Course: B.Com(PA)   **Batch : 2024-27**   **Semester : II**

SUBJECT : COST ACCOUNTING

UNIT:I   Nature of Cost Accounting

Cost Accounting – Definition – Meaning and Scope – Concept and Classification – Costing an aid to Management –– Types and Methods of Cost – Elements of Cost Preparation of Cost Sheet and Tender.

UNIT:II   Material   Control

Material Control: Levels of material Control – Need for Material Control – Economic Order Quantity – ABC analysis – Perpetual inventory – Purchase and stores Control: Purchasing of Materials – Procedure and documentation involved in purchasing – Requisition for stores – Stores Control – Methods of valuing material issue.

UNIT:III   Labour Turnover

Labour: System of wage payment – Idle time – Control over idle time – Labour turnover. Overhead – Classification of overhead – allocation and absorption of overhead.

UNIT: IV   Process Costing

Process costing – Features of process costing – process losses, wastage, scrap, normal process loss – abnormal loss, abnormal gain. (Excluding inter process profits and equivalent production).

UNIT: V   Operating Costing

Operating Costing - Contract costing – Reconciliation of Cost and Financial accounts.

UNIT-I

NATURE OF COST ACCOUNTING

Introduction:

Cost accounting is an internal business process for recording, analyzing, and reporting costs of production (materials, labor, overhead) to help managers make informed decisions on pricing, budgeting, efficiency, and profitability, unlike financial accounting which serves external stakeholders. It focuses on the cost of specific products, services, or departments, allowing for detailed analysis of variable and fixed expenses to control spending and improve resource use.

Definition of Cost Accounting:

Cost Accounting is an advanced field of accounting that focuses on the meticulous and accurate analysis, standardization, forecasting, and comparison of relevant costing data. It extends beyond basic costing to interpret and report various areas of concern to management. The primary aim of cost accounting is to ascertain the cost of a product or service, enhance operational efficiency, and provide detailed financial information that assists management in decision-making. It involves the application of accounting and costing principles to identify cost-saving methods, techniques, and any excess costs incurred through a comparative analysis with previous experiences or standards.

Features of Cost Accounting:

Cost Classification:

Cost accounting involves categorizing costs based on their nature, behavior, and relevance to the decision-making process. This classification can include direct vs. indirect costs, fixed vs. variable costs, and product vs. period costs.

Cost Analysis:

It entails the examination and evaluation of the different elements of cost to understand their behavior and impact on the overall cost of the product or service.

Cost Recording:

Systematic recording of cost data in a manner that aligns with the costing methodology adopted by the organization. This facilitates easier tracking, analysis, and reporting of cost information   .

Decision Support:

Cost accounting provides crucial data that supports managerial decisions relating to pricing, budgeting, expansion, and cost control measures.

Budgeting and Forecasting:

It includes the preparation of financial plans and forecasts that guide the organization in achieving its financial goals. Budgeting and forecasting are essential for resource allocation and financial planning.

Objectives of Cost Accounting:

Ascertainment of Cost Per Unit:

Determining the cost per unit of different products manufactured to understand the cost structure and aid in pricing strategies.

Cost Analysis for Operations and Processes:

Providing a detailed analysis of costs incurred in various operations or processes to identify areas of efficiency and inefficiency.

Identification of Wastage:

Revealing wastage of time, expenses, and materials to improve profitability of products and advising management on corrective measures.

Effective Control of Stocks:

Aiming to minimize the capital locked in stocks of raw materials, work in progress, consumables, and finished goods through efficient inventory management.

Revelation of Sources of Economy:

Identifying and implementing cost control measures across materials, labor, and overheads to achieve economies in operations.

Advising on Expansion and Capital Projects:

Providing insights to management on future expansion policies and the feasibility of proposed capital projects based on cost-benefit analysis.

Budget Preparation Assistance:

Helping in the preparation of budgets to forecast and plan for future financial activities effectively.

Formulation of Incentive Plans:

Guiding management in the development of incentive bonus plans that encourage cost saving, enhanced productivity, and efficiency.

Internal Audit System:

Organizing an internal audit system to ensure the efficient operation of different departments by monitoring and evaluating their financial activities and performance.

Managerial Decision Making:

Serving as a basis for managerial decision-making by providing detailed cost information that helps in strategizing, planning, and controlling organizational activities.

Nature of Cost Accounting:

- ❖ **Systematic Process:**
  Involves recording, analyzing, classifying, and summarizing cost data.
- ❖ **Decision Support:**
  Primarily serves management by providing crucial data for planning, controlling, and decision-making.

- ❖ **Science & Art:**
  Uses scientific principles (like techniques) and artistic judgment (like analysis and interpretation).
- ❖ **Focus on Cost:**
  Tracks expenses related to production, services, or projects.
- ❖ **Beyond Manufacturing:**
  Evolved from manufacturing to include services, agriculture, and government.

Scope of Cost Accounting:

- ✓ **Cost Ascertainment:**

  Techniques like job costing, process costing, and Activity-Based Costing (ABC) to find product/service costs.

- ✓ **Cost Control:**

  Guiding actual performance towards budgeted targets (e.g., using Standard Costing).

- ✓ **Cost Reduction:**

  Planned efforts to lower costs without sacrificing quality (e.g., reducing waste, improving efficiency).

✓ **Budgetary Control:**

Preparing budgets and comparing actuals to forecasts.

CLASSIFICATION OF COST AND COST CONCEPT

1. According to Elements. The cost is classified into

(i) Direct cost, and

(ii) Indirect cost according to elements, viz., materials, Labour and Expenses.

2. According to Functions. The cost is classified into the following:

i. Production Cost, or Manufacturing Cost, or Factory Cost,

ii. Administration Cost,

iii. Selling Cost, and

iv. Distribution Cost.

3. According to Nature. The cost is classified into the following:

i. Fixed Cost is "a cost which tends to be unaffected by variations in volume of output.
ii. Variable Cost is "a cost which tends to vary directly with volume of output.

iii. Semi-fixed or Semi-variable Cost is 'a cost which is partly variable.'

4. According to Controllability.

i. Controllable cost. This is a cost which can be influenced by the action of a specified member of an undertaking.

ii. Uncontrollable Cost. It is the cost which cannot be influenced by the action of a specified member of an undertaking, such as fixed costs.

5. According to Normality. The cost is classified into

(i) Normal cost, and

(ii) Abnormal cost.

i.Normal cost. It is the cost at a given level of output in the condition at which that level of output is normally attained.

ii. Abnormal cost. It is a cost which is beyond normal cost.

6. According to Relevance to Decision-making and Control.

i. Shut-down Cost. A cost which will is required to be incurred even though a plant is closed or shut-down for a temporary period, e.g., the cost of rent, rates, depreciation, maintenance expenses etc.

ii. Sunk cost. A cost which has been incurred in the past or sunk in the past and is not relevant to the particular decision-making. E.g. written down book value of the plant.

iii. Opportunity Cost. The costs which are related to the sacrifice made or the benefits foregone are opportunity costs.

iv. Imputed Cost. It is a hypothetical cost required to be considered to make costs comparable. Interest on one's own capital.

v. Out-of-Pocket cost. A cost which will have to be paid to outsiders as against costs such as depreciation, which do not require any cash payment.

vi. Replacement Cost. It is the cost of replacing a material or assets, by purchase from the current market.

vii. Marginal Cost. Marginal cost refers to the increase or decrease in total cost caused due to increase or decrease in output by one single unit.

viii. Differential Cost. The change in total cost due to the change in method or technique of production or charged in level of production is called differential cost.

ix. Standard Cost. Standard cost is a predetermined cost or estimate which is compared with the actual cost in order to determine variance and carry out an analysis of variance for cost control.

x. Relevant Cost. The relevant costs are those cost which aids to makes specific management decisions.

7. Product Cost & Period Cost The product cost is the total of cost that is associated with a unit of product. The cost in forming the product viz., direct material, direct labor, factory overhead constitute the product cost. Period cost, on the other hand, are costs that tends to be unaffected by changes in level of activity during as given specific time period. E.g., Selling & distribution cost

Methods of costing:

Job costing:

Job costing is a way to figure out how much it costs to make something specific, like a product, service, or project. You keep track of all the direct and indirect expenses for each job, such as labor, materials, and overhead, and then divide these costs up. It's often used in industries where things are made to order or are one-of-a-kind. This helps figure out the right price for each job and see if it's making money.

Activity-Based Costing:

Activity-based costing (ABC) is a way of figuring out how much different tasks in a company actually cost. Instead of just guessing, ABC looks at what makes those costs go up or down. By doing this, it helps businesses see where their money is really going, making it easier to make smart choices about how to spend and use resources.

Standard Costing:

Standard costing is a method where you set upfront estimates for how much materials, labor, and overhead should cost. These estimates act as reference points to see if your actual costs match up. By comparing what you actually spend with these estimates, you can spot differences and figure out how well your operations are running. This helps in evaluating performance, keeping costs in check, and making smarter decisions.

Target Costing:

Target costing is a smart way to manage costs early in making a product. It happens when you figure out the price you want to sell your product for, considering what customers will pay and how much profit you want to make. Here's how it works: you start with the selling price you aim for, then take away the profit you want. That gives you the target cost. This target cost helps steer the development of the product, making sure it can be made and sold at a profit.

Absorption Costing:

Absorption costing is a way of assigning all the costs of making something, such as materials and factory expenses, to each item produced. It includes both the costs that change with the number of items made and those that stay the same, like rent. This method treats fixed expenses, like rent and utilities, as part of the cost of each item. Companies use absorption costing for official financial reports, following standard accounting rules (GAAP). It gives

a fuller picture of what it actually costs to make a product compared to other methods like variable costing.

Uniform Costing:

Uniform costing streamlines cost analysis for firms in a particular industry. It's like using the same measuring tape for all tailor shops: it ensures everyone's using the same methods and formats to track costs. This helps businesses compare their performance, control costs together, and find ways to improve as a group.

Differential Costing:

Differential costing is a method used to compare costs between different choices. It helps by pinpointing the extra costs and benefits of picking one option over another. By focusing on the costs and revenues that change with each choice, it simplifies decision-making. This technique is valuable for understanding how different decisions affect profits and resource use.

Direct Costing:

Direct costing, also called variable costing, focuses only on variable expenses as part of a product's cost. Fixed costs are seen as periodic expenses instead. This method helps understand how costs change with production levels and aids in decision-making by revealing the profit margin of each item sold. It's handy for internal management and quick decisions.

Indirect Costing:

Indirect costing, or absorption costing, assigns both variable and fixed manufacturing costs to products. Fixed manufacturing overhead is included as a product cost, blending it into the cost of goods sold. This method is crucial for external financial reports according to accounting standards and gives a fuller picture of product costs compared to variable costing.

Full Costing:

Full costing, also called absorption costing, means assigning all the costs of making a product—including both the costs that change with production levels and those that stay the same—to each unit produced. This method looks at both direct costs (like materials) and indirect costs (like factory rent), giving a complete picture of what it costs to make something. It's a must-follow rule in accounting (GAAP) and helps to understand the total cost of making goods or providing services.

Variable Costing:

Variable costing, or direct costing, only counts the costs that change with how much is produced as the product costs. The fixed costs, like rent or salaries, are considered as regular expenses for the time period. This approach shows how costs change when production levels go up or down, which is super helpful for short-term decisions and seeing how well things are going. Variable costing is especially handy for managers since it helps to see how much each product sold contributes towards covering costs.

Fixed Costing:

While Fixed Costing isn't a widely recognized term in accounting, if you're referring to a method that solely assigns fixed costs to products or services, it's not common. Typically, fixed costs, like rent or salaries, are treated as regular expenses for a period, rather than being divided among individual units.

Activity-Based Management (ABM):

Activity-Based Management (ABM) is a strategic approach that uses activity-based costing info to make better decisions. It's all about improving processes and performance within a company. ABM digs into activities, their costs, and what drives them to find ways to be more efficient, cut costs, and add value. It's about making sure activities match up with what the organization wants to achieve, aiming to get the most value while minimizing waste.

Process Costing:

Process costing is a method used to calculate the cost of making similar products continuously. It works by averaging out the costs across all units produced within a specific production process or department. This method is commonly used in industries such as chemical manufacturing or food processing. Process costing simplifies cost calculation by evenly distributing costs across all units. This makes it easier to monitor and control production expenses for items that are mass-produced.

Marginal Costing:

Marginal costing is a method that focuses solely on the variable costs when figuring out how much it costs to produce one extra unit. Fixed costs are seen as regular expenses and aren't divided among products. This technique is useful for seeing how changes in production volume affect profits and for making quick decisions about pricing and production in the short

Life cycle:

Life Cycle Costing is a thorough way of looking at all the costs linked to a product or project from the beginning to the end of its life, including its creation, use, and disposal. This covers expenses from designing and making it to distributing, maintaining, and getting rid of it. By considering all these costs, it helps in making smarter choices about product development, pricing, and efforts to be sustainable.

Historical Costing:

Historical costing values assets and liabilities based on their original purchase or acquisition cost. Transactions are recorded at their original nominal value without adjustments for inflation or changes in market value over time.

While simple to apply, historical costing may not accurately reflect the true worth of assets in rapidly changing market conditions.

Opportunity Costing:

Opportunity costing evaluates the potential benefit lost when one alternative is chosen over another. It involves assessing the value of the next best alternative forgone in a decision-making process. By considering opportunity costs, businesses can make more informed decisions by understanding the trade-offs involved in choosing one option over another.

Costing aid to management:

Costing acts as a vital aid to management by providing detailed financial data for **planning, decision-making, and control**, helping optimize resource use, control expenses (materials, labor, overhead), set prices, improve efficiency through techniques like standard costing, and measure performance for better strategic choices, ensuring profitability and sustainability. It transforms raw financial figures into actionable insights for all management levels.

Costing Aids Management:

1. **Planning & Budgeting:** Develops coordinated plans (budgets) and forecasts future costs, ensuring efficient resource allocation and setting targets.

2. **Cost Control & Reduction:** Identifies inefficiencies, wastage, and losses in materials, labor, and overhead, allowing management to take corrective action.

3. **Decision Making:** Provides data for critical choices like product pricing, make-or-buy decisions, optimal production levels, and expansion plans.

4. **Performance Measurement:** Standard costing and variance analysis compare actual results to standards, highlighting strengths and weaknesses.

5. **Profitability Analysis:** Helps determine the profitability of different products, departments, or activities.

6. **Policy Formulation:** Guides the creation of production, pricing, and expansion policies based on factual cost information.

Common Costing Techniques Used:

- **Standard Costing:** Sets benchmarks for costs to measure efficiency and control.

- **Marginal Costing:** Separates fixed/variable costs to analyze contribution margin and profitability at different volumes.

- **Activity-Based Costing (ABC):** Assigns costs to activities, providing deeper insights.

- **Target Costing:** Sets costs proactively based on market price and desired profit, ensuring competitiveness.

- **Process Costing:** For continuous production, determining costs at each stage.

Specimen of Cost sheet

Cost sheet of ...... for the month of Dec. 1999

Particulars	Total cost Rs.	Cost per unit Rs.
Direct material	xxx	
Direct labour	xxx	
Direct expenses	xxx	
Prime cost		xxxx
Add: Works overhead:		
Indirect materials		
Indirect wages		
Factory rent and rates		
Factory lighting and heating		
Power and fuel		
Repairs and maintenance		
Drawing office expenses		
Depreciation of plant and machinery		
Factory Stationery		
Insurance of factory		
Factory/works manager salary		
Water consumption in factory		
Works cost/Factory cost/Manufacturing cost		xxxx
Add: Office or Administration overheads:		
Office rent and rates		
Office lighting		
Office stationery		
Office furniture depreciation and repairs		
Office salaries		
Legal charges		
Bank commission		
Telephone and postages		
Office cleaning		
Cost of production		xxxx
Add: Selling and Distribution overheads		
Salesmen's salaries		
Salesmen's commission		
Showroom rent		
Showroom expenses		
Advertisement		
Sales office rent		
Travelling expenses		
Warehouse rent and rates		
Warehouse staff salaries		
Repairs and depreciation of delivery vans		
Carriage outward		xxxx
Cost of sales		xxxx
Profit		xxxx

ILLUSTRATIONS

(A) Simple Cost Sheet

Illustration 1

Prepare a Cost Sheet from the following data:

Particulars	Rs.	Rs.
Direct material consumed		50,000
Direct wages paid		40,000
Chargeable expenses		10,000
Indirect materials:		
Used in factory	8,000	
Used in office	12,000	
Used in selling	6,000	
Used in distribution	4,000	30,000
Indirect labour:		
In factory	15,000	
In office	20,000	
In selling	18,000	
In distribution	12,000	65,000
Indirect expenses:		
Relating to factory	6,000	
Relating to office	3,000	
Relating to selling	1,000	10,000

Solution:

Cost Sheet

Particulars	Rs.	Rs.
Direct material consumed		50,000
Direct wages		40,000
Chargeable expenses		10,000
Prime cost		**1,00,000**
Add: Factory overheads:		
Indirect material used in factory	8,000	
Indirect labour used in factory	15,000	
Indirect expenses used in factory	6,000	29,000
Factory cost		**1,29,000**
Add: Administration overheads:		
Indirect materials used in office	12,000	
Indirect labour in office	20,000	
Indirect expenses of office	3,000	35,000
Cost of production		**1,64,000**
Add: Selling and Distribution overhead:		
Indirect material used in selling	6,000	
Indirect labour in selling	18,000	
Indirect expenses for selling	1,000	25,000
Indirect material used for distribution	4,000	
Indirect wages for distribution	12,000	16,000
Cost of sales		**2,05,000**

Note: 'Chargeable expenses' is an alternative term for 'direct expenses'.

Illustration 2

You are required to compile a statement showing cost and profit from the information given, showing clearly: (a) Material consumed (b) Prime cost (c) Works cost (d) Cost of Production (e) Cost of Sales (f) Profit and (g) Sales.

	Rs.
Materials purchased	2,00,000
Wages	1,00,000
Direct expenses	20,000
Opening stock of materials	40,000
Closing stock of materials	60,000

Factory overhead is absorbed at 20% on wages. Administration overhead is 25% on the works cost. Selling and distribution overheads are 20% on the cost of production. Profit is 20% on sales.

Solution:

Statement of Cost and Profit

Particulars	Rs.	Rs.
Opening stock of materials	40,000	
Add: Purchase of materials	2,00,000	
	2,40,000	
Less: Closing stock of materials	60,000	
(A) Cost of materials consumed		1,80,000
Direct wages		1,00,000
Direct expenses		20,000
(B) Prime cost		3,00,000
Add: Factory overheads:		
20% of wages; 1,00,000 × 20%		20,000
(C) Works cost		3,20,000
Add: Administration overheads:		
25% on works cost : 3,20,000 × 25%		80,000
(D) Cost of production		4,00,000
Add: Selling and Distribution overheads :		
20% on cost of production: 4,00,000 × 20%		80,000
(E) Cost of sales		4,80,000
Add: (F) Profit:		
20% on sales or 25% on cost of sales		
4,80,000 × 25%		1,20,000
(G) Sales		6,00,000

Illustration 3

During the year 1998, X Ltd., produced 50,000 units of a product. The following were the expenses:

	Rs.
Stock of raw materials on 1-1-98	10,000
Stock of raw materials on 31-12-98	20,000
Purchases	1,60,000
Direct wages	75,000
Direct expenses	25,000
Factory expenses	37,500
Office expenses	62,500
Selling expenses	25,000

You are required to prepare a Cost sheet showing cost per unit and total cost at each stage.

Solution:

<div align="center">

Cost sheet of X Ltd.
for the year ending 31-12-1998

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(Output 50,000 units)

Particulars	Total Rs.	Per unit Rs. P.
Opening stock of raw materials	10,000	
Add: Purchase of raw materials	1,60,000	
	1,70,000	
Less: Closing stock of raw materials	20,000	
Raw materials consumed	1,50,000	3.00
Direct wages	75,000	1.50
Direct expenses	25,000	0.50
Prime cost	2,50,000	5.00
Add: Factory overheads	37,500	0.75
Factory cost	2,87,500	5.75
Add: Office overheads:	62,500	1.25
Cost of production	3,50,000	7.00
Add: Selling overhead	25,000	0.50
Cost of sales	3,75,000	7.50

(F) Cost Sheet – Tenders and Quotations

Illustration 13

The accounts of a machine manufacturing company disclose the following information for six months ending 31st December 1978.

	Rs.
Materials used	1,50,000
Direct wages	1,20,000
Factory overheads	30,000
Administrative expenses	15,000

Prepare the cost sheet of the machine and calculate the price which the company should quote for the manufacture of a machine requiring materials valued at Rs. 1,250 and expenditure in productive wages Rs. 750, so that the price might yield a profit of 20% on the selling price.

[Madras, B.Com., April 1983]

Solution:

Statement of Cost
For Six months ending 31-12-1978

Particulars	Rs.
Materials used	1,50,000
Direct wages	1,20,000
Prime cost	**2,70,000**
Add: Factory overheads	30,000
Factory cost	**3,00,000**
Add: Administrative overheads	15,000
Cost of production	**3,15,000**

Percentage of factory overheads to wages $= \dfrac{30,000}{1,20,000} \times 100 = 25\%$

Percentage of administrative overheads to works cost $= \dfrac{15,000}{3,00,000} \times 100 = 5\%$

Statement showing price to be quoted for a machine

Particulars	Rs. P
Materials	1,250.00
Production wages	750.00
Prime cost	**2,000.00**
Add: Factory overheads (25% of wages) $750 \times \dfrac{25}{100}$	187.50
Works cost	**2,187.50**
Add: Administrative overheads : 5% of works cots $2,187.5 \times \dfrac{5}{100}$	109.38
Cost of production	**2,296.88**
Add: Profit 20% on sales or 25% on cost $2,296.88 \times \dfrac{25}{100}$	574.22
Sale price to be quoted	**2,871.10**

Illustration 14

On August 15, 1991 a manufacturer Soman desired to quote for a contract for the supply of 500 radio sets. From the following details prepare a statement showing the price to be quoted to give the same percentage of net profit on turnover as was realised during 6 months ending on 30th June 1991:

	Rs.
Stock of material as on 1st Jan. 1991	20,000
Stock of material as on 30th June 1991	25,000
Purchase of materials during 6 months	1,50,000
Factory wages during 6 months	1,20,000
Indirect charges during 6 months	25,000
Opening stock of completed sets	Nil
Closing stock of completed sets	100
Sales during 6 months	3,24,000

The number of radio sets manufactured during these six months was 1450 sets including those sold and those stocked at the end of the period. The radios to be quoted are of uniform quality and size as were manufactured during the six months to 30th June 1991. As from August 1, the cost of factory labour has gone up by 10%.

[Bharathidasan, M.Com. April 1992]

Solution:

Statement of cost and profit of radio sets
for six months ending 30th June 1991

(Output 1,450 radios)

Particulars	Total Rs.	Per unit Rs. P.
Opening stock of material	20,000	
Add: Purchase of material	1,50,000	
	1,70,000	
Less: Closing stock of material	25,000	
Cost of materials consumed	1,45,000	100.00
Factory wages	1,20,000	82.76
Prime cost	2,65,000	182.76
Add: Indirect charges	25,000	17.24
Cost of production	2,90,000	200.00
Less: Closing stock of finished radios (100 × 200)	20,000	—
Cost of sales	2,70,000	200.00
Profit (Bal. fig.)	54,000	40.00
Sales (1,450 – 100 = 1,350 radios)	3,24,000	240.00

Note: (1) Indirect charges are assumed to include all overheads.

(2) Closing stock of 100 units are valued at the cost of production rate of Rs. 200 each.

Working notes:

(1) Profit percentage: On sales $= \dfrac{54,000}{3,24,000} \times 100 = 16\frac{2}{3}\%$

or on cost $= \dfrac{54,000}{2,70,000} \times 100 = 20\%$

(2) Factory wages per unit   82.76

Add: 10% in increase   8.28   (approx.)

Wages per unit for quotation   91.04

Statement showing quotation for 500 radio sets

Particulars	Total Rs.	Per unit Rs. P
Material	50,000	100.00
Factory wages	45,520	91.04
Prime cost	95,520	191.04
Add: Indirect charges	8,620	17.24
Cost of production (or) cost of sales	1,04,140	208.28
Profit at $16\frac{2}{3}\%$ on sale or 20% on cost	20,828	41.656
Selling price (or) quotation	1,24,968	249.936

Note: (1) Material and indirect charges are calculated on the basis of cost per unit as shown in the cost sheet for 30th June 1991.

(2) Factory wages are shown at 10% higher than the previous period.

(3) Profit is calculated at the same percentage as in the previous period as per instruction.

Illustration 15 ✓

From the following particulars you are required to prepare a statement showing (a) the cost of materials consumed (b) the prime cost (c) the works cost (d) the total cost (e) the percentage of works overhead to productive wages and (f) the percentage of general overhead to works cost.

	Rs.
Stock of finished goods on 1-1-1980	72,800
Stock of raw materials on 1-1-1980	33,280
Purchases of raw materials	7,59,200
Productive wages	5,16,880
Sales of finished goods	15,39,200
Stock of finished goods on 31-12-1980	78,000
Stock of raw materials on 31-12-1980	35,360
Works overhead charges	1,29,220
Office and general expenses	70,161

The company is about to send a tender for a large plant. The costing department has estimated that the materials required would cost Rs. 52,000 and the wages to workmen for making the plant would cost Rs. 31,200. The tender is to be made at a net profit of 20% on the selling price. Show what the amount of tender would be, if it is based on the above percentages.

[Madras, B.Com., (ICE) May 2000 (Old);
Madras, B.A. Corp., Sep. 1988]

Solution:

Statement showing Cost and Profit
for the year ended 31st Dec. 1980

Particulars	Rs.	Rs.
Opening stock of raw materials	33,280	
Add: Purchase of raw materials	7,59,200	
	7,92,480	
Less: Closing stock of raw materials	35,360	
(a) Cost of materials consumed		7,57,120
Productive wages		5,16,880
(b) Prime cost		12,74,000
Works overheads		1,29,220
(c) Works cost		14,03,220
Office and general expenses		70,161
(d) Total cost		14,73,381
Add: Opening stock of finished goods		72,800
		15,46,181
Less: Closing stock of finished goods		78,000
Cost of goods sold		14,68,181
Profit (Bal. fig.)		71,019
Sales		15,39,200

(e) Percentage of works overhead to productive wages $= \dfrac{1,29,220}{5,16,880} \times 100 = 25\%$

(f) Percentage of general overhead to works cost $= \dfrac{70,161}{14,03,220} \times 100 = 5\%$

Tender for Large Plant

Particulars	Rs.
Materials	52,000
Wages	31,200
Prime cost	83,200
Add: Works overheads	
25% of wages – $31,200 \times \dfrac{25}{100}$	7,800
Works cost	
Add: Office and general overheads	91,000
5% of works cost – $91,000 \times \dfrac{5}{100}$	4,550
Total cost	95,550
Profit, at 20% on selling price (or) 25% on cost = $95,550 \times \dfrac{25}{100}$	23,888
Tender price of plant	1,19,438

Note: Since, selling and distribution overhead are not separately given, office and general overheads is taken as the total of all the overheads except works overhead. So, the total after adding the office and general overheads is 'Total cost'.

UNIT-II

MATERIAL CONTROL

Introduction:

Materialcontrolisasystemwhichensuresthatrightqualityof materialisavailableintherightquantityattherighttimeandrightplace with the right amount of investment. itcan be defined as a comprehensiveframeworkfor the accounting and control of material cost designed with theobjectofmaintainingmaterialsuppliesatalevelsoastoensure uninterrupted production but at the same time minimizing investment of funds in simple words material control is a systematic control over the purchasing,storing andusing ofmaterialssoastohavetheminimum possible cost of materials.

Need for material control:

The need for material control is to **ensure the right materials are available at the right time, quantity, and quality, at the lowest possible cost,** preventing production halts, minimizing waste, reducing capitalized upon inventory,andimprovingefficiencythroughaccuratetracking,therebyboosting profitability and operational smoothness. it's crucial for avoiding shortages, overstocking, spoilage, and theft, supporting better decision-making and financial management.

1. Availability of materials:

There should be a continuous availability of all types of materials in the factory a the production may not be held up for want of any material. minimum quantity of each material isfixed to permit production tomove on schedule.

2. No excessive investment in materials:

There should be no excessive investment in stocks. investment in materials must not tie up funds that could be better used in other activities. overstocking should be avoided keepingin view the disadvantagesit carries.for this purpose,amaximum quantity is assigned to each item ofmaterial above which stock should not be exceeded.

3.Reasonableprice:

While purchasing materials, it is seen that it is purchased at are a low price. quality is not to be sacrificed at the cost of the lower price. The material purchased should be of that quality alone which is needed.

4.Minimumwastage:

There should be minimum possible was tag of materials while these are being stored in the go-downs by storekeeper oruse din the factory by the workers. Wastage should be allowed up to acertain level known as normal level of wastage and it shouldnot exceedthat level. leakage or theft ofmaterialsmust be avoided to keep the cost of production under control.storekeeper and workers should be trained to handle thematerialsin a scientific way to avoid the wastage.the storekeeperis to keep the storesneatandtidy toavoidthewastageduetorust,dustordirt.

5.Noriskofspoilageandobsolescence:

In order to avoid spoilage and obsolescence, a maximum quantity ofeach material is determined and a proper method of issue of materialsisfollowed.thematerialsreceivedearliershouldbeissuedearlier.

6.Readyinformationaboutavailabilityofmaterials:

The storekeeper can supply thisinformation becausehe keeps an up-to-date record of every item of stocksunder a proper system of materialcontrol.

7.Misappropriationofmaterial:

Material can be easily misappropriated by employees becausegenerally misappropriation of cash i considered to bemore serious thanmisappropriation in kind. therefore, thisrequires an internal check onmaterialswhichisapart of material control.

8.Rightamountofpaymenttosuppliers:

Invoices received from suppliers should be approved or payment only if the items of materials ordered have been received and properly checked to avoid excess payment to suppliers.

Levels of material control:

- **Re-order Level:** The stock level at which a new order should be placed for fresh supplies (Reorder Level = Max Usage x Max Lead Time).

- **Minimum Stock Level:** The lowest stock to hold; prevents stockouts (Min Level = Reorder Level - (Normal Usage x Normal Lead Time)).

- **Maximum Stock Level:** The highest level to hold to avoid overstocking (Max Level = Reorder Level + Reorder Quantity - (Min Usage x Min Lead Time)).

- **Danger Level:** A critical low point requiring immediate emergency purchase to prevent production stoppage (Danger Level = Avg Usage x Max Lead Time).

- **Average Stock Level:** A measure of typical stock held (Avg Level = Min Level + 1/2 Reorder Quantity).

What is ABC analysis in cost accounting?

The term "ABC" refers to Activity-Based Costing, a method that categorizes and classifies items or activities based on their relative importance to a business's overall cost structure. This analysis assists businesses in more accurately allocating expenses by prioritizing inventory with the highest annual consumption value.

The analysis involves classifying items or products into three categories:

- A-Items: These are high-priority products or items with the highest sales value or profitability and contribute substantially to the total cost.

- B-Items: These are moderate-priority products with a moderate sales value and have a moderate impact on the total cost.

- C-Items: These are low-priority items with the lowest sales value and have a minor impact on the total cost.

Advantages of ABC analysis in cost accounting

- The ABC analysis provides better control of high-priority inventory, allowing businesses to focus on the (A-items) with the highest customer demand or products that are often required and have the highest sales value.

- It can further improve cost control by providing precise insights that allow organizations to better track and manage costs by focusing on the items that have the greatest impact on total costs.

- ABC analysis enhances strategic decision-making by improving the understanding of cost drivers. This includes decisions related to the assortment of products, process improvements, and overall business strategy.

- Furthermore, ABC analysis identifies inefficiencies and highlights non-value-added items, allowing companies to focus on these areas for improvement. This can lead to cost savings and process improvements.

- Accurate cost information from ABC analysis allows for more realistic budgeting and planning. Based on a thorough understanding of cost structures, organizations may define more accurate financial objectives and manage resources.

Disadvantages of ABC analysis:

- **Substantial resource requirements:** including significant effort and time, pose challenges, particularly for businesses operating with limited resources or tight schedules. The combination of inaccuracies or outdated information, along with the resource-intensive nature of the process, can result in flawed outcomes, compromising the reliability of the analysis.

- **Costing incompatibility:** ABC inventory analysis is incompatible with typical costing systems and does not comply with generally accepted accounting principles (GAAP) standards. If you have to operate multiple costing systems, labor costs may rise due to increased inefficiency.

- **Loss risk:** The continual exposure of excess stock to damage or loss is a weakness in ABC analysis. The lower value of B and C items does not always make them useless in comparison to Class A products. As a result, products that are regularly overlooked or not checked risk being lost.

- **Short-term strategy:** ABC analysis may emphasize short-term, measurable activities, potentially neglecting long-term strategic considerations and investments that are essential for future growth.

- **Shared resource allocation:** Allocating costs to activities that share resources across multiple products or services can be challenging. This is because determining fair and accurate allocations may lead to complexities in the process of resource distribution.

7 Essential Implementation Steps for ABC Analysis

To achieve the successful integration of Activity-Based Costing (ABC) analysis into an organization's cost management system, several essential steps must be considered. Here are the key steps for ABC analysis implementation:

1- Identify Activities

Identify all organizational activities that contribute to the production of products or services. This involves understanding the processes and tasks involved in delivering value to consumers.

2- Activity Analysis

The objective is to meticulously analyze, understand, allocate, and track expenses linked to organizational operations. This comprehensive study aims to uncover the underlying costs of products or services, offering insights into all aspects of the products.

3- Assign Costs to Activities

Assign direct and indirect costs to each identified activity. This step involves understanding the resource consumption associated with each activity.

4- Determine Activity Rates

Calculate Activity Rates by assigning financial values to factors such as direct and indirect labor. Ensure that all relevant weightings, such as benefit costs, are taken into account. For example, you may express production work hours as a weighted labor rate.

5- Allocate Costs to Products/Services

Apply the calculated activity rates to products or services based on their consumption of the respective cost drivers. This step assigns costs more accurately to products.

6- Communication and Training

Instruct the right people on the new ABC methodology. Communicate the changes and benefits of ABC analysis to employees at all levels to ensure understanding and cooperation.

7- Continuous Improvement and Refinement

Continuously refine the ABC model based on feedback, changes in the business environment, and evolving cost structures. Periodic reviews and adjustments help maintain accuracy.

What Is a Perpetual Inventory System?

A perpetual inventory system is a computerized system that continuously records inventory changes in real-time. This reduces or, in some cases, eliminates the need for physical inventory checks. Relying on data provided by electronic point-of-sale technology, it provides a highly detailed view of changes in inventory and immediate reporting on the amount of inventory in stock.

Perpetual inventory systems are suitable for large companies with complex inventories and high sales volumes. Perpetual inventory systems differ from periodic inventory systems, in which a company must instead depend on regularly scheduled physical counts. However, there is the occasional need for physical counts to verify inventory accuracy.

Advantages in Cost Accounting:

- **Real-Time Accuracy**: Continuously tracks inventory, providing instant updates on stock levels, sales, and returns, eliminating the need for lengthy manual counts.

- **Automated Cost of Goods Sold (COGS)**: Automatically updates COGS with every sale, offering precise, real-time profitability insights.

- **Reduced Shrinkage & Discrepancies**: Quickly identifies losses from theft, damage, or errors, improving overall inventory control.

- **Data-Driven Decisions**: Real-time data supports better purchasing, pricing, and stock optimization, preventing stock outs and overstocking.

- **Streamlined Financials**: Integrates with accounting software for immediate, accurate financial statements and easier tax prep.

- **Improved Efficiency**: Automates tasks, reduces manual labor for stocktaking, and frees up staff for more strategic work.

- **Enhanced Customer Service**: Ensures product availability, boosting customer trust and loyalty.

Purchasing of materials

Purchasing of materials refers to the procurement of materials for a price. It is usually handled by a specific department (e.g., purchase manager in the procurement department), particularly in large companies.

Procedure and documentation involved in purchasing:

Identifying a need, creating a Purchase Requisition (PR), getting it approved, selecting a supplier (often via RFQ/Quotation), issuing a formal Purchase Order (PO), getting supplier confirmation, receiving goods/services, and then matching the PO, Goods Receipt Note (GRN), and Invoice before payment and record-keeping.

Purchasing Procedure & Documentation Example

1. Need Identification & Planning

- **Action:** A department identifies a need (e.g., new laptops, raw materials).

- **Document: Purchase Requisition (PR)** – Internal form detailing item, quantity, specs, and justification.

2. Approval & Supplier Selection

- **Action:** PR is reviewed for budget/policy, then approved. Procurement identifies suppliers, sends out RFQs (Request for Quotation).

- **Document:** Approved PR, RFQ/Quote Comparison Sheet, Supplier Master List.

3. Ordering

- **Action:** A formal Purchase Order (PO) is created and sent to the chosen supplier.

- **Document: Purchase Order (PO)** (includes buyer/supplier details, items, price, terms).

4. Order Confirmation & Delivery

- **Action:** Supplier confirms the PO and delivers goods/services.

- **Document:** Supplier Order Confirmation, **Goods Receipt Note (GRN)** or Delivery Challan (signed upon receipt).

5. Invoice & Payment Processing (3-Way Match)

- **Action:** Supplier sends an invoice; Finance matches PO, GRN, and Invoice (3-way match) before payment.

- **Document: Supplier Invoice**, Payment Voucher.

6. Record Keeping & Closure

- **Action:** All documents are filed, payments recorded, and supplier performance reviewed.

- **Document:** Payment Records, Closed PO file, Performance Review Reports.

Key Documents Summary:

- **Purchase Requisition (PR):** Internal request.

- **Request for Quotation (RFQ):** Request for supplier pricing.

- **Purchase Order (PO):** Official commitment to buy.

- **Goods Receipt Note (GRN):** Proof of delivery/receipt.

- **Invoice:** Supplier's bill for payment.

Store Requisition:

A Store Requisition is a formal, internal request document used by an employee or department to ask for specific supplies, materials, or items from a central store or warehouse within the same organization, ensuring proper authorization, tracking, and control over inventory movement before items are issued. It acts as an internal control document, detailing item codes, quantities, department, and approvals, forming part of the Procure-to-Pay (P2P) cycle for better stock management.

A stores requisition is a form that a user fills out when removing parts from storage. The form is used by the organization's cost accounting system to charge the cost of the parts to a job, as well as to track inventory levels. When inventory is being sent to a department, the form is the basis for a charge to that department, and so is considered a source document of the accounting system.

Components of a Store Requisition Form:
- **Request Details:** Requisition Number, Date, Requesting Department/Employee.

- **Item Details:** Item Code, Description, Unit of Measure, Quantity Requested.

- **Project/Site Info:** Project Number, Site Location (if applicable).

- **Approval Signatures:** Requestor, Approving Manager, Storekeeper/Issuer, Receiver.

- **Issuance Details:** Quantity Issued, Date Issued, Remarks.

Purpose and Process:
1. **Initiation:**

An employee needs items (e.g., office supplies, raw materials, tools) and fills out a requisition form.

2. **Approval:**

The form is signed by the employee and their supervisor, verifying the need and budget.

3. **Issuance:**

The storekeeper checks availability, issues the items, and records the quantity taken.

4. **Tracking:**

The form creates an audit trail, linking the item back to the original request and department, preventing misuse and aiding inventory control.

5. **Automation:**
Modern systems use electronic Purchase Requisitions (PRs) that integrate into Procure-to-Pay (P2P) systems for automated approval and tracking.

Stores control:

stores control (or inventory control) is the systematic management of materials (raw, WIP, finished goods, etc.) from purchase to usage to minimize costs, prevent waste/theft, ensure timely supply for production, and provide accurate valuation for financial reporting, using methods like bin cards, stores ledgers, codification, and stock verification to balance availability with holding costs. It ensures the right stock quantity is available at the right time and cost, linking physical storekeeping with financial tracking.

Aspects & Functions:

- **Classification & Codification:** Assigning codes (numbers/letters) for easy identification and management of different materials.

- **Receipt & Storage:** Proper documentation and storage of incoming materials (temperature, space, security).

- **Issuing Materials:** Releasing materials against authorized requisitions (e.g., Material Requisition Slips) to production or other departments to prevent misuse.

- **Record Keeping:** Maintaining accurate records like **Bin Cards** (quantitative, physical stock) and **Stores Ledger** (quantitative & monetary value) for control and costing.

- **Stock Verification:** Regularly reconciling physical stock with book records (Cycle Counting, Physical Inventory).

- **Cost Control:** Using methods like FIFO, LIFO, or Average Cost to value material issues, influencing product cost and profit.

- **Reorder Levels:** Setting minimum stock points to trigger timely replenishment orders (e.g., Economic Order Quantity - EOQ).

Importance in Cost Accounting

- **Accurate Costing:** Provides reliable data for valuing materials consumed in production, affecting product costing and pricing.

- **Waste Reduction:** Minimizes spoilage, obsolescence, and theft by tracking movement closely.

- **Cash Flow Improvement:** Prevents tying up excessive capital in dead or slow-moving stock.

- **Production Efficiency:** Ensures materials are available when needed, preventing costly production delays.

- **Financial Control:** Supports inventory valuation for balance sheets and financial statements.

Methods for valuing material issues:

Methods for valuing material issues determine the cost assigned to materials used in production, primarily categorized into **Cost Price Methods** (FIFO, LIFO, Specific Price), **Average Price Methods** (Simple, Weighted, Periodic), and **Other Methods** (Standard Cost, Replacement Cost, Base Stock), each impacting inventory valuation and cost of goods sold differently by assuming different material flow patterns or using predetermined costs.

1. Cost Price Methods (Actual Cost Basis)

- **FIFO (First-In, First-Out):** Assumes oldest inventory items are used first, so issues are costed at the earliest purchase prices, reflecting current costs.

- **LIFO (Last-In, First-Out):** Assumes newest items are used first, costing issues at the most recent purchase prices, better reflecting current market costs but potentially distorting inventory value.

- **Specific Identification:** Each material issue is costed at its exact purchase price, ideal for unique, high-value items.

- **HIFO (Highest-In, First-Out):** Prices the most expensive materials first, useful in inflationary periods.

2. Average Price Methods
- **Simple Average Cost:** Averages the unit costs of all purchases in a period, ignoring quantities.

- **Weighted Average Cost (Moving/Periodic):** Calculates an average cost based on total cost and total quantity, smoothing out price fluctuations.

3. Other/Advanced Methods
- **Standard Cost:** Uses pre-determined costs (standards) for materials, with cost variances tracked separately, simplifying accounting and aiding control.

- **Replacement Cost:** Prices issues at the current market price to replace them, reflecting current economic conditions.

- **Base Stock:** Maintains a fixed minimum level of stock at a historical cost and prices new

- issues at current costs.

(a) Reorder Level or	= Maximum Consumption × Maximum reorder period
R. L	= M.C. × M.R.P.
(b) Minimum Level or	= Reorder level *minus* (Normal consumption × Normal reorder period)
Min. L.	= R. L. – (N.C. × N.R.P.)
(c) Maximum Stock Level or	= Reorder Level + Reorder Quantity – (Minimum Consumption × Minimum Reorder period)
Max. L	= R.L. + R.Q – (Min C. × Min. R.P.)
(d) Average level	= Minimum level + $\frac{1}{2}$ of reorder quantity
	or
	$\frac{1}{2}$ (Maximum level + Minimum level)
(d) Danger Level	= Average Consumption × Maximum reorder period for emergency purchases

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

where

EOQ = Economic Ordering Quantity

A = Annual consumption or usage of material in units.

B = Buying cost per order.

C = Cost per unit.

S = Storage and carrying cost per annum.

II. EOQ – ECONOMIC ORDERING QUANTITY

(A) Simple Problems

Illustration 1

Find out the economic order quantity (EOQ) from the following particulars:

Annual usage : 6,000 units

Cost of Material per unit : Rs. 20

Cost of placing and Receiving one order : Rs.60. Annual carrying cost of one unit : 10% of Inventory value.

[Madurai, B.B.A., Nov. 1991]

Solution:

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

where :

A = Annual Usage

B = Buying cost per order

C = Cost per unit

S = Storage and carrying cost per unit

$$EOQ = \sqrt{\frac{2 \times 6,000 \times 60}{20 \times \frac{10}{100}}}$$

= 600 Units

(B) EOQ-with ordering schedule

Illustration 2

Find out the economic order quantity and the number of orders per year from the following information:

Monthly consumption 3,000 units.

Cost per unit Rs.54

Ordering cost Rs.150 per order.

Inventory carrying cost 20% of the average inventory.

[I.C.W.A adapted]

Solution:

Annual consumption = 3,000 × 12 = 36,000 units

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

where

A = Annual usage of Material

B = Buying cost per order

C = Cost per unit

S = Storage and carrying cost per unit.

$$EOQ = \sqrt{\dfrac{2 \times 36,000 \times 150}{54 \times \dfrac{20}{100}}} = \sqrt{10,00,000}$$

$$= 1,000 \text{ units.}$$

$$\text{Number of orders per year} = \dfrac{36,000}{1,000} = 36$$

(C) EOQ – When Material usage is given in Rupees

Illustration 3

You are required to compute the economic ordering quantity and the frequency of the orders in terms of days, from the data given below :

Consumption of Material per annum Rs. 8,000

Ordering Costs per order Rs. 25

Storage and carrying cost per annum 10% of inventory value.

Solution:

$$EOQ = \sqrt{\dfrac{2AB}{S}}$$

where

EOQ = Economic ordering quantity in rupees.

A = Annual consumption of material in rupees.

B = Buying cost per order.

S = Storage and carrying cost %

$$EOQ = \sqrt{\dfrac{2 \times 8,000 \times 25}{\dfrac{10}{100}}} = \sqrt{\dfrac{2 \times 8,000 \times 25 \times 100}{10}}$$

$$= \sqrt{40,00,000} = Rs.2,000$$

$$\text{Frequency of orders in terms of days} = \dfrac{\text{Days in the year}}{\text{No. of orders per Annum}}$$

$$\text{No. of orders per Annum} = \dfrac{\text{Annual Consumption}}{\text{EOQ}}$$

$$= \dfrac{8,000}{2,000} = 4$$

$$\text{Frequency of orders} = \dfrac{365}{4} = 91.25 \text{ (or) 91 days}$$

Note : Since Annual consumption is given in Rupees instead of units, the formula for

(F) EOQ – Computation through different methods

Illustration 6

Calculate EOQ from the following information using: (i) Formula method (ii) Tabular method (iii) Graphic method (iv) Algebraic method :

    a) Annual consumption of material : 600 units.

    b) Ordering cost Rs. 12 per order.

    c) Price per unit Rs. 20.

    d) Carrying cost per annum 20%

[B.Com. Bharathidasan Adapted]

Solution:

(i) Formula Method :

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

where

A	=	Annual usage
B	=	Buying cost per order.
C	=	Cost per unit
S	=	Storage and carrying cost per unit.

$$EOQ = \sqrt{\frac{2 \times 600 \times 12}{20 \times \frac{20}{100}}}$$

$$= \sqrt{\frac{2 \times 600 \times 12}{4}} = 60 \text{ Units}$$

(ii) Tabular Method :

Annual demand (1)	No. of orders (2)	Units per order (3) $(3) = \frac{(1)}{(2)}$	Cost of order (4) $(4) = (3) \times 20$	Average Inventory (5) $(5) = \frac{(4)}{(2)}$	Carrying cost (6) $(6) = (5) \times \frac{20}{100}$	Ordering cost (7)	Total cost (8) $(8) = (6) + (7)$
600 units	1	600	12,000	6,000	1,200	12	1,212
	2	300	6,000	3,000	600	24	624
	3	200	4,000	2,000	400	36	436
	4	150	3,000	1,500	300	48	348
	5	120	2,400	1,200	240	60	300
	6	100	2,000	1,000	200	72	272
	7	86	1,720	860	172	84	256
	8	75	1,500	750	150	96	246
	9	67	1,340	670	134	108	242
	10	60	1,200	600	120	120	240
	11	54	1,100	550	110	132	242
	12	50	1,000	500	100	144	244

III – COMPUTATION OF STOCK LEVELS

(A) Stock levels for one material

Illustration 1

Material 'A' is used as follows :

Maximum usage in a month	600 Nos.
Minimum usage in a month	400 Nos.
Average usage in a month	450 Nos.

Lead time : Maximum 6 months, minimum 2 months.

Reorder Quantity : 1,500 Nos.

Maximum reorder period for emergency purchases – 1 month.

Calculate
- (a) Reorder level
- (b) Maximum level
- (c) Minimum level
- (d) Average stock level
- (e) Danger level

Solution:

The terms 'Lead-Time' and 'Reorder period' mean the same thing.

'Usage' and 'Consumption' are also used as alternative terms.

(a) *Reorder level* $=$ Maximum consumption × Maximum reorder period

$=$ 600 Units × 6 Months

$=$ 3,600 Units

(b) *Maximum stock level* $=$ Reorder level + Reorder quantity – (Minimum consumption × minimum reorder period)

$=$ 3,600 + 1,500 – (400 × 2)

$=$ 5,100 – 800 = 4,300 units

(c) *Minimum stock level* $=$ Reorder level – (Normal Consumption × Normal reorder period)

$$= 3,600 - \left(450 \times \frac{(6+2)}{2} \right)$$

$$= 3,600 - (450 \times 4)$$

$$= 1,800 \text{ units}$$

where

Normal reorder period $= \dfrac{\text{Maximum Reorder period} + \text{Minimum reorder period}}{2}$

(d) *Average stock level* $= \dfrac{\text{Maximum stock level} + \text{Minimum stock level}}{2}$

$$= \frac{4,300 + 1,800}{2} = 3,050 \text{ units}$$

Average stock level is also calculated by using the following formula :

$$= \text{Minimum stock level} + \frac{1}{2} \text{ of reorder quantity}$$

$$= 1{,}800 + \left(\frac{1}{2} \times 1{,}500\right)$$

$$= 2{,}550 \text{ Units}$$

However, the former method is more popular.

(e) Danger level $= $ Average consumption × Maximum reorder period for emergency purchases

$$= 450 \text{ units} \times 1 \text{ month} = 450 \text{ units}.$$

Illustration 2

In a company, weekly minimum and maximum consumption of material A are 25 and 75 units respectively. The reorder quantity as fixed by the company is 300 units. The material is received within 4 to 6 weeks from issue of supply order. Calculate minimum level and maximum level of material A.

[C.A. Inter, May 1995]

Solution:

Reorder level $= $ Maximum consumption × Maximum reorder period

$$= 75 \times 6 = 450 \text{ units}$$

Maximum stock level $= $ Reorder level + Reorder quantity – (Minimum consumption × Minimum reorder period)

$$= 450 + 300 - (25 \times 4)$$

$$= 650 \text{ units}$$

Minimum Stock level $= $ Reorder level – (Normal Consumption × Normal reorder period)

$$= 450 - \left(\frac{(25+75)}{2} \times \frac{(4+6)}{2}\right)$$

$$= 450 - (50 \times 5)$$

$$= 200 \text{ units}$$

where

$$\text{Normal Consumption} = \frac{\text{Maximum Consumption + Minimum Consumption}}{2}$$

where

$$\text{Normal reorder period} = \frac{\text{Maximum reorder period + Minimum reorder period}}{2}$$

Illustration 3

Compute the various stock levels from the following data :

Maximum consumption in a month – 300 units.

Minimum usage in a month – 200 units.

Average usage in a month – 225 units.

Time-lag for procurement of materials :

Maximum 6 months

Minimum 2 months

Reorder quantity 750 units.

[Madras, B.Com., Sept. 1991]

Solution:

The terms 'Time-lag', 'lead-time', Reorder period, etc., are used interchangeably. Similar is the case with 'usage' and 'consumption'.

(a) *Reorder level* = Maximum consumption × Maximum reorder period

= 300 × 6 = 1,800 units

(b) *Maximum stock level* = Reorder level + Reorder Quantity – (Minimum consumption × Minimum reorder period)

= 1,800 + 750 – (200 × 2)

= 2,150 units

(c) *Minimum stock level* = Reorder level – (Normal Consumption × Normal reorder period)

= 1,800 – (225 × 4)

= 900 units

(d) *Average stock level* = Minimum stock level + $\frac{1}{2}$ of reorder quantity

= $900 + \left(\frac{1}{2} \times 750\right)$

= 1,275 units

or

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

= $\dfrac{2,150 + 900}{2}$

= 1,525 units

IV. PRICING OF MATERIAL ISSUES

A) First in First out method (FIFO) (Without Returns And losses)

Illustration 1

From the particulars given below write up the stores ledger card :

1988

January	1	Opening stock	1,000 units at Rs. 26 each.
	5	Purchased	500 units at Rs. 24.50 each.
	7	Issued	750 units.
	10	Purchased	1,500 units at Rs. 24 each.
	12	Issued	1,100 units.
	15	Purchased	1,000 units at Rs. 25 each.
	17	Issued	500 units.
	18	Issued	300 units.
	25	Purchased	1,500 units at Rs. 26 each.
	29	Issued	1,500 units.

Adopt the FIFO method of issue and ascertain the value of the closing stock.

[Madras, B.A. Corp., Sept. 1988]

Solution:

Stores Ledger Account

FIFO Method

Name : ——————
Code No.: ——————
Description: ——————

Maximum level : ——————
Minimum level : ——————
Reorder level : ——————
Reorder quantity: ——————

Folio No. ——————
Bin. No. ——————
Location code: ——————

Date	Particulars or Reference	Receipts			Issues			Balance		
		Qty. Units	Rate Rs. P	Amount Rs.	Qty. Units	Rate Rs. P.	Amount Rs.	Qty. Units	Rate Rs. P.	Amount Rs.
1998										
Jan. 1	Balance B/d							1,000	26.00	26,000
5	G.R.N. No	500	24.50	12,250				1,000	26.00	26,000
								500	24.50	12,250
7	M.R. No.				750	26.00	19,500	250	26.00	6,500
								500	24.50	12,250
10	G.R.N. No	1,500	24.00	36,000				250	26.00	6,500
								500	24.50	12,250
								1,500	24.00	36,000
12	M.R. No.				250	26.00	6,500			
					500	24.50	12,250			
					350	24.00	8,400	1,150	24.00	27,600
					1,100					
15	G.R.N. No.	1,000	25.00	25,000				1,150	24.00	27,600
								1,000	25.00	25,000
17	M.R.No.				500	24.00	12,000	650	24.00	15,600
								1,000	25.00	25,000
18	M.R.No.				300	24.00	7,200	350	24.00	8,400
								1,000	25.00	25,000
25	G.R.N.No.	1,500	26.00	39,000				350	24.00	8,400
								1,000	25.00	25,000
								1,500	26	39,000
					350	24.00	8,400			
					1,000	25.00	25,000			
					150	26.00	3,900	1,350	26.00	35,100
29	M.R. No.				1,500					

Closing stock 1,350 units at Rs. 26 each = Rs.35,100

Note : G.R.N. No. = Goods Received note number.

M.R. No. = Material Requisition Number.

(B) Last in first out method (LIFO) (Without Returns and Losses)

Illustration 2

Prepare stores ledger account under LIFO method from the information given in Illustration 1 above.

Solution:

Stores Ledger Account
(LIFO Method)

Name : ——— Maximum level : ——— Folio No. ———
Code No.: ——— Minimum level : ——— Bin. No. ———
Description: ——— Reorder level : ——— Location code: ———

Date	Particulars or Reference	Receipts Qty. Units	Rate Rs.P.	Amount Rs.	Issues Qty. Units	Rate Rs. P.	Amount Rs.	Balance Qty. Units	Rate Rs. P.	Amount Rs.
1998										
Jan. 1	Balance B/d							1,000	26.00	26,000
5	G.R.N.No.	500	24.50	12,250				1000	26.00	26,000
								500	24.50	12,250
					500	24.50	12,250	750	26.00	19,500
					250	26.00	6,500			
7	M.R. No.				750					
10	G.R.N.No.	1,500	24.00	36,000				750	26.00	19,500
								1,500	24.00	36,000
12	M.R. No.				1,100	24.00	26,400	750	26.00	19,500
								400	24.00	9,600
15	G.R.N.No.	1,000	25.00	25,000				750	26.00	19,500
								400	24.00	9,600
								1,000	25.00	25,000
17	M.R. No.				500	25.00	12,500	750	26.00	19,500
								400	24.00	9,600
								500	25.00	12,500
18	M.R. No.				300	25.00	7,500	750	26.00	19,500
								400	24.00	9,600
								200	25.00	5,000
25	G.R.N.No.	1,500	26.00	39,000				750	26.00	19500
								400	24.00	9,600
								200	25.00	5,000
								1,500	26.00	39,000
29	M.R. No.				1,500	26.00	39,000	750	26.00	19,500
								400	24.00	9,600
								200	25.00	5,000

Closing Stock = 1,350 units, valued at Rs.34,100 (750 × 26 + 400 × 24 + 200 × 25)

Note : G.R.N.No.= Goods Received Note Number; M.R.No.= Material Requisition Number

(c) FIFO Method (With Returns and Losses of Material)
Illustration 3

Draw a stores ledger card recording the following transactions under (a) FIFO method and (b) LIFO method.

1998 July 1 Opening stock 2,000 unit at Rs.10 each.
          5 Received 1,000 units at Rs.11 each
          6 Issued 500 units.
       10 Received 5,000 units at Rs.12 each.
       12 Received back 50 units out of the issue made on 6th July.
       14 Issued 600 units.
       18 Returned to supplier 100 units out of goods received on 5th.
       19 Received back 100 units out of the issue made on 14th July.
       20 Issued 150 units.
       25 Received 500 units at Rs.14 each.
       28 Issued 300 units.

The stock verification report reveals that there was a shortage of 10 units on 18th July and another shortage of 15 units on 26th July.

Solution:

Stores Ledger Account

(FIFO Method)

Name : ——————   Maximum level : ——————   Folio No. ——————
Code No.: ——————   Minimum level : ——————   Bin. No. ——————
Description: ——————   Reorder level : ——————   Location code: ——————
                      Reorder quantity: ——————

Date	Particulars or Reference	Receipts Qty. Units	Rate Rs. P.	Amount Rs.	Issues Qty. Units	Rate Rs. P.	Amount Rs.	Balance Qty. Units	Rate Rs. P.	Amount Rs.
1998										
Jul. 1	Balance B/d							2,000	10	20,000
5	G.R.N.No.	1,000	11	11,000				2,000	10	20000
								1,000	11	11,000
6	M.R.No.				500	10	5,000	1,500	10	15,000
								1,000	11	11,000
10	G.R.N.No.	5,000	12	60,000				1,500	10	15000
								1,000	11	11,000
								5,000	12	60,000
12	Mat. Retd. Note No.	50	10	500				1,500	10	15,000
								1,000	11	11,000
								5,000	12	60,000
								50	10	500

Date	Particulars or Reference	Receipts			Issues			Balance		
		Qty. Units	Rate Rs. P.	Amount Rs.	Qty. Units	Rate Rs. P.	Amount Rs.	Qty. Units	Rate Rs. P.	Amount Rs.
								900	10	9,000
					600	10	6,000			
14	M.R.No.							1,000	11	11,000
								5,000	12	60,000
								50	10	500
18	Debit Note. No. Shortage				100	11	1,100	890	10	8,900
					10	10	100	900	11	9,900
								5,000	12	60,000
								50	10	500
19.	Mat. Retd. Note. No.	100	10	1,000				890	10	8,900
								900	11	9,900
								5,000	12	60,000
								50	10	500
								100	10	1,000
20	M.R.No.				150	10	1,500	740	10	7,400
								900	11	9,900
								5,000	12	60,000
								50	10	500
								100	10	1,000
25	G.R.N.No.	500	14	7,000				740	10	7,400
								900	11	9,900
								5,000	12	60,000
								50	10	500
								100	10	1,000
								500	14	7,000
26	Shortage				15	10	150	725	10	7,250
								900	11	9,900
								5,000	12	60,000
								50	10	500
								100	10	1,000
								500	14	7,000
28	M.R.No.				300	10	3,000	425	10	4,250
								900	11	9,900
								5,000	12	60,000
								50	10	500
								100	10	1,000
								500	14	7,000

Closing Stock = 6,975 units, valued at Rs. 82,650

$(425 \times 10 + 900 \times 11 + 5,000 \times 12 + 50 \times 10 + 100 \times 10 + 500 \times 14)$

(G) Highest in First out method (HIFO)
Illustration 7

Laxmi and Co. has purchased and issued material D as under.

1998

May 1 Opening stock 2,000 units at Rs.5 per unit.

3 Purchased 500 units at Rs.6 per unit.

5 Purchased 700 units at Rs.6.5 per unit.

10 Issued 800 units.

11 Purchased 300 units at Rs.8 per unit.

15 Purchased 200 units at Rs.7 per unit.

18 Issued 400 units.

25 Purchased 200 units at Rs.9 per unit.

28 Purchased 150 units at Rs.8.5 per unit.

30 Issued 200 units.

Ascertain the closing stock value under HIFO method of pricing of issues.

Solution:

Stores Ledger Account
(HIFO Method)

Name :———

Code No.:———

Description: ———

Maximum level :———

Minimum level :———

Reorder level :———

Reorder quantity:———

Folio No. ———

Bin. No. ———

Location code:———

Date	Particulars or Reference	Receipts			Issues			Balance		
		Qty. Units	Rate Rs. P.	Amount Rs.	Qty. Units	Rate Rs. P.	Amount Rs.	Qty. Units	Rate Rs. P.	Amount Rs.
1998										
May 1	Balance B/d							2,000	5.00	10,000
3	G.R.N.No.	500	6.00	3,000				2,000	5.00	10,000
								500	6.00	3,000
5	G.R.N.No.	700	6.50	4,550				2,000	5.00	10,000
								500	6.00	3,000
								700	6.5	4,550
					700	6.50	4,550	2,000	5.00	10,000
					100	6.00	600	400	6.00	2400
10	M.R.No.				800					
11	G.R.N.No.	300	8.00	2,400				2,000	5.00	10,000
								400	6.00	2,400
								300	8.00	2,400
15	G.R.N.No.	200	7.00	1,400				2,000	5.00	10,000
								400	6.00	2,400
								300	8.00	2,400
								200	7.00	1,400
					300	8.00	2,400	2,000	5.00	10,000
					100	7.00	700	400	6.00	2,400
18	M.R.No.				400			100	7.00	700
25	G.R.N.No.	200	9.00	1,800				2,000	5.00	10,000
								400	6.00	2,400
								100	7.00	700
								200	9.00	1,800
28	G.R.N.No.	150	8.50	1,275				2,000	5.00	10000
								400	6.00	2,400
								100	7.00	700
								200	9.00	1,800
								150	8.50	1,275
30	M.R.No.				200	9.00	1,800	2,000	5.00	10,000
								400	6.00	2,400
								100	7.00	700
								150	8.50	1,275

Materials

Closing Stock = 2,650 units valued at Rs.14,375

$(2,000 \times 5 + 400 \times 6 + 100 \times 7 + 150 \times 8.5)$

Note: 1. G.R.N.No. = Goods received note number.

M.R.No. = Material requisition number.

2. Every issue in this method is priced at the highest rate or rates existing in the Balance column on that date.

(H) Simple Average Method

Illustration 8

From the following particulars, prepare stores ledger by adopting simple average method of pricing of material issues.

Date	Receipts	Issues
1990 Jan. 1	300 units at Rs.10 per unit	
10	200 unit at Rs.12 per unit	
12	400 units at Rs.11 per unit	
15		250 units
16		150 units
18	200 units at Rs.14 per unit	
20		300 units
22	300 units at Rs. 15 per unit	
25	100 units at Rs.16 per unit	
27		200 units
31		100 units

[Madras, B.A. Corp., March 1992 Adapted]

Solution:

Stores Ledger Account
(Simple Average Method)

Name : ——————
Code No.: ————
Description: ————

Maximum level : ————
Minimum level : ————
Reorder level : ————
Reorder quantity: ————

Folio No. ————
Bin. No. ————
Location code: ————

Date	Particulars or Reference	Receipts			Issues			Balance		
		Qty. Units	Rate Rs.	Amount Rs.	Qty. Units	Rate Rs.	Amount Rs.	Qty. Units	Rate Rs.	Amount Rs.
1990										
Jan. 1	G.R.N. No.	300	10	3,000				300	10	3,000
10	G.R.N. No.	200	12	2,400				500	—	5,400
12	G.R.N. No.	400	11	4,400				900	—	9,800
15	M.R. No.				250	$\left(\dfrac{10+12+11}{3}\right)$ 11	2,750	650	—	7,050
16	M.R.No.				150	$\left(\dfrac{10+12+11}{3}\right)$ 11	1,650	500	—	5,400
18	G.R.N. No.	200	14	2,800						
20	M.R.No.				300	$\left(\dfrac{12+11+14}{3}\right)$ 12.33	3,699	700	—	8,200
								400	—	4,501
22	G.R.N. No.	300	15	4,500						
25	G.R.N. No.	100	16	1,600				700	—	9001
27	M.R.No.				200	$\left(\dfrac{11+14+15+16}{4}\right)$ 14	2,800	800	—	10,601
								600	—	7,801
31	M.R.No.				100	$\left(\dfrac{14+15+16}{3}\right)$ 15	1,500	500	—	6,301

Closing stock = 500 units valued at Rs. 6,301.

Note: Though simple average of prices of the lots in stock is taken for issue purpose, for physical stock purpose, 'FIFO' is inherent in simple average method.
So, whenever the older stocks are exhausted physically, their prices are also omitted while calculating simple average of prices.

For example: With the issue on 16th Jan, the first lot purchased on Jan. 1 is physically exhausted. So, the price of Rs. 10 is omitted when issue price is computed next time on Jan. 20.

(I) Weighted Average Method (Without Returns and Losses)
Illustration 9

Prepare stores Ledger Account under weighted average method from the information given in Illustration 8 above.
Solution:

Stores Ledger Account
(Weighted Average Method)

Name : ———

Code No.: ———

Description: ———

Maximum level : ———

Minimum level : ———

Reorder level : ———

Reorder quantity: ———

Folio No. ———

Bin. No. ———

Location code: ———

Date	Particulars or Reference	Receipts			Issues			Balance		
		Qty. Units	Rate Rs. P.	Amount Rs.	Qty. Units	Rate Rs. P.	Amount Rs.	Qty. Units	Rate Rs. P.	Amount Rs.
1990										
Jan. 1	G.R.N. No.	300	10	3,000				300	10.0	3,000
10	G.R.N. No.	200	12	2,400				500	10.8	5,400
12	G.R.N. No.	400	11	4,400				900	10.8888	9,800
15	M.R. No.				250	10.8888	2,722	650	10.8888	7,078
16	M.R. No.				150	10.88	1,633	500	10.8888	5,445
18	G.R.N. No.	200	14	2,800				700	11.7786	8,245
20	M.R. No.				300	11.7786	3,534	400	11.7786	4,711
22	G.R.N.No.	300	15	4,500				700	13.1586	9,211
25	G.R.N.No.	100	16	1,600				800	13.5137	10,811
27	M.R. No.				200	13.5137	2,703	600	13.5137	8,108
31	M.R.No.				100	13.5137	1,351	500	13.5137	6,757

Closing stock is 500 units valued at Rs. 6,757.

Note : New price is calculated and shown in the Balance column whenever there is a fresh receipt of material.

(J) Weighted Average Method (With Returns and Losses)
Illustration 10

Prepare a stores ledger account using weighted average method of pricing the issue of materials.

1999

March 1 Balance 1,000 units @ Rs. 70 per unit.

3 Purchased 2,000 units @ Rs. 80 per unit.

5 Issued 500 units.

10 Issued 1,000 units.

15 Purchased 2,000 units at Rs. 80 per unit.

18 Issued 400 units.

20 Received back 25 units out of the issue made on 5th March.

22 Issued 1,500 units.

24 Returned to supplier 30 units out of the purchases made on 15th March.

25 Purchased 1,000 units at Rs.75 per unit.

30 Issued 1,000 units.

Physical verification on 21st March revealed a shortage of 15 units and 20 units shortage on 30th March.

Solution:

Stores Ledger Account
(Weighted Average Method)

Name :———   Maximum level :———   Folio No.———

Code No.:———   Minimum level :———   Bin. No.———

Description:———   Reorder level :———   Location code:———

Reorder quantity:———

Date	Particulars or Reference	Receipts			Issues			Balance		
		Qty. Units	Rate Rs. P.	Amount Rs.	Qty. Units	Rate Rs. P.	Amount Rs.	Qty. Units	Rate Rs. P.	Amount Rs.
1999										
Mar. 1	Balance B/d							1,000	70.000	70,000
3	G.R.N. No.	2,000	80	1,60,000				3,000	76.667	2,30,000
5	M.R. No.				500	76.667	38,333	2,500	76.667	1,91,667
10	M.R. No.				1,000	76.667	76,667	1,500	76.667	1,15,000
15	G.R.N. No.	2,000	80	1,60,000				3,500	78.571	2,75,000
18	M.R. No.				400	78.571	31,428	3,100	78.571	2,43,572
20	Mat. Retd. Note No.	25	76.667	1,917				3,125	78.556	2,45,489
21	Shortage				15	78.556	1,178	3,110	78.556	2,44,311
22	M.R. No.				1,500	78.556	1,17,834	1,610	78.556	1,26,477
24	Debit Note No.				30	80	2,400	1,580	78.5297	1,24,077
25	G.R.N. No.	1,000	75	75,000				2,580	77.16	1,99,077
30	M.R. No.				1,000	77.16	77,160	1,560	77.16	1,20,374
	Shortage				20	77.16	1,543			

UNIT-III

LABOUR TURNOVER

Introduction:

Labour Turnover is a serious problem of industry in all countries. It is a major problem in the area of industrial relations in India. In every organisation employees constantly join and leave for one reason or other. The relation between the number of persons joining the organisation and leaving due to resignation, retirement or retrenchment to the average number of pay-roll is labour turnover. The labour turnover is caused by several factors, some may be controllable and some may not be controllable. Labour turnover may prove to be a costly process. This turnover is harmful to the efficiency of worker and impairs the quality of production. Labour turnover is a serious obstacle to the full utilisation of country's human and material resources. High Labour turnover is not desirable as it affects both employers and workers adversely.

ILLUSTRATIONS
I. LABOUR TURNOVER

Illustration 1

From the following data given by the Personnel Department, calculate the labour turnover rate by applying:

(a) Separation method

(b) Replacement method

(c) Flux method

No. of workers on the payroll:

At the beginning of the month   900

At the end of the month   1,100

During the month 10 workers left; 40 workers were discharged and 150 workers were recruited. Of these, 25 workers are recruited in the vacancies of those leaving while the rest were engaged for an expansion scheme.

[I.C.W.A. Inter, Dec. 1988]

Solution:

Average number of workers during the year

$$= \frac{\text{Number of workers at the beginning of the month} + \text{Number of workers at the end of the month}}{2}$$

$$= \frac{900 + 1100}{2} = 1,000$$

(a) Labour turnover rate by applying separation method

$$= \frac{\text{No. of separations}}{\text{Average number of workers}} \times 100$$

$$= \frac{10 + 40}{1000} \times 100 = 5\%$$

(b) Labour turnover rate by applying replacement method

$$= \frac{\text{Number of workers replaced}}{\text{Average number of workers}} \times 100$$

$$= \frac{25}{1000} \times 100 = 2.5\%$$

(c) Labour turnover rate by applying flux method

$$= \frac{\text{No. of additions} + \text{No. of separations}}{\text{Average number of workers}} \times 100$$

$$= \frac{150 + 40 + 10}{1000} = 20\%$$

Note: Replacement method ignores recruitment for expansion.
Flux method includes all recruitments including for expansions.

Illustration 2

From the following information calculate the labour turnover rate:

Number of workers at the beginning of the period :   3800

Number of workers at the end of the period :   4200

During the year, 40 workers left while 160 workers are discharged. 600 workers are recruited during the year; of these 150 workers are recruited to fill up vacancies and the rest are engaged on account of an expansion scheme.

[Bharathidasan, B.Com., April 1988]

Solution:

Average number of workers during the period

$$= \frac{\text{Number of workers at the beginning of the period} + \text{Number of workers at the end of the period}}{2}$$

$$= \frac{3800 + 4200}{2} = 4000$$

(a) Labour turnover by applying replacement method:

$$= \frac{\text{Number of workers replaced}}{\text{Average number of workers}} \times 100$$

$$= \frac{150}{4000} \times 100 = 3.75\%$$

(b) Labour turnover by applying separation method:

$$= \frac{\text{Number of workers separated}}{\text{Average number of workers}} \times 100$$

$$= \frac{40 + 160}{4000} = \frac{200}{4000} \times 100 = 5\%$$

(c) Labour turnover by applying flux method

$$= \frac{\text{Number of workers replaced} + \text{No. of workers separated}}{\text{Average number of workers}} \times 100$$

$$= \frac{600 + 200}{4000} \times 100 = 20\%$$

II. COMPUTATION AND TREATMENT OF LABOUR COST

(A) Allocation of wages

Illustration 3

Rajan, a worker in a manufacturing unit, is paid at the rate of Rs. 10 per hour. His working hours constitute 42 hours over a 5 days week. Time allowed per day as approved absence for personal needs etc. is 24 minutes.

Rajan's job cards for the week ended 30th Sep. 1998 show that his time during the week is chargeable as under:

Job No.   A – 42   =   15 hours

Job No.   K – 12   =   20 hours

Job No.   R – 3   =   2 hours

The time unaccounted for is due to a power failure.

You are required to show Rajan's wages for the week and how they would be dealt with in cost accounts.

Solution:

Statement showing allocation of worker's wages

Particulars	Total wages	Wages Chargeable		
		To work-in-progress(or) Jobs Rs.	To factory overheads Rs.	To costing Profit & Loss Account Rs.
Wages for 15 hours				
Job A – 42 = 15 × 10	150	150	–	–
Wages for 20 hours				
Job K – 12 = 20 × 10	200	200	–	–
Wages for 2 hours				
Job R – 3 = 2 × 10	20	20	–	–
Wages for approved Absence – Treated as normal idle time – To be recovered as factory overhead $\left(\dfrac{5 \times 24}{60}\right) \times 10$	20	–	20	–
Wages for abnormal idle time due to power failure – Treated as abnormal loss – Transferred to costing P & L A/c 3 × 10	30	–	–	30
Total wages for the week	420			
Allocation of wages		370	20	30

Working note (1) Normal idle time = 5 days × 24 minutes each
= 120 minutes or 2 hours

Working note (2) Abnormal idle time = 42 hours – (15 + 20 + 2 + 2) = 3 hours.

(B) Normal and Overtime Wages

Illustration 4

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

Days	Hours worked
Monday	8
Tuesday	12
Wednesday	10
Thursday	10
Friday	9
Saturday	4
	53

Normal working hours – 8 hours per day; on Saturday – 4 hours.

Normal rate Rs. 2 per hour.

Overtime rate – Upto 9 hours in a day at single rate and over 9 hours in a day at double rate. Or upto 48 hours in a week at single rate and over 48 hours at double rate, whichever is more beneficial to the workers.

[Madras, B.Com., Sep. 1994 Adapted]

Solution:

Statement showing over time hours

Days	Total hours worked	Normal working hours	Overtime hours At single rate	Overtime hours At double rate
Monday	8	8	–	–
Tuesday	12	8	1	3
Wednesday	10	8	1	1
Thursday	10	8	1	1
Friday	9	8	1	–
Saturday	4	4	–	–
Total	53	44	4	5

Computation of total wages of work man on day's Work basis

		Rs.
Wages for normal working hours 44 × 2		88
Wages for overtime hours:		
At single rate for 4 hours 4 × 2	8	
At double rate for 5 hours 5 × 4	20	28
Total wages		116

Computation of total wages of workman on week's work basis

	Rs.
Wages at normal hourly rate for 48 hours 48 × 2	96
Overtime wages for 5 hours at double rate 5 × 4	20
Total wages	116

Both methods are equally beneficial to the worker who will be paid Rs. 116 for the week under either of the methods.

III. METHODS OF REMUNERATION AND INCENTIVE SYSTEMS

(A) Time and piece wages

Illustration 9

MR. A a worker in a factory is paid on time basis. During the month of October 99 he has worked for 200 hours. His hourly wage rate is Rs. 10 per hour.

Mr. B another employee of the company is paid on the basis of piece wages. During the month of January 99 his output was 1,000 units. Rate of wages per piece is Rs. 3.

Calculate the wages of respective workers for the month of October 99.

Solution:

Wages of worker A:

Time wages = Hours worked × Rate per hour

∴ A's time wages = 200 × 10 = Rs. 2,000

Wages of worker B:

Piece wages = No. of pieces × Rate per piece

∴ B's piece wages = 1000 × 3 = Rs. 3,000

(B) Taylor's Differential Piece Rate System

Illustration 10

Calculate the earnings of workers X and Y under (A) straight piece rate system and (B) Taylor's differential piece rate system from the following details:

Standard time per unit = 12 minutes

Standard rate per hour = Rs. 60

Differentials to be used 80% and 120%

In a particular day of 8 hours, worker 'X' produced 30 units and worker 'Y' produced 50 units.

Solution:

(1) *Level of performance of workers*

Standard production for 12 minutes = 1 unit

Standard production per hour = $\dfrac{60 \text{ minutes}}{12 \text{ minutes}}$ = 5 units

Standard production per day of 8 hours = 8 hours × 5 units = 40 units

Worker 'X' who produced 30 units is below standard

Worker 'Y' who produced 50 units is above standard

(2) *Calculation of piece rates*

Standard rate per hour = Rs. 60

Straight piece rate = $\dfrac{\text{Rs. } 60}{5 \text{ units per hour}}$ = Rs. 12 per unit

Low piece rate for below standard production

= Straight piece rate × Lower differential

= Rs. 12 × 80% = Rs. 9.60 per unit

High piece rate for at or above standard production

= Straight piece rate × Higher differential

= Rs. 12 × 120% = Rs. 14.40 per unit.

(A) Earnings of workers under straight piece rate system

Earnings = Production of worker × Straight piece rate

Worker X : 30 units × Rs. 12 per unit = Rs. 360

Worker Y : 50 units × Rs. 12 per unit = Rs. 600

(B) Earnings of workers under Taylor's differential piece rate system:

Earnings = Production of worker × differential piece rate

Worker X = 30 units × Rs. 9.60 per unit

= Rs. 288

Worker Y = 50 units × Rs. 14.40 per unit

= Rs. 720

(C) Merrick's Multiple or Differential Piece Rate System

Illustration 12

Calculate the earnings of 3 workers A, B and C under 'Merrick's 'Multiple piece rate system', given the following:

Standard production per day : 150 units

Normal piece rate : Re. 0.50 per unit

Production of workers on a particular day:

A 120 units

B 140 units

C 160 units

Solution:

Standard output   = 150 units

Piece rate   = Re. 0.50 per unit

(1) Level of performance of workers

Worker A's output   = 120 units

Worker A's level of performance $= \dfrac{\text{Actual output}}{\text{Standard output}} \times 100$

$$= \dfrac{120}{150} \times 100 = 80\%$$

Worker B's output   = 140 units

Worker B's level of performance $= \dfrac{140}{150} \times 100 = 93.33\%$

Worker C's output   = 160 units

Worker C's level of performance $= \dfrac{160}{150} \times 100 = 106.67\%$

(2) Earnings of workers

Earnings of worker A:

Normal piece rate is applicable for performance below 83%, A's performance is 80%.

Wages   = Units produced × Normal piece rate

         = 120 units × 0.50 = Rs. 60

Earnings of worker B:

110% of normal piece rate is applicable for performance between 83% and 100% B's performance is 93.33%.

Wages   = Units produced × Piece rate × $\dfrac{110}{100}$

         $= 140 \times 0.50 \times \dfrac{110}{100} = $ Rs. 77

Earnings of worker C

120% of normal piece rate is applicable for performance of above 100%.

B's performance is 106.67%

$$\text{Wages} = \text{Units produced} \times \text{Piece rate} \times \frac{120}{100}$$

$$= 160 \times 0.50 \times \frac{120}{100} = \text{Rs. } 96$$

(D) Gantt's Task Bonus Plan

Illustration 13

The following are the particulars applicable to a work process:

Time rate Rs. 5 per hour

High task 40 units per week

Piece rate above the high task Rs. 6.5 per unit

In a 40 hour week, the production of the workers was as follows:

A 35 units   B 40 units

C 41 units   D 52 units

Calculate the wages of the workers under Gantt's task bonus plan.

[Madras, B.Com., Sep. 1988]

Solution:

(1) *Under Gantt's task bonus plan, wages are ascertained as follows:*

  (a) When output is below standard, guaranteed time wages are paid

  (b) When the output is at standard, time rate + 20% bonus

  (c) When the output is above standard high piece rate on worker's whole output.

(2) *Level of performance of workers*

$$\text{Level of performance} = \frac{\text{Actual output}}{\text{High task output}} \times 100$$

$$A - \frac{35}{40} \times 100 = 87.5\%$$

$$B - \frac{40}{40} \times 100 = 100\%$$

$$C - \frac{41}{40} \times 100 = 102.5\%$$

$$D - \frac{52}{40} \times 100 = 130\%$$

(3) Earnings of workers

A — Below standard performance – Only time wages

40 hours × Rs. 5 per hour = Rs. 200

B — Performance at standard – Time wages + 20% bonus

$40 \times 5 + 20\%(40 \times 5) = 200 + 40 = $ Rs. 240

C — Performance above standard – High piece rate on whole output

$41 \times 6.5 = $ Rs. 266.5

D — Performance above standard – High piece rate on whole output

$52 \times 6.5 = $ Rs. 338

Note: Some experts provide for 20% bonus in addition to high piece rate for above standard performance.

However, an overwhelming majority of authorities on cost accounting state that above standard workers receive 'High piece rate on whole output'.

So, the same method is adopted in the above working and also the answers for exercises.

(E) Halsey Plan
Illustration 14

A worker is paid at 25 paise per hour for completing a work within 8 hours. If he completes the work within 6 hours, calculate his wages under Halsey plan when the rate of premium is 50%. Also ascertain the effective hourly rate of earning by the worker.

[Madras, B.A. Corp., Sep. 1996]

Solution:

Wages or earnings under Halsey scheme

$$= T \times R + \frac{50}{100}(S - T)R$$

T = Actual time or time taken = 6 hours

R = Rate per hour = Re. 0.25

S = Standard time = 8 hours

Earnings (or) wages $= 6 \times 0.25 + \dfrac{50}{100}(8 - 6)\, 0.25$

$= 1.5 + 0.25 = $ Rs. 1.75

Effective hourly rate of earnings

$$= \frac{\text{Total earnings}}{\text{Actual time}}$$

$$= \frac{1.75}{6} = \text{Re. } 0.292 \text{ per hour (approx.)}$$

(A) Earnings of worker under Halsey premium plan

$$= 40 \times 1 + \frac{50}{100}(48 - 40)\ 1 = 40 + 4 = \text{Rs. } 44$$

(B) Earnings of worker under Rowan scheme

$$= 40 \times 1 + \frac{48 - 40}{48} 40 \times 1 = 40 + 6.67 = \text{Rs. } 46.67$$

Note: Worker's earnings are higher in Rowan plan compared to Halsey plan until time saved is 50% of time allowed. Beyond that, Halsey plan results in higher earnings.

I. Halsey & Rowan Plans

Comparative statement of worker's earnings and savings to the employer

Illustration 18.

For Job No. 54, standard time fixed is 50 hours. Standard rate of wages per hour of worker 'A' is Rs. 10. A has completed Job No. 54 in 35 hours works overhead chargeable to the Job is 75% of the cost of it's standard time.

You are required to calculate

(a) The normal time wages, bonus and total earnings of the worker for the job under Halsey plan and Rowan plan

(b) Savings to the employer under both the plans.

Also prepare a comparative statement showing (i) Effective rate of earnings per hour and (b) Savings to the employer per hour.

Solution:

(a) Normal time wages
= Time taken × Rate of wages
= 35 hours × Rs. 10 per hour = Rs. 350

Bonus under Halsey plan $= \dfrac{50}{100}(S - T)\ R$

Bonus under Rowan plan $= \dfrac{S - T}{S} \times T \times R$

S = Standard time or time allowed = 50 hours
T = Time taken or actual time = 35 hours
R = Rate of wages or rate per hour = Rs. 10

Bonus under Halsey plan $= \dfrac{50}{100}(50 - 35)10 = \text{Rs. } 75$

Bonus under Rowan Plan $= \dfrac{50 - 35}{50} \times 35 \times 10 = \text{Rs. } 105$

Total earnings of the worker = Normal Time wages + Bonus
Total Earnings under Halsey plan = 350 + 75 = Rs. 425
Total earnings under Rowan plan = 350 + 105 = Rs. 455

(b) Savings to the employer under Halsey and Rowan Plans:

	Halsey Plan Rs.		Rowan Plan Rs.
(i) Saving in labour cost standard wages – Total Earnings	$50 \times 10 - 425$	= 75.00	$50 \times 10 - 455$ = 45.00
(ii) Saving in overhead 75% of wages for time saved	$(50 - 35) \times \dfrac{75}{100} \times 10$ = 112.50		$(50 - 35) \times \dfrac{75}{100} \times 10$ =112.50
Total savings to the employer		187.50	157.50

Statement showing hourly rates of earning and saving to management under Halsey plan and Rowan plan

System	Time wages	Bonus	Total earnings of worker	Hours worked	Effective rate of hourly earnings	Employer's savings	Saving per hour worked
1	2	3	4	5	6	7	8
			(2 + 3)		(4 + 5)		(7 + 5)
	Rs.	Rs.	Rs.		Rs.	Rs.	Rs.
Halsey plan	350	75	425	35	$\dfrac{425}{35}$ = 12.143	187.5	$\dfrac{187.5}{35}$ = 5.357
Rowan plan	350	105	455	35	$\dfrac{455}{35}$ = 13	157.5	$\dfrac{157.5}{35}$ = 4.50

PROBLEMS AND SOLUTIONS
BASES OF APPORTIONMENT

Problem : 1 Mention the bases of apportionment of the following expenses to departments.

1. Rent
2. Lighting
3. Power
4. Depreciation of Plant & Machinery
5. Insurance of Plant & Machinery
6. Insurance of stock
7. Repairs of plant
8. Material handling charges
9. Supervision
10. Canteen expenses
11. Welfare expenses
12. Staff recreation
13. Stores overheads
14. Indirect materials
15. Indirect wages
16. Time - keeping
17. Municipal taxes
18. Advertising

Solution

	Expenses	Bases of Apportionment
1.	Rent	Floor area
2.	Lighting	Light points / Floor area
3.	Power	Kilo watt hours / Horse power of plant
4.	Depreciation of Plant & Machinery	Machine hours / Value of plant
5.	Insurance of Plant & Machinery	Value of plant & machinery
6.	Insurance of stock	Value of stock
7.	Repairs to plant	Value of plant
8.	Material handling charges	Value of materials

9.	Supervision	No of employees
10.	Canteen expenses	No of employees
11.	Welfare expenses	No of employees
12.	Staff recreation	No of employees
13.	Stores overheads	Materials consumed by each dept.
14.	Indirect materials	Direct materials
15.	Indirect wages	Direct wages
16.	Time-keeping	No. of employees
17.	Municipal taxes	Floor Area
18.	Advertisting	Actual expenses or % of sales

Problem : 2 Shiva Industries Ltd., has four departments. A,B and C are production departments and D is the service department. The actual expenses for a month were as follows :

	Rs.
Rent	6,000
Repairs to plant	3,600
Depreciation	2,700
Lighting charges	600
Supervision	9,000
Insurance of stock	3,000
Power	5,400
Employees' Insurance - Employer's liability	900

The following information is also available :

	Dept.A	Dept.B	Dept.C	Dept.D
Area in Sq. ft.	300	220	180	100
No. of workers	48	32	24	16
Total wages	Rs. 8,000	6,000	4,000	2,000
Value of plant	Rs. 24,000	18,000	12,000	6,000
Value of stock	Rs. 15,000	9,000	6,000	---

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

Solution :

Overhead Distribution Summary

Expenses	Basis of Apportionment	Total	Departments			
			A	B	C	D
		Rs.	Rs.	Rs.	Rs.	Rs.
Rent	Area (15:11:9:5)	6,000	2,250	1,650	1,350	750
Repairs to Plant	Plant value (4:3:2:1)	3,600	1,440	1,080	720	360
Depreciation	Plant value (4:3:2:1)	2,700	1,080	810	540	270
Lighting	Area (15:11:9:5)	600	225	165	135	75
Supervision	No. of workers (6:4:3:2)	9,000	3,600	2,400	1,800	1,200
Insurance of Stock	Stock value (5:3:2)	3,000	1,500	900	600	---
Power	Plant value (4:3:2:1)	5,400	2,160	1,620	1,080	540
Employees' insurance - Employer's Liability	Wages (4:3:2:1)	900	360	270	180	90

Absorption of overheads

Problem : 11 Calculate labour hour rate from the following :

Total number of workers	100
Working days in a year	300
No. of hours per day worked	8
Idle time 5%	
Factory overheads	Rs. 11,40,000
Gift to workers	Rs. 7,000

Solution :

$$\text{Labour hour rate} = \frac{\text{Factory overheads}}{\text{No. of Labour hours worked}}$$

No. of Labour hours worked :

=	No. of workers x Working days in a year x No. of hours per day	
=	300 x 100 x 8	= 2,40,000
	Less : Idle time 5% of 2,40,000	= 12,000
	No. of labour hours worked	= 2,28,000

$$\text{Labour hour rate} = \frac{\text{Rs. } 11,40,000}{2,28,000} = \text{Rs. 5 per hour.}$$

Note : Gift to workers will be included in administrative overheads and not in factory overheads.

Problem : 12 The following details pertain to the production department of a factory.

Material consumed	=	Rs. 60,000
Direct wages	=	Rs. 36,000
Machine hours	=	Rs. 18,000
Labour hours worked	=	Rs. 27,000
Factory overheads	=	Rs. 54,000
Output during the year	=	Rs. 9,000

Calculate overhead absorption rate under different methods possible from the above data.

Solution :

Direct material percentage rate $= \dfrac{\text{Factory overheads}}{\text{Direct material}} = 100$

$= \dfrac{54,000}{60,000} \times 100 = 90\%$

Direct wages percentage rate $= \dfrac{\text{Factory overheads}}{\text{Direct wages}} = 100$

$= \dfrac{54,000}{36,000} \times 100 = 150\%$

Prime cost percentage rate $= \dfrac{\text{Factory overheads}}{\text{Prime cost}} = 100$

$= \dfrac{54,000}{60,000 + 36,000} \times 100 = 56.25\%$

Labour hour rate $= \dfrac{\text{Factory overheads}}{\text{Labour hours}}$

$= \dfrac{54,000}{27,000} = \text{Rs. 2 per hour}$

Machine hour rate $= \dfrac{\text{Factory overheads}}{\text{Machine hours}}$

$= \dfrac{54,000}{18,000} = \text{Rs. 3 per hour}$

Absorption rate per unit of output $= \dfrac{\text{Factory overheads}}{\text{Output}}$

$= \dfrac{54,000}{9,000} = \text{Rs. 6 per unit}$

PROCESS COSTING

Process costing:

Introduction:

Process costing is a method of costing which is used to ascertain the cost of output at each stage of production.

Features of Process Costing

1. Continuous Production: Goods flow continuously through a series of distinct

production stages or processes.

2.Homogeneous Products: Products are identical or very similar (e.g., gallons of paint, tons of   steel).

3.Cost Accumulation by Process: Costs (materials, labor, overhead) are grouped by each process/department (cost center).

4.Sequential Stages: The output of one process becomes the raw material for the next, transferring costs along the way.

5.Average Costing: Costs are averaged over the total units produced in a period to get the cost per unit.

6.Work-in-Progress (WIP): Accounts for partially completed units at the start and end of periods using "equivalent units".

7.Managerial Control: Allows performance evaluation and cost control for each individual process.

Illustration 1 (No losses; No units)

Srikar & Co., produces a product through two process 'J' and 'K'. Prepare the process accounts from the following details relating to March 1997.

	Process J	Process K
	Rs.	Rs.
Material	45,000	15,000
Labour	60,000	25,000
Chargeable expenses	5,000	10,000

The overheads amounting to Rs. 17,000 are to be apportioned on the basis of labour.

Solution:

Process – 'J' Account

Particulars	Amount Rs.	Particulars	Amount Rs.
To Materials	45,000	By Process K A/c	1,22,000
To Labour	60,000	(output transferred)	
To Chargeable expenses	5,000		
To Overheads $\left(17,000 \times \dfrac{60}{85}\right)$	12,000		
	1,22,000		1,22,000

Process – 'K' Account

Particulars	Amount Rs.	Particulars	Amount Rs.
To Process J A/c (transfer)	1,22,000	By Finished Stock A/c	1,77,000
To Materials	15,000	(output transferred)	
To Labour	25,000		
To Chargeable expenses	10,000		
To Overheads $\left(17,000 \times \dfrac{25}{85}\right)$	5,000		
	1,77,000		1,77,000

Illustration 2

(No losses; units given)

A product passes through three processes 'X' 'Y' and 'Z' to its completion. During September 1998, 5,000 units of finished product were produced and the following expenses were incurred:

	Process X Rs.	Process Y Rs.	Process Z Rs.
Materials	5,000	10,000	5,000
Direct wages	25,000	20,000	15,000
Direct expenses	2,500	3,000	5,000

Indirect expenses amounted to Rs. 30,000 which are to be apportioned to the processes on the basis of direct wages. Raw materials worth Rs. 30,000 were issued to process 'X'. Ignore the question of process stocks and prepare the process accounts, showing cost per unit in each process.

Solution:

Process X Account

(output 5,000 units)

Particulars	Cost per unit Rs.	Total Cost Rs.	Particulars	Cost per unit Rs.	Total Cost Rs.
To Raw materials	6.00	30,000	By Process Y A/c	15.00	75,000
To Other materials	1.00	5,000	(output transferred)		
To Direct wages	5.00	25,000			
To Direct expenses	0.50	2,500			
To Indirect expenses					
$\left(30,000 \times \dfrac{25}{60}\right)$	2.50	12,500			
	15.00	75,000		15.00	75,000

Process Y Account

Particulars	Cost per unit Rs.	Total Cost Rs.	Particulars	Cost per unit Rs.	Total Cost Rs.
To Process X A/c	15.00	75,000	By Process Z	23.60	1,18,000
To Materials	2.00	10,000	(output transferred)		
To Direct wages	4.00	20,000			
To Direct expenses	0.60	3,000			
To Indirect expenses	2.00	10,000			
$\left(30,000 \times \dfrac{20}{60}\right)$					
	23.60	1,18,000		23.60	1,18,000

Process Z Account

Particulars	Cost per unit Rs.	Total Cost Rs.	Particulars	Cost per unit Rs.	Total Cost Rs.
To Process Y A/c	23.60	1,18,000	By Finished stock A/c	30.10	1,50,500
To Materials	1.00	5,000	(output transferred)		
To Labour	3.00	15,000			
To Direct expenses	1.00	5,000			
To Indirect expenses	1.50	7,500			
$\left(30,000 \times \dfrac{15}{60}\right)$					
	30.10	1,50,500		30.10	1,50,50

Illustration 3
(No losses – Stocks of material given)

Ramsons Ltd. produces a product which goes through three processes A, B and C before it is finished and sent to the godown for distribution. From the following details, ascertain the cost of the product at the end of each stage of production.

	Process A Rs.	Process B Rs.	Process C Rs.
Raw Material	10,000	–	–
Other direct materials	30,000	20,000	10,000
Direct wages	10,000	20,000	30,000
Overheads	10,000	8,000	20,000
Output in units	15,000	14,000	17,000
Opening stock (units from previous process)	–	6,000	5,000
Closing stock (units from previous process)	–	5,000	1,000

Solution:

Process 'A' Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Raw materials	15,000	10,000	By Process 'B' A/c	15,000	60,000
To Other direct materials		30,000	(transfer at Rs. 4		
To Direct wages		10,000	per unit)		
To Overheads		10,000			
	15,000	60,000		15,000	60,000

Process 'B' Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Opening Stock (Rs. 4 per unit)	6,000	24,000	By Process 'C' A/c (Transfer at $\dfrac{1,32,000 - 20,000}{14,000}$ = Rs. 8 per unit)	14,000	1,12,000
To Process 'A' A/c (transfer)	15,000	60,000			
To Other direct materials		20,000	By Closing stock (Rs. 4 per unit)	5,000	20,000
To Direct wages		20,000	By Wastage (balance)	2,000	–
To Overheads		8,000			
	21,000	1,32,000		21,000	1,32,000

Note 1: Opening and closing stocks are valued at cost per unit of the previous process since they are units from previous process.

Process 'C' Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Opening Stock (Rs. 8 per unit)	5,000	40,000	By Finished Stock A/c (Transfer at		
To Process 'B' A/c (transfer)	14,000	1,12,000	$\dfrac{2,12,000-8,000}{17,000}$ = Rs. 12 per unit)	17,000	2,04,000
To Other direct materials		10,000			
To Direct wages		30,000	By Closing stock		
To Overheads		20,000	(Rs. 8 per unit)	1,000	8,000
			By Wastage (balance)	1,000	–
	19,000	2,12,000		19,000	2,12,000

Note 2: Wastage in the processes is assumed as normal without any recovery value.

Illustration 4

Normal loss with scrap value

Samson & Co., produces a product through two processes 'R' and 'S'. The following details pertaining to process 'R' for January 1996 are available.

Inputs :	Rs.
Material (500 units)	10,000
Labour	8,000
Indirect expenses	7,000

Normal loss in the process is estimated at 5% of the input which possesses a scrap value of Rs. 31 per unit. Prepare the process account.

Solution:

Process 'R' Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Material	500	10,000	By Normal loss		
To Labour		8,000	(500 × 5% at		
To Indirect expenses		7,000	Rs. 31 per unit)	25	775
			By Process 'S' A/c	475	24,225
			(Transfer at		
			$\dfrac{25,000-775}{500-25}$		
			= Rs. 51 per unit)		
	500	25,000		500	25,000

Note: Cost per unit of output = $\dfrac{\text{Total cost of process} - \text{Scrap value of normal loss}}{\text{Input} - \text{Normal loss units}}$

Illustration 5 Normal loss in weight and scrap

Suman industries produces a product which passes through two processes I and II and then to finished stock. It is ascertained that in each process 5% of the total weight put in is lost and 10% is scrap which realises Rs. 5 per ton and Rs. 15 per ton respectively. The following details are available.

	Process I	Process II
Materials consumed in tons	2,000	140
Cost of materials per ton Rs.	200	300
Wages Rs.	20,000	15,000
Manufacturing expenses Rs.	6,000	5,000

Prepare process accounts showing the cost of the output of each process and cost per ton.

Solution:

Process I Account

Particulars	Tons	Rs.	Particulars	Tons	Rs.
To Material consumed at Rs. 200 per ton	2,000	4,00,000	By Loss in weight $(2,000 \times 5\%)$	100	–
To Wages		20,000	By Normal scrap $(2,000 \times 10\%$ at Rs. 5 per ton)	200	1,000
To Manufacturing expenses		6,000	By Process II A/c (Transfer at $\dfrac{4,26,000-1,000}{2,000-100-200}$ = Rs. 250 per ton)	1,700	4,25,000
	2,000	4,26,000		2,000	4,26,000

Note: Cost per ton $= \dfrac{\text{Total cost} - \text{Scrap value}}{\text{Input units} - \text{Loss in weight} - \text{Normal scrap}}$

Process II Account

Particulars	Tons	Rs.	Particulars	Tons	Rs.
To Process I A/c (Transfer)	1,700	4,25,000	By Loss in weight $(1,840 \times 5\%)$	92	–
To Material consumed at Rs. 300 per ton	140	42,000	By Normal scrap $(1,840 \times 10\%$ at Rs. 15 per ton)	184	2,760
To Wages		15,000	By Finished Stock A/c (Transfer at $\dfrac{4,87,000-2,760}{1,840-92-184}$ = Rs. 309.62 per ton)	1,564	4,84,240
To Manufacturing expenses		5,000			
	1,840	4,87,000		1,840	4,87,000

(2) ABNORMAL LOSS AND GAIN

Abnormal loss – One process

Illustration 8

In manufacturing a product, 1,000 kgs of raw materials at Rs. 8 per kg were supplied to process 'X'. Other expenses of the process were as follows:

Labour cost Rs. 2,000

Production expenses Rs. 1,000

Normal loss in the process has been estimated at 10% of the input and it could be sold at Rs. 2 per kg. The actual output in this process was 880 kgs which was transferred to process 'Y'.

Prepare process 'X' account and abnormal loss account.

Solution:

Process 'X' Account

Particulars	Kgs	Rs.	Particulars	Kgs	Rs.
To Raw materials	1,000	8,000	By Normal loss A/c		
To Labour		2,000	(10% of 1,000 units at	100	200
To Production expenses		1,000	Rs. 2 per unit)		
			By Abnormal loss*	20	240
			(at Rs. 12 per kg)		
			By Process 'Y' A/c (transfer at Rs.12 per kg)	880	10,560
	1,000	11,000		1,000	11,000

* Working Note 1 : Abnormal loss units

		Kgs
	Input into the process	1,000
Less:	Normal loss at 10%	100
	Normal output	900
	Actual output	880
	Abnormal loss	20

Working note 2: Value of abnormal loss

Value of abnormal loss = Cost per unit of the process output × Units of abnormal loss

$$\text{Cost per unit of the process output} = \frac{\text{Normal cost of normal output}}{\text{Normal output}}$$

Normal cost of normal output = Expenditure of the process – Scrap value of normal loss

= 11,000 – 200 = Rs. 10,800

∴ Cost per unit of the process output = $\frac{10,800}{900}$ = Rs. 12 per kg

Value of abnormal loss = 20 × 12 = Rs. 240

Abnormal Loss Account

Particulars	Kgs	Rs.	Particulars	Kgs	Rs.
To Process 'X' A/c	20	240	By Cash A/c (scrap value at Rs. 2 per kg)	20	40
			By Costing P & L A/c (transfer)		200
	20	240		20	240

Abnormal gain – One process

Illustration 9

100 units are introduced into process I at a cost of Rs. 9,600 and an expenditure of Rs. 4,800 is incurred. From past experience, it is ascertained that wastage normally arises to the extent of 15% of units introduced. This wastage is having a scrap value of Rs. 10 per unit. The actual output of process I is 90 units, transferred to process II. Prepare Process I Account, Abnormal Gain Account and Normal Loss Account.

[Bharathidasan, B.Com.]

Solution:

Process I Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Units introduced	100	9,600	By Normal Loss A/c	15	150
To Other expenses		4,800	(15% of 100 units at		
To Abnormal gain			Rs. 10 per unit)		
(at Rs.167.647 per unit)	5	838	By Process II A/c	90	15,088
			(transfer at		
			Rs. 167.647 per unit)		
	105	15,238		105	15,238

Working Note 1: Abnormal gain units

	Units
Input into the process	100
Less: Normal loss at 15%	15
Normal output	85
Actual output	90
Abnormal gain	– 5

Working note 2: Value of abnormal gain

Value of abnormal gain = Cost per unit of the process output × Units of Abnormal gain

Cost per unit of the process output = $\dfrac{\text{Normal cost of normal output}}{\text{Normal output}}$

Normal cost of normal output = Expenditure of the process – Scrap value of normal loss

= Rs. 14,400 – 150 = Rs. 14,250

∴ Cost per unit of the process output = $\dfrac{14,250}{85}$ = Rs. 167.647

Value of abnormal gain = 5 × 167.647 = Rs. 838

Abnormal Gain Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Normal Loss A/c (Loss of scrap income at Rs. 10 per unit)	5	50	By Process I A/c	5	838
To Costing P & L A/c (transfer)		788			
	5	838		5	838

Normal Loss Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Process I A/c	15	150	By Abnormal gain A/c	5	50
			By Cash A/c	10	100
	15	150		15	150

Abnormal Loss and Gain – Two processes

Illustration 10

The product of a company passes through two processes to completion known as A and B. From past experience it is ascertained that loss is incurred in each process as:

Process A – 2%   Process B – 5%

In each case the percentage of loss is computed on the number of units entering the process concerned.

The loss of each process possesses a scrap value. The loss of processes A and B is sold at Rs. 5 per 100 units.

The output of each process passes immediately to the next process and the finished units are passed into stock.

	Process A Rs.	Process B Rs.
Materials consumed	6,000	4,000
Direct labour	8,000	6,000
Manufacturing expenses	1,000	1,000

20,000 units have been issued to Process A at a cost of Rs. 10,000. The output of each process has been as under:

Process A 19,500; Process B 18,800

Prepare Process Accounts.

Solution:

Process 'A' Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Units Introduced	20,000	10,000	By Normal loss	400	20
To Materials		6,000	(2% of 20,000 units		
To Direct labour		8,000	at Rs. 0.05 each)		
To Manufacturing exp.		1,000	By Abnormal loss	100	127
			By Process B A/c (out-	19,500	24,853
			put transferred at		
			Rs.1.27449 per unit)		
	20,000	25,000		20,000	25,000

Working Note 1: Abnormal loss units

		Units
	Input into the process	20,000
Less:	Normal loss at 2%	400
	Normal output	19,600
	Actual output	19,500
	Abnormal loss	100

Working Note 2: Value of Abnormal loss

Cost per unit of the process output $= \dfrac{\text{Normal cost of normal output}}{\text{Normal output}}$

$= \dfrac{25,000 - 20}{19,600} = 1.27449$

Value of Abnormal loss $= 100 \times 1.27449 = $ Rs. 127

Process 'B' Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Process A A/c (transfer)	19,500	24,853.00	By Normal Loss A/c	975	48.75
To Materials		4,000.00	(5% of 19,500 units		
To Direct Labour		6,000.00	at Rs. 0.05 per unit)		
To Manufacturing expenses		1,000.00	By Finished stock A/c	18,800	36,335.75
To Abnormal gain	275	531.50	(output transferred at		
			Rs. 1.932753 per unit)		
	19,775	36,384.50		19,775	36,384.50

Working Note 3: Abnormal gain units

		Units
	Input into the process	19,500
Less:	Normal loss at 5%	975
	Normal output	18,525
	Actual output	18,800
	Abnormal gain	−275

Working Note 4: Value of Abnormal gain

$$\text{Cost per unit of the process output} = \frac{\text{Normal cost of normal output}}{\text{Normal output}}$$

$$= \frac{35,853 - 48.75}{18,525} = 1.932753$$

Value of Abnormal gain $= 275 \times 1.932753 = $ Rs. 531.50

Illustration 11

A product passes through two processes and then to finished stock. The normal wastage of each process is as follows:

Process A 3% and process B 5%.

The wastage of process A was sold @ Rs. 5 per unit and that of process B at Rs. 10 per unit. 20,000 units were introduced into process A at the beginning of January 1998 at a cost at Rs. 40 per unit.

Other expenses were as under:

	Process A Rs.	Process B Rs.
Sundry materials	40,000	60,000
Wages	2,00,000	3,20,000
Manufacturing expenses	30,000	28,500

The output of process A was 19,000 units and that of process B 18,200 units. Prepare the Process Accounts, Normal loss Account, Abnormal Loss Account and Abnormal Gain Account.

Solution:

Process 'A' Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Units introduced	20,000	8,00,000	By Normal Loss A/c	600	3,000
To Sundry materials		40,000	(3% of 20,000 units		
To Wages		2,00,000	at Rs. 5 per unit)		
To Manufacturing expenses		30,000	By Abnormal Loss A/c	400	22,000
			By Process B A/c	19,000	10,45,000
			(transfer of output		
			at Rs. 55 per unit)		
	20,000	10,70,000		20,000	10,70,000

Working Note 1: Abnormal loss units

	Units
Input into the process	20,000
Less: Normal loss at 3%	600
Normal output	19,400
Actual output	19,000
Abnormal loss	400

Working Note 2: Value of Abnormal loss

$$\text{Cost per unit of the process output} = \frac{\text{Normal cost of normal output}}{\text{Normal output}}$$

$$= \frac{10,70,000 - 3,000}{19,400} = \text{Rs. 55 per unit}$$

Value of Abnormal loss $= 400 \times 55$

$= \text{Rs. 22,000}$

Process 'B' Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Process A A/c (transfer)	19,000	10,45,000	By Normal Loss A/c	950	9,500
To Sundry materials		60,000	(5% of 19,000 units		
To Wages		3,20,000	at Rs. 10 per unit)		
To Manufacturing expenses		28,500	By Finished Stock A/c	18,200	14,56,000
To Abnormal gain	150	12,000	(Transfer of output		
			at Rs. 80 per unit)		
	19,150	14,65,500		19,150	14,65,500

Working Note 3: Abnormal gain units

		Units
	Input into the process	19,000
Less:	Normal loss at 5%	950
	Normal output	18,050
	Actual output	18,200
	Abnormal gain	–150

Working Note 4: Value of Abnormal gain

$$\text{Cost per unit of the process output} = \frac{\text{Normal cost of normal output}}{\text{Normal output}}$$

$$= \frac{14,53,500 - 9,500}{18,050} = \text{Rs. 80 per unit}$$

Abnormal Loss Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Process A A/c	400	22,000	By Cash A/c (Scrap	400	2,000
			value at Rs.5 per unit)		
			By Costing P & L A/c		
			(Transfer)		20,000
	400	22,000		400	22,000

Abnormal Gain Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Normal Loss A/c (Loss of scrap income at Rs. 10 per unit)	150	1,500	By Process B A/c	150	12,000
To Costing P & L A/c (transfer)		10,500			
	150	12,000		150	12,000

Normal Loss Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Process A A/c	600	3,000	By Abnormal Gain A/c (Loss of Income)	150	1,500
To Process B A/c	950	9,500	By Cash A/c	600	3,000
			By Cash A/c	800	8,000
	1,550	12,500		1,550	12,500

OPERATING COSTING

What Are Operating Costs?

Operating costs are the daily expenses necessary to maintain, operate, and administer a business. These include direct costs and indirect costs.

Operating costs do not include non-operating expenses necessary for financing a business, such as currency translation fees, interest on debt, or investments. A company's operating income is calculated by subtracting operating costs from revenue, and these values are shown on its income statement.

Operating Costing – Introduction

Operating costing method is one designed to ascertain and control the costs of the undertakings which do not produce products but which render services. Operating costing is also known as service costing. It is that form of operation costing which applies where standardized services are provided either by an undertaking or by a service cost center within an undertaking.

Meaning and Definitions of Operating Costing

Operating costing is a method of ascertaining cost of providing or operating a service. In this method, cost is determined in the same way as in the unit costing method or output costing method by preparing a cost sheet. Operating costing method is applied in undertakings which provide service or fall in the category of public utilities. The method is also called service costing.

This method of costing is employed in those undertakings which are engaged in providing or operating services rather than in manufacturing tangible products. This method is applicable to road transport undertakings, railways, tramways, airways, shipping companies, electricity companies, gas companies, hospitals, cinemas, hotels, canteens, water works etc.

Operating costing is characterized by a form of unit costing. The product produced is only one but it is some service. The service being provided is standardized, or is regarded as such. These may be for sale to the general public, or within the organization itself. In fact, every manufacturing entity has some service centers, else service departments which act as ancillaries to the production departments.

Operating costing is a method of costing designed to ascertain and control the costs of services. Those industries or organisations which do not produce any product but render some service to customers can use this method.

According to Wheldon – "operating costing actually is unit costing as applied to the cost of services."

According to CIMA, London, "Operating Costing is that form of operation costing which applies where standardized services are rendered either by an undertaking or by a service cost centre within an undertaking."

Objectives of operating costing:

i) To calculate the cost of uniform service rendered to the customers.

ii) To ascertain cost of all services produced within an undertaking viz., internal and external services.

iii) To keep the operating cost at the optimum level.

iv) To make a comparative analysis of operating cost incurred for different periods.

v) To make proper evaluation of different alternatives available.

vi) To determine whether to produce a service or buy it from outside.

vii) To ascertain whether the cost incurred on maintenance is excessively incurred or not.

COST ASCERTAINMENT

The cost may be ascertained by following ways:

Activity Based Costing in which each activity is taken as fundamental cost object.

Unit costing which is adopted to ascertain the total cost and also per unit cost by making a detailed analysis of different elements of cost.

Job Costing method as per which costs is ascertained for the particular job or work.a

Batch Costing which is used when products are produced in batches and cost is ascertained for each batch separately.

Contract Costing is a method of cost ascertainment of a particular contract which is non-recurring in nature. The person executing the contract is known as 'contractor' and the person with whom the contract is executed is known as the 'Contractee'.

Process Costing is a method employed to ascertain the cost of production in industries where a product passes through different processes or stages.

Operation Costing represents the costing in which each cost of each operation involved in an activity is ascertained separately.

Composite Costing is applied to ascertain the cost of complex products manufactured by the manufacturing concerns where no single method of ascertaining cost can be applied.

Departmental Costing is adopted where the factory is divided into several departments and it is desired to ascertain the cost of each department than the whole concern collectively.

COST RECORDING

The scope of cost accounting also includes the recording of the costs. It is the process by which the costs regarding the manufacturing activities are being recorded in the business accounting records. It is a formal mechanism and involves the specialized skills and knowledge of the cost and work accountants. From recording point of view, the costing is of various types:

Historical Costing: The recording of costs after they have been incurred is known as historical costing. It provides the record to the management what has happened and thus is a post-mortem of actual costs.

Post Costing: Under this system, the cost is ascertained after production is completed, by analyzing financial data in such a way as will disclose the cost of the units which have been produced.

Continuous Costing: Under this system, cost is ascertained by recording expenditure and allocating it to production as and when the same is incurred, with the result that cost is ascertained as soon as the job is completed or even in progress.

COST CONTROL

Cost control is the guidance and regulation of the costs by the administration and management authorities. It guides the organization to achieve the target of the undertaking for a given period. Cost control involves the following steps:

- Setting up the targets for expenses and production performance
- Measurement of the actual performance
- Comparison of the actual performance with the standard performance
- Finding out deviations, if any
- Taking corrective actions to remove all the deviations.

Cost control is done by following the various techniques:

Marginal Costing: It is a technique of cost accounting which pays attention to the behavior of costs with changes in the volume of the output.

Budgetary Control: It involves the establishment of budgets relating to the responsibilities of the executives to the requirements of the policy and the continuous comparison of the actual with the budgeted results, either to secure by individual action of that policy or to provide a basis for its revision.

Standard Costing: Standard costing discloses the cost of deviations from standards and classifies these as to their causes, so that management is immediately informed of the sphere of operations in which remedial action is necessary.

COST ESTIMATION AND COST ASCERTAINMENT

Cost estimation is the process of pre-determining the cost of a certain product job or order. Such pre-determination may be required for several purposes. Some of the purposes are as follows:

• Budgeting

• Measurement of performance efficiency

• Preparation of financial statements (valuation of stocks etc.)

• Make or buy decisions

• Fixation of the sale prices of products

Cost ascertainment is the process of determining costs on the basis of actual data. Hence, the computation of historical cost is cost ascertainment while the computation of future costs is cost estimation.

Both cost estimation and cost ascertainment are interrelated and are of immense use to the management. In case a concern has a sound costing system, the ascertained costs will greatly help the management in the process of estimation of rational accurate costs which are necessary for a variety of purposes stated above.

Moreover, the ascertained cost may be compared with the pre-determined costs on a continuing basis and proper and timely steps be taken for controlling costs and maximizing profits.

Reconciliation statement

The need for **reconciling accounts and financial accounts** arise due to discrepancy between cost accounts and financial account. The process of correcting these accounts is known as the reconciliation of cost and financial accounts. When prepared following financial accounting regulations, numerous things are only included in the profit and loss account.

If the profit or loss were calculated using financial accounts, it would be adjusted using cost accounts. We see a similar profit as per cost accounting after modifications. If we calculated profit using the cost account, we must change the items to reflect the financial accounts. We create a **reconciliation statement** with this goal in mind.

Reconciliation Meaning

The profit or loss shown by one set of books may differ from that indicated by the other when cost accounts and financial accounts are handled separately in two separate sets of books. As a result, it becomes important to regularly reconcile the profit or loss indicated by the two sets of accounting.

The reasons for the discrepancy between the data reported by each system are detailed in a note of reconciliation. It is done to look through both sets of accounts' mathematical precision and look for any errors that may have been made.

Need for Reconciliation:

a.   It explains the causes of the profit or loss discrepancy between cost and financial statements.

b.   It guarantees that no revenue or expense item has been left off the books and that overhead costs are not being under or over-recovered.

c.   It assists in verifying the mathematical precision of both sets of accounts.

d.   It guarantees the accuracy of cost accounting to properly determine the cost of manufacturing.

e.   By emphasising the fluctuations contributing to an increase or reduction in profit, it facilitates internal management.

f.   It encourages coordination and cooperation between cost and financial accounting divisions to provide accurate and trustworthy accounting data.

g.   It allows management to create rules for expenses, <u>depreciation</u>, and stock valuation.

h.   It guarantees managerial judgement.

Items Accounted for Differently in Cost Accounting and Financial Accounting

- **Overhead** - Cost accounts apply fixed rates of overheads to cost units based on projections, and the amount recovered may differ from the actual costs spent. The profits on two sets of books will differ if such under or over-recovery of overheads is not carried off to the costs profit and loss account.

- **Stock vVluation**- Stocks are evaluated in financial accounts at a lower cost or market value. In cost accounting, the stock is valued at cost using a technique that is appropriate to the unit, such as FIFO, LIFO, average, etc. As a result, stock value may change, which will indicate a profit discrepancy between the two sets of books.

- **Depreciation** - The profits will change if a different methodology is used to calculate depreciation in cost accounts compared to financial accounts.

Reasons for Disagreement of Profit between Cost Books and Financial Books

The profit shown by cost accounts and financial accounts often differ due to the following reasons:

1. Items Appearing Only in Financial Accounts:

- **Purely financial incomes**: e.g., interest received, rent received, profit on sale of assets.
- **Purely financial expenses**: e.g., loss on sale of assets, penalties, donations, income tax, etc.

2. Items Appearing Only in Cost Accounts:

- **Notional charges**: e.g., notional rent on owned premises, notional interest on capital, etc.

3. Over/Under Absorption of Overheads

- Overheads may be absorbed in cost accounts based on estimates, which may differ from actual recorded in financial accounts.

4. Different Bases of Stock Valuation:

- Stocks may be valued differently in cost accounts (e.g., at cost) and financial accounts (e.g., at cost or market price, whichever is lower).

5. Depreciation Methods:

- Different methods or rates of depreciation may be used in cost and financial accounts.

6. Abnormal Gains/Losses:

- Abnormal losses/gains may be treated differently in both sets of accounts.

PROBLEMS AND SOLUTIONS

Problem 1 : From the following information, calculate total kms. and total passenger kms.

No.of buses 5; Days operated in a month 30; Trip made by each bus 4; Distance of route 20 kms. long (one side) Capacity of the bus 50 passengers.

Normal passengers travelling - 75% of capacity

Solution

Calculation of total kms covered :

= No. of buses x No. of days x No. of trips x Distance per trip

= 5 x 30 x 4 x 40 (20 + 20) = 24,000 kms.

Calculation of total passenger kms.

= Total kms. covered x No. of passengers x Capacity.

$$= 24000 \times 50 \times \frac{75}{100} = 9,00,000 \text{ passenger kms.}$$

Problem 2 : Town Bus Service Ltd. run the following fleet of buses within the limits of Tiruchi.

Type	Buses	Carrying capacity
Ordinary	10	50 Passengers
Deluxe	15	40 Passengers

On an average each bus makes 10 trips a day covering a distance of 8 kms in each trip and 90% of the seats are occupied. The annual records show that 5 buses are generally required to be kept away from the road each day for repairs. Calculate effective passenger kms. for the month of April.

Solution:

Calculation of total kms covered:

No. of buses x No. of days x No. of trips x Distance per trip

Ordinary	10 x 30 x 10 x 8	=	24,000 Kms
Deluxe	15 x 30 x 10 x 8	=	36,000 Kms

Calculation of effective passenger kms:

Total kms. covered x No. of passengers x Capacity

Ordinary	24,000 x 50 x 90/100	10,80,000
Deluxe	36,000 x 40 x 90/100	12,96,000
	Total Passenger kms.	23,76,000
Less : Laid up for repairs		
	5/25 of 23,76,000	4,75,200
(i.e. 5 buses out of 25 are laid up for repairs)		
	Effective Passenger kms.	19,00,800

Problem 3 : A transport undertaking maintains a fleet of lorries for carrying goods from Tiruchi to Karur, 100 kms. apart. Each lorry which operates 25 days on an average in a month starts everday from Tiruchi with a load of 8 tonnes and returns from Karur with a load of 4 tonnes.

a. Calculate the total kms. tonne kms. and cost per tonne km. when the total monthly charges for a lorry are Rs. 24,000

b. What rate per tonne should be charged to earn a profit of 20% on the freightage?

Solution

Calculation of total kms. covered:

No. of days x Distance per round trip

25 x 200 (2x100) = 5,000 kms.

Onward trip 2500 kms + Return trip 2500 kms = 5000 kms

a. Calculation of tonne kms = Distance Covered x Capacity

Onward trip = 2,500 x 8 tonnes = 20,000
Return trip = 2,500 x 4 tonnes = 10,000

Total tonne kms. = 30,000

$$\text{Cost per tonne k.m.} = \frac{\text{Total monthly charges}}{\text{Total tonne kms.}}$$

$$\text{Rs. 24.000} / 30,000 \text{ kms.} = \text{Re. } 0.80$$

b. *Freight rate to be charged :*

	Rs.
Cost per tonne km. =	0.80
Add : Profit 20% on the freightage	
(i.e $\frac{1}{5}$ on freightage or $\frac{1}{4}$ on cost) =	0.20
Freight rate per tonne km. =	1.00

Problem 4 : Narmada Travels is running a fleet of six buses between two towns 75 kms apart. Seating capacity of each bus is 40 passengers. The following particulars are available for the month of June.

		Rs.
1.	Wages of drivers and conductors	7,200
2.	Salaries of office staff	3,000
3.	Taxation and Insurance	4,800
4.	Interest	6,000
5.	Diesel and oil	20,640
6.	Repairs and maintenance	2,400
7.	Depreciation	7,800
	Total	51,840

Actual passengers carried were 80 per cent of seating capacity. All the buses ran on all the days of the month. Each bus made one round trip per day. Find out the cost per passenger km.

Solution

Operating Cost Statement for the month of June....

Standing charges :	Rs.	Rs.
Wages of drivers and conductors	7,200	
Salaries of office staff	3,000	
Taxation and Insurance	4,800	
Interest	6,000	
		21,000

	Rs.	Rs.
Total Standing charges b/f.		21,000
Operating and maintenance expenses :		
Diesel and oil	20.640	
Repairs and maintenance	2,400	
Depreciation	7,800	
		30.840
Total Cost		51,840

$$\text{Cost per passenger km.} = \frac{\text{Total cost}}{\text{Total passenger kms.}}$$

$$= \text{Rs. } 51,840 / 8,64,000 = \text{Re. } 0.06$$

Working :

Calculation of total kms. covered :

Total kms. covered =

No. of buses x No. of days x No. of trips x Distance per trip

$$= 6 \times 30 \times 2 \times 75 = 27,000 \text{ kms.}$$

Calculation of effective passenger kms. :

Total kms. covered x No. of Passengers x Capacity

$$= 27,000 \times 40 \times 80 / 100 = 8,64,000$$

Problem 5 : From the following data, calculate the cost per km. of a vehicle

	Rs.
	1,50,000
Cost of vehicle	5,000
Road licence fee per year	1,000
Insurance charges per year	6,000
Garage rent per year	200
Driver's wages per month	24
Cost of petrol per litre	8
Kms. per litre	
Proportionate charges for tyre and maintenance per km.	0.20
Estimated life	1,50,000 kms
Estimated kms. per year	6,000

(B.Com., Bharathidasan)

Operating Cost Statement

	p.a Rs.	per km. Rs.
Standing charges :		
Road licence fee	5,000	
Insurance charges	1,000	
Garage rent	6,000	
Driver's wages 200 x 12	2,400	
Total Standing-Charges	14,400	
Estimated kms. per year	6,000	
Standing charges per km. = Rs. 14,400 / 6,000 =		2.40

Operating and maintenance expenses :

Depreciation per km. $= \dfrac{\text{Cost of Vehicle}}{\text{Estimated life (kms)}}$

		per km. Rs.
= Rs. 1,50,000 / 1,50,000 =		1.00
Proportionate charge for tyre and maintenance per km.		0.20
Cost of petrol :		
For 8 kms, cost is Rs. 24		
For 1 km, cost is 24 / 8		3.00
Operating cost per km.		6.60

Problem 6 : Mr. Jambu runs a tempo service in Thanjavur and has two vehicles. From the following data, calculate cost per running km.

	Vehicle A Rs.	Vehicle B Rs.
Cost of vehicle	25,000	15,000
Road licence fee p.a.	750	750
Supervisor's Salary p.a.	1,800	1,200
Driver's wages per hour	4	4
Cost of fuel per litre	6	6
Repairs and maintenance per km.	1.50	2
Tyre cost per km.	1	0.80

	Vehicle A Rs.	Vehicle B Rs.
Garage rent p.a.	1,600	550
Insurance p.a.	850	500
Kilometre run per litre	6	5
Kilometres run during the year	15,000	6,000
Estimated life of vehicle (kms.)	1,00,000	75,000

Charges interest 10% on the cost of vehicle. The vehicle runs 20 kms. per hour on an average.

(M.Com., Bharathidasan)

Solution

Operating Cost Statement

Standing charges :	Vehicle A		Vehicle B	
	p.a.	per km.	p.a.	per km.
	Rs.	Rs.	Rs.	Rs.
Road licence fee	750		750	
Supervisor's Salary	1,800		1,200	
Garage rent	1,600		550	
Insurance	850		500	
Interest 10% on Rs. 25,000	2,500			
10% on Rs. 15,000			1,500	
Total Standing Charges	7,500		4,500	
Kms. run during the year	15,000		6,000	
Standing charges per k.m. A 7,500/15,000		0.50		
B 4,500/6,000				0.75
Operating and maintenance expenses				
Repairs and Maintenance per km.		1.50		2.00
Tyre cost per km		1.00		0.80
Depreciation :				
Cost / Estimated life (kms.)				
Rs. 25,000 / 1,00,000 kms.		0.25		
Rs. 15,000 / 75,000 kms.				0.20
C/F		3.25		3.75

11.10

	Rs.	Rs.
B / F	3.25	3.75
Driver's wages per hour Rs. 4		
Distance covered per hour = 20 kms.		
For 20 kms, wages = Rs. 4		
For 1 km, wages = Rs. 4 / 20	0.20	0.20
Cost of fuel per litre Rs. 6		
For A Distance covered per litre = 6 kms.		
For 6 kms., Cost of fuel = Rs. 6		
For 1 km., Cost of fuel = Rs. 6 /6	1.00	
For B Distance covered per litre = Rs. 6		
For 5 kms., Cost of fuel = Rs. 6		
For 1 km., Cost of fuel = Rs. 6 / 5		1.20
Operating cost per km.	4.45	5.15

ILLUSTRATIONS

(a) Differences Given – Reconciliation Required

Illustration 1

From the following figures prepare a reconciliation statement between cost and financial records:

	Rs.
Net profit as per financial records	1,28,755
Net profit as per costing records	1,72,400
Works overhead under-recovered in costing	3,120
Administrative overhead recovered in excess	1,700
Depreciation charged in financial records	11,200
Depreciation recovered in costing	12,500
Interest received but not included in costing	8,000
Obsolescence loss charged in financial records	5,700
Income tax provided in financial books	40,300
Bank interest credited in financial books	750
Stores adjustment (credit in financial books)	475
Depreciation of stock charged in financial books	6,750

[Madras, B.Com., (ICE) Oct. 2000;
Madras, M.Com., April 1995]

Solution:

<div align="center">Reconciliation Statement</div>

Particulars	Rs.	Rs.	Rs.
Profit as per cost accounts			1,72,400
Add: (a) Administration overhead over recovered in cost accounts		1,700	
(b) Depreciation overrecovered in cost accounts (12,500 – 11,200)		1,300	
(c) Incomes and gains credited in financial accounts, but not shown in cost accounts:			
Interest Received	8,000		
Bank interest	750		
Stores adjustment	475	9,225	12,225
			1,84,625
Less: (a) Works overhead under-recovered in costing		3,120	
(b) Expenses and losses debited in financial accounts but not shown in cost accounts:			
Obsolescence loss	5,700		
Provision for income tax	40,300		
Depreciation of stock	6,750	52,750	55,870
Profit as per financial accounts			1,28,755

Note: The terms 'Absorption' and 'Recovery' are used interchangeably and they mean the same thing.

Illustration 2

For a company the profit as per cost accounts is Rs. 86,250. The following points are found out on comparison between cost accounts and financial accounts:

	Cost Accounts Rs.	Financial Accounts Rs.
(a) *Opening stock:*		
Materials	10,300	10,500
Work-in-progress	8,000	8,500
(b) *Closing stock:*		
Materials	15,000	14,200
Work-in-progress	6,000	5,600

(c) Dividend and interest received – Rs. 600.

(d) Loss on sale of investments – Rs. 1,000.

(e) Rs. 1,500 expenses charged in cost accounts but not considered in financial accounts.

(f) Goodwill Rs. 2,500 and preliminary expenses Rs. 3,000 have been written off during the year.

(g) Overheads incurred Rs.40,600 but overheads recovered amount to Rs.38,500.

Find out the profits as per Financial Accounts by preparing a reconciliation statement.

<div align="right">[Madras, M.Com., April 1985]</div>

Solution:

Reconciliation Statement

Particulars	Rs.	Rs.	Rs.
Profit as per cost accounts			86,250
Add: (a) Incomes not shown in cost accounts:			
Dividend and interest		600	
(b) Expenses shown in costs accounts but not considered in financial accounts		1,500	2,100
			88,350
Less: (a) Opening stock of material under valued in cost accounts (10,500 – 10,300)	200		
Opening stock of work-in-progress under valued in cost accounts (8,500 – 8,000)	500		
Closing stock of material overvalued in cost accounts (15,000 – 14,200)	800		
Closing stock of work-in-progress over valued in cost accounts (6,000 – 5,600)	400	1,900	
(b) Expenses and losses not shown in cost accounts but recorded in financial accounts:			
Loss on sale of investments	1,000		
Goodwill written off	2,500		
Preliminary expenses	3,000	6,500	
(c) Overheads under recovered in cost accounts (40,600 – 38,500)		2,100	10,500
Profit as per financial accounts			77,850

Note: (1) Overheads recovered are always in cost accounts whereas overheads incurred refers to financial accounts.

(2) Incomes like dividend and interest are excluded in cost accounts

(3) Goodwill and preliminary expenses are usually written off in financial accounts, but not in cost accounts.

(4) Lower opening stocks and higher closing stocks increase profits and vice versa.

Illustration 3 (Memorandum Reconciliation Account)

Prepare memorandum reconciliation account from the following data:

	Rs.
Net profit as per financial books	63,780
Net profit as per costing books	66,760
Factory overhead under recovered in costing	5,700
Administration overhead recovered in excess	4,250

Problem 6 : The following details have been ascertained from financial and cost accounts.

		Cost Accounts Rs.	Financial Accounts Rs.
a.	Opening stock :		
	Materials	10,000	15,000
	Finished goods	18,000	16,000
b.	Closing stock :		
	Materials	12,000	13,000
	Finished goods	20,000	17,000

c. Interest received but ignored in cost accounts Rs. 2,000.
d. Interest charged in financial accounts only Rs. 1,800.
e. Goodwill written off Rs. 7,000.
f. Overhead paid Rs. 35,600 but recovered Rs. 33,900.
g. Profit as per cost accounts is Rs. 1,65,000.

Find out the profit as per financial accounts by drawing up a reconciliation statement.

Solution :   **Reconciliation Statement**

		Rs.	Rs.
	Profit as per cost accounts		1,65,000
Add	Opening stock of finished goods over-valued in costing (Rs.18,000 – Rs.16,000)	2,000	
	Closing stock of raw materials under-valued in costing (Rs.13,000 – Rs.12,000)	1,000	
	Interest received not included in costing	2,000	5,000
			1,70,000
Less	Opening stock of raw materials under-valued in costing (Rs.15,000 – Rs.10,000)	5,000	
	Closing stock of finished goods over-valued in costing (Rs.20,000 – Rs.17,000)	3,000	
	Interest charges not included in costing	1,800	
	Goodwill written off not included in costing	7,000	
	Overhead under-recovered in costing (Rs. 35,600 – Rs. 33,900)	1,700	18,500
	Profit as per financial accounts		1,51,500

Problem 7: The financial books of Nirma Ltd. show a net profit of Rs. 50,000. The following details are ascertained on comparison of the cost and financial accounts.

		Cost Accounts Rs.	Financial Accounts Rs.
a.	Opening stock :		
	Raw materials	5,000	5,500
	Finished goods	12,000	15,000
b.	Closing stock :		
	Raw materials	4,000	5,300
	Finished goods	14,000	16,000

c. Transfer fees received Rs.1,000 and dividend paid Rs.1,200 are exclusively taken in financial accounts but ignored in cost accounts.

d. The company charged 10% interest on its opening capital employed of Rs.80,000

e. A machine with a net book value of Rs. 10,000 was sold during year for Rs.8,000

Find out the profit as per cost accounts and draw up a reconciliation statement.
(B.Com. Bharathidasan)

Solution :

Reconciliation Statement

		Rs.	Rs.
	Profit as per financial accounts		50,000
Add	Over-valuation of opening stock of raw materials in financial accounts (Rs.5,500 – Rs.5,000)	500	
	Over-valuation of opening stock of finished goods in financial accounts (Rs.15,000 – Rs.12,000)	3,000	
	Loss on sale of machine charged in financial accounts	2,000	
	Dividend paid included in financial accounts 1,200		
	Interest on capital 10% of Rs.80,000	8,000	14,700
			64,700

7.13

	Rs.	Rs.
Less Transfer fees received included in financial accounts	1,000	
Over-valuation of closing stock of raw materials in financial accounts (Rs.5,300–Rs.4,000)	1,300	
Over-valuation of closing stock of finished goods in financial accounts (Rs.16,000–Rs.14,000)	2,000	4,300
Profit as per cost accounts		60,400

Problem 8: The financial profit and loss account of a manufacturing company is given below :

Trading and Profit & Loss Account

	Rs.		Rs.
To Opening stock	82,000	By Sales	3,46,500
To Purchases	2,47,000	By Closing stock	75,000
To Direct wages	23,000		
To Factory expenses	21,000		
To Gross profit	48,500		
	4,21,500		4,21,500
To Adm. expenses	9,500	By Gross profit	48,500
To Selling expenses	14,250	By Sundry income	2,000
To Net profit	26,750		
	50,500		50,500

The costing records show :

a. Book value of closing stock Rs.78,000.

b. Factory overheads have been absorbed to the extent of Rs. 18,200.

c. Administrative expenses are recovered at 3% on selling price.

d. Total absorption of direct wages Rs.24,105.

e. Selling expenses are absorbed at 2% on sales.

f. Sundry income is not considered.

Prepare a reconciliation statement and arrive at the profit as per cost accounts.

Solution :

Reconciliation Statement

		Rs.	Rs.
	Profit as per financial accounts		26,750
Add	Under-valuation of closing stock in financial accounts (Rs.78,000 – Rs.75,000)	3,000	
	Factory over-head over-charge in financial accounts (Rs.21,000 – Rs.18,200)	2,800	
	Selling expenses over charged in financial accounts (Rs.14,250 – Rs.6,930)	7,320	13,120
			39,870
Less	Administrative expenses under-charged in financial accounts (Rs.10,395 – Rs.9,500)	895	
	Direct wages under - charged in financial accounts (Rs.24,105 – Rs.23,000)	1,105	
	Sundry income	2,000	4,000
	Profit as per cost accounts		35,870

Problem 9 : Given below is the Trading and Profit and Loss Account of Spic Electronics Ltd. for the year ended 31st March...

	Rs.			Rs.
To Materials	27,40,000	By Sales		
To Wages	15,10,000	(60,000 units)		60,00,000
To Factory		By Stock of finished		
expenses	8,30,000	goods (2,000 units)		1,60,000
To Administrative		By Work-in-progress :		
expenses	3,82,400	Materials	64,000	
To Selling		Wages	36,000	
expenses	4,50,000	Factory		
To Preliminary		expenses	20,000	1,20,000
exp. written off	60,000			
To Net profit	3,25,600	By dividend received		18,000
	62,98,000			62,98,000

The company manufactured a standard unit.

In Cost accounts:

a. Factory expenses have been allocated to production at 20% on prime cost.

b. Administrative expenses at Rs. 6 per unit produced and

c. Selling expenses at Rs.8 per unit sold.

Find out costing profit and reconcile the same with that shown in the financial accounts. **(B.Com. Annamalai University)**

Solution : **Statement of Cost and Profit**

	Rs.	Rs.
Materials		27,40,000
Wages		15,10,000
Prime cost		42,50,000
Factory expenses (20% on prime cost)		8,50,000
		51,00,000
Less Closing work-in-progress		
Materials	64,000	
Wages	36,000	
Factory expenses	20,000	1,20,000
Factory cost		49,80,000
Administrative Expenses		
(62,000 units x Rs.6 per unit)		3,72,000
Cost of production		53,52,000
Less Closing stock of finished goods (1)		1,72,645
Cost of goods sold		51,79,355
Selling Expenses (60,000 units x 8 per unit)		4,80,000
Cost of Sales		56,59,355
Profit (bal.fig.)		3,40,645
Sales		60,00,000

Working :

(1) No. of units sold ... 60,000

Add Closing stock of finished goods ... 2,000

No. of units produced ... 62,000

For 62,000 units, cost of production = Rs. 53,52,000

For 2,000 units, cost of production = $2,000 \times \dfrac{53,52,000}{62,000}$ = Rs. 1,72,645

7.16

Reconciliation Statement

			Rs.
	Profit as per cost accounts		3,40,645
Add	Factory expenses over-recovered in costing (8,50,000 – 8,30,000)	20,000	
	Selling expenses over-recovered in costing (4,80,000 – 4,50,000)	30,000	
	Dividend received not included in costing	18,000	68,000
			4,08,645
Less	Office expenses under-recovered in costing (3,82,400 – 3,72,000)	10,400	
	Closing stock of finished goods over-valued in costing (1,72,645 – 1,60,000)	12,645	
	Preliminary expenses written off not included in costing	60,000	83,045
	Profit as per financial accounts		3,25,600

CONTRACT COSTING

Simple Finished Contracts

Illustration 1

The following are the expenses of Balaji & Co., in respect of a contract which commenced on 1st January 1998:

	Rs.
Materials purchased	50,000
Materials on hand	2,500
Direct wages	75,000
Plant issued	25,000
Direct Expenses	40,000

The contract price was Rs. 7,50,000 and the same was duly received when the contract was completed in August 1998. Charge indirect expenses at 15% on wages; provide Rs. 5,000 for depreciation on plant and prepare the contract account and the Contractee's Account

Solution:

Balaji & Co., – Contract Ledger
Contract A/c

Particulars	Rs.	Particulars	Rs.
To Material purchased	50,000	By Material on hand	2,500
To Direct wages	75,000	By Contractee's A/c	
To Direct expenses	40,000	(contract price)	7,50,000
To Indirect expenses (15% on wages)	11,250		
To Depreciation on plant	5,000		
To P & L A/c (Profit – Bal. fig)	5,71,250		
	7,52,500		7,52,500

Contractee's A/c

Particulars	Rs.	Particulars	Rs.
To Contract A/c	7,50,000	By Bank	7,50,000
	7,50,000		7,50,000

Illustration 2

Write up Contract No. 303 account in the contract ledger of Saravana & Co., from the following details:

	Rs.
Direct Materials	16,200
Wages	10,800
Special plant	8,000
Stores issued	2,880
Loose tools	1,500
Tractor expenses	3,420
Contract price	40,000

The contract was completed in 20 weeks. The special plant was returned subject to depreciation at 20% on original cost. The value of loose tools and stores returned were Rs. 1,000 and Rs. 400 respectively. The book value of the tractor used for the contract was Rs. 19,500 and depreciation to be charged to this contract is at 20% per annum on the book value. Provide 7% for administrative expenses on works cost.

Solution:

Saravana & Co., Contract Ledger
Contract No. 303 Account

Particulars	Rs.	Particulars	Rs.
To Direct materials	16,200	By Special plant	
To Wages	10,800	(8,000 – 20% of 8,000)	6,400
To Special plant	8,000	By Loose tools (returned)	1,000
To Stores	2,880	By Stores (returned)	400
To Loose Tools	1,500	By Contractee's A/c	
To Tractor expenses	3,420	(contract price)	40,000
To Depreciation on tractor			
$\left(19,500 \times \dfrac{20}{100} \times \dfrac{20}{52}\right)$	1,500		
To Administrative expenses	2,555		
To Profit and Loss A/c (Bal. fig)	945		
	47,800		47,800

Note: Depreciation on plant is 20% flat and not 20% per annum.

Working note: Administrative expenses at 7% on works cost:

Works cost of the contract = 44,300 – 7,800 = Rs. 36,500

Administrative expenses = $36,500 \times \dfrac{7}{100}$ = Rs. 2,555

Two or more contracts

Illustration 13

Modern Constructions Ltd., has taken two contracts on 1st Oct. 1985. The position of contracts on 30th Sep. 1986 is as follows:

	Contract I (Rs.)	Contract II (Rs.)
Contract price	27,00,000	60,00,000
Materials	5,80,000	10,80,000
Wages paid	11,24,000	16,50,000
Other expenses	28,000	60,000
Plant at site	1,60,000	3,00,000
Unused materials at site	40,000	60,000
Wages payable	36,000	54,000
Other expenses due	4,000	9,000
Work certified	16,00,000	30,00,000
Cash received	12,00,000	22,50,000
Work completed but not yet certified	80,000	90,000

The plant at site is to be depreciated at 10%. Prepare the contract account in respect of each work, showing the notional profit and also the profit to be transferred to Profit and Loss Account.

[A.C.S. Dec. 1987]

Solution:

Modern Constructions Ltd.
Contract Accounts for the year ended 30-9-1986

Particulars	Contract I Rs.	Contract II Rs.	Particulars	Contract I Rs.	Contract II Rs.
To Materials	5,80,000	10,80,000	By Materials at site	40,000	60,000
To Wages paid	11,24,000	16,50,000	By Work-in-progress:		
Wages payable	36,000	54,000	Work certified	16,00,000	30,00,000
To Other expenses	28,000	60,000	Work uncertified	80,000	90,000
Expenses due	4,000	9,000			
To Depreciation on	16,000	30,000			
plant at site at 10%					
To Notional profit c/d		2,67,000	By P & L A/c (loss)	68,000	
	17,88,000	31,50,000		17,88,000	31,50,000
To Profit and Loss A/c			By Notional profit b/d		2,67,000
$2,67,000 \times \dfrac{2}{3} \times \dfrac{22,50,000}{30,00,000}$		1,33,500			
To Work-in-progress A/c (Reserve)		1,33,500			
		2,67,000			2,67,000

Note: Loss on contract I is fully transferred to P & L A/c. Work certified on contract II is 50% of contract price. So, 2/3rd of the notional profit, subject to cash received is transferred to P & L A/c.

Illustration 14

Kovai Construction Co. Ltd., undertook two contracts on 1st April 1998 and 1st July 1998 respectively. Their accounts showed the following position on 31st Dec. 1998.

	Contract A Rs.	Contract B Rs.
Contract price	1,20,000	1,00,000
Work certified	80,000	64,000
Work uncertified	2,400	3,200
Materials	28,500	23,000
Wages	44,000	45,000
General expenses	1,900	1,300
Cash received in respect of work certified	60,000	48,000

	Contract A	Contract B
	Rs.	Rs.
Wages accrued	1,400	1,500
General expenses accrued	500	200
Plant installed	8,000	6,400
Materials on hand	1,400	1,520

On the respective dates of the contracts, the plant was installed, depreciation there on being taken at 15% per annum. Write up contract ledger and ascertain the Profit or Loss on each contract and show the relevant items in the company's Balance Sheet.

Solution:

<div align="center">

Kovai Construction Ltd.
Contract Account

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Particulars	Contract A Rs.	Contract B Rs.	Particulars	Contract A Rs.	Contract B Rs.
To Materials	28,500	23,000	By Material		
To Wages	44,000	45,000	on hand	1,400	1,520
Wages due	1,400	1,500	By Work-in-progress:		
To General Expenses	1,900	1,300	Work certified	80,000	64,000
General expenses due	500	200	Work uncertified	2,400	3,200
To Depreciation			By P & L A/c (loss)		2,760
$8,000 \times \dfrac{15}{100} \times \dfrac{9}{12}$	900				
$6,400 \times \dfrac{15}{100} \times \dfrac{6}{12}$		480			
To Notional Profit c/d	6,600				
	83,800	71,480		83,800	71,480
To P & L A/c			By Notional Profit b/d	6,600	
$\left(6,600 \times \dfrac{2}{3} \times \dfrac{60,000}{80,000}\right)$	3,300				
To Work-in-progress A/c (Reserve)	3,300				
	6,600			6,600	

Balance Sheet as on 31-12-1998 (Extracts)

Liabilities	Rs.	Rs.	Assets	Rs.	Rs.
P & L A/c :			Fixed Assets:		
Contract – I Profit	3,300		Plant		
Contract – II Loss	2,760	540	Contract A	8,000	
			Contract B	6,400	
Wages due				14,400	
Contract – I	1,400				
Contract – II .	1,500	2,900	Less: Depreciation		
General Charges due				900	
Contract – I	300			480	1,380	13,020
Contract – II	200	500	Material on hand:		
			Contract A	1,400	
			Contract B	1,520	2,920
			Work-in-progress:		
			Contract A	82,400	
			Contract B	67,200	
				1,49,600	
			Less: Reserve of contract A	3,300	
				1,46,300	
			Less: Cash received		
			Contract A	60,000	
			Contract B	48,000	1,08,000	38,300

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