost of the process.

Journal Entry:

Normal loss A/c   Dr
        To process account A/c

Abnormal loss: Abnormal tosses are those losses the level deemed to be the normal loss rate for the process. The abnormal loss is the amount by which the actual loss exceeds the normal loss and it is expected to arise under efficient operating conditions.

The abnormal losses are not included in the process costs but are removed from the appropriate process account and reported separately as an abnormal loss. The abnormal loss is treated as a period cost and written off to the profit and loss account at the end of the period.

Abnormal Loss (units) = Normal output - Actual output

Journal Entry:

Abnormal Loss a/c   Dr   xx
        To process a/c   xx

Transfer:

Costing profit & loss a/c   . xx To
        Abnormal loss a/c   xx

Abnormal loss = Normal output - Actual output

Value of Abnormal Loss:

Amount (Rs) 1000 100

= Normal cost of Normal Output / Normal output x Unit of Abnormal loss

Example: Input 100 units of Rs.1000; Normal toss 10% scrap Rs.100 Actual output 87 units Calculate Abnormal loss

Answer:

	Unit	Amount (Rs.)
Input	100	1000
Less: Normal loss	10	100
Normal output	**90**	**(Normal cost) 900**
Less: Actual output	87	---
Abnormal loss	**3**	---

Calculation of value of Abnormal Loss:

Normal cost / Normal output x Unit of Abnormal loss = 900 / 90 x3 =Rs.30

Dr	Unit	Amount	Cr	Unit	Amount
To Input	100	1000	By Normal loss	10	100
			By abnormal loss	3	30
			By actual output	87	(b.f.) 870
	100	**1000**		**100**	**1000**

Abnormal Gain:

If the loss is less than the. normal expected loss, the difference is considered as abnormal gain. Abnormal gain is accounted sinmar to that abnormal loss. Abnormal gains will be debited to the process account and credited to an abnormal gains account The abnormal gain account is debited with the figure of reduced normal loss in quantity and value. At the end of the accounting year the balance in the abnormal gains account will be carried to Profit and Loss Account.

= Normal cost / Normal output x Unit of Abnormal gain.

Journal Entry:

Process a/c Dr   xx

       To abnormal gain a/c (Value of abnormal gain) xx

Transfer:

Abnormal gain a/c Dr .   xx

       To costing profit and Loss a/c   xx

       Example:

Input	100 units	= Cost Rs. 1000
Normal Loss	10% ;	Scrap Rs, 100
Actual output	95 units	Calculate Abnormal gain ?

	Unit	Amount (Rs.)	
Input	100		1000
Less: Normal toss	10		100
Normal output	**90**	**Normal cost**	**900**
Less: Actual output	95		---
Abnormal gain	5		---

Calculation of Abnormal gain:

=Normal cost / Normal Output x Unit of Abnormal

= 900 / 90 x 5 = Rs.50/-

Dr	Unit	Amount	Cr	Unit	Amount
To Input	100	1000	By Normal loss	10	100
To abnormal gain	5	50	By Actual output	95	(b.f.) 950
	105	1050		105	1050

Problem:

From the under mentioned figures prepare process accounts indicating the cost of each process and the total cost. The production was 480 articles per week.

Particulars	Process I	Process II	Process III
	Rs.	Rs.	Rs.
Material	3000	1000	400
Labour	1600	4000	1200
Factory overheads	520	1440	500

Office overheads amounting of Rs1700 should be apportioned on the basis of wages. Ignore stock in hand and work-in-process at the beginning and end of week.

Solution:

Process No. I A/c

	Cost per unit	Toal cost		Cost per unit	Toal cost
To material	*6.25	3000	By Process II A/c (Output Transferred)	11.50	5520
To labour	3.33	1600			
To factory overheads	1.08	520			
To office overheads (1700x4/17)	0.84	*400			
Total	**11.50**	**5520**	**Total**	**11.50**	**5520**

Office Overhead Allocated on the basis of Labour:

Process	I	II	III	
Labour	1600	4000	1200	
	4	10	3	=17

Office O.H. process I = 1700x4/17 =400* Cost
per unit = Total cost / Total output
Example: Material cost per unit = Rs.3000 / 480 units = rs. 6.25*

Process No. II A/c

	Cost per unit	Total cost		Cost per unit	Toal cost
To process I A/c	11.50	5520	By Process II A/c (Output Transferred)	27.00	12960
To material	2.08	1000			
To labour	8.34	4000			
To factory overheads	3.00	1440			
To office overheads (1700x10/17)	2.08	1000			
Total	**27.00**	**12960**	**Total**	**27.00**	**12960**

Process No. II A/c

	Cost per unit	Total cost		Cost per unit	Toal cost
To process II A/c	27.00	12960	By finished stock A/c (Output Transferred)	32.00	15360
To material	0.83	400			
To labour	2.50	1200			
To factory overheads	1.04	500			
To office overheads (1700x3/17)	0.63	300			
Total	**32.00**	**15360**	**Total**	**32.00**	**15360**

STUDY WELL

THANK YOU

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ASST.PROF. IN COMMERCE

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