



# RR Academy

## COST ACCOUNTING

**CMA INTER  
GROUP 1 - PAPER 8**

*Faculty:*

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( CHARTERED ACCOUNTANT )



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# **CHAPTER - ONE**

# **COST SHEET**

### **Simple Cost sheet:**

Raw materials consumed	xxx
Add: Direct wages, direct expenses	xxx
	----
<b>Prime Cost</b>	xxx
Add: Work overheads	xxx
	----
<b>Works cost</b>	xxx
Add: Administration overheads	xxx
	----
<b>Cost of production</b>	xxx
Add: Selling and Distribution overheads	xxx
	----
<b>Cost of sales</b>	xxx
Add: Net profit (balancing figure)	xxx
	----
<b>Sales</b>	<u>xxx</u>

### **COMPREHENSIVE COST SHEET:**

Opening stock of raw materials	xxx
Add: Purchase of raw material	xxx
Add: Expenses of purchases	xxx
	----
Less: Closing stock of raw materials	xxx
<b>Materials consumed</b>	xxx
Add: Direct wages, direct expenses	xxx
	----
<b>Prime Cost</b>	xxx
Add: Work overheads	xxx
	----
<b>Factory cost incurred</b>	xxx
Add: Opening stock of work-in-progress	xxx
	----
Less: Closing stock of work-in progress	xxx
	----
<b>Works cost</b>	xxx
Add: Administration overheads	xxx
	----
<b>Cost of production</b>	xxx
Add: Opening stock of finished goods	xxx
	----
Less: Closing stock of finished goods	xxx
	----
<b>Cost of goods sold</b>	xxx
Add: Selling and distribution overheads	xxx
	----
<b>Cost of sales</b>	xxx
Add: Profit (balancing figure)	xxx
	----
<b>Sales</b>	<u>xxx</u>

### **Important Points:**

Cost of converting raw material into finished goods is called 'conversion cost'. Conversion cost means labour and overheads.

Closing stock of finished goods should be valued at cost per unit.

$$\text{Cost per unit} = \frac{\text{Cost of Production}}{\text{Units produced}}$$

Units produced = Sales (+) closing stock (-) opening stock

Selling expenses should always be calculated with reference to units sold only

**Items which do not appear in cost sheet:** Interest on debentures, loss on sale of fixed assets, Discount, provision for income tax, provision for bad debts, goodwill written off, preliminary expenses written off, discount on issue of shares, dividend paid, transfer to reserves.

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### **Problems on Simple Cost Sheet:**

#### **1. Ascertain the prime cost, works cost, cost of production, total cost and profit.**

Direct Materials Rs.50,000;	Direct Labour Rs.30,000;	Factory expenses Rs.10,000;
Office expenses Rs.5,000;	Selling expenses Rs.3,000;	Sales Rs.1,10,000.

#### **2. In a factory two types of radios are manufactured, viz., Orient and Sujon models. From the following particulars prepare a statement showing cost and profit per radio sold. There is no opening or closing stock.**

	<b>Orient</b>	<b>Sujon</b>
Materials	Rs.27,300	Rs.1,08,680
Labour	Rs.15,600	Rs.62,920

Works overhead is charged at 80% on labour and office overhead is 15% on works cost. The selling price of both radios is Rs.1,000. 78 Orient radios and 286 Sujon radios were sold.

#### **3. In a factory a standard product is manufactured. From the following particulars prepare a cost sheet showing total cost and profit made.**

Raw material consumed	Rs.30,000
Labour	Rs.60,000

Works overhead is charged at 40% of works cost and office overhead is taken at 20% of total cost. The standard product sold during the period is 180 units at Rs.1,200 each.

#### **4. Prime cost Rs.12,50,000; works cost Rs.20,00,000 and office overheads are 30% of factory overheads. What is the cost of production?**

5. A firm has purchased a plant to manufacture a new product. The cost data are given below:

Estimated annual sales	36,000 units
Material	Rs.4 per unit
Direct Labour	Rs.0.6 per unit
Overheads – Manufacturing	Rs.24,000 p.a.
Administrative expenses	Rs.28,800 p.a.
Selling expenses	15% of sales

Calculate the selling price if profit per unit is Rs.1.50. Assume whatever is produced is sold.

6. A concern producing a single product estimates the following expenses for a production period.

	Rs.
Direct Material	50,000
Direct Labour	50,000
Direct Expenses	5,000
Overhead Expenses	2,10,000

What will be the overhead recovery rate based on prime cost?

---

#### **Problems on Comprehensive Cost Sheet:**

7. Following information has been obtained from the cost records of a company for 2019-20.

Direct labour Rs.1,60,000;	Purchase of raw materials Rs.98,000;
Indirect labour Rs.40,000;	Heat, light and power Rs.20,000;
Factory insurance and taxes Rs.5,000;	Repairs to plant Rs.3,000;
Factory supplies Rs.5,000;	Depreciation on factory building Rs.16,000

#### **Stock as on 1.4.2019:**

Raw materials Rs.10,000; Work-in-progress Rs.14,000; Finished goods Rs.50,000.

#### **Other information made available is:**

Raw material consumed Rs.95,000  
Factory cost of goods produced Rs.2,80,000  
Cost of goods sold Rs.1,60,000

No office and administration expenses were incurred. Prepare a statement of cost giving maximum possible information and its break-up.

8. Mr.G furnishes the following data for a product during the month of April, 2019:

Raw materials consumed	Rs.15,000
Direct labour charges	Rs.9,000
Machine hours worked	900 hours
Machine hour rate	Rs.5 per hour
Administrative overheads	20% on works cost

Selling overheads	Re.0.50 per unit
Units produced	17,100
Units sold	16,000 at Rs.4 per unit.

You are required to prepare a Cost Sheet from the above, showing: Cost of Production per unit; Profit per unit sold and profit for the period.

**9. The following extract of costing information relates to commodity 'A' for the half year ending 31.03.2019.**

Purchase of raw material Rs.1,20,000;  
Direct wages Rs.1,00,000;  
Sale of finished product Rs.3,00,000.

Works overhead Rs.48,000  
Carriage on purchases Rs.1,440;

Opening stock of:  
Raw materials Rs.20,000; WIP Rs.4,800;

Finished products (1,000 tons) Rs.16,000;

Closing stock of:  
Raw materials Rs.22,240; WIP Rs.16,000;

Finished products (2,000 tons) Rs.32,000.

Selling and distribution overheads are Re.1 per ton sold. 16,000 tons were produced during the period. **Prepare a cost sheet and compute net profit per ton of finished product.**

**Calculation of missing figure:**

**10. The books and records of a Company gives the following for the month of November 2019, Prepare a cost sheet**

Direct labour cost Rs.16,000 (160% of factory overhead)  
Cost of goods sold Rs.56,000

	<b>November 1<sup>st</sup></b>	<b>November 30<sup>th</sup></b>
Raw materials	8,000	8,600
Work-in-progress	8,000	12,000
Finished goods	14,000	18,000

Selling expenses Rs.3,400;  
Administration overheads Rs.2,600;  
Sales for the month Rs.75,000.

## **CHAPTER -TWO      UNIT OR OUTPUT COSTING**

### **Note: Methods of recovery of overheads in cost accounts:**

Factory overheads are absorbed/recovered as a % of Direct wages in cost accounts,  
Similarly, Administration overheads and other overheads are recovered as a % of Works cost.

### **Note:**

### **% of profit on sales is given, how to find out % of profit on cost?**

<u>% of profit on sales</u>	<u>% of profit on cost</u>
➤ 10/100	10/90
➤ 1/5	1/4
➤ 20/100	20/80
➤ 8/100	8/92
➤ 33.33/100	33.33/66.67

### **Problems:**

1. The account of Pleasant Company Ltd. show for 2019:

Materials Rs.3,50,000;	Labour Rs.2,70,000;
Factory overheads Rs.81,000;	Administration overheads Rs.56,080

What price should the company quote for a refrigerator? It is estimated that Rs.1,000 in material and Rs.700 in labor will be required for one refrigerator. Absorb factory overheads on the basis of labor and administration overheads on the basis of works cost. A profit of 12.5% on selling price is required.

2. Prepare a cost and profit statement of Popular Stoves Manufacturing Co. for the year 2019:

Stock of materials on 1.1.19	Rs.35,000	Establishment expenses	Rs.10,000
Stock of materials on 31.12.19	Rs.4,900	Completed stock in hand (1.1.19)	Nil
Purchase of materials	Rs.52,500	Completed stock in hand (31.12.19)	Rs.35,000
Direct wages	Rs.95,000	Sales	Rs.1,89,000
Factory expenses	Rs.17,500		

**The number of stoves manufactured during the year 2019 was 4,000.**

The company wants to quote for a contract for the supply of 1,000 Electric Stoves during the year 2020. The stoves to be quoted are of uniform quality and make and similar to those manufactured in the previous year; but cost of materials has increased by 15% and cost of factory labor by 10%.

Prepare a statement showing the price to be quoted to give the same percentage of net profit on turnover as was realized during the year 2019, assuming that the cost per unit of overheads will be the same as in the previous year.

3. From the following particulars you are required to prepare a statement showing: Materials consumed, Prime cost, Works cost, Total cost, Percentage of works overheads to productive wages, and Percentage of general overheads to works cost.

Stock of finished goods (1.1.19)	Rs.72,800
Stock of raw materials (1.1.19)	Rs.33,280
Purchase of raw materials	Rs.7,59,200
Productive wages	Rs.5,16,880
Sales of finished goods	Rs.15,39,200

Stock of finished goods (31.12.19)	Rs.78,000
Stock of raw materials (31.12.19)	Rs.35,360
Works overhead charges	Rs.1,29,220
Office overhead charges	Rs.70,161

The company is about to send a tender for a large plant. The costing department 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 based on the above percentages.**

4. Following are the details for the production of 2,000 sewing machines of Nath Engineering Co. Ltd., for the year 2019:

Cost of materials Rs.1,60,000;  
Manufacturing expenses Rs.1,00,000  
Selling expenses Rs.60,000;  
Rent, rates and insurance Rs.20,000;

Wages Rs.2,40,000;  
Salaries Rs.1,20,000;  
General expenses Rs.40,000  
Sales Rs.8,00,000.

The company plans to manufacture 3,000 machines during 2020. Submit a statement showing the price at which machines would be sold so as to show a profit of 10% on selling price.

**The following additional information is supplied to you:**

- a) Price of material is expected to rise by 20%
- b) Wages rates are expected to show an increase of 5%
- c) Manufacturing expenses will rise in proportion to the combined cost of materials and wages
- d) Selling expenses per unit will remain the same
- e) Other expenses will remain unaffected by the rise in output.

5. In respect of a factory the following figures have been obtained for the year 2019:

Cost of material Rs.6,00,000; Direct wages Rs.5,00,000; Factory overheads Rs.3,00,000; Office overheads Rs.3,36,000; Selling overheads Rs.2,24,000; Distribution overheads Rs.1,40,000 and Profit Rs.4,20,000.

A work order has been executed in 2020 and the following expenses have been incurred:  
Materials Rs.8,000 and Wages Rs.5,000.

Assuming that in 2020 the rate of factory overheads has increased by 20%, distribution overheads have gone down by 10% and selling and administration overheads have each gone up by 12.5%, at what price should the product be sold as to earn the same rate of profit on the selling price as in 2019?

Factory overhead is based on direct wages while all other overheads are based on factory cost.

6. A company manufactures scooters and sells it at Rs.3,000 each. An increase of 17% in cost of materials and of 20% of labor cost is anticipated. The increased cost in relation to the present sales price would cause a 25% decrease in the amount of the present gross profit per unit. At present, material cost is 50%, wages 20% and overhead is 30% of cost of sales.

You are required to:

- Prepare a statement of profit and loss per unit at present and;
- Compute the new selling price to produce the same percentage of profit to cost of sales as before.

7. The current quarter, a company has undertaken two jobs. The data of these jobs are as under:

	<b><i>Job 1100</i></b>	<b><i>Job 1200</i></b>
Selling price	Rs.1,07,325	Rs.1,57,920
Profit as percentage on cost	8%	12%
Direct materials	Rs.37,500	Rs.54,000
Direct wages	Rs.30,000	Rs.42,000

It is the policy of the company to charge factory overheads as a percentage on direct wages and selling and administration overheads as a percentage on factory cost.

The company has received a new order for manufacturing of a similar job. The estimate of direct materials and direct wages relating to the new order are Rs.64,000 and Rs.50,000 respectively. A profit of 20% on sales is required.

#### **Required: Compute**

- a. The rates of factory overheads and selling and administration overheads to be charged
- b. The selling price of the new order.

#### **Additional problems:**

8. The Managing Director of a manufacturing concern consults you as to the minimum price at which he can sell the output of one of the departments of the company which is intended for mass production in future.

The company's records show the following particulars for this department for the past year for production and sale of 100 units.

Materials Rs.13,000; Direct labor Rs.7,000; Direct charges Rs.1,000; Works overheads Rs.7,000; Administration overheads Rs.2,800; Selling overheads Rs.3,200; Profit Rs.6,000.

You ascertain that 40% of the works overheads fluctuate directly with production and 70% of the selling overheads fluctuate with sales.

It is anticipated that the department would produce 500 units per annum and that direct labor charges per unit will be reduced by 20%, while fixed works overheads will increase by Rs.3,000. Administration overheads and fixed selling overheads are expected to show an increase of 25% but otherwise no changes are anticipated.

9. A plant that manufactures tiffin boxes has an installed capacity of 1,20,000 units per year distributed evenly over each calendar month. The following is the cost structure of the product:

Raw Material	Rs.20 per unit
Direct Labor	Rs.12 per unit
Direct Expenses	Rs.2 per unit
Variable overheads	Rs.16 per unit
Fixed overhead	Rs.3,00,000 per annum (i.e. Rs.1,50,000 per half year)

Semi-variable overheads: Rs.7,500 per month up to 50% capacity and an additional Rs.2,500 per month for every additional 25% capacity utilization or part thereof. The plant will operate at 50% capacity during the first 6 months of the calendar year 2019 and at 100% capacity in the remaining months.

The selling price for the period from 1st January to 30<sup>th</sup> June was fixed at Rs.70 per unit. The firm wishes to revise the selling price for the next half year, which should be fixed effective 1<sup>st</sup> July to achieve a total profit of Rs.9,00,000 during 2019.

You may assume that whatever is produced is sold and that the market is likely to absorb the production after the revision in price.

You are required to prepare a statement showing the element wise total cost and profit for each half year and the revised selling price in the second-half of the year to achieve the overall annual profit of Rs.9,00,000 in 2019. Compute the semi-variable and fixed cost per unit for each of the half yearly periods.

Syll-2012      june 2014      2(b)

10. The following information is available for Z Ltd. for the Financial Year ending 31st March, 2019:

<b>Particulars</b>	<b>Rs.</b>
Direct Material	3,45,000
Direct Wages	3,90,000
Production Overheads (75% variable)	2,40,000
Administration Overheads (75% fixed)	1,20,000
Selling and Distribution Overheads (50% fixed)	1,60,000
 Sales (10,000 units)	 15,50,000
Opening Stock	Nil
Closing Stock – Finished Goods	5000 units
No WIP (Opening/Closing)	

For the year 2019-20, it is estimated that:

- a.** Output will increase by one-third; Sales quantity will increase by 50% by incurring additional advertisement expenses of Rs.1,45,200. Assume that opening stock is first sold before using the current year's output.
- b.** Material prices will increase by 5%
- c.** Wage rate will increase by 5% while overall direct labour efficiency will decrease by 4%
- d.** The variable overheads will be at the same unit rates as last year
- e.** Fixed production overheads will increase by 25%
- f.** Assume that production and sales units were achieved as per budget last year and will be achieved as per estimate this year also.
- g.** The company will revise its selling price in 2019-20 to Rs.125 per unit. This same selling price will hold for the units sold from the opening stock also.

You are required to prepare a statement showing cost of sales and sales and profit giving effect to the above for the financial year 2019-20.

Syll-12; June 16; 2a

#### **NOTE:**

##### **Industry / Product**

Automobile  
Cable  
Cement  
Chemicals / Fertilizers  
Gas  
Power - Electricity  
Transport  
Hospital  
Hotel  
Education  
Telecom  
BPO Service  
Professional Service

##### **Cost Unit**

Number of vehicles  
Metres / kilometres  
Tonne  
Litre / Kilogram / tonne  
Cubic Metre  
Kilowatt Hour  
Tonne-Kilometre, Passenger-kilometre  
Patient Day  
Bed Night  
Student year  
Number of Calls  
Accounts handled  
Chargeable Hours

# **CHAPTER - 3: RECONCILIATION**

## **How to prepare a reconciliation statement:**

**Profit as per Cost Accounts** xxx

### **Add: Items which increase profit in financial accounts:**

Incomes shown only in financial accounts	xxx
Expenses / Depreciation / Opening stock shown less in financial accounts	xxx
Closing stock shown more in financial accounts	xxx

### **Less: Items which decrease profit in financial accounts:**

Expenses shown only in financial accounts	xxx
Expenses / Depreciation / Opening stock shown more in financial accounts	xxx
Closing stock shown less in financial accounts	xxx

**Profit as per Financial Accounts**

**xxx**

**Note:** If profit as per cost accounts is not given then prepare a cost sheet to find out the profit.  
If profit as per financial accounts is not given then prepare a P & L A/c to find out the profit.

**Note:** Income shown only in financial accounts (e.g.)

Interest on investments, share transfer fees, stores adjustment (credit), Dividends received, Profit on sale of fixed assets, Discount received.

**Note:** Expense shown only in financial accounts (e.g.)

Goodwill written off, Preliminary expenses written off, Provision for income-tax, Donations, Loss on sale of fixed assets, Provision for bad debts, Dividends paid, Transfer to reserves.

**Note:** Under absorption (or) under recovery: Overheads charged less in cost accounts  
Over absorption(or) over recovery: Overheads charged more in cost accounts

## **PROBLEMS:**

## **Where profits as per cost accounts and financial accounts are given:**

### **1. A Company's Trading and Profit account was as follows:**

Purchases	25,210	Sales (50,000 units @ Rs.1.50each)	75,000
Direct wages	10,500	Discount received	260
Work expenses	12,130	Profit on sale of land	2,340
Selling expenses	7,100	Closing stock	4,080
Administration expenses	5,340		
Depreciation	1,100		
Net profit	20,300		
	-----		-----

**The profit as per cost accounts was only Rs.19,770.**

Cost accounts value of closing stock Rs.4,280.

The works expenses in the cost accounts were taken as 100 per cent of direct wages.

Selling and administration exps were charged in the cost at 10% of sales and Re.0.10 per unit.

Depreciation in the cost accounts was Rs.800.

### **Prepare a reconciliation statement.**

---

- 2. The net profit of a company appeared at Rs.60,652 as per financial records for the year ending 31.03.2019. The books, however, showed a net profit of Rs.86,200 for the same period. A scrutiny of the figures from both the sets of accounts revealed the following facts:**

Work overhead under-recovered in costs	Rs.1,560
Administrative overheads over-recovered in costs	Rs.850
Depreciation charged in financial accounts	Rs.5,600
Depreciation recovered in cost accounts	Rs.6,250
Interest on investments not included in costs	Rs.4,000
Bank interest and transfer fee credited in financial books	Rs.375
Stores adjustment (credit) in financial books	Rs.237
Goodwill expenses written off	Rs.3,000
Preliminary expenses written off	Rs.2,000
Loss on sale of furniture	Rs.600
Loss due to obsolescence charged in financial accounts	Rs.2,850
Income-tax provided in financial accounts	Rs.20,000
Provision for doubtful debts	Rs.150
Value of opening stock in cost accounts	Rs.24,800
Value of opening stock in financial accounts	Rs.26,300
Value of closing stock in cost accounts	Rs.25,000
Value of closing stock in financial accounts	Rs.23,000
Interest charged in cost accounts	Rs.2,000

### **Prepare a reconciliation statement.**

---

- 3. Prepare a reconciliation statement from the following details:**

Net loss as per cost accounts	Rs.3,44,800
Net loss as per financial accounts	Rs.4,32,890
Works overhead under recovered in costing	Rs.6,240
Depreciation overcharged in costing	Rs.5,200
Interest on investments	Rs.17,500
Goodwill written off	Rs.92,000
Stores adjustment in financial books (credit)	Rs.950
Depreciation of stock charged in financial books	Rs.13,500

**When financial profits alone are given:**

4. The following is a summary of the Trading and Profit and Loss Account of Messrs.Alpha Manufacturing Company for the year 2019:

To Material consumed	27,40,000	By Sales (1,20,000 units)	60,00,000
To Wages	15,10,000	By Finished stock (4,000 units)	1,60,000
To Factory expenses	8,30,000	By Work-in-progress:	
To Administration expenses	3,82,000	Materials	64,000
To Selling and distribution expenses	4,50,000	Wages	36,000
To Preliminary expenses	40,000	Factory exps.	<u>20,000</u>
To Goodwill written off	20,000	By Dividend received	1,20,000
To Net profit	3,26,000		18,000
	-----		-----

**The company manufactures a standard unit. In the cost accounts:**

- Factory expenses have been recovered from production at 20% on prime cost.
- Administration expenses at Rs.3 per unit on units produced.
- Selling distribution expenses at Rs.4 per unit on units sold.

**You are required to prepare a statement of cost and profit in cost books of the company and to reconcile the profit disclosed with that shown in the financial accounts.**

---

5. SV Ltd. has furnished you the following information from the financial books for the year ended 31.03.2019:

**Profit and loss account**

Opening stock (500 units at Rs.35)	17,500	Sales (10,250 units)	7,17,500
Materials consumed	2,60,000	Closing stock (250 units @ Rs.50 each)	12,500
Wages	1,50,000		
Gross profit	3,02,500		-----
Factory overheads	94,750	Gross profit b/d	3,02,500
Administration overheads	1,06,000	Interest	250
Selling expenses	55,000	Rent received	10,000
Bad debts	4,000		
Preliminary expenses	5,000		
Net profit	48,000		

The cost sheet shows the cost of materials as Rs.26 per unit and the labour cost Rs.15 per unit. The factory overheads are absorbed at 60% of labour cost and administration overheads at 20% of factory cost. Selling expenses are charged at Rs.6 per unit. The opening stock of finished goods is valued at Rs.45 per unit.

You are required to prepare:

- a statement showing profit as per cost accounts for the year ended 31.03.2019
  - a statement of reconciliation of profit disclosed in cost accounts with financial accounts.
-

**When profits as per cost accounts and financial accounts are not given:**

6. The following figures were available in respect of a Company for the year ended 31.03.2019

	<b>Financial accounts</b>	<b>Cost accounts</b>
<b>Opening stock:</b>		
Raw materials	6,000	5,000
Work-in-progress	7,000	6,500
Finished goods	5,000	4,500
<b>Closing stock:</b>		
Raw materials	4,000	4,300
Work-in-progress	3,000	3,700
Finished goods	5,900	6,200
Purchases	40,000	
Direct wages	20,000	
Factory expenses	20,000	21,000 absorbed
Sales	1,10,000	
Administration expenses	3,000	2,300 absorbed
Selling expenses	4,000	4,500 absorbed
Financial expenses	1,000	
Interest and dividends received	1,600	

**Compute profit in financial accounts as well as in cost accounts and prepare a Reconciliation Statement show clearly the reasons for the variation of the two profit figures.**

7. The following information is available in the financial accounts of a manufacturing company for the year ending 31<sup>st</sup> March, 2019:

	₹
Direct material consumption	3,55,000
Direct wages	3,60,000
Manufacturing expenses	2,45,000
Office and administrative expenses	2,40,000
Selling and distribution expenses	2,00,000
Donation and charity	20,000
Interest on debentures	48,000
Preliminary expenses (written off)	20,000
Provision for income tax	75,000
Interest received on deposits	25,000
Sales: 1,80,000 units	16,20,000
Closing stock of finished goods : 30,000 units	1,50,000

**The cost accounts reveals:**

- i. Manufacturing overheads recovered at 80 percent on direct wages
- ii. Office and administrative overheads recovered at 25 percent on factory cost
- iii. Selling and distribution overheads at ₹1.00 per unit sold
- iv. Closing stock of finished goods valued at cost of production

**You are required to**

- i. Prepare Profit and Loss Account showing net profit in financial accounts
  - ii. Prepare a statement showing profit in the cost accounts
  - iii. Prepare a statement reconciling the profits disclosed as per above (i) and (ii)
- 

8. From the following particulars calculate the profit as per cost records and also prepare a reconciliation statement, if the profit as per financial accounts for the year ending 31<sup>st</sup> March, 2019 was Rs.1,35,525:

Opening stock of raw materials	Rs.50,000
Opening stock of finished goods	Rs.1,50,000
Purchase of raw materials	Rs.3,50,000
Direct wages	Rs.1,50,000
Factory lighting	Rs.3,000
Factory rent	Rs.24,000
Power and fuel	Rs.30,000
Indirect wages	Rs.2,500
Depreciation on plant	Rs.50,000
Oil waste etc	Rs.2,000
Work manager's salary	Rs.23,000
Miscellaneous factory expenses	Rs.1,250
	-----
	Rs.1,35,750
Office rent	Rs.18,000
Office lighting	Rs.600
Depreciation on office appliances	Rs.2,000
Office staff salaries	Rs.20,000
	-----
Closing stock of finished goods	Rs.40,600
Closing stock of raw materials	Rs.50,000
Donations	Rs.75,000
	-----
	Rs.10,000

Factory overhead is charged at 20% on prime cost and office and administrative expenses at 50% of factory overhead. The selling price is fixed by adding 25% on the total cost of manufactured and finished articles sold. Assume no WIP.

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9. The net profit of Dhura Ltd. shown by cost accounts for the year ended 31st March 2019 was Rs.10,35,000 and by financial accounts for the same period was Rs.5,00,200.

A scrutiny of the figures of the financial accounts and the cost accounts revealed the following facts:

<b>Particulars</b>	<b>(Rs.)</b>
Administrative overhead under recovered in cost accounts	14,800
Factory overhead-over-recovered in cost accounts	20,000
Depreciation-over charged in financial accounts	40,000
Interest on Investment	20,000

Loss due to obsolescence charged in financial accounts	24,000
Abnormal Labour wastage charged in financial accounts	2,00,000
Income Tax provided in financial accounts	2,80,000
Bank Interest credited in financial accounts	4,000
Stocks adjustment credited in financial accounts	28,000
Loss due to depreciation in stock values charged in financial accounts	48,000

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- 10.** During the year ended 31st March, 2019, the profit of ROVERTZ LTD. as per Financial Profit and Loss Account was Rs.33,248 as given below:

**Profit and Loss A/c for the year ended 31st March, 2019**

	Rs.		Rs.
To Opening Stock	4,94,358	By Sales	6,93,000
To Purchases	<u>1,64,308</u>	By Sundry income	632
	6,58,666		
Less: Closing Stock	<u>1,50,242</u>		
	5,08,424		
To Direct wages	46,266		
To Factory overhead	41,652		
To Admin expenses	19,690		
To Selling expenses	44,352		
To Net Profit	33,248		
	-----		

The costing records show:

Closing Stock	1,56,394
Direct wages absorbed	49,734
Factory overheads absorbed	39,428
Administration expenses calculated at 3% of Sales	
Selling expenses absorbed @ 5% of Sales	

Required: (i) Find out the impact on Costing Profit & Loss A/c. (ii) Prepare a Reconciliation Statement and arrive at the profit as per Cost Accounts

- 11. The following is the Trading & Profit and Loss Account of Ram & Co:**

<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
To Materials consumed	23,01,000	By Sales (30000 units)	48,75,000
To Direct wages	12,05,750	By Stock of finished goods	
To Production overheads	6,92,250	(1000 units)	1,30,000
		By W.I.P:	Rs.
		Material	55,250
		Wages	26,000
		Prod'n o. h.	16,250
			97,500

To Administration Overheads	3,10,375	By Interest on Bank deposit	65,000
To Selling & Distribution Overheads	3,68,875	By Dividends	3,90,000
To Preliminary expenses w. off	22,790		
To Goodwill written off	45,000		
To Fines	3,250		
To Interest of mortgage	13,000		
To Loss on sale of machine	16,250		
To Taxation	1,95,000		
To Net Profit	3,83,960		

Ram & Co. manufactures a standard unit. The cost accounting records of the firm shows the following information:

- Production overheads have been charged at 20% on prime cost.
- Administration overheads have been recovered at Rs.9.75 per finished unit.
- Selling and distribution overheads have been recovered at Rs.13 per unit sold.

**Required:** (i) Prepare a statement showing cost and profit as per cost records.  
(ii) Prepare a statement reconciling the profit disclosed by cost accounts with that shown in financial accounts.

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### **MEMORANDUM RECONCILIATION ACCOUNT:**

12. A manufacturing company disclosed a net loss of ₹3,47,000 as per their cost accounts for the year ended 31<sup>st</sup> March, 2019. The financial accounts however disclosed a net loss of ₹ 5,10,000 for the same period. The following information was received as a result of scrutiny of figures of both the sets of accounts.

		₹
(i)	Factory overheads under absorbed	40,000
(ii)	Administration overheads over absorbed	60,000
(iii)	Depreciation charged in financial Accounts	3,25,000
(iv)	Depreciation charged in cost Accounts	2,75,000
(v)	Interest on investments not included in cost Accounts	96,000
(vi)	Income tax provided	54,000
(vii)	Interest on loan funds in Financial Accounts	2,45,000
(viii)	Transfer fees (credit in financial books)	24,000
(ix)	Stores adjustment (credit in financial books)	14,000
(x)	Dividend received	32,000

**Required:** Prepare a Memorandum Reconciliation Account

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### **MEMORANDUM RECONCILIATION ACCOUNT:**

13. A manufacturing company has disclosed net loss of ₹ 48,700 as per their cost accounting records for the year ended 31<sup>st</sup> March, 2019. However their financial accounting records disclosed net profit of ₹ 35,400 for the same period. A scrutiny of data of both the sets of books of accounts revealed the following information:

		₹
(i)	Factory overheads under absorbed	30,500
(ii)	Administrative overheads over absorbed	65,000
(iii)	Depreciation charged in financial accounts	2,25,000
(iv)	Depreciation charged in cost accounts	2,70,000
(v)	Income tax provision	52,400
(vi)	Transfer fee (credited in financial accounts)	10,200
(vii)	Obsolescence loss charged in financial accounts	20,700
(viii)	Notional rent of own premises charged in cost accounts	54,000
(ix)	Value of opening stock	
	a) In cost accounts	1,38,000
	b) In financial accounts	1,15,000
(x)	Value of closing stock	
	a) In cost accounts	1,22,000
	b) In financial accounts	1,12,500

Prepare a Memorandum Reconciliation Account by taking costing loss as base.

14. PCT Ltd. provides you the following information and requests you to prepare Manufacturing, Trading & Profit & Loss Account for the year ended 31<sup>st</sup> March 2019:

#### **COST SHEET**

Production: 15,740 units

	Particulars	₹	₹
A.	Raw material consumed		
	Opening stock	51,616	
	Add: Purchases	1,90,000	
	Less: Closing stock	<u>47,804</u>	1,93,812
B.	Direct wages		80,072
C.	Direct Expenses		9,334
D.	Prime cost (A+B+C)		2,83,216
E.	Production Overhead (250% of ₹ 80,072)		2,00,180
F.	Add: Opening WIP		24,146
G.	Less: Closing WIP		24,020
H.	Works cost (E+F-G)		4,83,524
I.	Administration expenses @ Rs.2 per unit on 15,740 units		31,480
J.	Cost of Goods Produced (H+I)		5,15,004
K.	Add: Opening stock of finished goods (2,500 units)		63,238
L.	Less: Closing stock of finished goods (2,600 units)		65,020
M.	Cost of goods sold (15,640 units) (J+K-L)		5,13,222
N.	Selling & Distribution expenses @ ₹4 per unit on 15,640 units		62,560
O.	Cost of sales (M+N)		5,75,782
P.	Profit		49,818
Q.	Sales		6,25,600

The Memorandum Account reconciling the profit shown in the Financial & Cost Accounts for the year ended 31<sup>st</sup> March 2019 as follows:

<b>Particulars</b>	<b>₹</b>	<b>₹</b>	<b>Particulars</b>	<b>₹</b>	<b>₹</b>
Profit as shown in financial Accounts		48,920	Profit as shown in the Cost Accounts		49,818
Difference in stock valuation			Difference in stock valuation:		
Opening Stock:			Opening stock:		
WIP	350		Raw material	320	
Finished goods	652				
Closing stock:			Closing Stock:		
Raw Material	422		Finished goods	682	1,002
WIP	<u>296</u>	1,720			
Administration Expenses (Under- Absorbed)		21,578	Discount Received		1,500
Debenture Interest		2,000	Interest & Dividend Received		290
Discount Allowed		2,964	Selling & Distribution expenses (Over-absorbed)		15,072
			Production overhead (Over absorbed)		9,500

**Solution 14:**

**MANUFACTURING, TRADING & PROFIT & LOSS ACCOUNT**

**For the year ending on 31<sup>st</sup> March, 2019**

To Opening stock		By Closing stock	
- Raw materials	51,296	- Raw materials	47,382
- WIP	24,496	- WIP	23,724
To Purchases	1,90,000	By Trading Account	4,74,772
To Direct Wages	80,072	(cost of goods manufactured)	
To Direct expenses	9,334		
To Production overheads	<u>1,90,680</u>		-----
To Manufacturing Account (cost of goods manufactured)	4,74,772	By Sales (15640 units)	6,25,600
To Opening stock of finished goods	63,890	By Closing stock of finished goods	65,702
To Gross profits	1,52,640		-----
	-----		
To Administration expenses	53,058	By Gross profit	1,52,640
To Selling and Distribution expenses	47,488	By Discount received	1,500
To Debenture Interest	2,000	By Interest & dividend received	290
To Discount allowed	2,964		
To Net profit	48,920		

# **CHAPTER - 4: OPERATING COSTING**

## **Operating cost statement**

### **Standing charges or Fixed charges:**

	<b><u>Kilometers run</u></b>
<i>Garage rent</i>	xx
<i>Insurance</i>	xx
<i>Depreciation</i>	xx
<i>Road tax</i>	xx
<i>Interest on capital</i>	xx
<i>Salary to Manager, Accountant, etc.</i>	xx

### **Operating charges or Running charges or Variable charges**

<i>Petrol</i>	xx
<i>Oil</i>	xx
<i>Grease</i>	xx
<i>Wages to driver</i>	xx
<i>Repairs, Tires and tubes, Overhauling</i>	xx

**Total operating cost      xxx**

$$\text{Cost per kilometer: } \frac{\text{Total operating cost}}{\text{Total Kilometres run}}$$

$$\text{Cost per passenger kilometer: } \frac{\text{Total operating cost}}{\text{Total Passenger kms.}}$$

**Note:** *Passenger kilometer means: Kilometres run x Passenger occupied (average)*  
**Ton kilometer means:** *Kilometres run x Tons carried (average)*

- A transport service company is running four buses between two towns which are 50kms. apart. Seating capacity of each bus is 40 passengers. Actual passengers carried were 75% of the seating capacity. All the four buses ran on all the days of the month of April 2018. Each bus made one round trip per day. Calculate total kilometers and total passenger kilometers for the month.**

- A transport service company is running four buses between two towns which are 50 kms. apart. Seating capacity of each bus is 40 passengers. The following particulars were obtained from their books for April, 2018:**

<i>Wages of drivers, conductors</i>	Rs.2,400
<i>Salaries of office and supervisory staff</i>	Rs.1,000
<i>Diesel oil and other oil</i>	Rs.3,500
<i>Repairs and maintenance</i>	Rs.1,300
<i>Taxation, Insurance, etc.</i>	Rs.1,600
<i>Depreciation</i>	Rs.2,600
<i>Interest and other charges</i>	Rs.2,000

Actual passengers carried were 75% of the seating capacity. All the four buses ran on all the days of the month. Each bus made one round trip per day. **Find out cost per passenger kilometer.**

**3. From the following information, calculate kilometers and total passenger kilometers:**

Number of buses: 4  
Trips made by each bus: 4  
Capacity of the bus 60 passengers

Days operated in a month: 30  
Distance of route: 30 km long (one way)  
Normal passengers travelling 80% of the capacity.

4. A transport undertaking maintains a fleet of lorries for carrying goods from Chennai to Pondicherry, 100 kms. off. Each lorry which operates 25 days on an average in a month starts every day from Chennai with a load of 8 tons and returns from Pondicherry with a load of 4 tons.

Calculate the commercial ton-kms. and cost per commercial ton-km. when the total monthly charges for a lorry are Rs.24,000. What rate per ton should the Undertaking charge if it plans to earn a profit of 20% on the freightage.

5. Mr.S furnishes the following data, wants you to compute the cost per running ton km. of vehicle 'A'.

	Rs.
Cost of vehicle	2,50,000
Road license per year	8000
Supervision and salaries (yearly)	2,700
Driver's wages per hour	4
Cost of fuel per litre	12
Repairs and maintenance per km.	2
Tyre cost per km.	1
Insurance premium (yearly)	700
Garage rent per year	1,300

Kilometers run per litre	20
<b>KILOMETRES RUN DURING THE YEAR</b>	<b>15,000</b>
Estimated life of the vehicle (kms.)	1,00,000
Tons per km. (average)	6

Charge interest at 5% p.a. on cost of vehicle. The vehicle runs 20kms. per hour on an average.

6. Mr.S owns a fleet of taxis. The following information is available from the records maintained by him:

<b>Number of taxis</b>	<b>10</b>
Cost of each taxi	Rs.54,600
Salary of manager	Rs. 700p.m
Salary of accountant	Rs.500p.m
Salary of cleaner	Rs.200p.m
Salary of mechanic	Rs.400p.m
Garage rent	Rs.600p.m
Insurance premium	5% per annum
Annual tax	Rs.900 per taxi
Driver's salary	Rs.350 per month per taxi
Annual repairs	Rs.1,000 per taxi

Total life of a taxi is about 2,00,000 kms. A taxi runs, in all, 3,000 kms. in a month and 30% of this distance has to be run without any passenger. Petrol consumption is one litre for every 10 kms. @ Rs.4.41 per litre. Oil and other sundries are Rs.10.50 per 100 kms. **Calculate the cost of running a taxi per kilometer.**

---

- 7. Delhi Transport Company has been given a route of 20 kms. long to run a bus.** The bus costs the company a sum of Rs.50,000. It has been insured at 3% p.a. and the annual tax will amount to Rs.1,000. Garage rent is Rs.100 p.m. Annual Repairs will be Rs.1,000 and the bus is likely to last for five years.

The driver's salary will be Rs.150 per month and the conductor's salary will be Rs.100 per month in addition to 10% of the takings as commission (to be shared by the driver and the conductor equally).

Cost of stationery will be Rs.50 per month. Manager salary is Rs.350 per month. Petrol and oil will be Rs.25 per 100 kms. The bus will make 3 round trips carrying on an average 40 passengers in each trip.

Assuming 15% profit on takings, calculate the bus fare to be charged from each passenger. The bus will run on an average 25 days in a month.

---

- 8. Your company is considering three alternative proposals for conveyance facilities for its sale personnel who have to do considerable travelling subject to the maximum unit of 20,000 kms. each by car per year.** The proposals are as follows:

- i. Purchase and maintain its own fleet of cars. The average cost of a car is Rs.25,000; or
- ii. Allow the executive use his own car and reimburse expenses at the rate of 40 paise per kilometer and also bear insurance costs; or
- iii. Hire cars from an agency at Rs.5,000 per year per car. The company will have to bear costs of petrol, taxes and tyres.

The following further details are available:

Petrol Re.0.15 per km.; repairs and maintenance Re.0.05 per km.; tyres Re.0.03 per km.; insurance Rs.300 per year; taxes Rs.200 per year; life of the vehicle 5 years; resale value Rs.5,000 at the end of the fifth year. Work out the relative costs of three proposals and rank them.

---

- 9. Viveka Elementary School has a total of 150 students consisting of 5 sections with 30 students per section.** The school plans for a picnic around the city during the weekend to places such as zoo, the amusement park, the planetarium etc.

A private transport operator has come forward to lease out the buses for taking the students. Each bus will have a maximum capacity of 50 (excluding 2 seats reserved for the teachers accompanying the students). The school will employ two teachers for each bus, paying them an allowance of Rs.50 per teacher. It will also lease out the required number of buses.

The following are the other cost estimates:

Breakfast:	Rs.5 per student
Lunch:	Rs.10 per student
Tea:	Rs.3 per student
Entrance fee of zoo:	Rs.2 per student
Rent:	Rs.650 per bus
Special permits fees:	Rs.50 per bus
Block entrance fees at the planetarium:	Rs.250
Prizes to students for games:	Rs.250

No costs are incurred in respect of accompanying teachers. (Except the allowance of Rs.50 per teacher). You are required to prepare a statement showing the total cost and also average cost per student for the levels of 30, 60, 90, 120 and 150 students.

---

**Important Note:**

Absolute ton-kms: Kilometers covered (x) Actual tonnes carried

Commercial ton-kms: Kilometers covered (x) Average tonnes carried

**10.** A truck starts with a load of 10 tons of goods from station P. It unloads 4 tons at station Q and rest of the goods at station R. It reaches back directly to station P after getting reloaded with 8 tons of goods at station R. The distances between P to Q, Q to R and then from R to P are 40 kms., 60 kms. and 80 kms. respectively. Compute 'Absolute ton-kms' and 'Commercial ton-kms'.

**11.** A lodging home is being run in a small hill station with 50 single rooms. The home offers concessional rates during six off-season months in a year. During this period, half of the full room rent is charged. The management's profit margin is targeted at 20% of the room rent. The following are the cost estimates and other details for the year ending on 31st March 2018. [Assume a month to be of 30 days]

- i. Occupancy during the season is 80% while in the off-season it is 40% only.
- ii. Expense:
  - Staff salary [excluding room attendants] Rs.2,75,000
  - Repairs to building Rs.1,30,500
  - Laundry and linen: Rs.40,000
  - Interior and tapestry: Rs.87,500
  - Sundry expenses: Rs.95,400
- iii. Annual depreciation is to be provided for building @ 5% and on furniture and equipments @15% on straight line basis.
- iv. Room attendants are paid Rs.5 per room day on the basis of occupancy of the rooms in a month.

- v. Monthly lighting charges are Rs.120 per room, except in four months in winter when it is Rs.30 per room and this cost is on the basis of full occupancy for a month.
- vi. Total investment in the home is Rs.100 lakhs of which Rs.80 lakhs relate buildings and balance for furniture and equipments.

Your required to work out the room rent chargeable per day both during the season and the off –season months on the basis of the foregoing information.

---

- 12. Three are two warehouses for storing finished goods produced in a factory.** Warehouse – A is at a distance of 10 kms. and Warehouse – B is at a distance of 15 kms. from the factory. A fleet of 5-ton lorries are engaged in transporting the finished goods from the factory.

The records show that the lorries average a speed of 30 kms. per hour when running and regularly takes 40 minutes to load at the factory. At Warehouse—A, unloading takes 30 minutes per load, while at Warehouse—B, it takes 20 minutes per load.

Drivers' wages, depreciation, insurance and taxes amount to Rs.18 per hour operated. Fuel, oil, tyres, repairs and maintenance cost Rs.2.40 per kilometer.

**You are required to draw up a statement showing the cost per ton kilometer of carrying the finished goods to the warehouse.**

---

- 13. A person owns a bus which runs from Delhi to Chandigarh and back for 10 days in a month.** The distance from Delhi to Chandigarh is 150 miles. The bus completes a trip from Delhi to Chandigarh and back on the same day. The bus goes another 10 days in a month towards Agra. The distance from Delhi to Agra is 120 miles. The trip is also completed in the same day. For the rest 4 days of its operation in a month it runs on the local city. The daily distance covered in the local city is 40 miles.

**Calculate the rate the person should charge a passenger when he wants to earn profit of 33 1/3 % on his net takings.** The other information is given below:

Cost of the bus	Rs.60,000
Depreciation rate	20% p.a
Salary of driver	Rs.350 p.m
Salary of conductor	Rs.350 p.m
Salary of part-time accountant	Rs.160 p.m
Insurance	Rs.1,680 p.a
Diesel consumption 4 miles per litre	Rs.1 per litre
Token tax	Rs.600 p.a
Lubricant oil	Rs.10 per 100 miles
Repairs and maintenance	Rs.500 p.m
Normal capacity	50 persons

The bus is generally occupied 90% of the capacity when it goes to Chandigarh and 80% when it to Agra. It is always full when it runs within the city. Passenger tax is 20% of his net takings.

---

- 14.** A hotel has a capacity of 100 single rooms and 20 double rooms. The average occupancy of both single and double room is expected to be 80% throughout the year of 365 days. The rent for the double room has been fixed at 125% of the rent of the single room.

The costs are as under:

Variable costs:	Single room Rs.220 each per day;	Double room Rs.350 each per day
Fixed costs:	Single room Rs.120 each per day;	Double room Rs.250 each per day

Calculate the rent chargeable for single and double rooms per day in such a way that the hotel earns a margin of safety of 20% on hire of room.

---

- 15.** Global Transport Ltd. charges Rs.90 per ton for its 6 tons truck lorry load city 'A' to city 'B'. The charges for the return journey are Rs.84 per ton. No concession or reduction is made in these rates for any delivery of goods at intermediate station 'C'.

In January, 2019 the truck made 12 outward journeys for city 'B' with full load out of which 2 tons were unloaded twice in the way at city 'C'. The truck carried a load of 8 tons in its return journey for 5 times but once caught by police and Rs.1,200 was paid as fine. For the remaining trips the truck carried full load out of which all the goods on load were unloaded once at city 'C'.

The distance from city 'A' to city 'C' and city 'B' are 140 kms and 300 kms respectively. Annual fixed costs and maintenance charges are Rs.60,000 and Rs.12,000 respectively. Running charges spent during January, 2019 are Rs.2,944.

**You are required to find out the cost per absolute ton-kilometer and profit.**

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- 16.** A city municipality arranges for the removal of its garbage by means of motor vehicle transport. The following vehicles are maintained.

No. of vehicles	Specifications
20	5 Tonnes lorries
30	4 Tonnes lorries
50	3 Tonnes lorries
40	2 Tonnes lorries

On an average each lorry makes six trips a day and, in each trip, covers an average distance of five kms. Each lorry carries garbage weighting only 60% of its capacity. Taking an annual average, 20% of the lorries are laid up for repairs every day. The conservancy work is carried on daily.

The following are monthly charges incurred on the conservancy transport:

Items of Cost	Monthly Charges Rs.
Salary of the Superintendent, Motor Vehicles Department	2,000
Salaries of 3 Transport Foremen	500 each
Wages of Drivers	150 each for 140 Drivers
Wages of Mazdoors (Labourers)	75 each for 280 Mazdoors
Consumable Stores	16,000

Petrol	60,000
Lubricants	15,000
Replacements of Tyres, Tubes and Other Parts and Accessories	5,000
Garage Rent and Rates (adjusted in the books of the Municipalities)	3,000
Gas and Electric Charges	1,000
Miscellaneous Expenses	12,000

There is a repair workshop attached to the Motor Vehicles Department which also carries out repairs for office cars and other vans vehicles. 50% of the Superintendent's salary is debited to the workshop, and the stipulated charges to be borne by the Conservancy Transport Department for the services of the Workshop are Rs.10,000 p.m. Assuming that a month consists of 30 days, calculate the cost per tonne km. for removal of garbage.

---

17. SMC is a public school having 5 buses each plying in different directions for the transport of its school students. In view of a large number of students availing of the bus service, the buses work two trips daily both in the morning and in the afternoon. The buses are garaged in the school.

The work load of the students has been so arranged that in the morning the first trip picks up senior students and the second trip plying an hour later picks up the junior students. Similarly, in the afternoon the first trip drops the junior students and an hour later the second trip takes the senior students home.

The distance travelled by each bus one way is 8 kms. The school works 25 days in a month and remains closed for vacation in May, June and December. But fee, is payable by the students for all the 12 months in a year.

#### **The details of expenses for a year are as under:**

Driver's salary	Rs.450 per month per driver
Cleaner's salary (salary payable for all 12 months) (one cleaner employed for all the five buses)	Rs. 350 per month.
License fee, taxes, etc.	Rs. 860 per bus per annum.
Insurance	Rs. 1,000 per bus per annum.
Repairs & maintenance	Rs. 3,500 per bus per annum.
Purchase price of the bus	Rs. 1,50,000 each:
Life	12 years
Scrap value	Rs. 30,000
Diesel cost	Rs. 2.00 per litre.

Each bus gives an average mileage of 4 kms, per litre of diesel

Seating capacity of each bus is 50 students.

Students picked up and dropped within a range up to 4 kms. of distance from the school are charged half fare and fifty per cent of the students travelling in each trip are in this category. Ignore interest. Since the charges are based on average cost you are required to:

- (i) Prepare a statement showing the expenses of operating a single bus and the fleet of five buses for a year;
  - (ii) Work out the average cost per student per month in respect of
    - (a) Students coming from a distance up to 4 kms. from the school, and
    - (b) Students coming from a distance beyond 4 kms. from the school.
- 

### **PAST EXAMINATION PROBLEMS:**

18. A Sales Manager of a large retail chain has to travel extensively to visit the various sales outlets. Currently he is hiring an air-conditioned car to make the trip at a cost of ₹ 20 per kilometer. The office is considering the following two alternatives:

- i. To buy a new small car at a cost ₹ 4.50 lakhs which will be disposed of at a price of ₹ 1 lakh after 5 years;
- ii. To buy a second hand car at a cost of ₹ 4.50 lakhs, which will be disposed of at a price of ₹ 50,000 after 5 years.

The following future particulars are provided:

	For new car	For old car
Repairs & Servicing per annum	₹ 15,000	₹ 25,000
Taxes and Insurances per annum	₹ 6,000	₹ 3,500
Petrol consumption per litre	15 km	12km
Petrol / Diesel price per litre	₹ 75	₹ 48

Currently the Sales Manager has to travel 12,000 km annually, which is likely to increase to 18,000 km annually.

You are required to work out which of the three alternative transport will be economical if the Sales Manager travels 12,000 km and 18,000 km respectively.

19. Prince Hotel has three types of rooms viz. super deluxe, deluxe and semi-deluxe.

Detail information are given below:

- i. There are 20 super deluxe rooms, 80 deluxe rooms and 180 semi-deluxe rooms.
- ii. The rent/tariff of super deluxe rooms is to be fixed as twice the deluxe rooms and that of semi-deluxe rooms as 2/3rd of the deluxe rooms.

- iii. Normally 80% of super deluxe; 75% of deluxe and 70% of semi-deluxe rooms are occupied in summer of 7 (seven) months. In winter of 5 (five) months 40% of super deluxe, 50% of deluxe and 60% semi-deluxe rooms are occupied.
- iv. Normal days in a month may be taken as 30 days.
- v. Total actual expenses for the year ended 31<sup>st</sup> March 2018 are ₹ 4,73,85,000.

You are required to suggest what rent should be charged for each type of room if profit is 25% on gross receipts/room rent.

---

- 20.** The following information relating to two vehicles is given. Prepare the operating cost statement and determine the cost per running kilometer for each vehicle.

	Vehicle A (₹)	Vehicle B (₹)
Cost of vehicle	25,000	15,000
Road license fee per year	750	750
Supervision yearly salary	1,800	1,200
Driver's wages per hour	4.00	4.00
Cost of fuel per litre	1.50	1.50
Repairs and maintenance per km	1.50	2.00
Tyre cost per km	1.00	0.80
Garage rent per year	1,600	550
Insurance yearly	850	500
Kilometers run per litre	6	5
Kilometers run during the year	15,000	6,000
Estimated life of vehicle (km)	1,00,000	75,000

Charge interest at 10% on the cost of vehicle. Each vehicle runs 20km. per hour on an average.

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# **CHAPTER - 5: STANDARD COSTING**

## **I. Classification of Variances:**

- ✓ **COST VARIANCES** (material, labour & overheads)
- ✓ **SALES VARIANCES**

## **ONE: MATERIAL VARIANCES:**

Difference between:

✓ standard cost and actual cost is called	<b>COST</b>	variance
✓ standard price and actual price is called	<b>PRICE</b>	variance
✓ standard quantity and actual quantity is called	<b>USAGE</b>	variance
✓ standard mix and actual mix is called	<b>MIX</b>	variance
✓ standard yield and actual yield is called	<b>YIELD</b>	variance

<b>1</b> SQ x SP	<b>2</b> AQ x AP	<b>3</b> AQ x SP	<b>4</b> RSQ x SP
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Material Cost Variance	(1-2)
Material Price Variance	(3-2)
Material Usage Variance	(1-3)
Material Mix Variance	(4-3)
Material Yield Variance	(1-4)

**Note: SQ means:**

Standard quantity for actual production

**Note: Revised Standard Quantity (RSQ) means:**

Total actual quantity in the ratio of standard quantity.

**Note: Column 4 is required only to compute 'Mix' and 'Yield' variances.**

<b>MATERIAL COST VARIANCE</b>	=	<b>MATERIAL PRICE</b>	<b>+</b>	<b>MATERIAL USAGE</b>
<b>MATERIAL USAGE VARIANCE</b>	=	<b>MATERIAL MIX</b>	<b>+</b>	<b>MATERIAL YIELD</b>

## **Problems on MATERIAL variances:**

- From the following calculate: MCV MPV MUV

Quantity of material purchased 3,000 units

Value of material purchased Rs.9,000

Standard quantity of material required per ton of finished product 25 units

Standard rate of material Rs.2 per unit

Opening stock of material nil and closing stock of material 500 units.

Finished production during the year 80 tons.

2. Calculate: MCV. MPV. MUV.

Standard:	Materials for 70kg. of finished product Price of material	100kgs. Re.1 per kg.
Actual:	Output Material used Cost of material	2,10,000 kgs. 2,80,000 kgs. Rs.2,52,000

---

## **Problems involving all material variances:**

3. The standard cost of a chemical mixture is as under:

8 tons of material A at Rs.40 per ton  
12 tons of material B at Rs.60 per ton

Standard yield is 90% of input  
Actual yield is 27 tons

Actual cost for a period is as under  
11 tons of material A at Rs.30 per ton  
24 tons of material B at Rs.68 per ton

Compute: Material Cost variance, Material Price variance, Material Usage variance,  
Material Mix variance and Material Yield variance.

4. The standard cost of a certain chemical mixture 'PQ' is as follows:

40% material P at Rs.400 per kg  
60% material Q at Rs.600 per kg

A standard loss of 10% is normally expected in production. The following particulars are available for the month of September 2019:

180 kgs material P at a cost of Rs.360 per kg  
220 kgs material Q at a cost of Rs.680 per kg

Actual output of 'PQ' was 369 kgs.

Compute: Material Cost variance, Material Price variance, Material Usage variance,  
Material Mix variance and Material Yield variance.

5. The standard material cost to produce one tonne of chemical X is  
 300 kg. of material A @ Rs.10 per kg.  
 400 kg. of material B @ Rs.5 per kg.  
 500 kg. of material C @ Rs.6 per kg.

During a period, 100 tonnes of mixture X were produced from the usage of:

35 tonnes of material A at a cost of Rs.9,000 per tonne.

42 tonnes of material B at a cost of Rs.6,000 per tonne

53 tonnes of material C at a cost of Rs.7,000 per tonne.

Calculate price, usage and mix variances.

---

6. XYZ company manufactures a product ABC by mixing three raw materials. For every 100 kgs of ABC, 125 kgs of raw material are used. In April, 2019, there was an output of 5,600 kgs of ABC. The standard and actual particulars of April 2019 are as follows:

Raw material	Standard			Actual		
	Mix %	Price per kg Rs.		Mix %	Price per kg Rs.	
I	50	40		60	42	
II	30	20		20	16	
III	20	10		20	12	

**Calculate all variances.**

---

7. ABC Ltd. produces an article by blending two basic raw materials. It operates a standard costing system and the following standards have been set for raw materials.

Material	Standard Mix	Standard Price
A	40%	Rs.4.00
B	60%	Rs.3.00

The standard loss in processing is 15%. During September 2019, the company produced 1,700 kg of finished output.

Material	Quantity as on 1.9.19 kg	Quantity as on 30.09.19 kg	Purchases Kg	Cost Rs.
A	35	5	800	3,400
B	40	50	1,200	3,000

Calculate all material variances. Assume first-in-first-out method for issue of material. The opening stock is to be valued at standard price.

---

8. The standard material cost for 100 kg of chemical D is made up of:

Chemical	A 30 kg	@ ₹ 4 per kg
Chemical	B 40 kg	@ ₹ 5 per kg
Chemical	C 80 kg	@ ₹ 6 per kg

In a batch, 500 kg of chemical D were produced from a mix of:

Chemical	A 140 kg	@ ₹ 588
Chemical	B 220 kg	@ ₹ 1,056
Chemical	C 440 kg	@ ₹ 2,860

How do the yield, mix and the price factors contribute to the variance in the actual cost per 100 kg of chemical D over the standard cost?

---

9. The following data is obtained from the cost records of P Limited:

**Standard Mix**

Material X :	120kg @ Rs.25
Material Y :	80 kg @ Rs.50
	200 kg
Less: Loss 30%	60 kg
Output	140kg

**Actual Mix**

Material X :	110 kg @ Rs.30
Material Y :	90 kg @ Rs.45
	200 kg
Less: Loss 25%	50 kg
	150 kg

**Compute all material variances**

---

10. The standard material cost for a mix of one tonne of final product is based on the following:

Material	Usage (kg)	Price per kg (Rs.)
A	250	12
B	450	15
C	600	20

During the month of May, 2019, 12 tonnes of final product were produced from the following:

Material	Usage (tonnes)	Total cost (Rs.)
A	3.50	45,500
B	6.10	85,400
C	6.50	1,43,000

**Calculate all material variances.**

**11.** The standard material inputs required for 1,000 kgs. of a finished product are given below:

Material	Quantity (in kgs)	Standard rate per kg (in ₹)
A	450	20
B	400	40
C	250	60
	1,100	
Less: Standard loss	100	
Standard output	1,000	

Actual production in a period was 40,000 kgs. of finished product for which the actual quantities of material used and the prices paid thereof, are as under:

Material	Quantity (in kg)	Purchase price per kg. (in ₹)
A	20,000	19
B	17,000	42
C	9,000	65

**Compute all material variances.**

---

**12.** ABOKASH LTD., operates a system of standard costing. The company manufactures a chemical product by mixing three ingredients chemical A, B and C and processes the same.

The standard cost data for the product are as follows:

Chemical	Percentage of total input	Standard cost per kg. (₹)
A	50%	40
B	30%	60
C	20%	95

Note: Loss during processing is 5% of input and this has no realizable value.

During the month of May, 2019, 10,450 kg. of finished product was obtained from the inputs as per details given below:

Chemical Consumed	Quantity purchased and issued	Actual Cost (₹)
A	5200 kg	2,34,000
B	3600 kg	2,19,600
C	1700 kg	1,58,100

**Compute all material variances**

---

**13.** ESKAY LTD. operates a system of standard costing throughout division. The company produces an alloy by mixing and processing three materials P, Q and R as per standard data given below:

Materials	Ratio of input	Cost per kg (₹)
P	2	40
Q	2	60
R	1	85

Note: Loss during processing is 5% of input and this has no realizable value.

During the month of June, 2019, 5,70,000 kg of finished alloy was obtained from inputs as per details given below:

Materials	Quantity consumed (kg)	Cost per kg (₹)
P	2,40,000	38
Q	2,50,000	59
R	1,10,000	88

Compute all material variances.

---

**14.** One kilogram of product 'K' requires two chemicals A and B. The following were the details of product 'K' for the month of June 2019:

- a. Standard mix chemical A 50% and chemical B 50%
- b. Standard price per kilogram of chemical A Rs.12 and chemical B Rs.15
- c. Actual input of chemical B 70 kilograms
- d. Actual price per kilogram of chemical A Rs.15
- e. Standard normal loss 10% of total input
- f. Material cost variance total Rs.650 adverse
- g. Material yield variance total Rs.135 adverse

You are required to calculate all material variances after finding out actual loss of actual input, actual input of chemical A and actual price per kilogram of chemical B. Assume the actual output is 90 kgs.

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**15.** Modern Tiles Ltd. makes plastic tiles of standard size of 6" x 6" x 1"/8. From the following information you are required to calculate all variances for direct materials:

A standard mix of the compound required to produce an output of 20,000 square feet of tiles of 1"/8 thickness is as follows:

Direct Material	Qty. (kg.)	Price (Rs. per kg.)
A	600	0.90
B	400	0.65
C	500	0.40

During December, 2019, eight mixes were processed and actual materials consumed were:

Direct Material	Qty. (kg.)	Price (Rs. per kg.)
A	5,000	0.85
B	2,900	0.60
C	4,400	0.45

Actual production for December was 6,20,000 tiles.

**Hint:** One sq foot = 12" x 12" = 144 sq inches  
 Each tile to be produced requires 6" x 6" = 36 sq inches  
 Therefore out of 144 sq inches: 4 tiles of 6"x6" can be produced [144/36]

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# RR Academy

## **STANDARD COSTING - LABOUR VARIANCES:**

### **A. PROBLEMS WITHOUT IDLE TIME VARIANCE**

SH x SR

AH x AR

AH x SR

SH means standard hours for actual production  
AH means actual hours

SR means standard rate per hour  
AR means actual rate per hour

Labour Cost Variance                    (1-2)  
Labour Rate Variance                    (3-2)  
Labour Efficiency Variance            (1-3)

1. The standard hours for manufacturing two products M and N are 15 hours per unit and 20 hours per unit respectively. Both the products require identical kind of labour and the standard wage rate per hour is Rs.5.

In the year 2019, 10,000 units of M and 15,000 units of N were produced. The total labour hours actually worked were 4,50,500 and the actual wage bill came to Rs.23,00,000. This includes 12,000 hours paid for @ Rs.7 per hour and 9,400 hours paid for @ Rs.7.50 per hour, the balance having been paid at Rs.5 per hour. **Compute labour variances.**

**Note:** For computation of Mix or Gang variance and Yield variance, column 4 is required.  
Mix or gang variance will arise only if there is more than one type of labour is in use.  
The 4th column is (Revised standard hours x Standard rate per hour)

#### **Problem on Gang and Yield variance (4<sup>th</sup> column):**

2. The details regarding the composition and the weekly wage rates of labour force engaged on a job scheduled to be completed in 30 weeks are as follows:

Category of workers	Standard		Actual	
	No. of workers	Weekly wage rate per worker	No. of workers	Weekly wage rate per worker
Skilled	75	60	70	70
Semi-Skilled	45	40	30	50
Unskilled	60	30	80	20

The work is actually completed in 32 weeks:

**Calculate:** Labour cost variance; Labour rate variance; Labour efficiency variance;  
Labour revised efficiency variance (yield); Labour mix (gang) variance      (Dec 2017 & 18)

3. During a period 17,500 labour hours were worked at a standard cost of Rs.6.50 per hour. The labour efficiency variance was Rs.7,800 favourable. How many standard hours were produced?

(a) 1,200                  (b) 16,300                  (c) 17,500                  (d) 18,700

## **B. PROBLEMS WITH IDLE TIME VARIANCE, GANG AND YIELD VARIANCES**

SH x SR	AH x AR	AH x SR	AHW x SR	RSH x SR
Labour	Cost	Variance (1-2)		
Labour	Rate	Variance (3-2)		
Labour	Efficiency	Variance (gross) (1-3)		
Labour	Efficiency	Variance (net) (1-4)		
Labour	Idle time	Variance (4-3)		
Labour	Mix or Gang	Variance (5-4)		
Labour	Yield	Variance (1-5)		

### **Proof or Verification:**

**Labour cost variance** = Labour rate variance + Labour efficiency variance

**Labour efficiency variance (gross)** = Labour efficiency variance (net) + Labour gang variance + Labour yield variance

**Note:** Idle time variance shall always be **ADVERSE**.

4. A gang of workers usually consist of 10 men, 5 women and 5 boys in a factory. They are paid at standard hourly rates of Rs.1.25, Re.0.80 and Re.0.70 respectively. In a normal working week of 40 hours the gang is expected to produce 1,000 units of output.

In a certain week, the gang consisted of 13 men, 4 women and 3 boys. Actual wages were paid at the rates of Rs.1.20, Re.0.85 and Re.0.65 respectively. Two hours per week were lost due to abnormal idle time and 960 units of output were produced. Calculate labour variances.

5. The following was the composition of a gang of workers in a factory during a particular month, in one of the production departments. The standard composition of workers and wage rates per hour were as follows.

Skilled: Two workers at standard rate of Rs.20 per hour each  
Semi-skilled: Four workers at a standard rate of Rs.12 per hour each  
Unskilled: Four workers at a standard rate of Rs.8 per hour each

The standard output of the gang was four units per hour. During the month in question, however, the actual composition of the gang and hourly rates paid were as under:

Skilled: Two workers at Rs.20 per hour  
 Semi-skilled: Three workers at Rs.14 per hour  
 Unskilled: Five workers at Rs.10 per hour

The gang was engaged for 200 hours during the month, which included 12 hours when no production was possible due to the machine breakdown. 810 units of the product were recorded as output of the gang during the month.

#### **Calculate labour variances.**

- 
6. The standard output of production X is 25 units per hour in a manufacturing department of a company employing 100 workers. The standard wage rate per labour hour is Rs.6.

In a 42 hours week, the department produced 1040 units of the product despite 5% of the time paid were lost due to an abnormal reason. The hourly wage actually paid were Rs.6.20, Rs.6 and Rs.5.70 respectively to 10, 30 and 60 of the workers. Compute various relevant labour variances.

- 
7. G Ltd. engaged 120 employees in the manufacture of product 'A' at standard rate of Re.1 per hour. A 45 hours working week is in operation. During the four weeks in February, 2020, 13,500 units were produced. The standard performance is set at 90 units per hour. Abnormal idle time due to power failure in each week amounted to five hours per employee.

During the month, 100 employees were paid at the standard rate but 20 employees were paid @ Rs.1.20 per hour. Calculate: Labour Rate Variance, Labour Efficiency Variance and Labour Idle Time Variance.

**Syll-2008; dec 2014 (set 2)**

- 
8. The following information pertains to labour force of UDHHAMI LTD. engaged in a week of November 2019 for a JOB-PH.

	Skilled	Semi-skilled	Unskilled	Total
No. of workers in standard gang:	16	12	8	36
Standard rate per hour (₹)	60	30	10	-
No. of workers in actual gang:	-	-	-	-
Actual rate per hour (Rs.)	70	20	20	-

In a 40 hours week, the gang produced 1080 standard hours. The actual number of semi-skilled workers is two times of the actual number of unskilled workers. Total number of actual workers are same as standard gang. The rate variance of semi-skilled workers is ₹ 6400 (F).

**G-II Syl-12 2014**

You are required to find the following:

- a) The actual number of workers/labour in each category.
  - b) Labour gang (mix) variance.
  - c) Labour sub-efficiency variance.
  - d) Labour rate variance.
  - e) Labour cost variance.
- 

## **Standard Costing – III – Mixed Variances:**

1. The standard cost card for a product show:

Material cost 2 kg @ Rs.2.50 each	Rs.5.00 per unit
Labour 2 hours @ Rs.10 each	Rs.20 per unit

The actual data is given below:

Production	8000 units
Material consumed 16,500 kg @ Rs.2.40 each:	Rs.39,600
Wages paid 18,000 hours @ Rs.8 each:	Rs.1,44,000

Calculate appropriate material and labour variances.

2. The following standards have been set to manufacture a product:

Direct Materials:

2 units of A @ Rs.4 per unit:	Rs.8
3 units of B @ Rs.3 per unit:	Rs.9
15 units of C @ Re.1 per unit:	<u>Rs.15</u>

Rs.32

Direct labour 3 hours @ Rs.8 per hour:	<u>Rs.24</u>
Standard Prime Cost	<u>Rs.56</u>

The company manufactured and sold 6,000 units of the product during the year.

Direct material costs were as follows:

12,500 units of A at Rs.4.40 per unit
18,000 units of B at Rs.2.80 per unit
88,500 units of C at Rs.1.20 per unit

The company worked for 17,500 direct labour hours during the year. For 2,500 of these hours the company paid Rs.12 per hour while for the remaining the wages were paid at the standard rate. Calculate material price and usage variances and labour rate and efficiency variances.

---

3. T Industries turns out only one article, the prime cost standards have been established as follows:

		Per completed piece
Material	-	5 lbs. @ Rs.4.20
Labour	-	3 hours @ Rs.3

The production schedule for the month of July, 2019 required completion of 5,000 pieces. However, 5,120 pieces were actually completed.

Purchases for the month of July, 2019 amounted to 30,000 lbs. of material at the total invoice price of Rs.1,35,000.

Production records for the month of July, 2019 showed the following actual results.

Materials requisitioned and used	25,700 lbs.
Direct labour – 15,150 hours	Rs.48,480

Calculate appropriate material and labour variances.

4. In a factory the budgeted and actual figures of the cost of materials and direct labour incurred in the production during the month of January are as under:

	Actual	Budgeted
Units of finished goods produced	90,000	1,00,000
<b>Materials:</b>		
Units	1,82,000	2,00,000
Cost of materials per unit	Re.0.52	Re.0.50
Total cost of materials	Rs.94,640	Rs.1,00,000
Direct labour hours (2 units of finished goods in one hour)	47,000	50,000
Wages	Rs.2.10 per hour	Rs.2.00 per hour
Total direct labour cost	Rs.98,700	Rs.1,00,000

You are required to calculate the material and labour variances.

5. From the following particulars, compute material and labour variances:

An input of 100 kg of material yields a standard output of 10,000 units.  
Standard price per kg of material Rs.20.

Actual price per kg of material Rs.21 per kg

Actual quantity of material issued and used by production department 10,000 kgs.

Actual output 9,00,000 units

Number of employees 200

Standard wage rate per employee per day Rs.40

Actual wage rate per day Rs.45

Standard daily output per employee 100 units

Total number of days worked 50 days

(idle time paid for and included in the above half day for each employee)

6. The following details relating to the product 'X' during the month of March, 2019 are available:

**Standard Cost per unit**

Materials 50 kg @ ₹ 40 per kg.

Labour 400 hours ₹ 1.00 per hour.

**Actual Cost for the month**

Material 4,900 kgs @ ₹ 42 per kg.

Labour 39,600 hours @ ₹ 1.10 per hour.

Actual Production – 100 units

You are required to compute;

- |                               |       |
|-------------------------------|-------|
| i. Material Price Variance    | (MPV) |
| ii. Material Usage Variance   | (MUV) |
| iii. Material Cost Variance   | (MCV) |
| iv. Labour Rate Variance      | (LRV) |
| v. Labour Efficiency Variance | (LEV) |
| vi. Labour Cost Variance      | (LCV) |

You are also required to reconcile the standard and the actual cost with the help of such variances.

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# **CHAPTER - 6 MARGINAL COSTING**

## **1. Marginal Cost Statement:**

Sales	xxx
(-) Variable cost	<u>xxx</u>
Contribution	xxx
(-) Fixed cost	<u>xxx</u>
Profit	<u>xxx</u>

- 2.** “Variable cost” (or) “marginal cost” means cost incurred to manufacture a product. e.g. Direct material, Direct labour, Variable overheads. Variable cost per unit will always remain fixed. But total variable cost will vary according to production.
- 3.** Fixed cost in total will always remain fixed irrespective of number of units produced. But fixed cost per unit will always vary. e.g. Salaries; Depreciation; Insurance
- 4.** **Formula:**

- Contribution:  $\frac{\text{Sales} (-) \text{ Variable cost}}{\text{Fixed cost} (+) \text{ Profit}}$  (or)
- Profit-volume ratio (PVR):  $\frac{\text{Contribution} (\times) 100}{\text{Sales}}$  (or)  $\frac{\text{Change in Profit} (\times) 100}{\text{Changes in Sales}}$
- Break-even point (Rs) (BEP):  $\frac{\text{Fixed cost}}{\text{PVR}}$
- Margin of safety:  $\frac{\text{Actual sales} (-) \text{ BEPsales}}{\text{PVR}}$  (or)
- Sales for a desired profit (Rs.)  $\frac{\text{Fixed cost} (+) \text{ desired profit}}{\text{PVR}}$
- Profit for a given sale: Prepare Marginal cost statement.

**5. Important points:**

Variable cost to sales ratio and profit-volume ratio are complimentary to each other.  
e.g. If variable cost to sales is 75%; then PVR is 25% of sales

Similarly BEP to sales ratio and MOS to sales ratio are complimentary to each other.  
e.g. If BEP is 60% of sales then MOS is 40% of sales

**In units:** If the question requires you to answer in number of units then use contribution per unit instead of profit-volume ratio.

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**Model I:**

**1. Compute PVR, BEP and MOS from the following:**

- Sales Rs.5,00,000; Variable cost Rs.3,00,000; Fixed cost Rs.1,50,000
- Sales Rs.2,00,000; Total cost Rs.1,50,000; Fixed cost Rs.50,000
- Sales Rs.30,000; Variable cost Rs.15,000; Profit Rs.7,500

**2. Sales Rs.1,00,000; Variable cost (60% of sales); Fixed cost Rs.25,000**

- Profit-volume ratio, Break-even point and Margin of safety
  - Sales for a profit of Rs.30,000
  - Sales if the company incurs a loss of Rs.10,000
  - Profit when sales are Rs.2,00,000
  - Margin of safety for a profit of Rs.12,000.
- 

**Model II: Two year's profit and two years's sales**

**3. Assuming that the cost structure and selling prices remain the same in periods I and II, find out:**

- Profit-volume ratio;
- Fixed cost;
- Break-even point in sales
- Profit when sales are Rs.1,00,000
- Sales required to earn a profit of Rs.20,000
- Margin of safety at a profit of Rs.15,000
- Variable cost in period II

Period	Sales	Cost	Profit
I	1,20,000	1,11,000	9,000
II	1,40,000	1,27,000	13,000

- 4.** A company sells its product at Rs.15 per unit. In a period, if it produces and sells 8,000 units, it incurs a loss of Rs.5 per unit. If the volume is raised to 20,000 units it earns a profit of Rs.4 per unit. Calculate Break-even point both in terms of rupees as well as in units.

**5. Calculate: Profit-volume ratio and fixed cost.**

Year	Sales	Profit
2018	20,000	1,000
2019	10,000	400

**6. Calculate: Profit-volume ratio and fixed cost.**

Year	Sales	Profit
2018	3,00,000	(10,000)
2019	4,00,000	10,000

**Model - III: "Unit" Problems**

- 7. Fixed cost Rs.2,40,000; Variable cost per unit Rs.15; Selling price per unit Rs.30**

- Profit volume ratio
- Break even sales (units and in Rs)
- If the selling price is reduced by 10% what will be the new BEP. in units.

- 8. Mr.A sells a popular brand of 'T-shirts' at an average price of Rs.28 each. He purchases the shirts from a supplier at a unit cost of Rs.18. The costs of operating his shop are all fixed cost and amounts to Rs.54,000 a year. He pays commission to his salesmen at the rate of Re.1 for every shirt sold through the particular salesman.**

Required:

- How many shirts must be sold in a year to break-even?
- Compute the sales revenue at the break-even.
- Compute the monthly sales revenue required to earn a net-profit before tax of Rs.45,000 per annum

**9. From the following particulars, calculate:**

- Contribution, PVR., BEP (units and Rs.)
- What will be the selling price per unit if the BEP. is brought down to 25,000 units?

**Fixed cost Rs.1,50,000; Variable cost per unit Rs.10; Selling price per unit Rs.15**

**10. From the following data, calculate:**

- BEP (Rs.)
- Number of units that must be sold to earn a profit of Rs.1,20,000 per annum
- How many units are to be sold to earn a net income of 15% on sales?

Selling price per units Rs.40; Variable manufacturing cost per unit Rs.22; Variable selling cost per unit Rs.3; Fixed factory overhead Rs.1,60,000 and fixed selling cost Rs.20,000.

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**Model - IV:**

11. Given fixed cost Rs.8,000; profit earned Rs.2,000 and BEP (sales) Rs.40,000. Find out actual sales.
12. Given the following: Calculate PVR.; Profit when sales are Rs.20,000; New BEP. if selling price is reduced by 20%.

Fixed cost Rs.4,000; Break-even point Rs.10,000

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**Model - V:**

13. The PVR. of a company dealing in precision instruments is 50% and MOS is 40%. You are required to work out the BEP. and the net profit if the sales volume is Rs.50 lakhs.
  14. If margin of safety is Rs.2,40,000 (40% of sales) and PVR. is 30%, Calculate BEP. and the amount of profit on sales of Rs.9,00,000.
- 

**Model - VI: Miscellaneous Problems:**

15. A company has fixed expenses of Rs.90,000 with sales of Rs.3,00,000 and a profit of Rs.60,000 during the first half year. If in the next half year, the company suffered a loss of Rs.30,000, calculate:
  - PVR., BEP. and MOS for the first half year
  - Expected sales volume for next half year assuming that selling price and fixed expenses remain unchanged.
  - The BEP and MOS for the whole year.

**16. An analysis of costs of a company is given below:**

Cost elements	Variable cost (% of sales)	Fixed cost
Direct materials	32.8%	
Direct labour	28.4%	
Factory overheads	12.6%	Rs.1,89,900
Distribution expenses	4.1%	Rs.58,400
General expenses	1.1%	Rs.66,700

**Budgeted sales for the next year are Rs.18,50,000.**

**You are required to determine:**

- BEP.
- Profit at budgeted sales volume
- Profits if actual sales drop by 10%

**17.** Two businesses, X Ltd. and Y Ltd. sell the same type of product in the same type of market. Their budgeted profit and loss account for the coming year are as follows:

	<b>X Ltd.</b>	<b>Y Ltd.</b>
Sales	2,50,000	2,50,000
(-) Variable costs	2,00,000	1,50,000
(-) Fixed costs	25,000	75,000
	<hr/>	<hr/>
Profit	<u>25,000</u>	<u>25,000</u>

**Required**

- PVR., and BEP for each company
- Sales volume at which each of the business will earn Rs.10,000 profit.
- State which business is likely to earn greater profits in conditions of:
  - a. low demand and
  - b. high demand

**18.** Two businesses, X Ltd. and Y Ltd. sell the same type of product in the same type of market. Their budgeted profit and loss account for the coming year are as follows:

	<b>X Ltd.</b>	<b>Y Ltd.</b>
Sales	10,00,000	10,00,000
(-) Variable costs	8,00,000	6,00,000
(-) Fixed costs	25,000	75,000
	<hr/>	<hr/>
Profit	1,75,000	3,25,000

**Required:** At what level of sales both the companies will earn same amount of profit (or)  
Calculate the Indifference Point (i.e. Point of no difference)

**19.** The cost volume and profit relationship of a company is described by equation

$Y = \text{Rs.}3,00,000 + 0.7x$       in which 'x' represents sales revenue and 'Y' represents total cost.

**Find out the following:**

- C/S ratio
- BEP
- Sales volume required to earn a profit of Rs.90,000
- Sales volume when there is a loss of Rs.30,000.

**20. From the following, compute the cash break-even point.**

Selling price per unit Rs.50; Variable cost per unit Rs.40 (depreciation per unit Rs.10)  
Fixed cost Rs.2,00,000 (including depreciation Rs.40,000).

**21. A factory engaged in manufacturing toys is working at 40% capacity and produces 10,000 toys per annum. The present cost break-up for one toy is as under:**

Material	Rs.10
Labour	Rs.3
Overheads	Rs.5 (60% fixed)

**The selling price is Rs.20 per toy.**

If it is decided to work the factory at 50% capacity, the selling price falls by 3%. At 90% capacity, the selling price falls by 5% accompanied by a similar fall in the price of material.

**You are required to calculate profit at 50% and 90% capacities and also calculate BEP.**

**22. N Ltd has two factories with similar plant and machinery for manufacture of soda ash. The Board of Directors of the company has expressed the desire to merge them and to run them as one integrated unit. Following data are available in respect of these two factories:**

Factory	X	Y
Capacity in operation	60%	100%
Turnover	120 lakhs	300 lakhs
Variable cost	90 lakhs	220 lakhs
Fixed cost	25 lakhs	40 lakhs

**Required:**

- What should be the capacity of the merged factory to be operated for break-even?
- What is the profitability of working at 80% of the integrated capacity?
- What turnover will give an overall profit of Rs.60 lakhs?

**23. A Company budgets for a production of 1,50,000 units. The variable cost per unit is Rs.14 and fixed cost per unit is Rs.2 per unit. The company fixes the selling price to fetch a profit of 15% on cost.**

- What is the break-even point?
- What is the profit-volume ratio?
- If the selling price is reduced by 5%, how does the revised selling price affects the BEP and the PVR?
- If profit increase of 10% is desired more than the budget, what should be the sales at the reduced price?

**24.** From the following figures, find the Break Even Volume

Selling price per ton Rs.69.50  
 Variable cost per ton Rs.35.50  
 Fixed cost Rs.18.02 lakhs

If this volume represents 40% capacity, what is the additional profit for an added production of 40% capacity, the selling price of which is 10% lower for 20% production and 15% lower than the existing price, for the other 20% capacity?

**25.** ABC Ltd. maintains a margin of safety of 37.5% with an overall contribution to sales ratio of 40%. Its fixed costs amount to Rs.5,00,000. Calculate the following:

1. Break Even Sales
2. Total Sales
3. Variable Cost
4. Current Profits
5. New Margin of Safety if the sales volume is increased by 7.5%

**26.** Nakul Limited provides the following data:

Product	Selling Price Per unit(Rs.)	Variable Cost as % of sales	% of Sales revenue
A	40	75	20
B	50	80	40
C	80	60	40

At 100 percent capacity: Total sales Rs.35,00,000 and Fixed cost Rs.5,80,000.

You are required to calculate:

- i. BEP in rupees
- ii. Profit or Loss at 80% capacity level sales.

**27.** The following information is provided by Shyama Limited:

Particulars	Products		
	P-1	P-2	P-3
Unit selling price (Rs.)	500	400	250
Unit variable cost (Rs.)	300	280	125
Proportion of output quantity (%)	20	50	30

Total fixed costs are Rs.89,37,500.

You are required to work out the overall break-even point quantity and the product wise break up of such quantity.

- 28.** The following information is provided by M Ltd for the year ended 31<sup>st</sup> March, 2019:

Particulars	First 6 Months (Rs.)	Last 6 Months (Rs.)
Sales	5,40,000	6,00,000
Total Cost	4,80,000	5,16,000

You are required to calculate:

- i. P/V Ratio
  - ii. Fixed Cost for the year
  - iii. Break-even Point for the year
  - iv. Margin of Safety
  - v. Profit earned when sales are Rs.15,00,000
  - vi. Sales required to earn a profit of Rs.2,00,000.
- 

- 29.** M. Lal Limited produces single product and sells its product at Rs.240 per unit. In 2018-19, the company operated at a margin of safety of 40%. The fixed costs amounted to Rs.17,28,000 and the variable cost ratio to sales was 70%.

In 2019-20, it is estimated that the variable cost will go up by 10% and the fixed cost will increase by 5%. Find the selling price required to be fixed in 2019-20 to earn the same P/V ratio as in 2018-19.

Assuming the same selling price of Rs.240 per unit in 2019-20, find the number of units required to be produced and sold to earn the same profit as in 2018-19.

---

- 30.** The following data are given by S Kumar Limited:

Sales (32,000 units) Rs.9,60,000; Variable cost Rs.6,72,000; Profit Rs.1,08,000.

You are required to calculate:

- i. P/V Ratio
  - ii. BEP in units
  - iii. Profit at sales volume of Rs.7,20,000
  - iv. Required sales to achieve same contribution if P/V Ratio is 40%.
  - v. If the selling price is reduced by 20%, the new BEP in units will be.
-

**31.** Following figures are related to MD Limited for the year ended 31st March, 2019:

Selling price per unit	Rs.50
Variable cost per unit	Rs.30
Fixed cost	Rs.9,00,000

You are required to calculate:

- i. Break-even point in units
  - ii. Units to be sold to earn a target net income of Rs. 17,500 per month during a year.
  - iii. Number of units to be sold to earn a net income of 25% on cost.
  - iv. New selling price per unit if BEP is to be brought down by 20% of present BEP.
  - v. New selling price to earn a profit of 20% on sales by selling only 33,000 units.
- 

**32.** The following data are provided by Jaggu Limited:

	2018 (Rs.)	2019 (Rs.)
Sales @ Rs. 20 per unit	6,00,000	9,50,000
Profit / (Loss)	(40,000)	1,00,000

You are required to calculate:

- i. Fixed cost
  - ii. Required sales to earn a profit of Rs. 1,60,000
- 

**33.** The following figures are given: (Rs. in '000s)

Particulars	Year ended 31st March	
	2018 (Rs.)	2019 (Rs.)
Profit/[loss]	25	(15)
Cost	155	95

You are required to calculate:

- i. P/V Ratio
  - ii. Fixed Cost
  - iii. Break-even Point in units if selling price is Rs. 250 per unit.
  - iv. Required sales to earn a profit of 25% on cost.
-

- 34.** The Margin of Safety is 40 percent of sales and P/V Ratio is 30 percent. The firm sold 50,000 units at a price of Rs.45 per unit

You are required to calculate:

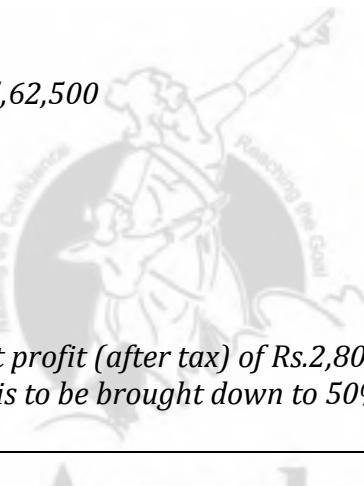
- i. Break-even Point in units.
  - ii. Profit earned
  - iii. Number of units to be sold to earn a profit of 10% on sales.
  - iv. Break-even sales in units if selling price is reduced by 10 percent
- 

- 35.** The following figures are provided by Geeta Limited for the year ending 31st March, 2019:

P/V Ratio 40%

Break-even Point at 60% of sales

Sales @ Rs. 250 per unit for Rs. 15,62,500



You are required to calculate:

- i. BEP in units
  - ii. Fixed cost
  - iii. Profit earned
  - iv. Margin of safety in rupees
  - v. Units to be sold to earn a net profit (after tax) of Rs.2,80,000 if tax rate is 30%.
  - vi. Selling price per unit if BEP is to be brought down to 50% of sales units.
- 

- 36.** Jatin Limited produces and sells 1,50,000 units at Rs. 30 per unit. The variable cost per unit is Rs.18 and fixed overheads are Rs. 65,000 per month.

You are required:

- i. Calculate P/V Ratio; Profit and Break-even-Point in rupees for the year.
  - ii. If selling price is reduced by 20 percent, Find out BEP and what additional sales would be needed to maintain the old level of profit
  - iii. If on account of reduction in selling price, sales increase to 2,10,000 units, what profit would result?
-

- 37.** Vikash Limited budgets for a production of 2,50,000 units. Per unit variable cost and fixed costs are Rs.24 and Rs.6 respectively. The company fixes its selling price to fetch a profit of 20 percent on selling price.

You are required to:

- Ascertain P/V Ratio
  - Ascertain Break-even Point
  - If the selling price is reduced by 10 percent, how will it affect the P/V Ratio and the BEP?
  - If a profit desired 10% more than the budgeted total profit, what should be the sales at reduced price?
- 

- 38.** If margin of safety is Rs. 4.80 lakhs (30% of sales) and P/V Ratio is 40%.

You are required to calculate:

- Break-even sales
- Fixed cost
- Profit earned
- Amount of profit on sales of Rs. 24 lakhs.

- 39.** The following data are given:

Margin of safety (40,000 units)	Rs.24,00,000
Total Cost of Production	Rs.71,40,000
No. of units produced and sold	1,40,000 units

You are required to calculate:

- Unit selling price
  - Profit earned
  - P/V Ratio
  - Fixed Cost
  - Break-even Point in units
  - Sales units required to earn a target net profit of Rs. 28,00,000 after tax, assuming corporate tax rate to be 30%.
- 

- 40.** Dafali Limited reports the following cost structure at two capacity levels:

	80% capacity	60% capacity
Output (Units)	30,000	22,500
Production overhead I	Rs. 30 per unit	Rs. 40 per unit
Production overhead II	Rs. 45 per unit	Rs. 45 per unit

If the selling price, reduced by direct material and labour is Rs.120 per unit, what would be its break-even point?

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**41.** The following details provides by the Gargi Limited:

*Ratio of variable cost to sales 60 percent*

*Break-even point at 70 percent of the capacity sales*

*Fixed cost Rs.13,30,000*

*You are required to calculate:*

- i. Break-even Point in rupees.
  - ii. Sales at full capacity.
  - iii. Profit earned at 75 percent of capacity sales.
  - iv. Sales capacity needed to earn a profit of Rs.45,000
- 

**42.** Priyanshu Limited has furnished the following data:

Particulars	Year ended 31 <sup>st</sup> March	
	2018	2019
Sales	Rs. 2500 Lakhs	?
Margin of Safety as a % of total sales	30 %	22 %
P/V Ratio	40 %	36 %

*There has been substantial saving in fixed cost in the year ended 31st March, 2019 due to the restructuring process. The company could maintain its sales quantity level of 2017-18 in 2018-19 by reducing selling price.*

*You are required to calculate for the later year:*

- i. Sales
  - ii. Profit
  - iii. Fixed Cost
  - iv. Break-even Sales
-

**Sales volume to be maintained meaning variable cost to be the same:**

43. In 2018 the turnover of Akash Ltd., which operated at a margin of safety of 25%, amounted to Rs.12,00,000 and its PVR was 40%. During 2019 the company estimated that although the same volume of sales would be maintained, the sale value would go down due to decrease in selling price. There will be no change in variable costs.

The company proposes to reduce its fixed costs through an incentive cost reduction programme. These changes will alter the PVR and margin of safety to  $\frac{100}{3}$  % and 40% respectively in 2019.

You are required to present a comparative statement indicating sales, variable costs, fixed costs and profits of the company for 2018 and 2019.

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44. There are three similar plants under the Corporate Management who wants them to be managed for better operation. The following are the details relating to these plants:

	Plant A	Plant B	Plant C
Capacity in Operation	100%	70%	50%
(₹ In lakhs)			
Turnover	300	280	150
Variable Cost	200	210	75
Fixed Cost	70	50	62

**You are required to calculate:**

- i. Capacity of merged plant to be operated to break-even
  - ii. Profitability of working at 75% capacity;
  - iii. The turnover from the merged plant to give a profit of Rs. 28 lakhs.
- 

45. In a purely competitive market, 10,000 pocket transistors can be manufactured and sold and a certain profit can be generated. It is estimated that 2,000 pocket transistors need to be manufactured and sold in a monopoly market to earn the same profit.

Profit under both the conditions is targeted at ₹ 2,00,000. The variable cost per transistor is ₹ 100 and the total fixed cost is ₹ 37,000.

You are required to find out the unit selling price both under monopoly and competitive situations.

---

**46.** A company manufactures a product currently utilizing 80% capacity with a turnover of 32,000 units at a selling price of ₹ 25 per unit. The variable cost of the product is ₹ 17.5 per unit. Fixed cost amounts to ₹ 1,50,000 up to 80% of level of output and there will be an additional cost of a supervisor amounting to ₹ 20,000 beyond that level.

Calculate:

- (i) Activity level (%) at break-even point
  - (ii) Number of units to be sold to earn a net income of 10% of sales
  - (iii) Activity level (%) to earn a profit of ₹ 1,00,000
- 

**47.** The following data relates to a manufacturing company:

Plant capacity: 4,00,000 units per annum. Present utilization - 40%

Actuals for the year 2018 were:

Selling price ₹ 50 per unit,

Material cost ₹ 20 per unit

Variable manufacturing costs ₹ 15 per unit

Fixed cost = ₹ 27,00,000.

In order to improve capacity utilization, the following proposal is considered:

Reduce selling price by 10% and spend additionally ₹ 3,00,000 in sales promotion.

How many units should be produced and sold in order to increase profit by ₹ 8,00,000 per year?

**48.** M/s Northern Industries specializes in the manufacture of small capacity motors. The cost structure of a motor is given below:

Material	₹ 100
Labour	₹ 160
Variable overheads	50% of labour cost

Fixed overheads of the company ₹ 3,00,000 p.a. The sale price of the motor is ₹ 400 each.

Determine the number of motors in a year in order to break-even.

How many motors have to be made and sold to make a profit of ₹ 1,20,000 per year.

If the sale price is reduced by ₹ 20 each, how many motors have to be sold to break-even?

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## **MARGINAL COSTING – II: DECISION MAKING**

### **Problems of “Key factor” or “Limiting factor”:**

Steps in key-factor problems:

1. Calculate contribution per unit of each product
  2. Calculate contribution based on key factor (contribution ÷ key factor)
  3. Rank the products
  4. Make a decision
- 

1. From the data, which product would you recommend to be manufactured, “**TIME**” being the key factor:

	Per unit of product 'A'	Per unit of Product 'B'
Direct material	Rs.24	Rs.14
Direct labour at Re.1 per hour	Rs.2	Rs.3
Variable overhead at Rs.2 per hour	Rs.4	Rs.6
Selling price	Rs.100	Rs.110
Standard time to produce	2 hours	3 hours

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2. The following particulars are obtained from costing records of a factory:

	Per unit of product 'A'	Per unit of product 'B'
Selling price	Rs.200	Rs.500
Material (Rs.20 per litre)	Rs.40	Rs.160
Labour (Rs.10 per hour)	Rs.50	Rs.100
Variable overhead	Rs.20	Rs.40
Total fixed overheads	Rs.15,000	

Comment on the profitability of each product when:

- Raw material is in short supply
  - Production capacity is limited
  - Sales quantity is limited
  - Sales value is limited
  - Only 1,000 litres of raw materials is available for both the products in total and maximum sales quantity of each product is 300 units.
- 

3. A firm can produce three different products from the same raw material using the same production facilities. The requisite labour is available in plenty at Rs.8 per hour for all products. The supply of raw material, which is imported at Rs.8 per kg is limited to 10,400 kg. for the budget period. The variable overheads are Rs.5.60 per hour. The fixed overheads are Rs.50,000. The selling commission is 10% on sales.

From the following information, you are required to suggest the sales mix which will maximize the firm's profits. Also determine the profit that will be earned at the level:

Product	Market demand	Selling Price per unit(Rs.)	Labour (hours per unit)	Raw Material required (kg per unit)
X	8,000	30	1	0.7
Y	6,000	40	2	0.4
Z	5,000	50	1.5	1.5

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4. New India Engineering Co. Ltd, produces three components A, B and C. The following particulars are provided:

	A Rs.	B Rs.	C Rs.
Sale price	60	55	50
Direct material	20	18	15
Direct labour	15	14	12
Variable overhead	13	13	17
Estimated sales (in no. of units)	2,000	2,000	2,000
Machine hours per unit	6	2	1

Fixed cost is ₹ 20,000 per year. Due to break-down of one of the machines, the capacity is limited to 12,000 machine hours and this is not sufficient to meet the total sales demand.

You are required to work out

- (a) What will be most profitable product mix that should be produced, and
  - (b) The total contribution from the revised product mix.
- 

5. A Company produces two products A & B using similar inputs and facilities. The availability of Labour hours in a year is 2,35,000 hours and this is considered as the limiting factor. The following details are available for the two products:

	Product A	Product B
Selling price per unit (₹)	100	50
Direct material per unit (₹)	50	11
Direct labour (₹ 5 per hour)	25	20
Estimated sale demand (nos.)	10,000	50,000

Other variable costs common to both products are:

- i. Variable production overhead ₹ 2 per hour of direct labour.
- ii. Variable selling overhead 10% of sale price.

In the context of the above limiting factor, you are required to calculate a production plan that will maximize contribution to the company and also workout total contribution at the level.

6. From the following particulars, find the most profitable Product – mix and prepare a statement of profitability of that product - mix.

<b>Particulars</b>	<b>Product - A</b>	<b>Product - B</b>	<b>Product - C</b>
Budgeted Production (units)	4,000	5,000	1,500
Selling Price/ unit (₹)	60	55	50
<b>Requirement/unit:</b>			
Direct Material (Kg)	5	3	4
Direct Labour (Hours)	4	3	2
Variable Overhead (₹)	7	13	8
Fixed Overhead (₹)	5	10	15
Cost of Direct Material / kg (₹)	4	4	4
Direct Labour hour-rate (₹)	2	2	2

All the 3 Products are produced from the same Direct Material, using the same type of Machines and labour. Direct labour is the key-factor, which is limited to 18,600 Hours. **Syl12 Dec 2015**

7. ANKIT LTD. a manufacturing Company which produces three products furnishes the following information for the year 2018-19:

<b>Particulars</b>	<b>Products</b>		
	<b>A</b>	<b>B</b>	<b>C</b>
Selling Price (per unit)	₹ 200	₹ 150	₹ 100
Profit Volume Ratio	10%	20%	40%
Raw Material content as a % of Variable Cost	50%	50%	50%
Maximum Sales Potential (units)	40,000	25,000	10,000

Fixed costs are estimated at Rs. 12 lakhs. The firm uses same raw material in all the three products. Raw material is in 'Short Supply'. The firm has a quota for the supply of raw materials of the value of Rs.36 lakhs for the year 2018-19 for the production of three products to meet sales demand.

Determine the optimal product mix and ascertain the maximum profit therefrom.

**J-18 s-16**

#### **Evaluation of proposals:**

8. A review, made by the top management of THAKAR LTD. which makes only one product, of the result of first quarter of the year revealed the following:

Sales in units	10,000
Loss in (Rs.)	10,000
Fixed cost (for the year Rs.1,20,000)	Rs.30,000
Variable cost per unit in	Rs.8

The Finance Manager who feels perturbed (worried) suggests that the company should at least break even in the second quarter with a driver for increased sales. Towards this, the company should introduce a better packing which will increase the cost by Rs.0.50 per unit.

The Sales Manager has an alternate proposal. For the second quarter additional sales promotion expenses can be increased to the extent of Rs.5,000 and a profit Rs.5,000 can be aimed at for the period with increased sales.

The Production Manager feels otherwise. To improve the demand, the selling price per unit has to be reduced by 3 per cent. As a result the sales volume can be increased to attain a profit level of Rs. 4,000 for the quarter.

The Managing Director asks you as a Cost Accountant to evaluate these three proposals and calculate the additional sales volume that would be required in each case, in order to help him make a decision.

2012 - June 2013

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### **Acceptance or Rejection of Foreign order**

9. The cost sheet of a product is given below:

Direct material		Rs.5
Direct wages		Rs.3
Variable factory overheads	Re.0.50	
Fixed factory overheads	<u>Re.0.50</u>	Re.1
Administrative expenses		Re.0.75
Variable selling expenses	Re.0.50	
Fixed selling expenses	<u>Re.0.25</u>	<u>Re.0.75</u> <u>Rs.10.50</u>

The selling price per unit is Rs.12. The above figures are for an output of 50,000 units, the capacity of the firm is 65,000 units. A foreign customer is desirous of buying 15,000 units at a price of Rs.10 per unit. Advise the manufacturer whether the order should be accepted. What will be your advice if the order was from a local merchant?

10. Due to industrial depression, a plant is running, at present, at 50% of its capacity.

Cost of production per unit	
Direct materials	Rs.2
Direct labour	Re.1
Variable overheads	Rs.3
Fixed overheads	Rs.2
	Rs.8
Production per month	20,000 units

Total cost of production (20,000 x Rs.8)	Rs.1,60,000
Sales	Rs.1,40,000
Loss	Rs.20,000

An exporter offers to buy 5,000 units per month at the rate of Rs.6.50 per unit and the company hesitates to accept the offer for fear of increasing its already large operation losses. Advise whether the company should accept or decline this offer.

---

- 11.** A company annually manufactures 10,000 units of a product at a cost of Rs.4 per unit and there is home market for consuming the entire volume of production at the sale price of Rs.4.25 per unit. In the year 2018, there is a fall in demand for home market which can consume 10,000 units only at a sale price of Rs.3.72 per unit.

The analysis of the cost per 10,000 units is:

Material	Rs.15,000
Wages	Rs.11,000
Fixed overheads	Rs.8,000
Variable overheads	Rs.6,000

The foreign market is explored and it is found that this market can consume 20,000 units of the product if offered at a sale price of Rs.3.55 per unit. It is also discovered that for additional 10,000 units of the product (over initial 10,000 units) the fixed overheads will increase by 10%. Is it worthwhile to try to capture the foreign market?

---

#### **Miscellaneous Problems:**

- 12.** An umbrella manufacturer makes an average net profit of Rs.2.50 per piece on a selling price of Rs.14.30 by producing and selling 6,000 pieces or 60% of the capacity. His cost of sales is:

	Rs.
Direct material	3.50
Direct wages	1.25
Works overheads (50% fixed)	6.25
Sales overheads (25% variable)	0.80

During the current year, he intends to produce the same number but anticipates that fixed charges will go up by 10%. Direct labour rate and material will increase by 8% and 6% respectively. He has no option of increasing the selling price. Under this situation, he obtains an offer for further 20% of the capacity. What minimum price you will recommend for acceptance to ensure the manufacturer an overall profit of Rs.16,730.

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- 13.** A manufacturer with overall (interchangeable among the products) capacity of 1,00,000 machine hours has been so far producing a standard mix of 15,000 units of product A, 10,000 units of product B and C each. On experience, the total expenditure exclusive of his fixed charges is found to be Rs.2.09 lakhs and the cost ratio among the product approximately 1, 1.5, 1.75 respectively per unit.

The fixed charge comes to Rs. 2 per unit. When the unit selling prices are Rs. 6.25 for A, Rs. 7.5 for B and Rs. 10.5 for C, he incurs a loss.

	Mix-I	Mix-II	Mix-III
A	18,000	15,000	22,000
B	12,000	6,000	8,000
C	7,000	13,000	8,000

As a management accountant what mix will you recommend?

---

### **Make or buy:**

**14.** A radio manufacturing company finds that while it costs Rs.6.25 each to make component X 273 Q. The same is available in the market at Rs.5.75 each, with an assurance of continued supply. The break-down of cost is:

Materials	Rs.2.75 each
Labour	Rs.1.75 each
Other variable costs	Rs.0.50 each
Depreciation and other fixed costs	Rs.1.25 each
	<u>Rs.6.25 each</u>

Should you make or buy?

What would be your decision if the supplier offered the component at Rs.4.85 each?

---

**15. R Ltd. manufactures automobile accessories. The following are the total cost of processing 1,00,000 units:**

Direct material cost	Rs.5 lakhs
Direct labour cost	Rs.8 lakhs
Variable factory overheads	Rs.6 lakhs
Fixed factory overheads	Rs.5 lakhs

The purchase price of the component is Rs.22. The fixed overhead would continue to be incurred even when the component is bought from outside although there would have been reduction to the extent of Rs.2,00,000.

### **Required:**

- Should the part be made or bought considering that the present facility when released following a buying decision would remain idle.
  - In case the released capacity can be rented out to another manufacturer for Rs.1,50,000 having good demand, what should be the decision?
-

**16. The budgeted results for A company Ltd. include the following:**

<b>Sales</b>	<b>Rs.in lakhs</b>	<b>Variable cost as % of Sales</b>
A	50	60%
B	40	50%
C	80	65%
D	30	80%
E	44	75%

Fixed overheads for the period amount to Rs.90 lakhs.

**You are asked to:**

- Prepare a statement showing the amount of loss expected
  - Recommend a change in the sales volume of each product which will eliminate the expected loss. Assume that the sale of only one product can be increased at a time.
- 

**Discontinuance of a production line**

**17. A company manufactures 3 products A, B, and C. There are no common processes and the sale of one product does not affect the prices or volume of sale of any other.**

**The company's budgeted profit/loss for 2019 has been abstracted thus:**

	<b>Total</b>	<b>A</b>	<b>B</b>	<b>C</b>
Sales	<u>3,00,000</u>	<u>45,000</u>	<u>2,25000</u>	<u>30,000</u>
Variable production cost	1,80,000	24,000	1,44,000	12,000
Fixed production cost	<u>60,000</u>	<u>3,000</u>	<u>48,000</u>	<u>9,000</u>
Variable selling cost	24,000	8,100	8,100	7,800
Fixed selling cost	<u>6,000</u>	<u>2,100</u>	<u>1,800</u>	<u>2,100</u>
<b>Profit (loss)</b>	<b><u>30,000</u></b>	<b><u>7,800</u></b>	<b><u>23,100</u></b>	<b><u>(900)</u></b>

On the basis of above, the Board had almost decided to eliminate Product C, on which a loss was budgeted. Meanwhile, they have sought your opinion. As the company's Cost Accountant, what would you advise?

---

**18. A company is at present working at 90% of its capacity and producing 13,500 units per annum. It operates a flexible budgetary control system. The following figures are obtained from its budget:**

	<b>90% (₹)</b>	<b>100% (₹)</b>
Sales	15,00,000	16,00,000
Fixed expenses	3,00,500	3,00,600
Semi-fixed expenses	97,500	1,00,500
Variable expenses	1,45,000	1,49,500
Units made	13,500	15,000

**19.** Labour and material costs per unit are constant under present conditions. Profit margin is 10%.

- i. You are required to determine the differential cost of producing 1,500 units by increasing capacity to 100%?
- ii. What would you recommend for an export price for these 1,500 units if overseas prices are much lower than indigenous prices?

**Syl12 Dec 2015**

**Answer:** ii. *The minimum price for these 1,500 units should not be less than Rs.64.84*

---

**20.** M/s Zenith Co. Ltd. operating at normal capacity produces 1,00,000 units of a product which supplies the following particulars:

Particulars	(₹) per unit
Direct material	32
Direct labour	12
Variable overhead	16
Fixed overhead	<u>15</u>
	<b>75</b>

Sale price per unit ₹ 100.

In addition, selling and distribution cost of ₹ 5 per unit is incurred for selling each unit of product. As the company faces recession in the market, the Marketing Department desires to produce only 5000 units. But management is of the opinion to shutdown the plant.

If the plant is shutdown the loss due to fixed cost could be avoided to the extent of ₹ 4,00,000, but an additional committed unavoidable cost would be estimated at ₹ 2,95,000. Advise whether the plant should be shutdown or not.

**J-15 2008 syll**

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**21.** QUALITY PRODUCTS LTD., manufactures and markets a single product. Available data:

	₹/Unit
Materials	16
Conversion costs (variable)	12
Dealer's margin (10% of sales)	4
Selling price	40
Fixed cost:	₹ 5 lakhs
Present sales:	90,000 units
Capacity utilization:	60%

There is acute competition. Extra efforts are necessary to sell. Suggestions have been made for increasing sales:

- a) By reducing selling price by 5%
- b) By increasing dealer's margin by 25% over the existing rate.

Which of these two suggestions you would recommend, if the company desires to maintain the present profit?

**June-18 2016-syl group 2**

**Answer:**

#### **Recommendation:**

The 2<sup>nd</sup> proposal is recommended because the contribution per unit is higher and the sales (in units) are lower. Lower sales effort required to implement the 2<sup>nd</sup> proposal. The company can earn higher profits by increasing its sales, as an alternative.

- 22.** Gupta Enterprise is operating at 60% capacity level producing and selling 60,000 units Rs.100 per unit. Other relevant particulars are as follows:

Cost per unit	
Material	Rs.40
Conversion Cost (variable)	Rs.20
Dealer's margin (10% of sales)	Rs.10
Fixed cost for the period is	Rs.12,00,000

As there is a stiff competition it is not possible to sell all the products at the existing cost price structure. The following alternative proposals are considered:

- i. Decrease selling price by 20%
  - ii. Increase dealer's margin from 10% to 20%

Select the better alternative. Also calculate the sales volume required to maintain the same amount of profit under the alternative which is considered better assuming that volume of sales will not be a limiting factor under such alternative. Also assume that fixed cost will remain constant. **dec 2014**

**Answer:**

From the above result it appears that P/V Ratio under the second alternative is higher than that under the first alternative. Also breakeven point under the second alternative is lower than under the first alternative. Therefore, second alternative i.e., increasing dealer's margin to 20% is better both in terms of profitability (P/V ratio) and risk (BEP)

23. While preparing the estimate of profitability for the coming year, the Sales Manager of a company indicated sale of a single product at a sale price of ₹ 60 per unit.

At that price the expected profit will be ₹ 25,00,000. The variable cost of the product is ₹ 20 per unit and the total fixed expenses for the year was estimated at ₹ 15,00,000. The Sales Manager further indicated that if there is a reduction in price, the quantity of sale will rise in the following manner:

When selling price reduced by	Quantity of sale to increase by
i. 10%	20%
ii. 5%	15%
iii. 2.5%	8%

As a Cost Accountant, you have been asked to evaluate the effect of alternative sale prices as above and suggest the best alternative to be adopted in the coming year. **Syl08 Dec13**

**Answer:**

The best option is to reduce selling price by 5% which will result increase in sales by 15%

**24. SHEENNA LTD.**, an appliance manufacturer, has always sold its product through wholesalers. Last year its sales were Rs.20,00,000 and its net profit 10% of sales. As a result of the increase in appliance sales through departmental stores and e-commerce business establishment, the company is considering elimination of wholesalers and selling directly to retailers.

It is estimated that this would result in a 40% drop in sales but net profit would be Rs.1,80,000 due to the elimination of middlemen. Fixed expenses would increase from Rs.2,00,000 to Rs. 3,00,000 owing to additional storage and logistics facilities.

As a Management Accountant you are required to find out:

- i. Whether the proposed change would raise or lower the break-even point in rupees? By how much? Give reason.
- ii. What would be the sale volume in rupees which would enable Sheena Ltd. to obtain as much profit as it made last year?

**2012 June 2015**

**25.** Normal capacity of SUVAN LTD. is 2,40,000 units per annum. Cost structure for the year ending 31<sup>st</sup> March, 2019 is as follows:

	Rs.
Direct material cost per unit	25
Direct labour cost per unit (subject to minimum of Rs.2,50,000 p.m.)	20
Overheads:      Fixed	18,00,000
Variable per unit	15

Semi variable Rs.9,60,000 per year up to 50% capacity and additional Rs.3,00,000 for every 20% increase in capacity or part thereof.

In the year 2019-20 the company to be worked at 60% capacity for the first four months but it was expected that it would work at 80% capacity for the remaining 8 months. During the first four months, the selling price per unit will be fixed at Rs.100.

**Required:** What should be the price per unit in the remaining eight months to earn a total profit of Rs.43,80,000?

**2012 June 2015**

**26. MODERN LTD.** has three departments X, Y and Z, each of which makes a different product. The budgeted data for the coming year are as follows:

<b>Particulars</b>	<b>Amount (₹)</b>		
	<b>X</b>	<b>Y</b>	<b>Z</b>
Sales	22,40,000	11,20,000	16,80,000
Direct materials	2,80,000	1,40,000	2,80,000
Direct labour	1,12,000	1,40,000	4,48,000
Direct expenses	2,80,000	1,40,000	5,60,000
Fixed cost	5,60,000	2,80,000	5,60,000

The management of the company is considering to close down department Z. There is a possibility of reducing fixed cost by ₹ 1,50,000 if department Z is closed down. Advise the management whether or not department Z should be closed down.

27. AVONA LTD., a toy factory presents the following information for the year ended 31st March, 2019:

	₹
Material cost	1,20,000
Labour cost	2,40,000
Fixed overheads	1,20,000
Variable overheads	60,000
Units produced	12,000
Selling Price per unit	50

The available capacity is a production of 20000 units per year. The firm has an offer for the purchase of 5000 additional units at a price of ₹ 40 per unit. It is expected that by accepting this offer there will be a saving of rupee one per unit in material cost on all units manufactured, the fixed overhead will increase by ₹ 35,000 and the overall efficiency will drop by 2% on all production. State whether offer is acceptable or not.

*December 2018*

**I. Marginal cost statement for 12,000 units**

Sales (12,000 x 50)	6,00,000
<u>Less: Variable cost</u>	
Direct material @ Rs.10 per unit	1,20,000
Direct labour @ Rs.20 per unit	2,40,000
Variable oh @ Rs.5 per unit	60,000
Contribution	1,80,000
Less: Fixed cost	1,20,000
Profit	<b>60,000</b>

**II. Marginal cost statement for 17,000 units (85% capacity)**

Sales (12,000 x 50) + (5,000 x 40)	8,00,000
<u>Less: Variable cost</u>	
Direct material @ Rs.9 per unit	1,53,000
Direct labour @ Rs.20 per unit	3,46,939
Variable oh @ Rs.5 per unit	85,000
Contribution	2,15,061
Less: Fixed cost (1,20,000 + 35,000)	1,55,000
Profit	<b>60,061</b>

**Note:** Sales 17,000 units out of full capacity of 20,000 (85%)

**Note:** Labour efficiency drops by 2%. Therefore, time required to produce 17,000 units requires more time of labour. Labour cost will go up accordingly.

**Decision:** By accepting the special offer of 5,000 units, the profit increases by Rs.61 (Rs.60,061 – 60,000). Hence the offer can be accepted.

**28.** ABC Ltd. is manufacturing three products X, Y and Z. All the products use the same raw material which is scarce and available to the extent of 61,000 kg. only. The following information is available from records of the company:

Particulars		Product X	Product Y	Product Z
Selling price per unit	( ₹)	100	140	90
Variable cost per unit	( ₹)	75	110	65
Raw material requirement per unit	(kg)	5	8	6
Market demand	(units)	5,000	3,000	4,000

Fixed costs are ₹1,50,000. Advise the company about the most profitable product mix. Compute the amount of profit resulting from such product mix.

---

**29.** Present the following information to show to management:

- a. The marginal product cost and the contribution per unit
- b. The total contribution and profits resulting from each of the following sales mix results.

Particulars	Product	Per unit (₹)
Direct Materials	A	10
Direct Materials	B	9
Direct wages	A	3
Direct wages	B	2

Fixed Expenses - ₹ 800

(Variable expenses are allotted to products at 100% Direct Wages)

Sales Price: A ₹ 20

Sales Price: B ₹ 15

Sales Mixtures:

- (a) 100 units of Product A & 200 of B
  - (b) 150 units of Product A & 150 of B
  - (c) 200 units of Product A & 100 of B
-

**30.** A Ltd., manufactures and sells four types of products under the brand names of A , B, C and D. The sales mix in value comprises  $33\frac{1}{3}\%$ ,  $41\frac{2}{3}\%$ ,  $16\frac{2}{3}\%$ ,  $8\frac{1}{3}\%$  of products A, B, C & D respectively.

The total budgeted sales (100% are ₹ 60,000 p.m)

***Operating costs are:***

Variable Costs:

Product A 60% of selling price

Product B 68% of selling price

Product C 80% of selling price

Product D 40% of selling price

Fixed Costs: ₹ 14,700 p.m.

- (a) Calculate the break-even-point for the products on overall basis and
  - (b) Also calculate break-even-point, if the sales mix is changed as follows the total sales per month remaining the same. Mix: A - 25%; B - 40%; C - 30%; D - 5%.
- 



**CHAPTER - 7****PROCESS COSTING - BASICS****Process I Account**

1.	<u>Units</u>	<u>Amount</u>		<u>Units</u>	<u>Amount</u>
To Raw material introduced	xxx	xxx	By Normal loss	xxx	xxx
To Direct labour		xxx	By Process II a/c	xxx	xxx
To Overhead expenses	—	xxx	By Abnormal loss	xxx	xxx

2. Cost per unit:  $\frac{\text{Debit side total } (-) \text{ normal loss}}{\text{Expected output}}$

Note: Expected output: Units introduced (-) normal loss

3. Abnormal loss and abnormal gain should be valued at cost per unit.

4. Output of P-I is the input of P-II. Similarly output of P-II is the input of P-III.

1. Bengal Chemical Co. produced three chemicals during the month of July, 2019 by three consecutive processes. In each process 2% of total weight put in is lost and 10% is scrap which from processes I and II realizes Rs.100 a ton and from process III Rs.20 a ton.

	Process I	Process II	Process III	
Passed on to the next process	75%	50%	--	
Sent to warehouse for sale	25%	50%	100%	
	<b>Rs.</b>	<b>Tons</b>	<b>Rs.</b>	<b>Tons</b>
Raw materials	1,20,000	1,000	28,000	140
Manufacturing wages	20,500		18,520	
General expenses	10,300		7,240	
			<b>Rs.</b>	<b>Tons</b>
			1,07,840	1,348
			15,000	
			3,100	

Prepare process cost accounts showing the cost per ton of each product.

**Abnormal Loss Account**

	<u>Units</u>	<u>Amount</u>		<u>Units</u>	<u>Amount</u>
To Process a/c.	xxx	xxx	By Cash (scrap value)	xxx	xxx
			By Costing P & L a/c.		xxx

**Note:** Abnormal loss (or) Abnormal gain should be valued at **cost per unit**. The difference between the cost and realization from scrap is transferred to costing profit and loss account.

	<u><b>Abnormal Gain A/c</b></u>			
	<u><b>Units</b></u>	<u><b>Amount</b></u>		
To Normal loss	xxx	xxx	By Process a/c. (scrap value)	
To Costing P&L. a/c.	xxx			

	<u><b>Normal Loss A/c</b></u>			
	<u><b>Units</b></u>	<u><b>Amount</b></u>	<u><b>Units</b></u>	<u><b>Amount</b></u>
To Process I a/c.	xxx	xxx	By Cash a/c.	xx
To Process II a/c.	xxx	xxx	By Abnormal gain a/c.	xx
			By Costing P & L a/c.	xx

**Model - II: Problems on abnormal loss and abnormal gain:**

2. In process A, 100 units of raw materials were introduced at a cost of Rs.1,000. The other expenditure incurred by the process was Rs.602. Of the units introduced, 10% are normally lost in the course of manufacture and they possess a scrap value of Rs.3 each. The output of Process A was only 75 units. Prepare Process A Account and Abnormal loss account.

---

3. In process B, 75 units of a commodity were transferred from process A at a cost of Rs.1,310. The additional expenses incurred by the process were Rs.190. 20% of the units entered are normally lost and sold at Rs.4 per unit. The output of the process was 70 units. Prepare Process B account and abnormal gain account.

---

4. Naitik Ltd. provides the following cost data of a product passing through two manufacturing processes: Process A and Process B.

	<b>Process A</b>	<b>Process B</b>
Input: 8800 units	9,59,200	—
Material	46,500	93,680
Labour Cost	1,45,000	95,000
Electric Power	48,000	32,000
Normal loss	5%	4%
Value of scrap per unit	10	12
Output (units)	8,300	8,000

Other manufacturing expenses are ₹ 1,68,000 to be charged on the basis of labour cost.

Prepare Process Accounts, Abnormal Loss Account and Abnormal Gain Account.

Syl-12 D-15

5. The product of a manufacturing concern passes through two processes, A and B and then to finished stock. It is ascertained that in each process, normally 5% of the total weight is lost and 10% is scrap from which processes A and B realize ₹ 80 per tonne and ₹ 200 per tonne respectively. The following are the figures relating to the processes:

Particulars	Process A	Process B
Materials (tonnes)	1,000	70
Cost of Materials ₹ /tonne	125	200
Wages (₹)	28,000	10,000
Manufacturing Expenses (₹)	8,000	5,250
Output (tonnes)	830	780

There was no stock or WIP in any process. Prepare the Process Cost A/c of Process B assuming no inter-process profit mark-up on transfers to Process B.

*Syl-08 D-13*

6. A product is finally obtained after it passes through three distinct processes. The following is available.

	Process A	Process B	Process C	Total
Materials	Rs.2,600	Rs.2,000	Rs.1,025	Rs.5,625
Direct wages	Rs.2,250	Rs.3,680	Rs.1,400	Rs.7,330
Production overhead	**	**	**	Rs.7,330

500 units at Rs.4 per unit were introduced in process A. Production overheads are absorbed as a % of wages. The actual output and normal loss of the respective process are given below:

	Output (units)	Normal loss (% of input)	Value of Scrap (per unit)
Process A	450	10	Rs.2
Process B	340	20	Rs.4
Process C	270	25	Rs.5

**Prepare the process accounts and abnormal gain/loss account.**

- 
7. A product is completed in three consecutive processes.

During a particular month the input to Process I of the basic raw material was 5,000 units at Rs.2 per unit.

	Process I	Process II	Process III
Output (units)	4,700	4,300	4,050
Normal loss	5%	10%	5%
Scrap value per unit	Re.1	Rs.5	Rs.6
Direct wages (Rs.)	3,000	5,000	8,000
Direct expenses (Rs.)	9,750	9,910	15,560

Overhead Rs.32,000 in total, chargeable as percentage of direct wages. There were no opening or closing work-in-progress stocks. Compile three process accounts and finished stock account with details of abnormal loss and gain.

---

- 8. A product passes through three processes – A, B and C. The details of expenses incurred on the three processes during the year 2019 were as under:**

Process	A	B	C
<b>Units issued/introduced</b>	<b>10,000</b>	-	-
Cost per unit	100	-	-
	<b>Rs.</b>	<b>Rs.</b>	<b>Rs.</b>
Sundry materials	10,000	15,000	5,000
Labour	30,000	80,000	65,000
Direct Expenses	6,000	18,150	27,200
Selling price per unit of output	120	165	250
Normal Loss (%)	5	15	20
Scrap per unit (Rs.)	2	5	10

Management expenses during the year were Rs.30,000 and selling expenses were Rs.10,000. These are not allocable to the processes.

Actual output of the three processes was: A-9,300 units, B-5,400 units and C-2,100 units.

Two-thirds of the output of Process A and one-half of the output of Process B was passed on to the next process and the balance was sold. The entire output of Process C was sold.

#### **Prepare the three Process Accounts and the Profit and Loss Account.**

---

- 9.** In a manufacturing unit, raw material passes through four processes I, II, III, and IV and the output of each process is the input of the subsequent process. The loss in the four processes I, II, III and IV are respectively 25%, 20%, 20% and 16 2/3% of the input. If the end product at the end of process IV is 40,000 kgs. What is the quantity of raw material required to be fed at the beginning of process I and the cost of the same at Rs.5 per kg.
- 

- 10.** A product passes through three processes, A, B and C. 10,000 units at a cost of Re.1 were issued to process A. The other direct expenses were:

	A	B	C
Sundry materials	1,000	1,500	1,480
Direct labour	5,000	8,000	6,500
Direct expenses	1,050	1,188	1,605

The wastage of process A was 5% and process B 4%. The wastage of process A was sold at Re.0.25 per unit and that of B at Re.0.50 per unit and that of C at Re.1.00 per unit. The overhead charges were 168% of direct labour. The final product was sold at Rs.10.00 per unit, fetching a profit of 20% on sales. **Find the percentage of wastage in process C.**

---

**11.** The input to a purifying process was 16,000 kgs. of basic material purchased @ Rs.1.20 per kg. Process wages amounted to Rs.720 and overhead was applied @ 240% of the labour cost. Indirect materials of negligible weight were introduced into the process at a cost of Rs.336. The actual output from the process weighed 15,000 kgs. The normal yield of the process is 92%. Any difference in weight between the input of basic material and output of purified material (product) is sold @ Rs.0.50 per kg.

The process is operated under a license which provides for the payment of royalty @ Re.0.15 per kg. of the purified material produced.

- Purifying Process Account,
  - Normal Loss Account,
  - Abnormal Loss/Gain Account and
  - Royalty Payable Account.
- 

**12.** The following details are extracted from the costing records of EVINIE LTD. an oil mill for the year ended 31<sup>st</sup> March, 2020. Purchased 2,000 tons of copra for ₹ 1,00,000 and other expenses were as under:

	Crushing (₹)	Refining (₹)	Finishing (₹)
Cost of labour	10,000	6,000	4,000
Sundry material	4,000	3,000	2,000
Electric power	3,000	2,000	1,600
Steam	2,000	2,000	1,500
Repair of machine	2,000	1,000	500
Cost of casks	-----	-----	7,500

Factory expenses were ₹ 10,000 to be apportioned on the basis of wages. 1700 tons of crude oil was produced; 1540 tons of oil was refined and finally 1500 tons of oil was finished for delivery. Realized ₹ 2,000 from sale of sacks; ₹ 5,000 by sale of 250 tons of copra residue and ₹ 5,100 by sale of 120 tons of by-products in refining process. Prepare Process Accounts for the year ending on 31<sup>st</sup> March, 2020.

**Syl-16 Dec-18**

**13.** A company produces a product 'M' by three distinct processes before it is ready for sale. From the information given below, work out the selling price of the product if the Management decides to earn a profit of 20% over its works cost. Present the process account for each process.

Particulars	A	B	C
Input of raw material @ Rs.40 per kg (kgs)	10,000	-	-
Normal loss of input	5%	5%	5%
Delivered to next process (kgs)	9,000	8,000	-
Total direct labour cost (Rs.)	15,000	15,750	13,000
Variable overhead (% of direct labour)	150%	120%	100%
Fixed overhead (% of direct labour)	250%	180%	200%
Finished stock held back (kgs)	400	400	-

**J-17**

## **CHAP - 7      PROCESS – II:      EQUIVALENT PRODUCTION**

### **Steps for solving problems:**

- Prepare a statement of equivalent production
- Compute cost per unit of equivalent production
- Compute the values of finished goods, closing stock, abnormal loss or gain
- Prepare necessary process accounts

### **A. Statement of equivalent production**

<b><u>Input</u></b>	<b><u>Output</u></b>	<b><u>Materials</u></b>	<b><u>Labour and Overheads</u></b>
		<b><u>% units</u></b>	<b><u>% Units</u></b>
<i>Introduced</i>	<i>xxx</i>	<i>Units completed</i>	<i>xx</i>
		<i>Normal loss</i>	<i>xx</i>
		<i>Closing WIP.</i>	<i>xx</i>
		<i>Abnormal loss</i>	<i>xx</i>
	.....	.....	.....
	.....	.....	.....

### **B. Statement of cost per unit of equivalent production**

*Material cost per unit:* 
$$\frac{\text{Materials (introduced + other material (-) normal loss)}}{\text{Equivalent units of material}}$$

*Labour cost per unit:* 
$$\frac{\text{Labour cost}}{\text{Equivalent units of labour}}$$

*Overhead cost per unit:* 
$$\frac{\text{Overheads}}{\text{Equivalent units of overhead}}$$

### **Problems:**      **When there is only closing work-in-progress but with no process losses:**

- Input 3,800 units; Output 3,000 units

#### **Closing work-in-progress 800 units**

	Degree of completion	Process costs
Materials	80%	Rs.7,280
Labour	70%	Rs.10,680
Overheads	70%	Rs.7,120

- Find out:
- Equivalent production,
  - Cost per unit of equivalent production and
  - Prepare the Process Account

**When there is only closing work-in- progress but with process losses:**

2. During January, 2,000 units were introduced into process I. The normal loss was estimated at 5% on input. At the end of the month, 1,400 units had been produced and transferred to the next process. 460 units were incomplete and 140 units had been scrapped.

It was estimated that uncompleted units had reached a stage in production as follows:  
Material 75% completed; Labour 50% completed; Overhead 50% completed

The cost of 2,000 units was Rs.5,800. Direct material introduced amounted to Rs.1,440. Direct wages amounted to Rs.3,340. Production overheads incurred were Rs.1,670. Units scrapped realized Re.1 each. Units scrapped passed through the process, so were 100% completed as regards material, labour and overheads.

**Find out:** a) Equivalent production, b) Cost per unit and c) Show the necessary accounts.

3. From the following data, calculate: a) Equivalent production, b) cost per unit of equivalent production, and c) Prepare the necessary accounts.

No. of units introduced in the process	4,000 nos.
No. of units completed and transferred to process B	3,200 nos.
No. of units in process at the end of the period:	800 nos.
Stage of completion: Material 80%              Labour 70%	Overheads 70%
Normal process loss at the end of the process	200 units
Value of scrap Re.1 per unit.	
Value of raw materials Rs.7,480;	Wages Rs.10,680;
	Overheads Rs.7,

When there is opening as well as closing work-in-progress but with no process loss:

4. From the following details, prepare statement of equivalent production, statement of cost, statement of evaluation and process account by following FIFO method.

#### Opening work-in-progress (2,000 units):

Materials (100% completed)	Rs.5,000
Labour (60% completed)	Rs.3,000
Overhead (60% completed)	<u>Rs.1,500</u>

Units introduced into the process 8,000

There are 2,000 units in progress, and the stage of completion is estimated to be:

Material 100% Labour 50% Overheads 50%

8,000 units are transferred to next process.

**The process costs for the period are:**

Material Rs.96,000;      Labour Rs.54,600      Overheads Rs.31,200

**When there is opening as well as closing work-in-progress but with process loss:**

<b>5. Particulars</b>	<b>Units</b>	<b>Degree of completion</b>
Opening stock	1,600 units	Material      70% Labour        60% Overhead     60%
Transfer from process I	10,200 units	
Transfer to next process	9,200 units	
Units scrapped	800 units	
Normal loss 10% of output		
Closing stock	1,800 units	Material      60% Labour        40% Overhead     40%

Prepare a Statement of Equivalent Production

6. The following data pertains to Process I for March, 2019 of B Ltd.

Opening Work-in-progress 1,500 units for Rs.15,000

Degree of completion: Material 100%, Labour and Overheads 33 1/3%

Input of material 18,500 units at Rs.52,000; Direct Labour Rs.14,000; Overheads Rs.28,000

Closing work-in-progress 5,000 units.

Degree of completion: Materials 90% and Labour and Overheads 30%.

Normal Process loss is 10% of total input (opening work in progress + units put in).

Scrap value Rs.2.00 per unit.

Units transferred to the next process 15,000 units.

- Required to:
- a) Compute equivalent units of production
  - b) Compute cost per equivalent unit for each element.
  - c) Compute the cost of finished output and closing WIP
  - d) Prepare the process and other accounts. (FIFO method is used)

7. Prepare a Statement of Equivalent Production, Cost Statements, Statement of Valuation and Process Account from the following particulars using First In First Out Method

A] Opening work in progress – 900 units @ Rs.4,500, degree of completion, material – 100%, labor and overheads – 60%

B] Input of materials: 9100 units @ Rs.27,300, labour Rs.12,300, overheads Rs.8,200

- C] Finished units transferred to next process – 7,800  
 D] Normal scrap – 10% of input, scrap realization @ Rs.3 per unit  
 E] Units scrapped - 1,200 units, stage of completion: material 100%, labour and overheads: 70%  
 F] Closing WIP – 1000 units, degree of completion: material 100%, labour and overheads 80%

### **Problem on equivalent production – AVERAGE COST method**

8. From the following details prepare statement of equivalent production, statement of cost, statement of evaluation and Process Account by following average cost method:

Opening work-in-progress:	(2,000 units)
Materials (100% complete)	Rs.7,500
Labour (60% complete)	Rs.3,000
Overhead (60% complete)	Rs.1,500
Units introduced into the process	8,000

There are 2,000 units in process, and the stage of completion is estimated to be:

Materials	100%
Labour	50%
Overheads	50%

8,000 units are transferred to the next process.

The process costs for the period are:

Material	1,00,000
Labour	78,000
Overheads	39,000

9. Following information is available regarding Process A for the month of February, 2019:

#### **Production Record**

Units in process as on 1-2-2019	4,000
(All materials used, 25% complete for labour and overhead)	

Units completed	14,000
New units introduced	16,000
Units in process as on 29-2-2019	6,000
(All materials used, 33 <sup>1/3</sup> % complete for labour and overhead)	

#### **Cost Records**

Work in progress as on 1-2-2019	Rs.
Materials	5,000
Labour	1,000
Overhead	1,000

Cost during the month	
Materials	25,000
Labour	15,000
Overhead	15,000

Presuming that average method of inventory is used, prepare:

- Statement of equivalent production
- Statement showing cost for each element
- Statement of apportionment of cost
- Process cost account for process A.

**10.** The following details are given in respect of a manufacturing unit for the month of April 2019.

- |  |        |
|--|--------|
| (i) Opening work-in-progress 5,000 units   | Rs.    |
| (a) Materials (100% complete)  | 18,750 |
| (b) Labour (60% complete)  | 7,500  |
| (c) Overheads (60% complete)   | 3,750  |
| (ii) Units introduced into the process 17,500 units.   |        |
| (iii) 17,500 units are transferred to the next process.  |        |
| (iv) Process cost for the period are<br>Material Rs.2,50,000; Labour Rs.1,95,000; Overheads Rs.97,500                    |        |
| (v) The stage of completion of units in closing WIP are estimated to be:<br>Material 100%, Labour 50% and Overheads 50%. |        |

You are required to prepare a statement of equivalent units of production and a statement of cost.

Also find the value of:

- (a) Output transferred,
- (b) Closing work-in-progress, using average cost method.

## **CHAPTER - 7: PROCESS – III JOINT AND BY-PRODUCTS**

### **Meaning of joint product:**

Two or more products obtained from the same raw material is called joint products.

### **Meaning of by-product:**

While manufacturing the main product (e.g. A), another product may be obtained (e.g. B) which is called a by-product.

### **Meaning of joint cost:**

Cost incurred up to the point of separation is called joint cost. Joint cost should be apportioned to various products on the basis of the following methods:

- Based on sale value at the split off point; or
- Based on number of units sold; or
- Based on net realizable value.

### **Meaning of separate cost:**

The products may be processed further after split off. Further processing cost is called separate cost or cost incurred after split off.

- In manufacturing the main product A, a company processes the resulting waste material into two by-products B1 and B2. Using reverse cost method of by-product, prepare a comparative Profit and Loss Statement of the three products from the following data:

Total cost up to separation point was Rs.68,000.

	A	B1	B2
Sales (all production)	Rs.1,64,000	16,000	24,000
Cost after separation		Rs.4,800	7,200
Estimated net profit % to sale value		20%	30%
Estimated selling expenses as % of sales value	20%	20%	20%

- A factory is engaged in the production of a chemical BOMEX and in the course of its manufacture, a by-product BRUCIL is produced, which after further processing has a commercial value. For the month of April, 2018, the following are the summarized cost data:

	Joint expenses		Separate Expenses	
			BOMEX	BRUCIL
Materials	1,00,000	6,000	4,000	
Labour	50,000	20,000	18,000	
Overhead	30,000	10,000	6,000	
Selling price per unit		98	34	
Estimated profit per unit on sale of BRUCIL		---	4	
No. of units produced		2,000	2,000	

The factory uses reverse cost method of accounting for by-products whereby the sales value of by-product after deduction of the estimated profit, post separation costs and selling and distribution expenses relating to the by-product is credited to the joint process cost account.

You are required to prepare statement showing:

- the joint cost allocable to BOMEX.
- the product-wise and overall profitability of the factory for April, 2018.

- 3.** XY Ltd. manufactures three joint products --- A, B and C. The actual joint expenses of manufacture were Rs.8,000. It was estimated that the profit on each product as a percentage of sales would be 30%, 25%, and 15% respectively. Subsequent expenses were as follows:

	A	B	C
Materials	100	75	25
Direct wages	200	125	50
Overheads	150	125	75
	<u>450</u>	<u>325</u>	<u>150</u>
Sales	6,000	4,000	2,500

Prepare a statement showing the apportionment of the joint expenses.

- 4.** A company manufactures one Main Product and two by-products.

	Main Product	By-Product A	By-product B
Sales	1,50,000	12,000	7,000
Manufactured cost:			
i) before separation	75,000	***	***
ii) after separation	23,000	2,200	1,800
Administration cost	12,000	1,500	1,000
Ratio of distribution of selling exps.	85%	10%	5%
Net profit on sales	20%	15%	10%

Apportion the joint cost among main product and the by-products.

- 5.** Sellwell Ltd. operates a chemical process which produces four products A, B, C and D from a basic raw material. The company's budget for month is as under.

Raw material consumption	17,520
Initial processing wages	16,240
Initial processing overheads	16,240

Product	Production (kgs)	Sales (Rs.)	Additional processing costs after split-off
A	16,000	1,09,000	28,800
B	200	5,600	----
C	2,000	30,000	16,000
D	360	21,600	6,600

The company presently intends to sell product B at the point of split-off without further processing. The remaining products A, C and D are to be further processed and sold. However, the management has been advised that it would be possible to sell all the four products at the split-off point without further processing and if this course was adopted, the selling prices would be as under:

Product	A	B	C	D
Selling price per kg. (Rs)	4.00	28.00	8.00	40.00

Joint costs to be apportioned on the basis of the sales realization value at the point of split-off.

You are required to -

- a) Prepare a statement showing the apportionment of joint costs.
  - b) Prepare a statement showing the product wise and total profit or loss based on the proposal to sell product B at the split-off point and products A, C and D after further processing.
  - c) Prepare a statement to show the product wise and total profit or loss if the alternative strategy to sell all the products at split-off stage was adopted.
  - d) Recommend any other alternative which, in your opinion, can increase the total profit further. Calculate the total profit as also the product wise profit or loss, based on your recommendation.
- 
6. A certain raw material on undergoing a chemical process yields three products A, B and C and a by-product X. The relevant particulars of the process for a month are given below:

Joint processing cost:

Raw materials input	:	20,000 kgs. @ Rs.15
Other materials	:	Rs.30,600
Direct labour	:	4,000 hrs @ Rs.20
Production overheads	:	Rs.1,00,000

Product	Output (kg.)	Selling price/kg if sold without further processing	Further processing cost	Selling price/kg. after further processing
A	8,000	Rs.28	Rs.56,000	Rs.38
B	6,000	Rs.30	Rs.60,000	Rs.42
C	5,000	Rs.32	Rs.60,000	Rs.43
X	500	Rs.6	Rs.1,500	Rs.8

- a) If the company apportions the joint cost after taking credit for the sale value of the by-product, proportion to the sale value of the three main products at the point of separation, what is the cost per kg. of each product at that stage?
- b) Which of the products should be processed further? Show workings.
- c) What is the profit earned if all the main products are sold without further processing? Give product wise details.
- d) If further processing is done as suggested in b), what is the total profit earned? Give product wise details.
- 
7. A company purchases raw materials worth **Rs.11.04 lakhs** and processes them into four products, P, Q, R and S, which have a unit sales value of Rs.3, Rs.9, Rs.16 and Rs.60 respectively at split-off point, as they could be sold as such to other processors.

However, during a year, the company decided to further process and sell products P, Q and S while R was not to be processed further but sold at split off point to other processors. The processing of raw materials into the four products cost **Rs.28 lakhs** to the company. The other data for the year were as under:

Product	Output-units	Sales Rs. in lakhs	Additional processing costs after split off [all variable costs] Rs. in lakhs
P	10,00,000	46.00	12.00
Q	20,000	4.00	2.40
R	10,000	1.60	----
S	18,000	12.00	.40

You are required to work out the following information for managerial decision-making.

- If the joint costs are allocated amongst the four products on the basis of '**NET REALIZABLE VALUE**' at split off point, what would be the company's annual income?
- If the company had sold off all other three products at split off stage, identify the increase/ decrease in the company's annual income as compared to I above.
- What sales strategy could the company have planned to maximize its profit in the year?
- Identify the net increase in income if the strategy at III is adopted, as compared to I above?

**Hint: Meaning of "Net Realizable Value": Sale value after further processing (-) further processing cost**

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**SUMS FOR PRACTICE:**

8. In a concern engaged in process industry, four products emerge from a particular process of operation. The total cost of input for the period ended 30.9.2018 is ₹ 2,53,500. The details of output, additional costs after split-off point and the sales value of the products are as under:

Products	Output (kgs.)	Addl. cost after split-off point (₹)	Sales value (₹)
A	8,000	60,000	1,68,000
B	5,000	10,000	1,10,000
C	3,000	-	60,000
D	4,000	20,000	90,000

If the products are sold at split-off point, without further processing, the sales value would have been:

Products	(₹)
A	1,15,000
B	90,000
C	55,000
D	80,000

You are required to prepare a statement of profitability based on the products being sold.

- i. after further processing
- ii. at the split-off point.

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9. JB Ltd. produces four joint products, A, B, C and D, all of which emerge from the processing of one raw material. The following are the relevant data:

Production for the period:

Joint Product	Number of Units	Selling Price per Unit Rs
A	500	18.00
B	900	8.00
C	400	4.00
D	200	11.00

The company budgets for a profit of 10% on sales value. The other estimated costs are:

Carriage inwards: Rs.1,000

Direct wages: Rs.3,000

Manufacturing overheads: Rs.2,000

Administration overheads: 10% of the sales value

You are required to,

- a. Calculate the maximum price that may be paid for the raw material
- b. Prepare a comprehensive cost statement for each of the products allocating the materials and other costs based up on: Number of units and Sales value.

# CHAPTER – 8:

# CONTRACT COSTING

### Important terms:

Contract, Contractor, Contractee, Contract price, Work certified, Work uncertified, Cash received, Retention money, Notional Profit.

### CONTRACT A/C

To Materials sent to site	xxx	By Materials at site (closing)	xxx
To Plant issued to site	xxx	By Materials returned	xxx
To Direct Labour	xxx	By Plant less depreciation	xxx
To Overhead expenses	xxx	By Plant returned	xxx
To Notional Profit	xxx	By <u>Work-in-progress:</u>	
		Work certified	xxx
		Add: Work uncertified	xxx
	----		----
	xxx		xxx
	----		----
To Profit and Loss A/c	xxx	By Notional Profit	xxx
To Work-in-progress (reserve)	xxx		----
	----		----

### CONTRACTEE ACCOUNT

To Balance c/d.	xxx	By Bank (cash received)	xxx
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### BALANCE SHEET (extract)

#### Liabilities

Profit and loss account	xxx
Outstanding expenses (if any)	xxx

#### Assets

Materials on hand	xxx
Materials returned	xxx
Plant less depreciation	xxx
Plant returned	xxx

#### Work-in-progress:

Work-certified	xxx
Add: Work uncertified	xxx
Less: Cash received	xxx
Less: WIP (reserve)	xxx    xxx

#### INCOMPLETE CONTRACTS:

#### Where contracts have not been fully complete:

It is not proper to transfer the entire amount of notional profit to the credit of profit and loss account. If the contract is not fully complete then the following rules should be followed:

#### % of work-certified to contract price

Less than 25%	
25% or more and up to 49%	
50% and above	

#### % of notional profit transferred to P & L

Nil	
One-third	
Two-Third	

**Formula for transferring that portion of notional profit to P & L A/c:**

Notional Profit (x) 2/3 (x) Cash received  
Work certified

**Note:** In case of LOSS on an incomplete contract, the entire loss should be transferred to P&L A/c.

**Note:** Work-uncertified should be valued at COST.

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1. The following was the expenditure on a contract for **Rs.6,00,000** commenced in January, 2019:

Materials Rs.1,20,000; Wages Rs.1,64,400; Plant Rs.20,000; Business Charges Rs.8,600. Cash received on account to 31<sup>st</sup> December, 2019 amounted to Rs.2,40,000 being 80% of work certified. The value of materials in hand at 31.12.19 was Rs.9,000 and cost of work uncertified is Rs.1,000. Prepare Contract Account for 2019 showing the profit to be credited to the year's profit and loss account. Plant is to be depreciated at 10%.

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2. From the following information, prepare **contract account for 2019?** Also show what part of the profit on the contract should be taken credit of in 2019? The contract was for **Rs.8,00,000**.

Materials issued from stores Rs.1,50,000; Wages paid Rs.2,20,000; General charges Rs.8,000; Plant installed at site on 01.07.19 Rs.40,000; Materials on hand at close Rs.8,000; Wages accrued due Rs.8,000; Work certified Rs.4,00,000. Work completed but not certified Rs.12,000; Cash received Rs.3,00,000; Materials transferred to other contracts Rs.8,000; Materials received from other contracts Rs.2,000; Depreciation on plant is to be provided at **10% per annum**.

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3. C. Ltd. is engaged on two contracts A and B. The following are obtained at the end of 31.12.19:

	<b>Contract A</b>	<b>Contract B</b>
Date of commencement	April 1 <sup>st</sup>	September 1 <sup>st</sup>
Contract price	Rs.6,00,000	Rs.5,00,000
Materials issued	Rs.1,60,000	Rs.60,000
Materials returned	Rs.4,000	Rs.2,000
Materials at site (Dec.31)	Rs.22,000	Rs.8,000
Direct Labour	Rs.1,50,000	Rs.42,000
Direct Expenses	Rs.66,000	Rs.35,000
Establishment expenses	Rs.25,000	Rs.7,000
Plant installed at site	Rs.80,000	Rs.70,000
Value of Plant (Dec.31)	Rs.65,000	Rs.64,000
Cost of contract not yet certified	Rs.23,000	Rs.10,000
Value of contract certified	Rs.4,20,000	Rs.1,35,000
Cash received from contractee	Rs.3,78,000	Rs.1,25,000
Architect's fees	Rs.2,000	Rs.1,000

During the period materials amounting to Rs.9,000 have been transferred from Contract A to Contract B. You are required to show: Contract account, Contractees's account, and Balance sheet (extract).

4. A company undertook a contract for construction of a large building complex. The construction work commenced on 1<sup>st</sup> April 2019 and the following data are available for the year ended 31<sup>st</sup> March, 2020:

<b>Particulars</b>	<b>(₹ '000)</b>
Contract price	35,000
Work certified	20,000
Progress payments received	15,000
Materials issued to site	7,500
Planning and estimating costs	1,000
Direct wages paid	4,000
Materials returned from site	250
Equipment hire charges	1,750
Wage related costs	500
Site office costs	678
Head office expenses apportioned	375
Direct expenses incurred	902
Work not certified	149

The contract owns a plant which originally cost ₹ 20 lakhs and has been continuously in use only in this contract throughout the year. The residual value of the plant after 5 years of life is expected to be ₹ 5 lakhs. Straight line method of depreciation is in use. As on 31<sup>st</sup> March 2020, the direct wages due and payable amounted to ₹ 2,70,000 and the materials at site were estimated at ₹ 2,00,000.

Prepare the contract account for the year ended 31<sup>st</sup> March 2020. Present figures in (₹ '000)  
Compute Profit/Loss to be taken to the P&L A/c of the year ending 31-3-2020. **June 2017**

5. A contractor has undertaken a construction work at a price of Rs.5,00,000 and begun the execution of work on 1<sup>st</sup> January, 2019. The following are the particulars of the contract up to 31<sup>st</sup> December, 2019.

<b>Particulars</b>	<b>Amount</b>	<b>Particulars</b>	<b>Amount</b>
Machinery	30,000	Overheads	8,252
Materials	1,70,698	Materials returned	3,098
Wages	1,48,750	Work certified	3,90,000
Direct expenses	6,334	Cash received	3,60,000
Uncertified work	9,000	Materials on 31.12.2019	3,766
Wages outstanding	5,380	Value of plant on 31.12.2019	23,000

It was decided that the profit made on the contract in the year should be arrived at by deducting the cost of work certified from the total value of the architect's certificate, that 1/3 of the profit so arrived at should be regarded as a provision against contingencies and that such provision should be increased by taking to the credit of P&L A/c only such portion of the 2/3rd Profit, as the cash received to the work certified.

Prepare Contract Account showing the profit on the Contract.

**Dec 2017 CWA inter**

6. **OMEGA LTD.** undertook a contract for Rs.5,00,000 on 1st January, 2019. The company furnishes the following details for the year ended 31st December, 2019:

Materials consumed	1,65,000
Direct Expenses	5,000
Wages	30,000
Materials returned to stores	5,000
Materials stolen from site	10,000
Insurance claim admitted	6,000

Works expenses @ 20% on wages

Office expenses @ 10% on works cost

Materials in hand on 31.12.2020	15,000
Cash received to the extent of 90% of works certified	2,70,000
Cost of work uncertified	11,000

Plant sent to site costing Rs.60,000 with a scrap value of Rs.10,000 and its useful life is 5 years. The plant was used on the contract for 146 days. Prepare Contract Account showing therein the cost of materials issued to site and the amount of profit or loss to be transferred to the Profit & Loss Account.

**Dec 18 CWA Inter**

#### **Escalation Clause:**

7. Deluxe Ltd. undertook a contract for Rs.5,00,000 as on 1st July 2019. On 30th June 2020, when the accounts were closed, the following details about the contract were gathered.

<b>Particulars</b>	<b>Amount</b>
	Rs. '000s
Materials purchased	100
Wages paid	45
General expenses	10
Plant purchased	50
Materials on hand on 30th June 2020	25
Wages accrued on 30th June 2020	5
Work certified	200
Cash received	150
Work uncertified	15
Depreciation of plant	5

***The above contract contained an escalation clause which reads as follows:***

"in the event of materials and rates of wages increase by more than 5%, the contract price would be increased accordingly by 25% of the rise in the cost of materials and wages beyond 5% in each case."

It was found that since the date of signing the agreement, the prices of materials and wage rates increased by 25%. The value of work certified does not take into account the effects of the above clause. Prepare Contract Account. Working should form part of your answer.

### **COMPUTATION OF ESTIMATED PROFIT:**

8. Prabhu Builders Ltd. commenced work on 1st April 2019 on a contract of which the agreed price was Rs.5 lakhs. The following expenditure was incurred during the year up to 31st March 2020.

Particulars	Amount Rs.
Wages	1,40,000
Plant	35,000
Materials	1,05,000
Head office expenses	12,500

Materials costing Rs.10,000 proved unsuitable and were sold for Rs.11,500 and a part of plant costing Rs.1,700 was scrapped and sold at cost.

Of the contract price, Rs.2,40,000 representing 80% of work certified had been received by 31st March 2020 and on the date the value of the plant on the job was Rs.8,000 and the value of materials was Rs.3,000. The cost of work done but not certified was Rs.25,000.

It was decided to:

- (a) Estimate what further expenditure would be incurred in completing the contract.
- (b) Compute from the estimate and the expenditure already incurred, the total profit that would be made on the contract; and
- (c) Ascertain the amount of profit to be taken to the credit of Profit and Loss Account for the year ending on 31st March 2020. While taking profit to the credit of Profit and Loss A/c., that portion of the total profit should be taken which the value of work certified bears to the contract price.

Details of the estimates are given below:-

- i. That the contract would be completed by 30th September 2020
- ii. The wages to complete would amount Rs.84,750
- iii. That materials in addition to those in stock on 31st March 2020 would cost Rs.50,000
- iv. That further Rs.15,000 would have to be spent on plant and the residual value of the plant on 30th September 2020 would be Rs.6,000
- v. The Head Office expenses to the contract would be at the same annual rate as in 2019-20.
- vi. That claims, temporary maintenance and contingencies would require Rs.9,000

Prepare contract account for the year ended 31st March 2020 and show your calculations of the sum to be credited to Profit and Loss A/c for the year.

### **For contracts which are almost complete:**

If the work is nearing completion (e.g. completion stage is between 90% and 99%), then a proportion of ESTIMATED TOTAL PROFIT is credited to profit and loss account. This proportion is ascertained by adopting any one of the following formulae:

<b>Method 1:</b>	<i>Estimated profit (x) Work certified / Contract price</i>
<b>Method 2:</b>	<i>Estimated profit (x) Work certified / Contract price (x) Cash received / Work certified</i>
<b>Method 3:</b>	<i>Estimated profit (x) Cost of work to date / Estimated total cost</i>
<b>Method 4:</b>	<i>Estimated profit (x) Cost of work to date / Estimated total cost (x) Cash received / Work certified</i>

### **"ESTIMATED PROFIT" is computed as follows:**

Contract price	xxx
Less: Expenditure incurred to date	xxx
Less: Estimated further expenditure to be incurred	<u>xxx</u>
<b>Estimated profit</b>	<b><u>xxx</u></b>

9. Compute a conservative estimate of profit on a contract (which has been 90% complete) from the following particulars. Illustrate four methods of computing the profit:

Total expenditure till date	1,70,000
Estimated further expenditure to complete the contract (including contingencies)	34,000
Contract price - Sales	3,06,000
Work certified	2,00,000
Work not certified	17,000
Cash received	1,63,200

### **Answer:**

Since the contract is almost complete (90%), it is proper to transfer a proportion of TOTAL ESTIMATED PROFIT to the credit of Profit & Loss A/c.

### **Estimated profit**

Contract price	3,06,000
Less: Total expenditure to date	1,70,000
Less: Estimated further expenditure	<u>34,000</u>
Total Estimated profit	<b><u>1,02,000</u></b>

### **Amount to be transferred to P&L:**

**Method 1:** Estimated profit (x) WC/CP  
1,02,000 (x) 200/306 = Rs.66,667

**Method 2:** Estimated profit (x) WC/CP (x) CR/WC  
1,02,000 (x) 200/306 (x) 163.2/200 = Rs.54,400

**Method 3:** Estimated profit (x) Cost to date / Estimated total cost  
 $1,02,000 \times 170/204 = \text{Rs.}85,000$

**Method 4:** Estimated profit (x) Cost to date / Estimated total cost (x) CR/WC  
 $1,02,000 \times 170/204 \times 163.2/200 = \text{Rs.}69,360$

10. A contractor commenced a building contract October 1, 2018. The contract price is Rs.4,40,000. The following data pertaining to the contract for the year 2019-20 has been compiled from his books and is as under:

	Rs.
April 1, 2019	55,000
Work in progress not certified	55,000
Materials at site	2,000
2019-20	
<u>Expenses incurred:</u>	
Materials issued	1,12,000
Wages paid	1,08,000
Hire of Plant	20,000
Other expenses	34,000
March 31, 2020	
Materials at site	4,000
Work-in-progress: not certified	8,000
Work-in-progress: certified	4,05,000

The cash received represents 80% of work certified. It has been estimated that further costs to complete contract will be Rs.23,000 including materials at site as on 31.03.2020.

**Required:** Determine the profit on the contract for the year 2019-20 on **PRUDENT** basis which has to be credited to P/L A/c.

<u>CONTRACT A/C for the year 2019-20</u>			
<u>1.4.2019</u>		<u>31.03.2020</u>	
To balance b.d.			
WIP not certified	55,000	By Materials at site	4,000
Material at site	2,000	By WIP	
		Work certified	4,05,000
		Work uncertified	8,000
<u>2019-20</u>			
To Materials issued	1,12,000		
To Wages paid	1,08,000		
To Hire of plant	20,000		
To Other expenses	34,000		
To Notional profit	<u>86,000</u>		-----
To P & L A/c	66,273	By Notional profit	86,000
To WIP (reserve)	<u>19,727</u>		
	<u>86,000</u>		<u>86,000</u>

% of work certified to contract price = (WC / CP) x 100     $(4,05,000 / 4,40,000) \times 100 = 92.04\%$   
(90% or more. **ESTIMATED PROFIT** is computed and then transferred to P & L as shown below)

**Computation of estimated profit**

Contract price	4,40,000
Less: Cost incurred till date	3,27,000 (55000+2000+112000+108000+20000+34000-4000)
Less: Further cost to complete	<u>23,000</u>
<b>Estimated profit</b>	<b><u>90,000</u></b>

**Amount transferred to credit of P & L:**

Estimated profit (x) WC/CP x CR/WC:  $90,000 \times (405/440) \times (80/100) = \text{Rs.} 66,273$

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**COMPUTATION OF WORK UNCERTIFIED:**

11. A contractor commenced the work on a particular contract on 1st April, 2019. He usually closes his books of accounts for the year on 31st December of each year. The following information is revealed from his costing records on 31st December, 2019.

Materials sent to site	43,000
Jr. Engineer	12,620
Labour	1,00,220

A machine costing Rs.30,000 remained in use on site for 1/5th of the year. Its working life was estimated at 5 years and scrap value at Rs.2,000. A supervisor is paid Rs.2,000 p.m. and had devoted one half of his time on the contract. All other expenses were Rs.14,000. The materials on site were Rs.2,500.

The contract price was Rs.4,00,000. On 31st December, 2019, 2/3rd of the contract was completed however, the architect gave certificate only for Rs.2,00,000 on which 80% was paid.  
**Prepare Contract Account.**

**Solution:****Computation of work uncertified:****Work uncertified should be valued at COST**

Expenditure incurred till date	Rs.1,77,460 (for 2/3 <sup>rd</sup> complete)
Less: Cost of work certified (50% of total cost)	<u>Rs.1,33,095</u> (see note below)
Cost of work uncertified	<b><u>Rs.44,365</u></b>

Given 50% of the contract is certified (2 lacs/4 lacs).

Cost incurred till date is Rs.1,77,460 which is 2/3rd of the total contract. Therefore, estimated cost to complete the whole contract Rs.2,66,190 ( $1,77,460 \times 3/2$ )

Cost of work certified is 50% of Rs.2,66,190 which is Rs.1,33,095.

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Contract price Rs.4 lacs  
Total estimated cost Rs.2,66,190

Value of work certified is Rs.2 lacs (50% of contract price)  
Cost of work certified is Rs.133095 (50% of contract price)

### **COMPUTATION OF WORK UNCERTIFIED:**

12. A contractor commenced a contract on 1-7-2019. The costing records concerning the said contract reveal the following information as on 31-3-2020.

	(Rs)
Material sent to site	7,74,300
Labour paid	10,79,000
Labour outstanding as on 31-3-2020	1,02,500
Salary to Engineer	20,500 p.m.
Cost of plant sent to site (1-7-2019)	7,71,000
Salary to Supervisor (3/4 time devoted to contract)	9,000 p.m.
Administration & other expenses	4,60,600
Prepaid Administration expenses	10,000
Material in hand at site as on 31-3-2020	75,800

Plant used for the contract has an estimated life of 7 years with residual value at the end of life Rs.50,000. Some material costing Rs.13,500 was found unsuitable and sold for Rs.10,000.

Contract price was Rs.45,00,000. On 31-3-2020, two-third of the contract was completed. The architect issued certificate covering 50% of the contract price and contractor has been paid Rs.20,00,000 on account. Depreciation on plant is charged on straight basis. **Prepare Contract Account.**

#### **Solution:**

#### **Computation of work uncertified:**

##### **Work uncertified should be valued at COST**

Expenditure incurred till date	Rs.26,39,600 (for 2/3 <sup>rd</sup> complete)
Less: Cost of work certified	<u>Rs.19,79,700</u> (see note below)
Cost of work uncertified	<b><u>Rs.6,59,900</u></b>

Given 50% of the contract is certified.

Cost incurred till date is Rs.26,39,600 which is 2/3rd of the total contract. Therefore, estimated cost to complete the whole contract Rs.39,59,400 ( $26,39,600 \times 3/2$ )

Cost of work certified is 50% of Rs.39,59,400 which is Rs.19,79,700.

13. BATRON LTD., a contractor commences the contract No.HB-108 on 1<sup>st</sup> July, 2019. The details about the contract for the year ending 31<sup>st</sup> March, 2020 were following:

Contract price	30,00,000
Materials issued	8,00,000
Material transferred from contract no.101	50,000
Wages paid	6,31,000
Wages outstanding	35,000
Supervisor's Salary	1,80,000
Establishment Exp.	41,000
Plant issued	10,00,000

Material costing ₹ 15,000 was sold for ₹ 11,000 and plant costing ₹ 80,000 refunded to stores on 31<sup>st</sup> December, 2019. A crane costing ₹ 20,00,000 has been on the contract site for 73 days. Its working life is estimated at 6 years and its scarp value at ₹ 1,10,000. Depreciation on plant is to be charged @ 15% per annum.

Up to 31<sup>st</sup> March, 2020, ¾ (three-fourth) of the contract was completed but architect's certificate has been issued covering 2/3 of the contract and Rs.15,00,000 had been received in cash on account

**Required:**

Prepare the Contract No.HB-108 Account for the year ended March 31, 2020.

State to how much Profit should be credited to P&L A/c for the year ended March 31, 2020.

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**Solution:**

**Computation of work uncertified:**

**Work uncertified should be valued at COST**

Expenditure incurred till date	Rs.18,94,500 (for 3/4 <sup>th</sup> complete)
Less: Cost of work certified	<u>Rs.16,84,000</u> (see note below)
Cost of work uncertified	<b><u>Rs.2,10,500</u></b>

Given 2/3<sup>rd</sup> of the contract is certified.

Cost incurred till date is Rs.18,94,500 which is 3/4<sup>th</sup> of the total contract. Therefore, estimated cost to complete the whole contract Rs.25,26,000 ( $18,94,500 \times 4/3$ )

Cost of work certified is 2/3<sup>rd</sup> of Rs.25,26,000 which is Rs.16,84,000.

- 14.** The following Trial balance was extracted on 31<sup>st</sup> December, 2019 from the books of Swastik Co. Ltd., Contractors:

	Rs.	Rs.
Share Capital: Shares of Rs.10 each		3,51,800
Profit and Loss a/c on 1 <sup>st</sup> January, 2019		25,000
Provision for Depreciation of Machinery		63,000
Cash received on account: Contract 7		12,80,000
Creditors		81,200
Land and Buildings (cost)	74,000	
Machinery (cost)	52,000	
Bank	45,000	

**Contract 7:**

Materials	6,00,000
Direct Labour	8,30,000
Expenses	40,000
Machinery at site (cost)	<u>1,60,000</u>

Contract 7 was commenced on 01.01.2019. The contract price is Rs.24,00,000 and the customer has so far paid Rs.12,80,000, being 80% of the work certified. The cost of the work done since certification is estimated at Rs.16,000.

On 31<sup>st</sup> December, 2019, after the above Trial Balance was extracted, machinery costing Rs.32,000 was returned to stores, and materials when at site were valued at Rs.27,000. Provision is to be made for labour due Rs.6,000 and for depreciation on all machinery at 12.5% on cost.

You are required to prepare: Contract account and Balance Sheet of Swastik Company Ltd. as on 31<sup>st</sup> December, 2019.

**CHAPTER – 9****OVERHEADS DISTRIBUTION****Methods of Distribution of Overheads:**

- a. **Primary Distribution Method:** Overheads being distributed among various departments both production and service departments.
- b. **Secondary Distribution Method:** Re-distributing the overhead expenses of service departments to production departments on the basis of information given.
- c. **Repeated Distribution Method:** Re-distributing service department's expenses not only to production departments but also to the other service department. This process will be repeated until the expenses of service department reduces to nil.
- d. **Simultaneous Equation Method:** Mathematical method of distribution of overhead by forming equations.

**Note:** Departments that are directly connected with the production of goods are termed as "Production Departments".

**Note:** Departments which are NOT directly connected with the production of goods are termed as "Service Departments". It provides services to production departments. eg. Canteen in a factory.

**Note:** Materials used by service departments and wages paid to service departments are indirect material and indirect wages. They are classified as overheads. Hence to be shown in overhead distribution summary.

**Problems on Primary Distribution Method:**

1. The following data were obtained from the books of Light Engineering Company for half year ended 31<sup>st</sup> March, 2020

	<b>Production Departments</b>			<b>Service Departments</b>	
	<b>P<sub>1</sub></b>	<b>P<sub>2</sub></b>	<b>P<sub>3</sub></b>	<b>S<sub>1</sub></b>	<b>S<sub>2</sub></b>
Direct wages	7,000	6,000	5,000	1,000	1,000
Direct material	3,000	2,500	2,000	1,500	1,000
Employees (Nos)	200	150	150	50	50
Electricity (Kwh.)	8,000	6,000	6,000	2,000	3,000
Light points (Nos.)	10	15	15	5	5
Asset value (Rs.)	50,000	30,000	20,000	10,000	10,000
Area occupied (sq. metres)	800	600	600	200	200

**The expenses for 6 months were:** Stores overhead Rs.400; Motive power Rs.1,500; Electric light Rs.200; Labour welfare Rs.3,000; Depreciation Rs.6,000; Repairs and maintenance Rs.1,200; General overhead Rs.10,000; Rent and taxes Rs.600.

You are required to prepare **Primary Overhead Distribution Summary** for the departments.

2. In a factory, there are three production departments P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub> and one service department S<sub>1</sub>. The following figures are available for **one month** of **25 working days** of **8 hours each** day. All departments work all these days will full attendance.

<b>Expenses</b>	<b>Total</b>	<b>S<sub>1</sub></b>	<b>P<sub>1</sub></b>	<b>P<sub>2</sub></b>	<b>P<sub>3</sub></b>
Power and lighting	1,100	240	200	300	360
Supervisor's salary	2,000	***	***	***	***
Rent	500	***	***	***	***
Welfare	600	***	***	***	***
Others	1,200	200	200	400	400
Supervisor's salary		20%	30%	30%	20%
Number of workers		10	30	40	20
Floor area in sq. metres		500	600	800	600
Service rendered by department to production departments		***	50%	30%	20%

**Calculate labour hour rate for each of the Departments P<sub>1</sub>, P<sub>2</sub>, and P<sub>3</sub>**

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3. In a Light Engineering Factory, the following particulars have been collected for the three-monthly period ended 31.03.2020. Compute the departmental overhead rates for each of the production departments, assuming that overheads are recovered as a percentage of direct wages.

	<b>Production Departments</b>			<b>Service Departments</b>	
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
Direct wages	2,000	3,000	4,000	1,000	2,000
Direct materials	1,000	2,000	2,000	1,500	1,500
Staff (nos).	100	150	150	50	50
Electricity (kwh)	4,000	3,000	2,000	1,000	1,000
Light points (nos)	10	16	4	6	4
Asset value (Rs.)	60,000	40,000	30,000	10,000	10,000
Area occupied (sq.mts.).	150	250	50	50	50

**The expenses for the period were:**

Motive power Rs.550;	Amenities to staff Rs.1,500;	Lighting power Rs.100;
Stores overhead Rs.400;	General overhead Rs.6,000;	Rent and taxes Rs.275;
Repairs & maintenance Rs.3,000;	Depreciation Rs.15,000	

**Apportion the expenses of service department 'E' proportionate to direct wages and that of service department 'D' in the ratio of 5:3:2 to departments A, B and C respectively.**

### **SIMULTANEOUS EQUATION METHOD:**

4. The following particulars relate to a manufacturing company which has three production departments P<sub>1</sub>, P<sub>2</sub> and P<sub>3</sub> and two service departments S<sub>1</sub>, S<sub>2</sub>

	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>
Total departmental overhead as per primary distribution	6,300	7,400	2,800	4,500	2,000

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

	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>
Service Department S <sub>1</sub>	40%	30%	20%	***	10%
Service Department S <sub>2</sub>	30%	30%	20%	20%	***

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

---

5. A company is having three production departments X, Y and Z and two service departments: Boiler-house and Pump-room.

The boiler-house has to depend upon the pump-room for supply of water and pump-room in its turn is dependent on the boiler-house for supply of steam-power for driving the pump.

**The expenses incurred by the production departments are:** X: Rs.6,00,000; Y: Rs.5,25,000; Z: Rs.3,75,000. The expenses of boiler-house are Rs.1,75,500 and pump-room are Rs.2,25,000.

**The expenses of the boiler-house and pump-room are apportioned to the production departments on following basis:**

	X	Y	Z	B. House	P. Room
Expenses of boiler-house	20%	40%	30%	***	10%
Expenses of pump-room	40%	20%	20%	20%	***

Show clearly as to how the expenses of boiler-house and pump-room would be apportioned to X, Y and Z departments by following simultaneous equation method.

---

### **REPEATED DISTRIBUTION METHOD:**

6. Solve problem no.4 through Repeated Distribution method.  
7. Solve problem no.5 through Repeated Distribution method.  
8. M Ltd. has three production departments P<sub>1</sub>, P<sub>2</sub> and P<sub>3</sub> and two service departments S<sub>1</sub> and S<sub>2</sub>

	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>
Direct wages (Rs.)	3,000	2,000	3,000	1,500	195
Working hours	3,070	4,475	2,419	***	***
Value of machines (Rs.)	60,000	80,000	1,00,000	5,000	5,000
H.P. of machines	60	30	50	10	***
Light points	10	15	20	10	5
Floor space (sq. feet)	2,000	2,500	3,000	2,000	500

**The following figures were extracted from the accounting records are relevant:**

Rent and rates Rs.5,000;	General lighting Rs.600;	Indirect wages Rs.1,939;
Power Rs.1,500;	Depreciation on machines Rs.10,000;	Sundries Rs.9,695

**The expenses of the service departments are allocated as under:**

	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>
S1	20%	30%	40%	***	10%
S2	40%	20%	30%	10%	***

**Find out the total cost of product 'X'** which is processed for manufacture in department P<sub>1</sub>, P<sub>2</sub> and P<sub>3</sub> for 4, 5 and 3 hours respectively, given that its direct material cost is Rs.50 and direct labour cost is Rs.30.

**9. A Company has two production departments and two service departments. The data relating to a period are as follows:**

<b>Particulars</b>	<b>Prod. Dept.I</b>	<b>Prod. Dept.II</b>	<b>Serv. Dept.I</b>	<b>Serv. Dept.II</b>
Direct Materials	80,000	40,000	10,000	20,000
Direct Wages	95,000	50,000	20,000	10,000
Overheads	80,000	50,000	30,000	20,000
Power requirement at normal capacity operation (kwh)	23,000	38,000	14,750	18,000
Actual power consumed (kwh)	13,000	23,000	10,250	10,000

The power requirement of these departments is met by a power generation plant. The said plant incurred an expenditure which is not include above of Rs.1,21,875 out of which a sum of Rs.84,375 was variable and the rest fixed.

After apportionment of power generation plant cost to the four departments, the service department overheads are to be redistributed on the following basis:

<b>Departments</b>	<b>Prod. Dept. I</b>	<b>Prod. Dept. II</b>	<b>Serv. Dept. I</b>	<b>Serv. Dept. II</b>
Service Dept I (%)	50	40	--	10
Service Dept II (%)	60	20	20	--

**You are required to:**

- Apportion the power generation plant costs to the four departments
- Reapportion service department cost to production department.
- Calculate the overhead rate per direct labour hour of production departments, given that the direct wages rates of Production Dept I and II are Rs.5 and Rs.4 per hour respectively.

### **ADDITIONAL PROBLEMS:**

1. A factory has 3 production departments (P1, P2, P3,) and 2 service departments (S1 & S2). The following overheads & other information are extracted from the books for May 2020:

<b>Expenses</b>	<b>Amount (₹)</b>
Rent	7,200
Plant repair	3,600
Depreciation	2,700
Lighting	600
Supervision	9,000
Fire insurance for stock	3,000
Cost of idle time	900
Power	5,400

<b>Particulars</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>S1</b>	<b>S2</b>
Area sq ft	400	300	270	150	80
No. of workers	54	48	36	24	18
Wages (₹)	18,000	15,000	12,000	9,000	6,000
Value of plant (₹)	72,000	54,000	48,000	6,000	
Stock value (₹)	45,000	27,000	18,000		
Horse Power of plant	600	400	300	150	50

- (i) Allocate the overheads among the various departments on the most appropriate basis (primary distribution only).
- (ii) If S1 and S2 use 10% of each other's facilities, find the total cost of S1 by the simultaneous equation method.

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2. K Ltd. has three production departments viz. A, B and C and two service departments viz. X and Y. Allocated overheads are follows:

	A	B	C	X	Y
Allocated overheads (₹)	2,50,000	85,000	1,75,000	1,35,000	1,65,000
Direct Labour Hours	25,000	18,000	13,000	---	---

The expenses of the service departments are charged as follows:

Service Department:	X	A	B	C	X	Y
	X	20%	40%	30%	-	10%
	Y	30%	25%	25%	20%	-

- i. Determine the total overheads of the service departments after loading the inter-departmental exchange of services by the simultaneous equation method.
- ii. Calculate the overhead to be charged to Job No.211 which uses 25 hours in Production Department A.

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3. XYZ Ltd. has three production departments, X Y and Z and two service departments, S1 and S2. The following figures are available for a certain production period:

<b>Items of Overheads</b>	<b>Amount (₹)</b>
Indirect wages	16,000
Indirect materials	12,000
Depreciation - Machinery	30,000
Depreciation - Building	10,000
Rent, rates and taxes	10,000
Electric power for lighting	1,000
Electric power for machinery	15,000
General expenses	15,000

	<b>Total</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>S1</b>	<b>S2</b>
Direct material (₹)	60,000	20,000	10,000	20,000	6,000	4,000
Direct wages (₹)	40,000	15,000	15,000	5,000	3,000	2,000
Floor area (Sft)	50,000	15,000	10,000	10,000	5,000	10,000
Value of machinery (₹)	3,00,000	80,000	1,00,000	60,000	30,000	30,000
HP of machinery	150	60	50	30	5	5
Number of lights points	50	15	10	10	10	5
Labour hours	15,000	10,000	5,000	2,000	1,000	2,000

Prepare a statement showing the distribution of overheads among the production and service departments on the most equitable basis.

*June 2016 – Syll 12*

4. A company having three production cost centres A, B and C and two service cost centres X and Y, reports the following data on overhead allocation costs for a certain period:

Cost Centres	Overhead costs (₹)	Estimates of benefits received from Service cost centres (%)	
		X	Y
A	80,000	20	20
B	40,000	30	25
C	20,000	40	50
X	20,000	-	5
Y	10,000	10	-

Determine the total overhead costs of C after apportioning the service centre costs using

- i. Simultaneous Equations Method and
- ii. Repeated Distribution method.

Comment on your findings. Explain the concept. (Present your calculations to the nearest rupee)

*June 2017 – syl12*

1.

**OVERHEAD DISTRIBUTION SUMMARY**

<b>Overheads</b>	<b>Basis</b>	<b>Ratio</b>	<b>Production Departments</b>			<b>Service Departments</b>	
			<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>S1</b>	<b>S2</b>
Stores overhead	D Material	6:5:4:3:2	120	100	80	60	40
Motive power	Electricity	8:6:6:2:3	480	360	360	120	180
Electric light	Light points	2:3:3:1:1	40	60	60	20	20
Labour welfare	Employees	4:3:3:1:1	1000	750	750	250	250
Depreciation	Asset value	5:3:2:1:1	2500	1500	1000	500	500
Repairs and maint	Asset value	5:3:2:1:1	500	300	200	100	100
General overhead	D Wages	7:6:5:1:1	3500	3000	2500	500	500
Rent and taxes	Area occup	4:3:3:1:1	200	150	150	50	50
Direct wages	***	***	**	**	**	1000	1000
Direct material	***	***	**	**	**	1500	1000
			<b>Total</b>	<b>8340</b>	<b>6220</b>	<b>5100</b>	<b>4100</b>
							<b>3640</b>

3.

**OVERHEAD DISTRIBUTION SUMMARY**

<b>Overheads</b>	<b>Basis</b>	<b>Ratio</b>	<b>Production Departments</b>			<b>Service Departments</b>	
			<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
Motive power	Electricity	4:3:2:1:1	200	150	100	50	50
Staff amenities	Staff (nos)	2:3:3:1:1	300	450	450	150	150
Lighting power	Light points	5:8:2:3:2	25	40	10	15	10
Stores overhd	Direct matl	2:4:4:3:3	50	100	100	75	75
General overhd	Direct wages	2:3:4:1:2	1000	1500	2000	500	1000
Rent and taxes	Area	3:5:1:1:1	75	125	25	25	25
Repairs	Asset value	6:4:3:1:1	1200	800	600	200	200
Depreciation	Asset value	6:4:3:1:1	6000	4000	3000	1000	1000
Direct wages	***	***	***	***	***	1000	2000
Direct material	***	***	***	***	***	1500	1500
			<b>Total</b>	<b>8850</b>	<b>7165</b>	<b>6285</b>	<b>4515</b>
Expenses of SD	'D'	5:3:2		2258	1354	903	(4515) nil
Expenses of SD	'E'	2:3:4		1336	2003	2671	nil (6010)
			<b>Total</b>	<b>12444</b>	<b>10522</b>	<b>9859</b>	<b>nil</b>
							<b>nil</b>

**Overhead rate as a % of direct wages:**

$$\frac{\text{Overheads}}{\text{Direct wages}} \times 100$$

$$\text{A: } \frac{12444 \times 100}{2000} = 622.2\%$$

$$\text{B: } \frac{10522 \times 100}{3000} = 350.73\%$$

$$\text{C: } \frac{9859 \times 100}{4000} = 246.48\%$$

6.

**OVERHEAD DISTRIBUTION SUMMARY**

Particulars	Ratio	Production Departments			Service Departments	
		P1	P2	P3	S1	S2
Overheads as per Primary distribution		6300	7400	2800	4500	2000
Expenses of S1	4:3:2:1	1800	1350	900	(4500)	450
Expenses of S2	3:3:2:2	735	735	490	490	(2450)
Expenses of S1	4:3:2:1	196	147	98	(490)	49
Expenses of S2	3:3:2:2	15	15	9	10	(49)
Expenses of S1	4:3:2:1	4	3	3	(10)	nil
<b>Total</b>		<b>9050</b>	<b>9650</b>	<b>4300</b>	<b>nil</b>	<b>nil</b>

7.

**OVERHEAD DISTRIBUTION SUMMARY (repeated)**

Particulars	Ratio	Production Departments			Service Departments	
		X	Y	Z	BH	PR
Overheads as per Primary distribution		600000	525000	375000	175500	225000
Expenses of BH	2:4:3:1	35100	70200	52650	(175500)	17550
Expenses of PR	4:2:2:2	97020	48510	48510	48510	(242550)
Expenses of BH	2:4:3:1	9702	19404	14553	(48510)	4851
Expenses of PR	4:2:2:2	1940	970	971	970	(4851)
Expenses of BH	2:4:3:1	194	388	291	(970)	97
Expenses of PR	4:2:2:2	39	19	19	20	(97)
Expenses of BH	2:4:3:1	4	8	6	(20)	2
Expenses of PR	4:2:2:2	1	nil	1	nil	(2)
<b>Total</b>		<b>744000</b>	<b>664500</b>	<b>492000</b>	<b>nil</b>	<b>nil</b>

9.

## OVERHEAD DISTRIBUTION SUMMARY

Particulars	Basis	Ratio	Production Departments		Service Departments	
			P1 P2		S1 S2	
			***	***	10000	20000
Direct material					10000	20000
Direct wages			***	***	20000	10000
Overheads			80000	50000	30000	20000
Power						
- Variable	actual					
	power	52:92:41:40	19500	34500	15375	15000
- Fixed	at normal					
	capacity	92:152:59:72	9200	15200	5900	7200
		Total	108700	99700	81275	72200
Expenses of S1	5:4:1		40638	32510	(81275)	8127
Expenses of S2	6:2:2		48196	16066	16065	(80327)
Expenses of S1	5:4:1		8032	6426	(16065)	1607
Expenses of S2	6:2:2		965	322	320	(1607)
Expenses of S1	5:4:1		160	128	(320)	32
Expenses of S2	6:2:2		19	7	6	(32)
Expenses of S1	5:4:1		3	3	(6)	nil
		Total	206713	155162	nil	nil

Overhead rate per direct labour hour: Overheads / direct labour hours

P1: Rs.206713 / 19000 = **Rs.10.88** per labour hour (Rs.95000 / 5)P2: Rs.155162 / 12500 = **Rs.12.41** per labour hour (Rs.50000 / 4)

## **CHAPTER – 9:      OVERHEADS – 2 - MACHINE HOUR RATE**

### **MACHINE HOUR RATE**

<i><u>Standing charges or Fixed charges</u></i>	<i><u>Per month</u></i>
Rent and rates	xxx
Depreciation	xxx
Lighting charges	xxx
Wages to machine operator	xxx
Supervisor's salary	xxx
Insurance	xxx

#### *Variable Charges*

Repairs	xxx
Power	xxx
Electricity	xxx

***Total Machine Overheads***                    xxx

- **Machine Hour Rate:**  $\frac{\text{Total Machine Overheads}}{\text{Machine Hours Run}}$

- 1.** A machine was purchased on 1.1.2020 for Rs.5 lakhs. The total cost of all machinery inclusive of new machinery was Rs.75 lakhs. The following details are available:

- Expected life of the machine 10 years with scrap value Rs.5,000
- Repairs and maintenance for the machine during the year Rs.2,000
- Expected number of working hours of the machine per year 4,000 hours
- Insurance premium annually for *all* the machines Rs.4,500
- Electricity consumption for the machine per hour (at 75 paise per unit) 25 units
- Rent per month for the department Rs.800
- Area occupied by the machine 100 sq. feet. Area occupied by the other machines 1,500 sq. feet.
- Lighting charges for 20 points for the whole department out of which 3 points are for this machine Rs.120 p.m. **Compute the machine hour rate.**

- 2. Compute the machine hour rate from the following data.**

- Cost of the machine Rs.1,00,000 and installation charges Rs.10,000;
- Estimated scrap value after expiry of its life (15 years) Rs.5,000.
- Rent and rates for the shop per month Rs.300
- Insurance premium for the machine per annum Rs.960
- Repairs and maintenance per annum Rs.1,000
- Power consumption – 10 units per hour
- Rate of power per 100 units Rs.20
- Shop supervisor's salary per month Rs.600
- Estimated working hours per annum – 2,200. This includes setting up time of 200 hours.

The machine occupies one-fourth of the total area of the shop. The supervisor is expected to devote one-fifth of his time for supervising this machine. There are four identical machines in the shop.

- 3. The machine costs Rs.90,000 and is deemed to have a scrap value of 5% at the end of its effective life (19 years).** Ordinarily the machine is expected to run for 2,400 hours p.a. but it is estimated that 150 hours will be lost for normal repairs and maintenance and further 750 hours will be lost due to staggering.

To other details in respect of the machine shop are:

- Wages, PF of each of two operators (each operator is in-charge of two machines) Rs.6,000 p.a.
  - Rent and rates of the shop Rs.3,000 p.a.
  - General lighting of the machine Rs.200 per quarter.
  - Cost of repairs and maintenance for the machine Rs.250 per month.
  - Shop supervisor's salary Rs.500 per month.
  - Power consumption of the machine per hour 20 units. Rate of power per 100 units Rs.10.
  - Other factory overheads attributable to the shop Rs.4,000 p.a.
- 

- 4. The following annual charges are incurred in respect of a machine in a shop where work is done by means of five machines of exactly similar type of specification.**

- Rent and rates (proportional to the floor space occupied) for the shop Rs.4,800.
- Depreciation on each machine Rs.500.
- Repairs and maintenance for the five machines Rs.1,000.
- Power consumed (as per metre) @ 5 paise per unit for the shop Rs.3,000.
- Electric charges for the light in the shop Rs.540.
- Attendants: There are two attendants for the five machines and they are each paid Rs.60 p.m.
- Supervision: For five machines in the shop there is one supervisor whose salary is Rs.250 p.m.
- Sundry supplies such as lubricants, jute and cotton waste, etc., for the shop Rs.450.
- Hire-purchase installment payable for the machine (including Rs.300 as interest) Rs.1,200.

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

- 5. Compute comprehensive Machine Hour Rate from the following data:**

Total cost of the machine to be depreciated Rs.2,30,000.

Life 10 years. Depreciation on straight line.

**Department overheads (annual):**

Rent Rs.50,000

Heat and light Rs.20,000

Departmental area 70,000 square metres: Machine area 2,500 square metres

Supervision Rs.1,30,000

26 machines in the department.

Annual cost of reserve equipment for the machines Rs.1,500.

**Hours run on production 1,800 & Hours for setting and adjusting 200.**

Power cost Rs.0.50 per hour of running time.

**Labour Rs.6 per hour:** When setting and adjusting, full time attention.  
When machine is producing: One worker can look after 3 machines.

**B. Using the machine hour rate as calculated above, work out the amount of factory overhead to be absorbed on the following:**

	Total hours	Production time hours	Setting up time hours
Job No.605	100	80	20
Job No.595	100	70	30

---

6. A manufacturing unit has added a new machine to its fleet of five existing machines. The total cost of purchase and installation of the machine is Rs.7,50,000. The machine has an estimated life of 15 years and is expected to realize Rs.30,000 as scrap at the end of its working-life. Other data are:

Budgeted working hours is 2,400 based on 8 hours per day for 300 days. This includes 400 hours for plant maintenance.

Electricity used by the machine is 15 units per hour at a cost of Rs.2.00 per unit. No current is drawn during maintenance. The machine requires special oil for heating which is replaced once in every month at a cost of Rs.2,500 on each occasion.

Estimated cost of maintenance of the machine is Rs.500 per week of 6 working days.

3 Operators control the operations of the entire battery of six machines and the average wages per person amounts to Rs.450 per week plus 40% fringe benefits.

Departmental and general works overheads allocated to the operation during the last year was Rs.60,000. During the current year it is estimated that there will be an increase of 12.5% of this amount. No incremental overhead is envisaged for the installation of the new machine.

**You are required to compute the machine hour rate.**

**Answer:**

**MACHINE HOUR RATE**

**2,000 hours P.A.**

Depreciation $(750000 - 30000)/15$	48,000
Electricity $(15 \times 2000 \times 2)$	60,000
Special oil $(2,500 \times 12)$	30,000
Maintenance $(500 \times 50 \text{ weeks}) (300/6)$	25,000
Operators wages $(450 \times 50 \times 3) + 40\% (94,500 / 6)$	15,750
Departmental overheads $(60,000 + 12.5\%) / 6$	<u>11,250</u>
<b>TOTAL</b>	<b><u>1,90,000</u></b>

Machine hour rate:  $(Rs.1,90,000 / 2000 \text{ hours})$  Rs.95

---

**7. Calculate the machine hour rate of a machine with information given below:**

**Operating data:**

Total number of hours per week	48
Total number of weeks per quarter	13
Time taken for setup	2 hrs./week
Stoppage due to maintenance	8 hrs. p.m.

**Cost details:**

Cost of machine	Rs.2,00,000
Operator's wages	Rs.3,000 p.m.
Supervisor's salary	Rs.5,000 p.m.
Repair and maintenance	Rs.24,000 p.a.
Consumable stores	Rs.30,000 p.a.
Cost of power	15 units per hour at Rs.3 per unit
Rent, rates and taxes	Rs.8,000 per quarter

- a. Life of the machine is 10 years. Depreciation on straight line and is treated as variable cost.
  - b. Repairs and maintenance and consumable stores are variable costs.
  - c. Power is consumed for production runs only.
- II. The company hires out excess capacity in the machine shop for outside jobs. Assuming that hire charges are fixed at **variable cost plus 20%**. What rate should be quoted by the company?

**Answer:**

No. of hours per week	48
No. of weeks per quarter	13
Therefore total no. of hours	624
Less: Set-up time (2 x 13 weeks)	26
Less: Stoppage due to maintenance	24 (8 x 3 months)
Productive working hours	<b>574 per quarter</b>

**MACHINE HOUR RATE**

**574 hours – Per Quarter**

**Variable costs:**

Depreciation (2 lacs – 0) / 10 ÷ 4 quarters	5,000
Repair and maintenance (24000 / 4 qrs)	6,000
Consumable stores (30000 / 4 quarters)	7,500
Power (15 units x 574 hrs x 3)	25,830

**Fixed costs:**

Operator wages (3000 x 3)	9,000
Supervisor's salary (5000 x 3) / 5 machines	3,000
Rent, rates and taxes	8,000
<b>Total machine overheads</b>	<b>64,330</b>

Machine hour rate: $(64,330 / 574)$	Rs.112.07
II) Variable cost per machine hour $(44,330 / 574)$	Rs.77.23
Add: 20% margin	Rs.15.45
Rate to be quoted per hour	Rs.92.68

#### **8. Compute a comprehensive machine hour rate:**

Machine cost including installation charges	Rs.20,00,000
Estimated useful life	10 years
Estimated salvage value	10%
Working hours:	
Number of working days	300
Number of shifts per day	2
Effective working hours per shift	7
Stoppages for repairs and maintenance etc.:	200 hrs.

#### **Operating and other costs:**

Wages of two operators (one for each shift) @ Rs.5,000 p.m. each

Supervisor salary (one for each shift) @ Rs. 7,500 p.m. One-fifth of the time is to this machine.

Electric power: 20 units per hour, each unit costing Rs.3.20

Insurance charges	Rs.5,000 per annum
Repairs and maintenance (estimated)	Rs.12,500 p.m.
Rent, rates and taxes (allocated)	Rs.10,000 p.a.
General lighting etc. (allocated)	Rs. 750 p.m.
Other factory overheads (allocated)	Rs.1,40,000 p.a.

**Answer:**

No. of machine hours in the year (300 x 2 shifts x 7 )	4,200
Less: Stoppages for repairs	<u>200</u>
Effective working hours	<b>4,000</b>

## MACHINE HOUR RATE

	<b><u>4000 hours P.A.</u></b>
Depreciation (20 lacs – 2 lacs) / 10	1,80,000
Wages of two operators (5,000 x 2 x 12)	1,20,000
Salary of supervisor (7500 x 2 x 12 x 1/5)	36,000
Electric power (20 x 4000 x 3.20)	2,56,000
Insurance charges	5,000
Repairs and maintenance	1,50,000
Rent, rates and taxes	10,000
General lighting	9,000
Other factory overheads	1,40,000
<b>Total machine overheads</b>	
	<b>9,06,000</b>

Machine hour rate ( $9,06,000 / 4,000$  hours): **Rs.226.50**

9. A machine shop of Avon Ltd. has six identical machines manned by 6 operators. The machines cannot be worked without an operator wholly engaged on it. The cost of all these 6 machines including installation charges works out to Rs.12 lakhs and these machines are deemed to have a scrap value of 10% at the end of its effective life (9 years). These particulars are furnished for a six-month period:

Normal available hours (per month)	218
Absenteeism (without pay) hours	18
Leave (with pay) hours	20
Stoppage for repairs and maintenance etc. hours	20
Average rate of wages per day of 8 hours	Rs.80
Production bonus estimated	15% on wages
Value of power consumed	Rs.24,150
Supervision and indirect labour	Rs.9,900
Lighting and electricity	Rs.4,800

***These particulars are for a year:***

Repairs and maintenance including consumables	Rs.36,000
Insurance	Rs.60,000
Other sundry works expenses	Rs.36,000
General management expenses allocated	Rs.1,09,040

**You are required to work out a comprehensive machine hour rate for the machine shop.**

**Answer:**

Normal available hours (per month)	218
Less: (18+20+20)	<u>58</u>
Productive hours (per month)	160

Total no. of hours for 6 machines for 6 months:  $160 \times 6 \text{ machines} \times 6 \text{ months} = 5,760 \text{ hours}$

## MACHINE HOUR RATE

**For 6 mach 6 months**

Depreciation (12 lacs – 1.20 lacs) / 9 years x 6/12	Rs.60,000
Wages (218 – 18) x 6 x 6 x Rs.10 (Rs.80 / 8)	Rs. 72,000
Production bonus (15% of Rs.72,000)	Rs.10,800
Power consumed	Rs.24,150
Supervision	Rs.9,900
Lighting and electricity	Rs.4,800
Repairs and maintenance (36,000 x 6/12)	Rs.18,000
Insurance (Rs.60,000 x 6/12)	Rs.30,000
Other sundry works expenses (36000 x 6/12)	Rs.18,000
General management expenses (1,09,040 x 6/12)	Rs.54,520
<b>Total Machine Overheads</b>	<b>Rs.3.02.170</b>

**Machine hour rate (Rs.3,02,170 / 5760 hours)**

Rs.52.46

### **10. Calculate the comprehensive Machine hour rate of a machine from the following:**

Cost of the machine Rs.25 lakhs, having a scrap value of Rs.1 lakh after 10 years.

The machine will be operated for three shifts of 7 hours each for 300 working days in a year of which 300 hours will be utilized for minor repairs and maintenance.

Wages payable: Rs.8,000 p.m. for an operator and Rs.3,000 p.m. for a helper for every shift. Rs.16,000 per month to one supervisor per shift for the department accommodating four machines including the above machine.

Other details:

Power consumption	25 units (kwh) @ Rs.4.80 per unit
Repairs and maintenance	Rs.30,000 per annum
General lighting and heating	Rs.4,000 p.m. for the whole department having four machines
Insurance	Rs.18,000 per machine per annum
Rent, Rates and Taxes	Rs.3,000 p.m. for the department
Factory overhead	Rs.36,000 per annum for the department

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### **11. A machine shop has 6 identical machines manned by 6 operators. The machines cannot be worked without an operator being wholly engaged on it. The original cost of all these six machines is totally ₹ 8 lakhs. The following particulars are furnished for a six month period:**

Normal available hours <u>per month</u> per operator	208
Absenteeism (without pay) - hours per operator	18
Leave with pay-hours per operator	20
Normal idle time unavoidable-hours per operator	10
Average rate of wages per day of 8 hours per operator	₹ 24
Production Bonus estimated	15% on wages
Value of power consumed	₹ 8,050
Supervision and indirect labour	₹ 3,300
Lighting and Electricity	₹ 1,200

The following particulars are for a year:

Repairs and maintenance including consumable are 3% on value of machines.

Insurance ₹ 40,000.

Depreciation is 10% on original cost. Assume no salvage value.

Other sundry works expenses ₹12,000.

General management expenses allocated ₹54,530.

You are required to work out a comprehensive machine hour rate for the machine shop.

(Present items of expenses for six months and arrive at the machine hour rate at the final step).

**Dec 16 – syll 2012**

**Ans: Rs.24.55**

- 12.** The machine shop of a factory offers the following information about a particular machine: Cost of the machine: ₹ 20,00,000; Salvage value: ₹ 80,000; Life of the machine: 10 years. Assume straight-line depreciation on net value over the life of the machine.

Cost of repairs and maintenance - ₹ 28,000 per annum. Electric power used by the machine is 15 units per hour at ₹ 8.5 per unit. No power is consumed during maintenance and set-up time. A chemical costing ₹ 8,250 per packet is used for operating the machine every month.

The wages of the operator are ₹ 1,32,000 per annum. The operator devotes one third of his time to this machine. Annual insurance charges are 1% of the cost of the machine. Cost of lighting the department is ₹15,000 p.m. There are 72 points of which only 12 lighting points are used by this machine. Other indirect charges chargeable to this machine are ₹13,000 per month.

Annual working hours are 3000. The machine requires a set-up time of 156 hours per annum which are to be considered **productive time**. The machine requires 400 hours per annum for repairs and maintenance. You are required to calculate the machine hour rate.

**Answer**

No. of machine hours	3000
Less: Unproductive time	400 (repairs and maintenance)
Productive time	<b><u>2600</u></b>

**MACHINE HOUR RATE**

	<b>P.A.</b>
Depreciation (20 lacs – 80,000) / 10	1,92,000
Repairs and maintenance	28,000
Electric power (3000 – 156 – 400) x 15 x 8.50	3,11,610
Chemical cost (8,250 x 12)	99,000
Wages of operator (132000 x 1/3)	44,000
Insurance (20 lacs x 1%)	20,000
Lighting (15000 x 12 x 12/72)	30,000
Other indirect charges (13000 x 12)	1,56,000
Total Machine Overheads	<b><u>8,80,610</u></b>

**Machine hour rate (Rs.8,80,610 / 2600 hours)**

**Rs.338.70 per hour**

## **CHAPTER – 9: OVERHEADS – 3: Under/over absorption:**

1. The following information relates to the activities of production department M of MTH Ltd for November 2019:

Materials consumed	Rs.3,83,000
Direct labour	Rs.5,51,520
Factory overhead chargeable to Department M	Rs.2,75,760
Labour hours worked	18,384
Machine hours	3,064

One job order carried out in Department M has the following details:

Material consumed	Rs.11,000
Direct labour	Rs.19,000
Direct labour hours	540 hours
Machine hours worked	85

Find the amount of factory overheads for the job under the following methods of overhead absorption: % of direct material cost, % of direct labour cost, direct labour hour rate and machine hour rate.

2. The production department of a factory furnishes the following for the month of March, 2020.

Materials used	Rs.54,000
Direct wages	Rs.45,000
Overheads	Rs.36,000
	overhead recovery rates (predetermined rates)
Labor hours worked	- 36,000
Hours of machine operation	- 30,000

For an order executed by the department during the period, the relevant information was as under:

Materials used	Rs.6,00,000
Direct Wages	Rs.3,20,000
Labor hours worked	- 3,200
Machine hours worked	- 2,400

**Calculate the overhead charges chargeable to the job by the following methods,**

- i) Direct materials cost percentage rate
- ii) Percentage of direct wages
- iii) Labor hour rate and
- iv) Machine hour rate.

3. The following information relates to the activities of a production department of factory for a certain period.

	Rs.
Material used	36,000
Direct Wages	30,000
Overhead chargeable to the department	24,000
Labour hours	12,000
Hours of Machinery-operation	20,000

On one order carried out in the department during a period the data was:-

Material used	Rs.6,000
Direct Wages	Rs.4,950
Labour hours worked	1,650
Machine Hours	1,200

**Calculate the overheads chargeable to the job by four commonly used methods.**

**Answer:**

**Methods of recovery of overheads:**

Method 1: As a % of materials:	$\text{Rs.}24,000 / \text{Rs.}36,000 \times 100 = 66.67\%$
Method 2: As a % of labour:	$\text{Rs.}24,000 / \text{Rs.}30,000 \times 100 = 80\%$
Method 3: On the basis of labour hours:	$\text{Rs.}24,000 / 12,000 = \text{Rs.}2 \text{ per hour}$
Method 4: Machine hour rate:	$\text{Rs.}24,000 / 20,000 = \text{Rs.}1.20 \text{ per hour}$

**Overheads chargeable to the job:**

- As a % on material:  $\text{Rs.}6,000 \times 66.67\% = \text{Rs.}4,000$
- As a % on labour:  $\text{Rs.}4,950 \times 80\% = \text{Rs.}3,960$
- On the basis of labour hours:  $1,650 \times 2 = \text{Rs.}3,300$
- On the basis of machine hours:  $1,200 \times 1.20 = \text{Rs.}1,440$

4. XYZ Ltd manufactures four products A, B, C and D whose data are given below:

	A	B	C	D
Direct materials	3,000	6,000	9,000	18,000
Direct labour	1,500	3,000	4,500	9,000
Direct labour hours	50	100	150	300
Machine hours	30	15	10	5

You are required to prepare a statement showing the allocation of factory overheads (which amounted to Rs.1,08,000) using the basis of allocation as under:

- |     |                      |                         |
|-----|----------------------|-------------------------|
| i.  | Direct material cost | iii. Direct labour cost |
| ii. | Direct labour hours  | iv. Machine hours       |

Out of these four bases of allocation, compute overhead rates.

**Answer:**

**Overhead rates:**

1. As a % of material cost:	Rs.1,08,000 / 36000 x 100	= 300%
2. As a % of labour cost:	Rs.1,08,000 / 18000 x 100	= 600%
3. On the basis of labour hours:	Rs.1,08,000 / 600 hours	= Rs.180 per hour
4. On the basis of machine hours:	Rs.1,08,000 / 60 hours	= Rs.1,800 per hour

**Allocation of factory overheads to the four products:**

	A	B	C	D	total
As a % of material	9,000	18,000	27,000	54,000	1,08,000
As a % of labour	9,000	18,000	27,000	54,000	1,08,000
On the basis of lab hour	9,000	18,000	27,000	54,000	1,08,000
On the basis of mac hr	54,000	27,000	18,000	9,000	1,08,000

**UNDER ABSORPTION OR OVER ABSORPTION OF OVERHEADS:**

If budgeted overheads absorbed are less than the actual overheads incurred then it is called under absorption. If budgeted overheads absorbed are more than the actual overheads incurred then it is called over absorption

e.g. 1.	Actual overheads	Rs.54,000
	Budgeted overheads	Rs.50,000

Since budgeted overheads are less than actual overheads it is called under absorption. Under absorption Rs.4,000

e.g. 2. Budgeted hours 2,000; Budgeted overheads Rs.12,000. Calculate pre-determined rate per hour. If actual hours worked are 5,000 and actual overheads are Rs.32,000, compute under or over absorption of overheads.

Note: Pre-determined rate can be calculated on the basis of materials or labour or labour hours or machine hours.

### **RECTIFICATION OR DISPOSAL OF "UNDER ABSORBED" OVERHEADS IN COST ACCOUNTS:**

- A. Can be adjusted in cost accounts using a supplementary rate; or
  - B. Write off to Costing Profit and Loss Account; or
  - C. Carrying forward to future period.
- A. **Adjustment in cost accounts:** If the amount of under absorption is considerable (significant/substantial/large/huge), such under absorption is adjusted against cost of production by computing a supplementary rate.
- |                            |                                   |
|----------------------------|-----------------------------------|
| <u>Supplementary rate:</u> | <u>Amount of under absorption</u> |
|                            | Actual base                       |
- Supplementary Rate may also be calculated as a % of the amount absorbed. (refer sums below)
- B. **Writing off to Costing Profit and Loss Account:** If the amount of under absorption (due to any abnormal reason) is small, it may be written off to Costing Profit and Loss Account instead of calculating a supplementary rate.
  - C. **Carry forward to future period:** This method is followed when the normal business cycle is more than one year.

**Note:** If under absorption is due to an abnormal reason (e.g. machine break-down) then such under absorption can be written off to costing P and L A/c.

### **PROBLEMS:**

1. Overhead incurred	Rs.15,000
Overhead recovered	Rs.10,000
Cost of sales	Rs.1,00,000
Closing stock of Finished goods	Rs.80,000
Closing stock of Work in process	Rs.70,000.

### **How to rectify the under absorption of overheads.**

2. XYZ Ltd., uses a historical cost accounting system and absorbs overheads on the basis of predetermined rates. The following data are available for the year ended 31.03.2020:

#### **Particulars                          Amount in Rupees**

#### **Manufacturing overheads**

Amount actually spent	1,70,000
Amount absorbed	1,50,000

Cost of goods sold	3,36,000
Stock of finished goods	96,000
Work in progress	48,000

Using two methods of disposal of under/absorbed overheads show the implication on the profits of the company under each method.

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3. In a manufacturing unit, overhead was recovered at a predetermined rate of Rs.20 per labour hour. The total factory overhead incurred and the labour hours actually worked were Rs.45,00,000 and 2,00,000 respectively.

During this period, 30,000 units were sold. At the end of the period 5,000 units were held in stock, while there was no opening stock of finished goods. Similarly, though there was no stock of uncompleted units at the beginning of the period, at the end of the period there were 10,000 incomplete units which may be reckoned as 50% complete.

On analyzing the reasons, it was found that 60% of the unabsorbed overheads were due to defective planning and rest were attributed to increase in overhead costs. **How would unabsorbed overheads be treated in cost accounts?**

---

4. The total overhead expenses of a factory are Rs.4,46,380. Taking into account, the normal working of the factory, overhead was recovered in production at Rs.1.25 per hour. The actual hours worked were 2,93,104.

How would you proceed to close the books of accounts, assuming that besides 7,800 units produced of which 7,000 were sold, there were 200 equivalent units in work in progress?

On investigation, it was found that 50% of the unabsorbed overhead was on account of increase in the cost of indirect materials and indirect labor and the remaining 50% was due to factory inefficiency. Also give the profit implication of the method suggested.

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5. In a manufacturing unit, overhead was recovered at a predetermined rate of Rs.25 per man-day. The total factory overhead incurred and the man-days actually worked were Rs.41,50,000 and 1,50,000 respectively.

Out of the 40,000 units produced during a period, 30,000 units were sold. There were also 30,000 uncompleted units which may be reckoned at 66.67% complete.

On analyzing the reasons, it was found that 40% of the unabsorbed overheads were due to defective planning and the rest were attributable to increased overhead costs. How would unabsorbed overhead be treated in Cost Accounts?

Dec 2019

6. Your company uses a historical cost system and applies overheads on the basis of "Predetermined" rates. The following are the figures from the Trial Balance as at 30-9-2019:-

	Dr. Rs.	Cr. Rs.
Manufacturing overheads	4,26,544	---
Manufacturing overheads - applied	---	3,65,904
<b><u>Cost of production:</u></b>		
Work-in-progress	1,41,480	---
Finished Goods Stock	2,30,732	---
Cost of Goods Sold	8,40,588	---

Give two methods for the disposal of the under absorbed overheads and show the profit implications of the method.

---

7. In a factory, overheads of a particular department are recovered on the basis of Rs.5 per machine hour. The total expenses incurred and the actual machine hours for the department for the month of August were Rs.80,000 and 10,000 hours respectively.

Of the amount of Rs.80,000, Rs.15,000 became payable due to an award of the Labour Court and Rs.5,000 was in respect of expenses of the previous year booked in the current month (August).

Actual production was 40,000 units, of which 30,000 units were sold. On analyzing the reasons, it was found that 60% of the under-absorbed overhead was due to defective planning and the rest was attributed to normal cost increase. How would you treat the under absorbed overhead in the cost accounts?

---

8. The budgeted working conditions for a cost centre are as follows:

Normal working per week	42 hours
Number of machines	14
Normal weekly loss of hours on maintenance	5 hours per machine
Number of weeks worked per year	48
Estimated annual overheads	Rs.1,24,320

Actual result in respect of a 4-week period are:

Overhead incurred	Rs.10,200
Machine hours produced	2,000

On the basis of the above information you are required to calculate:

- a. The machine hour rate
  - b. The amount of under or over absorption of overhead.
-

9. The unit X of P. Co. Ltd. having a strength of 20 workers, planned for 290 working days per year of 8 hours per day with half an hour break. Based on the earlier year's trend, it is forecasted that average absenteeism per worker would be 10 days, in addition to the eligibility of 30 days annual leave.

The budgeted overhead related to the unit for the year amounted of ₹ 75,000 and the unit follows a system of recovering overhead on the basis of direct labour hours.

The actual overhead during the year amounted to ₹ 71,200 and the following details regarding actual working of the unit are available:

- a. The factory worked 3 extra days to meet the production target but one additional paid holiday had to be declared.
- b. There was a severe break down of a major equipment leading to a loss of 350 man-hours.
- c. The total overtime hours (in addition to 3 extra working days) amounted to 680 hours.
- d. The actual average absenteeism per worker was 12 days.

From the above data relating to production unit X, work out the under or over recovery of overhead during the period under review. *(Syl - 08; June 14)*

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## Answers – under absorption or over absorption

1. Overheads incurred	Rs.15,000
Overheads recovered	<u>Rs.10,000</u>
Under absorption of overheads	<u>Rs.5,000</u>

### Rectification or treatment of under absorption in cost accounts:

Treatment of under absorption of overheads in cost accounts:

- a. Can be adjusted against cost of production using a supplementary rate; or
- b. Writing off to Costing Profit and Loss A/c; or
- c. Carry forward to future period

#### **A. Using a supplementary rate it can be adjusted in cost accounts as shown under:**

<b>Particulars</b>	<b>Original amount</b>	<b>Additional amount</b>	<b>Total Amount</b>
Cost of goods sold	1,00,000	2,000	1,02,000
Stock of finished goods	80,000	1,600	81,600
Work in progress	70,000	1,400	71,400

**Note:** Adjustment to cost of goods sold, stock of finished goods and work in progress are made in the ratio of 10:8:7. Supplementary rate can also be calculated as follows:  $5,000/2,50,000 * 100 = 2\%$ .

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2. Actual overheads	Rs.1,70,000
Overheads absorbed	<u>Rs.1,50,000</u>
Under absorption of overheads	<u>Rs.20,000</u>

Treatment of under absorption of overheads in cost accounts:

- a. Can be adjusted in cost accounts using a supplementary rate
- b. Writing off to Costing Profit and Loss A/c
- c. Carry forward to future period

#### **Using a supplementary rate it can be adjusted in accounts as shown under:**

<b>Particulars</b>	<b>Original amount</b>	<b>Additional amount</b>	<b>Total Amount</b>
Cost of goods sold	3,36,000	14,000	3,50,000
Stock of finished goods	96,000	4,000	1,00,000
Work in progress	48,000	2,000	50,000

**Note:** Adjustment to cost of goods sold, stock of finished goods and work in progress is made in the ratio of 336:96:48 (or) 7:2:1.

#### **Implication of profit under each method:**

**Method 1:** Writing off to Costing Profit & Loss Account: This will reduce the profits by Rs.20,000 for the period.

**Method 2:** Using supplementary rate: Profit of the current period will reduce by Rs.14,000 and value of stock will increase by Rs.6,000. The latter will affect the profit of the subsequent period.

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3. Actual overheads (given)	Rs.45,00,000
Overheads recovered ( $200000 \times 20$ )	<u>Rs.40,00,000</u> (based on pre-determined rate)
Under absorption of overheads	<u>Rs.5,00,000</u>

**Under absorption Rs.5,00,000.**

60% of this amount (Rs.3 lakhs) is due to defective planning, hence treated as abnormal overheads and therefore written off to Costing Profit and Loss A/c.

Balance of unabsorbed overheads Rs.2,00,000 is due to the increase in the overhead costs and hence to be adjusted in cost accounts by using a supplementary rate.

Supplementary rate:  $\frac{\text{Rs.2,00,000}}{40,000 \text{ units}} = \text{Rs.5 per unit}$

**Additional amount to be charged (on the basis of supplementary rate)**

Cost of goods sold:	$30,000 \times 5$	=	Rs.1,50,000
Closing stock of finished goods:	$5,000 \times 5$	=	Rs.25,000
Closing stock of WIP: ( $10,000 \times 50\%$ )	$5,000 \times 5$	=	Rs.25,000

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4. Actual overheads (given)	Rs.4,46,380
Overheads recovered ( $293104 \text{ hrs} \times 1.25$ )	<u>Rs.3,66,380</u> (based on pre-determined rate)
Under absorption of overheads	<u>Rs.80,000</u>

**Under absorption Rs.80,000.**

50% of this amount (Rs.40,000) is due to inefficiency of the factory, hence treated as abnormal overheads which may be written off to Costing Profit and Loss A/c.

Balance of unabsorbed overheads Rs.40,000 is due to the increase in the overhead costs and hence to be adjusted in cost accounts by using a supplementary rate.

Supplementary rate:  $\frac{\text{Rs.40,000}}{8,000 \text{ units} (7800+200)} = \text{Rs.5 per unit}$

**Additional amount to be charged (on the basis of supplementary rate)**

Cost of goods sold:	$7,000 \times 5$	=	Rs.35,000
Closing stock of finished goods:	$800 \times 5$	=	Rs.4,000
Closing stock of WIP:	$200 \times 5$	=	Rs.1,000

**Impact on profit:** Profit of the current period will reduce by Rs.35,000 and value of stock will increase by Rs.5,000. The latter will affect the profit of the subsequent period.

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5. Actual overheads (given)	Rs.41,50,000
Overheads recovered ( $1,50,000 \times 25$ )	<u>Rs.37,50,000</u> (based on pre-determined rate)
Under absorption of overheads	<u>Rs.4,00,000</u>

**Under absorption Rs. 4,00,000.**

40% of this amount (Rs.1,60,000) is due to defective planning, hence treated as **abnormal overheads** and written off to Costing Profit and Loss A/c.

Balance of unabsorbed overheads Rs.2,40,000 is due to the increase in the overhead costs and hence to be adjusted in cost accounts by using a supplementary rate.

Supplementary rate:  $\frac{\text{Rs.2,40,000}}{60,000 \text{ units}} = \text{Rs.4.00 per unit}$

**Additional amount to be charged (on the basis of supplementary rate)**

Cost of goods sold:	30,000 x 4	=	Rs.1,20,000
Closing stock of finished goods:	10,000 x 4	=	Rs.40,000
Closing stock of WIP: ( $30000 \times 66.667\%$ )	20,000 x 4	=	Rs.80,000

6. Actual overheads	Rs.4,26,544
Overheads recovered	<u>Rs.3,65,904</u> (based on pre-determined rate)
Under absorption of overheads	<u>Rs.60,640</u>

**Can be adjusted in cost accounts by using a supplementary rate:**

Particulars	Original amt (in rupees)	Additional amount to be charged	Total amount to be charged
Cost of goods sold	8,40,588	42,029 (5% of 840588)	8,82,617
Stock of finished goods	2,30,732	11,537 (5% of 230732)	2,42,269
Work in progress	1,41,480	7,074 (5% of 141480)	1,48,554

**Note:** Adjustment to cost of goods sold, stock of finished goods and work in progress is made by using a supplementary rate. SR =  $60,640 / 12,12,800 \times 100 = 5\%$

**Implication of profit under each method:**

**Method 1:** Writing off to Costing Profit & Loss A/c: Will reduce the profits by Rs.60,640 for the current period.

**Method 2:** Adjustment in cost accounts using supplementary rate: Profit of the current period will reduce by Rs.42,029 only and value of stock will increase by Rs.18,611. The latter will affect the profit of the subsequent period.

7. Total overheads incurred	Rs.80,000
Less: Award of the labour court	Rs.15,000
Less: Previous year's expenses	<u>Rs.5,000</u>
<b>Net overhead incurred for the month</b>	<b>Rs.60,000</b>
Overhead recovered ( $10000 \times 5$ )	<u>Rs.50,000</u>
<b>Under-absorbed overhead</b>	<b><u>Rs.10,000</u></b>

**Under absorption of overheads Rs.10,000.**

60% of this amount (Rs.6,000) is due to defective planning, hence to be treated as abnormal overheads and therefore written off to Costing Profit and Loss A/c.

Balance of unabsorbed overheads Rs.4,000 is due to the increase in the overhead costs and hence to be adjusted in cost accounts by computing a supplementary rate.

$$\text{Supplementary rate} = \text{Rs.4,000} / 40,000 = .10 \text{ per unit (10 paise)}$$

Cost of sales will increase by $(30,000 \times .10)$	= Rs.3,000
Closing stock of finished goods will increase by $(10,000 \times .10)$	= Rs.1,000

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8. Effective machine hours run $(37 \text{ hrs} \times 48 \text{ weeks} \times 14 \text{ machines})$	24,864
Estimated annual overheads	Rs.1,24,320

$$\text{Machine hour rate: Rs.1,24,320} / 24,864 = \text{Rs.5}$$

**Under absorption:**

Actual overheads incurred	Rs.10,200
Overheads absorbed based on mach hr rate	<u>Rs.10,000</u> $(2000 \times 5)$
<b>Under absorption</b>	<b><u>Rs.200</u></b>

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**9. Calculation of overhead rate (pre-determined rate)**

Expected working hours $(20 \times 290 \times 7.5)$	43,500
Less: Hours lost due to leave $(20 \times 40 \times 7.5)$	6,000
	<b><u>37,500</u></b>

$$\text{Overhead rate per hour: Rs.75,000} / 37,500 \text{ hours}$$

Rs.2 per hour

**Calculation of actual hours worked:**

Expected working hours	37,500
Add: Extra days worked $(3 \times 20 \times 7.5)$	450
Less: Loss of hours for one paid holiday $(1 \times 20 \times 7.5)$	150
Less: Loss of hours for break down	350
Add: Overtime worked	680
Less: Loss of hours due to extra leave $(2 \times 20 \times 7.5)$	300
<b>Actual hours worked</b>	<b><u>37,830</u></b>

**Under or over absorption of overheads:**

Actual overheads incurred	71,200
Less: Overheads absorbed $(37,830 \times 2)$	<u>75,660</u>
<b>Over absorption of overheads</b>	<b><u>4,460</u></b>

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## **CHAPTER – 9: OVERHEADS – 4: Segregation Into Variable And Fixed**

1. The monthly cost of maintenance of machinery for 12,000 machine hours is Rs.1,70,000 and for 18,500 hours it is Rs.2,02,500. The cost of maintenance for 14,000 hours is .....
 

(A) 1,90,000      (B) 1,80,000      (C) 1,85,000      (D) 2,00,000
2. The manufacturing overhead of XYZ Ltd. is Rs.32,00,000 p.a. for an activity level of 3,00,000 machine hours. If the activity level is increased to 8,00,000 machine hours, its manufacturing overhead would be Rs.52,00,000. The manufacturing overhead for an activity level of 5,00,000 machine hours is:
 

(A) 20,00,000      (B) 40,00,000      (C) 60,00,000      (D) 50,00,000
3. The cost per unit of a product amounts to Rs. 160 (75% variable) when production is 10,000 units. When production increases by 25%, the cost of production will be Rs. \_\_\_\_\_ per unit.
 

(A) 145      (B) 152      (C) 150      (D) 140
4. The total production cost of Lalaji Ltd. for making 6,000 units is Rs.35,000 and the total production cost for making 15,000 units is Rs.67,000. Once the production exceeds 10,000 units, additional fixed costs of Rs.5,000 are incurred. What will be the full production cost per unit for making 12,000 units?
 

(A) Rs.5.21      (B) Rs.4.83      (C) Rs.4.64      (D) insufficient data
5. The standard departmental overhead rate is Rs.15 per hour. Based on the following details provided to you, work out the activity level at which the overhead rate has been fixed.

Activity level (hours)	6,000	8,000	10,000
Overheads allowance (RS. )	1,20,000	1,44,000	1,68,000

6. The following information is given: Find the overhead rate per direct labour hour.

The total number of operators working in a department	300
The number of working days per year	300
Number of hours per day	8
Total departmental overhead is	Rs.3,42,000
5% of the total number of days is normal idle time.	

7. The variable and semi variable costs of producing 50,000 units are Rs.6 per unit and Rs.12 per unit respectively. If at 20,000 units, these total costs add up to Rs.4,80,000; what is the amount of fixed cost component of the semi variable cost?



### Economic Order Quantity

$$E.O.Q = \sqrt{\frac{2CO}{I}}$$

C = Consumption per annum

O = Ordering cost per order

I = Inventory carrying cost per unit per annum

Note: Ordering cost = No. of orders (x) ordering cost per order

Note: Carrying cost =  $\frac{\text{Ordering quantity } (x) i}{2}$

Note: Total cost of materials = Purchase cost + Ordering cost + Carrying cost

**Important:** At EOQ, both ordering cost and carrying cost are equal

3. The average annual consumption of a material is 36,000 units at a price of Rs.21.60 per unit. The storage cost is 20% on an average inventory and the cost of placing an order is Rs.60. How much quantity is to be purchased at a time? Also compute the number of orders to be placed in a year.

4. A company manufactures a special product which requires a **component 'Alpha'**. The following particulars are collected for the year 2019:

Annual demand of Alpha: 8,000 units;  
Cost per unit of Alpha: Rs.400

Cost of placing an order: Rs.200 per order  
Carrying cost % p.a.: 20%

The company has been offered a quantity discount of 4% on the purchase of 'Alpha', provided the order size is 4,000 components at a time.

Required: Compute the EOQ  
Advise whether the quantity discount offer can be accepted.

5. G Ltd produces a product which has a monthly demand of 4,000 units. The product requires a component X which is purchased at Rs.20. For every finished product, two units of component are required. The ordering cost is Rs.120 per order and the holding cost is 10% p.a.

You are required to calculate:

- i. EOQ
- ii. If the minimum lot size to be supplied is 4,000 units, what is the extra cost?
- iii. What is the minimum carrying cost, the company has to incur?

6. The annual carrying cost of material 'X' Rs.3.60 per unit and its total carrying cost is Rs.9,000 per annum. What would be the EOQ for material 'X', if there is no safety stock of material 'X'.

7. A company manufactures a product from a raw material, which is purchased at Rs.60 per kg. The company incurs a handling cost of Rs.360 plus freight of Rs.390 per order. The incremental carrying cost of inventory of raw material is Re.0.50 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is Rs.9 per kg. per annum. The annual production of the product is 1,00,000 units and 2.5 units are obtained from one kg of raw material.

Required:

- Calculate the EOQ
- Advise, how frequently should orders for procurement be placed
- If the company proposes to rationalize placement of orders on quarterly basis, what % of discount in the price of raw materials should be negotiated?

8. About 50 items are required every day for a machine. A fixed cost of Rs.50 per order is incurred for placing an order. The inventory carrying cost per item amounts to Rs.0.02 per day. The lead period is 32 days. Compute reorder level and economic order quantity.  
 (A) 1,200 items      (B) 1,400 items      (C) 1,600 items      (D) 1,800 items

9. If the ordering cost per order is Rs.40, carrying cost is 10% of average inventory value, purchase cost is Rs.10 per unit and economic order quantity (EOQ) for the product is 800 units; what is the expected annual demand for the product?  
 (A) 8,000 units      (B) 10,000 units      (C) 20,000 units      (D) None of the above

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#### **Methods of pricing issues:**

10. The transactions in connection with the materials are as follows:

	Receipts (units)	Rate (Rs.)	Issue (units)
1.12.19	40	15.00	
2.12.19	20	16.00	
3.12.19			30
4.12.19	50	17.00	
5.12.19			20
6.12.19			40

Prepare a stores ledger under: a) FIFO.      b) LIFO.      c) the value of closing stock.

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11. The following transactions took place in respect of an item of material.

	Receipts (units)	Rate (Rs.)	Issue (units)
02.09.19	200	2.00	
10.09.19	300	3.00	
15.09.19			250
18.09.19	250	4.00	
20.09.19			200

Prepare a stores ledger under: SIMPLE AVG METHOD and WEIGHTED AVG METHOD

**12. Prepare a Stores ledger by adopting SIMPLE AVG. METHOD of pricing of material issues.**

<u>January</u>	<u>Receipts</u>	<u>Issues</u>
1 <sup>st</sup>	300 units at Rs.10	
10 <sup>th</sup>	200 units at Rs.12	
12	400 units at Rs.11	
15 <sup>th</sup>		250 units
16 <sup>th</sup>		150 units
18 <sup>th</sup>	200 units at Rs.14	
20 <sup>th</sup>		300 units
22 <sup>nd</sup>	300 units at Rs.15	
25 <sup>th</sup>	100 units at Rs.16	
27 <sup>th</sup>		200 units
31 <sup>st</sup>		100 units

**13. After inviting tenders, two quotations are received as under:**

Supplier A – Rs.2.20 per unit.

Supplier B – Rs.2.10 per unit plus Rs.2,000 fixed charges irrespective of units ordered.

**Calculate the order quantity for which the purchase price per unit will be the same.**

Considering all factors regarding production requirement and availability of finance, the purchase officer wants to place an order for 15,000 units. Which supplier should be selected?

**14. The particulars relating to 1,200 kgs. of a certain raw material purchased by a company during June 2019, were as follows:**

- Lot prices quoted by supplier and accepted by the company for placing the purchase order:  
Lot up to 1,000 kgs @ Rs.22 per kg  
Between 1,000 to 1,500 kgs. @ Rs.20 per kg.  
Between 1,500 to 2,000 kgs. @ Rs.18 per kg.
- Trade discount 20%
- Additional charge for containers @ Rs.10 per drum of 25 kgs.
- Credit allowed on return of containers @ Rs.8 per drum.
- GST at 10% on raw material and 5% on drums.
- Total freight paid by the purchaser Rs.240.
- Insurance at 2.5% (on net invoice value) paid by the purchaser.
- Stores overhead applied at 5% on total purchase cost of material.

The entire quantity was received and issued to production. The containers are returned in due course. **Draw up a statement to show: Total cost of material purchased and unit cost of material issued.**

**15. From the stores ledger recorded for material item P-18 for June, 2019, the following information is available:**

<i>Date</i>	<i>Receipts</i>			<i>Balance</i>		
	Quantity	Rate	Value	Quantity	Rate	Value
June 2019 1 <sup>st</sup>	-	-	-	100	Rs.2	Rs.200
10 <sup>th</sup>	200	Rs.2	Rs.400	100	Rs.2	
				200	Rs.2	Rs.600
15 <sup>th</sup>	300	Rs.4	Rs.1,200	100	Rs.2	
				200	Rs.2	
				300	Rs.4	Rs.1,800
16 <sup>th</sup>	-	-	-	100	Rs.2	
				300	Rs.4	Rs.1,400
20 <sup>th</sup>	-	-	-	100	Rs.4	Rs.400
25 <sup>th</sup>	400	Rs.5	Rs.2,000	100	Rs.4	
				400	Rs.5	Rs.2,400
28 <sup>th</sup>	-	-	-	200	Rs.5	Rs.1,000
29 <sup>th</sup>	-	-	-	50	Rs.5	Rs.250

State the method of pricing that was employed in the ledger and complete the store ledger.

**16. The stock ledger for material X reveals the following data for the quarter ended Sept. 30, 2019**

		<i>Receipts</i>		<i>Issues</i>	
		Quantity	Price	Quantity	Price
July 1	Balance b/d	1,600	2.00	-	-
July 9		3,000	2.20	-	-
July 13		-	-	1,200	2,556
Aug 5		-	-	900	1,917
Aug 17		3,600	2.40	-	-
Aug 24		-	-	1,800	4,122
Sept. 11		2,500	2.50	-	-
Sept. 27		-	-	2,100	4,977
Sept. 29		-	-	700	1,659

Physical verification on Sept. 30, revealed an actual stock of 3,800 units.

You are required to:

- (a) Indicate the method of pricing employed in the above and
- (b) Complete the above account by making entries you would consider necessary.

**Inventory turnover ratio (or) Material turnover ratio**

**Material turnover ratio:**  $\frac{\text{Materials consumed}}{\text{average stock}}$

Material consumed = op sto + pur - clo sto

Average stock =  $\frac{\text{op sto} + \text{clo sto}}{2}$

**17. Calculate the material turnover ratio for the year 2019 from the following and determine which of the two materials is most fast moving.**

	Material X	Material Y
Material in hand (1.1.19)	25,000	87,500
Material in hand (31.12.19)	15,000	62,500
Material purchased during the year	1,90,000	1,25,000

**18. The following information is available from the records of Oil Ltd. for the month of March, 2020:**

Sales for the month: Rs.19,25,000

Opening stock as on 1 March, 2020: 1,25,000 litres @ Rs.6.50 per litre

Purchases (including freight and insurance):

March 5: 1,50,000 litres @ Rs.7.10 per litre  
March 27: 1,00,000 litres @ Rs.7.00 per litre

Closing stock as on 31st March, 2020: 1,30,000 litres

Expenses for the month is Rs.45,000.

Pricing of material issues is being done at the end of the month after all receipts during the month.

On the basis of above information, calculate the following using FIFO and LIFO methods of pricing:

- Value of closing stock as on 31 March, 2020.
- Cost of goods sold during March, 2020.
- Profit or loss for March, 2020. (A detailed stores ledger account is not required. Only relevant figures need to be calculated).

**19.** Oil India is a bulk distributor of high octane petrol. A periodic inventory of petrol on hand is taken when the books are closed at the end of each month. The following summary of information is available for the month of June, 2019:

Sales (between 2 <sup>nd</sup> and 29 <sup>th</sup> June) Rs.9,45,000	<b>Purchases (including freight):</b>
General administration cost Rs.25,000	June 1: 2,00,000 litres @ Rs.2.85 per litre
Opening stock: 1,00,000 litres @ Rs.3 per litre Rs.3,00,000	June 30: 1,00,000 litres @ Rs.3.03 per litre
	June 30: Closing stock 1,30,000 litres

Compute the following data by FIFO, LIFO and WAM of inventory costing:

- (a) Value of inventory on June 30.
- (b) Amount of the cost of goods sold for June.
- (c) Profit or loss for June.

**20.** A company manufactures 5,000 units of a product per month. The cost of placing an order is Rs.100. The purchase price of the raw material is Rs.10 per kg. The re-order period is 4 to 8 weeks. The consumption of raw materials varies from 100 kg to 450 kg per week, the average consumption being 275 kg. The carrying cost of inventory is 20% per annum.

You are required to calculate:

- a. Re-order quantity
- b. Re-order level
- c. Maximum level
- d. Minimum level
- e. Average stock level

**21.** X Ltd. has received an offer of quantity discounts on its order of materials as under.

<b>Price per tonne</b>	<b>Tonnes</b>
Rs.1,200	Less than 500
Rs.1,180	500 and less than 1,000
Rs.1,160	1,000 and less than 2,000
Rs.1,140	2,000 and less than 3,000
Rs.1,120	3,000 and above

The annual requirement for the material is 5,000 tonnes. The ordering cost per order is Rs.1,200 and the stock holding is estimated at 20% of materials cost per annum. You are required to compute the **most economical purchase level**.

B) What will be your answer if there are no discounts offered and the price per tonne is Rs.1,500.

**22.** The *quarterly* production of a company's product which has a steady market is 20,000 units. Each unit of a product requires 0.5 kg of raw material. The cost of placing one order for raw material is Rs.100 and the inventory carrying cost is Rs.2 per annum. The lead time for procurement of raw material is 36 days and a safety stock of 1,000 kg of raw materials is maintained by the company. The company has been able to negotiate the following discount structure with the raw material supplier:

Order quantity (kgs.)	Discount (Rs.)
Up to 6000	Nil
6000---8000	400
8000---16000	2000
16000---30000	3200
30000---45000	4000

You are required to:

- a. Calculate the re-order point taking 30 days in a month
- b. Prepare a statement showing the total cost of procurement and storage of raw material after considering the discount if the company selects to place one, two, four or six orders in the year.
- c. State the number of orders which the company should place to minimize the costs after taking EOQ also in to consideration.

**23.** The following is the summary of receipts and issues of material in a factory for May 2019.

Prepare the Stores Ledger (only the quantity and rate columns of the Receipts and Issues are required) according to

- (i) First In First Out Method;
- (ii) Last In First Out Method;
- (iii) Compute the Inventory Turnover Ratio under both (i) and (ii).

Date: May 2019	Transaction
1 <sup>st</sup>	Opening Balance 500 units @ Rs.25 per unit
3 <sup>rd</sup>	Issue 250 units
13 <sup>th</sup>	Received from supplier 200 units @ Rs.24.5 per unit
14 <sup>th</sup>	Returned to stores 15 units @ Rs.24 per unit
16 <sup>th</sup>	Issue 180 units
20 <sup>th</sup>	Received from supplier 240 units @ Rs.24.75 per unit
24 <sup>th</sup>	Issue 304 units
25 <sup>th</sup>	Received from supplier 320 units @ Rs.24.5 per unit
26 <sup>th</sup>	Issue 112 units
27 <sup>th</sup>	Returned to stores 12 units @ Rs.24.5 per unit
28 <sup>th</sup>	Received from supplier 100 units @ Rs.25 per unit

There was a shortage of 5 units on the 15<sup>th</sup> and 8 units on the 27<sup>th</sup>.

J-13 s-2008

**ADDITIONAL PROBLEMS FOR PRACTICE:**

1. Your factory holds 600 kg of raw materials in store at the beginning of the month of December 2019. You are provided with the following further information:

Per day consumption of material is constant at 50 kg and the time span between placing orders and receiving materials varies within 6-10 days, ordering cost per order is Rs.4,000 and carrying cost per kg per day is Rs.0.064.

- (i) At what level of stock you should place your next order?
- (ii) What quantity you should order each time? and
- (iii) At what time interval you would continue placing orders for materials?

**D-16 S-12**

2. A company requires 1,00,000 units of an item annually. The cost per unit is Rs.10. Ordering cost is Rs. 500 per order and inventory carrying cost is 50% per unit per annum.

- (i) Find the Economic Order Quantity (EOQ).
- (ii) The supplier offers a discount of 3% for order quantity between 4500-5999 and 3.5% for order quantity 6000 and above. Work out a statement comparing the total inventory management costs for the EOQ, 4500 and 6000 units of order and comment on your findings. Advise the company on how much to order.

**J-16 S-12**

3. From the following particulars with respect to a particular item of materials of a manufacturing company, calculate the best quantity to order:

Ordering quantities (tonne)	Price per ton (Rs.)
Less than 250	6.00
250 but less than 800	5.90
800 but less than 2,000	5.80
2,000 but less than 4,000	5.70
4,000 and above	5.60

The annual demand for the material is 4,000 tonnes. Stock holding costs are 25% of material cost p.a. The delivery cost per order is Rs.6.00.

4. PQR Ltd., manufactures a special product, which requires 'ZED'. The following particulars were collected for the year 2019-20:

Monthly demand of ZED	7,500 units
Cost of placing an order	Rs.500
Re-order period	5 to 8 weeks
Cost per unit	Rs.60
Carrying cost % p.a.	10%
Normal usage	500 units per week
Minimum usage	250 units per week
Maximum usage	750 units per week

Required:

- i. Re-order quantity
- ii. Re-order level
- iii. Minimum stock level
- iv. Maximum stock level
- v. Average stock level

10.

**STORES LEDGER UNDER FIFO METHOD**

Date	Particulars	Receipts			Issues			Balance		
		Qty	Rate	Amt	Qty	Rate	Amt	Qty	Rate	Amt
01.12.19	Purchases	40	15	600				40	15	600
02.12.19	Purchases	20	16	320				40	15	600
								20	16	320
03.12.19	Issues				30	15	450	10	15	150
								20	16	320
04.12.19	Purchases	50	17	850				10	15	150
								20	16	320
								50	17	850
05.12.19	Issues				10	15	150	10	16	160
					10	16	160	50	17	850
06.12.19	Issues				10	16	160			
					30	17	510	20	17	340

**STORES LEDGER UNDER LIFO METHOD**

Date	Particulars	Receipts			Issues			Balance		
		Qty	Rate	Amt	Qty	Rate	Amt	Qty	Rate	Amt
01.12.19	Purchases	40	15	600				40	15	600
02.12.19	Purchases	20	16	320				40	15	600
								20	16	320
03.12.19	Issues				20	16	320	30	15	450
					10	15	150			
04.12.19	Purchases	50	17	850				30	15	450
								50	17	850
05.12.19	Issues				20	17	340	30	15	450
								30	17	510
06.12.19	Issues				30	17	510			
					10	15	150	20	15	300

11.

**STORES LEDGER UNDER Simple Average Method**

Date	Particulars	Receipts			Issues			Balance	
		Qty	Rate	Amt	Qty	Rate	Amt	Qty	Amt
02.09.19	Purchases	200	2	400				200	400
10.09.19	Purchases	300	3	900				500	1300
15.09.19	Issues				250	2.5	625	250	675
18.09.19	Purchases	250	4	1000				500	1675
20.09.19	Issues				200	3.5	700	300	975

Simple average price as on:

15.09.19  $(2+3)/2 = 2.50$  per unit

20.09.19  $(3+4)/2 = 3.50$  per unit (Rs.2 should not be included) (stock already issued on 15.09.18) (simple average method along with fifo principle)**STORES LEDGER UNDER Weighted Average Method**

Date	Particulars	Receipts			Issues			Balance	
		Qty	Rate	Amt	Qty	Rate	Amt	Qty	Amt
02.09.19	Purchases	200	2	400				200	400
10.09.19	Purchases	300	3	900				500	1300
15.09.19	Issues				250	2.60	650	250	650
18.09.19	Purchases	250	4	1000				500	1650
20.09.19	Issues				200	3.30	660	300	990

Weighted average price as on:

15.09.19  $\text{Rs.}1300/500 = 2.60$

20.09.19  $\text{Rs.}1650/500 = 3.30$

12.

**STORES LEDGER UNDER Simple Average Method**

Date	Particulars	Receipts			Issues			Balance	
		Qnty	Rate	Amt	Qnty	Rate	Amt	Qnty	Amt
01.01.	Purchases	300	10	3000				300	3000
10.01.	Purchases	200	12	2400				500	5400
12.01.	Purchases	400	11	4400				900	9800
15.01.	Issues				250	11	2750	650	7050
16.01.	Issues				150	11	1650	500	5400
18.01.	Purchases	200	14	2800				700	8200
20.01.	Issues				300	12.33	3700	400	4500
22.01.	Purchases	300	15	4500				700	9000
25.01.	Purchases	100	16	1600				800	10600
27.01.	Issues				200	14	2800	600	7800
31.01.	Issues				100	15	1500	500	6300

Simple average price as on:

15.01.  $(10+12+11)/3 = \text{Rs.}11$  per unit16.01.  $(10+12+11)/3 = \text{Rs.}11$  per unit

By applying fifo principle; Rs.10 per unit stock is fully issued (no more Rs.10 stock)

20.01.  $(12+11+14)/3 = \text{Rs.}12.33$  per unit (no more Rs.12 stock) (fully issued – fifo)27.01.  $(11+14+15+16)/4 = \text{Rs.}14$  per unit (no more Rs.11 stock) (fully issued – fifo)31.01.  $(14+15+16)/3 = \text{Rs.}15$  per unit

15.

**STORES LEDGER UNDER FIFO METHOD**

Date	Particulars	Receipts			Issues			Balance		
		Qnty	Rate	Amt	Qnty	Rate	Amt	Qnty	Rate	Amt
01.06.18	Opening bal							100	2	200
10.06.18	Purchases	200	2	400				100	2	200
								200	2	400
15.06.18	Purchases	300	4	1200				100	2	200
								200	2	400
								300	4	1200
16.06.18	Issues				100	2	200	100	2	200
					100	2	200	300	4	1200
20.06.18	Issues				100	2	200			
					200	4	800	100	4	400

25.06.18	Purchases	400	5	2000			100	4	400
							400	5	2000
28.06.18	Issues				100	4	400		
					200	5	1000	200	5
29.06.18	Issues				150	5	750		
							50	5	250

16.

**STORES LEDGER UNDER WAM**

Date	Particulars	Receipts			Issues			Balance	
		Qnty	Rate	Amt	Qnty	Rate	Amt	Qnty	Amt
01.07.18	Purchases	1600	2	3200				1600	3200
09.07.18	Purchases	3000	2.2	6600				4600	9800
13.07.18	Issues				1200	2.13	2556	3400	7244
05.08.18	Issues				900	2.13	1917	2500	5327
17.08.18	Purchases	3600	2.4	8640				6100	13967
24.08.18	Issues				1800	2.29	4122	4300	9845
11.09.18	Purchases	2500	2.50	6250				6800	16095
27.09.18	Issues				2100	2.37	4977	4700	11118
29.09.18	Issues				700	2.37	1659	4000	9459
30.09.18	Shortage				200	2.36	472	3800	8987

19. Opening stock

Add: Purchases (2 lacs + 1 lac)	<u>3,00,000</u>
Total	<u>4,00,000</u>
Less: Closing stock	<u>1,30,000</u>
Issues during the month	<u>2,70,000</u>

Opening stock (June 1 <sup>st</sup> )	1,00,000 @ Rs.3 each
Purchases (June 1 <sup>st</sup> )	<u>2,00,000</u> @ Rs.2.85 each
Total	<u>3,00,000</u>
Less: Issues (2 <sup>nd</sup> and 29 <sup>th</sup> June)	<u>2,70,000</u>
Balance	<u>30,000</u>
Add: Purchases (June 30 <sup>th</sup> )	<u>1,00,000</u> @ Rs.3.03 each
Closing stock (June 30 <sup>th</sup> )	<u>1,30,000</u>

**Under FIFO:**

Value of closing stock

$$(30,000 \times 2.85) + (1,00,000 \times 3.03) = \text{Rs.}3,88,500$$

Cost of goods sold:      Opening stock + Purchases - Closing stock  
 $3,00,000 + [(2,00,000 \times 2.85) + (1,00,000 \times 3.03)] - 3,88,500 = \text{Rs.}7,84,500$

Profit:                      Sales (-) Cost of goods sold (-) General administration cost  
 $\text{Rs.}9,45,000 (-) \text{Rs.}7,84,500 (-) \text{Rs.}25,000 = \text{Rs.}1,35,500$

**Under LIFO:**

Value of closing stock

$$(30,000 \times 3) + (1,00,000 \times 3.03) = \text{Rs.}3,93,000$$

Cost of goods sold:      Opening stock + Purchases - Closing stock  
 $3,00,000 + [(2,00,000 \times 2.85) + (1,00,000 \times 3.03)] - 3,93,000 = \text{Rs.}7,80,000$

Profit:                      Sales (-) Cost of goods sold (-) General administration cost  
 $\text{Rs.}9,45,000 (-) \text{Rs.}7,80,000 (-) \text{Rs.}25,000 = \text{Rs.}1,40,000$

**Under WAM:**

Weighted average price:  $\text{Rs.}8,70,000 / 3,00,000 = \text{Rs.}2.90$  each

Value of closing stock

$$(30,000 \times 2.90) + (1,00,000 \times 3.03) = \text{Rs.}3,90,000$$

Cost of goods sold:      Opening stock + Purchases - Closing stock  
 $3,00,000 + [(2,00,000 \times 2.85) + (1,00,000 \times 3.03)] - 3,90,000 = \text{Rs.}7,83,000$

Profit:                      Sales (-) Cost of goods sold (-) General administration cost  
 $\text{Rs.}9,45,000 (-) \text{Rs.}7,83,000 (-) \text{Rs.}25,000 = \text{Rs.}1,37,000$

---

22. Quarterly production 20,000 units

Therefore, annual demand for the product  $(20,000 \times 4)$  80,000 units

Each product requires 0.5 kg of raw material

Therefore, for producing 80,000 units; 40,000 kgs of raw material is required  $(80,000 \times .5)$

a. Re-order point or Re-order level:      Lead time consumption + safety stock  
 $(40000 \times 36 / 360) + 1000 = 5000 \text{ kgs}$

b.	No. of Orders	Quantity	Ordering Cost	Carrying Cost	Discount	Net Cost
	1	40000	100	40,000	4000	36,100
	2	20000	200	20,000	3200	17,000
	4	10000	400	10,000	2000	8,400
	6	6667	600	6,667	400	6,867

c. EOQ =  $\frac{2 \times 40,000 \times 100}{2}$   
           = 2,000 kgs

Therefore, no of orders at EOQ:  $40,000 / 2,000 = 20$  orders

Ordering cost at EOQ =  $(40,000 / 2,000 \times 100) = \text{Rs.}2,000$

Carrying cost at EOQ =  $(2000 / 2) \times 2 = \text{Rs.}2,000$

Ordering cost and carrying cost (total) = **Rs.4,000**

Ordering cost and carrying cost is minimum at EOQ. The company should therefore, place 20 orders.

3.	No. of Orders	Ordering Quantity	Price per ton	Purchase cost	Ordering cost	Carrying cost	Total cost
	1	4000	5.60	22,400	6	2,800	25,206
	2	2000	5.70	22,800	12	1,425	24,237
	4	1000	5.80	23,200	24	725	23,949
✓	5	800	5.80	23,200	30	580	23,810
	8	500	5.90	23,600	48	369	24,017
	10	400	5.90	23,600	60	295	23,955
	16	250	5.90	23,600	96	184	23,880
	20	200	6.00	24,000	120	150	24,270

Note: EOQ formula cannot be used as quantity discounts are offered.

Note: Carrying cost means: **(Ordering quantity/2)xi**

e.g.  $(4000/2) \times (5.60 \times 25\%) = \text{Rs.}2,800$

4. Reorder quantity means EOQ: 3872 units approximately  
 Reorder level:  $750 \times 8 = 6,000$  units  
 Minimum stock level:  $6000 - (500 \times 6.5) = 2750$  units  
 Maximum stock level:  $(6000 + 3872) - (250 \times 5) = 8622$  units  
 Average stock level:  $2750 + (50\% \text{ of } 3872) = 4686$  units

**CHAPTER - 11:****BUDGETARY CONTROL****Production Budget:**

No. of units to be produced: Sales + desired closing stock (-) opening stock  
(finished goods)

**Materials Purchase Budget**

No. of units to be purchased: Consumption + desired closing stock (-) opening stock  
(raw materials)

1. Prepare a Production Budget for three months ending March 31, 2020, for a factory producing four products:

Types of Product	Estimated stock on Jan. 1, 2020 (units)	Estimated Sales during Jan. to Mar. 2020 (units)	Desired Closing stock on Mar. 31, 2020 (units)
A	2,000	10,000	3,000
B	3,000	15,000	5,000
C	4,000	13,000	3,000
D	3,000	12,000	2,000

2. From the following figures, prepare a Raw Materials Purchase Budget for January, 2020:

	Materials (units)		
	A	B	C
Estimated stock on January 1 <sup>st</sup>	16,000	6,000	24,000
Estimated stock on January 31 <sup>st</sup>	20,000	8,000	28,000
Estimated consumption	1,20,000	44,000	1,32,000

3. X Ltd., produces and markets 3 products - Chairs, Tables and Benches. The company is interested in presenting its budget of the next quarter ending 31st March. It expects to sell 4,200 chairs, 800 tables and 500 benches during the said period at the selling price of ₹ 50, ₹ 85, and ₹ 158 per unit. The following information is made available for this purpose:

Inventory levels planned:

Particulars	Chairs (Nos.)	Tables (Nos.)	Benches (Nos.)
Opening stock	400	100	50
Closing stock	200	300	50

Prepare the production budget for the Quarter ending 31st March.

**4. The Sales Director of a company reports that next year he expects to sell 50,000 units of a particular product.**

The production manager consults the storekeeper and casts his figures as follows:  
 Two kinds of raw materials, A and B are required to manufacture the product. Each unit of the product requires 2 units of A and 3 units of B.

The estimated opening balances at the commencement of the next year are:

Finished product: 10,000 units Raw material A: 12,000 units Raw material B: 15,000 units

The desirable closing balances at the commencement of the next year are:

Finished product: 14,000 units Raw material A: 13,000 units Raw material B: 16,000 units

**Draw up a quantitative chart showing Materials Purchase Budget for the next year.**

---

**5. X Ltd. plans to sell 1,10,000 units of a certain product line in the first fiscal quarter; 1,20,000 units in the second quarter; 1,30,000 units in the third quarter; 1,50,000 units in the fourth quarter and 1,40,000 units in the fifth quarter.**

At the beginning of the first quarter of the current year, there are 14,000 units of the product in stock. At the end of each quarter, the company plans to have an inventory equal to one-fifth of the sales for the next fiscal quarter. **How many units must be manufactured in each quarter of the current year?**

---

**6. A company manufactures two products, X and Y. A forecast of units to be sold in the first five months of the year is given below:**

Particulars	Product X (units)	Product Y (units)
January	1,000	2,800
February	1,200	2,800
March	1,600	2,400
April	2,000	2,000
May	2,400	1,600

Particulars	Product X	Product Y
	Rs. Per unit	Rs. Per unit
Direct material	12.50	19.00
Direct labour	4.50	7.00
Factory overheads	3.00	4.00

There will be no opening and closing work in progress at the end of any month and finished product (in units) equal to half of the budgeted sale of the next month should be in stock at the end of each month (including previous year December)

You are required to prepare:

- A. Production budget for January to April; and
- B. Summarized cost of production budget.

**7. Zenith Ltd. has prepared the following Sales Budget for the first five months of 2020**

<b>Month</b>	<b>Sales Budget [units]</b>
January	10,800
February	15,600
March	12,200
April	10,400
May	9,800

Inventory of finished goods at the end of every month is to be equal to 25% of sales estimate for the next month. On 1st January 2020, there were 2,700 units of product on hand. There is no work in progress at the end of any month.

Every unit of product requires two types of materials in the following quantities.

Material A: 4 kg  
Material B: 5 kg

Materials equal to one half of the requirements of the next month's production are to be in hand at the end of every month. This requirement was met on 1st January 2020.

**Prepare the following budgets for the quarter ending on 31st March 2020**

- I] Production Budget – Quantity wise
  - II] Materials Purchase Budget – Quantity wise.
- 

**8. A Ltd. manufactures a single product P with a single grade of labor. The sales budget and finished goods stock budget for the 1st Quarter ending on 30th June 2020 are as follows.**

Sales:	1,400 units
Opening finished units:	100 units
Closing finished units:	140 units

The goods are imported only when production work is complete and it is budgeted that 10% of finished work will be scrapped.

The standard direct labor content of the product P is 3 hours. The budgeted productivity ratio for direct labor is 80% only.

The company employs 36 direct workers who are expected to average 144 working hours each in the 1st quarter.

**You are required to prepare,**

- I] Production Budget
  - II] Direct Labor Budget and
  - III] Comment on the problem that your direct labor budget reveals and suggest how this problem might be overcome.
-

### **Problem on Sales Budget:**

9. AB Ltd. manufactures two products, **A** and **B** and sells them through two divisions, **north** and **south**. For the purpose of submission of Sales Budget to the budget committee the following information is available.

**Budgeted Sales** for the current year were,

Product A:	North 4,000 units @ Rs.9 each,	South 6,000 units @ Rs.9 each
Product B:	North 3,000 units @ Rs.21 each,	South 5,000 units @ Rs.21 each

**Actual sales** for the current year were,

Particulars	North	South
Product A:	5,000 units @ Rs.9 each	7,000 units @ Rs.9 each
Product B:	2,000 units @ Rs.21 each	4,000 units @ Rs.21 each

Adequate market studies reveal that Product A is popular but underpriced. It is observed that if the price of A is increased by Re.1 it will still find a ready market. On the other hand, B is overpriced to customers and the market could absorb more if sales price of B is reduced by Re.1. The management has agreed to give effect to the above price changes.

From the information based on these price changes and reports from salesmen, the following estimates have been prepared by divisional managers.

Percentage increase in sales over current budget is,

Particulars	North	South
Product A:	+ 10%	+ 5%
Product B:	+ 20%	+ 10%

With the help of an intensive advertisement campaign, the following additional sales over the estimated sales of divisional managers are possible.

Additional sales above the estimated sales of divisional managers

Particulars	North	South
Product A	600	700
Product B	400	500

**You are required to prepare a budget for sales incorporating the above estimates and also show the budgeted sales and actual sales for the current year.**

---

### **Problems on Cash Budget:**

**10. Prepare a Cash Budget for May, June and July 2020 on the basis of the following:**

#### **Income and Expenditure Forecasts:**

Month	Credit sales	Credit purchase	Wages	Manufacturing expenses	Office exps.	Selling exps.
March	60,000	36,000	9,000	4,000	2,000	4,000
April	62,000	38,000	8,000	3,000	1,500	5,000
May	64,000	33,000	10,000	4,500	2,500	4,500
June	58,000	35,000	8,500	3,500	2,000	3,500
July	56,000	39,000	9,500	4,000	1,000	4,500
August	60,000	34,000	8,000	3,000	1,500	4,500

- Cash balance on 1<sup>st</sup> May, 2020 Rs.8,000.
- Advance Tax of Rs.8,000 each is payable in March and June.
- Plant costing Rs.16,000 is due for delivery in July, payable 10% on delivery and balance after 3 months.
- Period of credit allowed: i) by suppliers – two months, and ii) to customers – one month.
- Lag in payment of manufacturing expenses –  $\frac{1}{2}$  month
- Lag in payment of office and selling expenses – one month.

**11. ABC Ltd. a newly started company wishes to prepare Cash Budget from January. Prepare a Cash Budget for the first six months from the following estimated revenue and expenses:**

Months	Total sales	Materials	Wages	Prodn OH.	Selling OH.
January	20,000	20,000	4,000	3,200	800
February	22,000	14,000	4,400	3,300	900
March	28,000	14,000	4,600	3,400	900
April	36,000	22,000	4,600	3,500	1,000
May	30,000	20,000	4,000	3,200	900
June	40,000	25,000	5,000	3,600	1,200

- Cash balance on 1<sup>st</sup> January was Rs.10,000.
- A new machinery is to be installed at Rs.20,000 on credit, to be repaid by two equal installments in March and April.
- Sales commission at 5% on total sales is to be paid within a month following actual sales.
- Rs.10,000 being the amount of 2<sup>nd</sup> call may be received in March. Share premium amounting to Rs.2,000 is also obtainable with the 2<sup>nd</sup> call.
- Period of credit allowed: i) by suppliers—two months, and ii) to customers – one month.
- Delay in payment of overheads: one month.
- Delay in payment of wages:  $\frac{1}{2}$  month.
- Assume cash sales to be 50% of total sales.

**12.** ABC Company Ltd., has given the following particulars. You are required to prepare a cash budget for the three months ending 31<sup>st</sup> December, 2019.

<b>a) Month</b>	<b>Sales</b>	<b>Materials</b>	<b>Wages</b>	<b>Overheads</b>
August	20,000	10,200	3,800	1,900
September	21,000	10,000	3,800	2,100
October	23,000	9,800	4,000	2,300
November	25,000	10,000	4,200	2,400
December	30,000	10,800	4,500	2,500

**b) Credit terms are:**

Sales/Debtors—10% sales are on cash basis, 50% of the credit sales are collected next month and the balance in the following month:

Creditors	---	Materials	2 months
	---	Wages	1/5 month
	---	Overheads	½ month

- c)** Cash balance on 1<sup>st</sup> October, 2019 is expected to be Rs.8,000
- d)** A machinery will be installed in August, 2019 at a cost of Rs.1,00,000. The monthly installment of Rs.5,000 is payable from October onwards.
- e)** Dividend at 10% on preference share capital of Rs.3,00,000 will be paid on 1<sup>st</sup> December, 2019.
- f)** Advance to be received for sale of vehicle Rs.20,000 in December 2019.
- g)** Income-tax (advance) to be paid in December 2019 Rs.5,000.

**13. Prepare a Cash Budget from the following information for ABC Ltd.**

<b>Particulars</b>	<b>1st Quarter</b>	<b>2nd Quarter</b>	<b>3rd Quarter</b>	<b>4th Quarter</b>
Opening Cash	10,000			
Collections from customers	1,25,000	1,50,000	1,60,000	2,21,000

**Payments:**

Purchase of materials	20,000	35,000	35,000	54,200
Other expenses	25,000	20,000	20,000	17,000
Salaries and wages	90,000	95,000	95,000	1,09,200
Income Tax	5,000			
Machinery purchase				20,000

The company desires to maintain a cash balance of Rs.15,000 at the end of each quarter. Cash can be borrowed or repaid in multiples of Rs.500 at an interest rate of 10% p.a. Management does not want to borrow cash more than what is necessary and wants to repay as early as possible.

In any event, loans cannot be extended beyond a quarter. Interest is computed and paid when principal is repaid. Assume that borrowing takes place at the beginning and repayments are made at the end of the quarter.

<b>Flexible Budget:</b>	<b>Cost per unit</b>	<b>Total cost</b>
Variable overhead	fixed	varies
Fixed overhead	varies	fixed

**14. The expenses for budget production of 10,000 units in a factory are furnished below:**

	<b>Per unit</b>
Materials	Rs.70
Labour	Rs.25
Variable overheads	Rs.20
Variable expenses (direct)	Rs.5
Fixed overheads (Rs.1,00,000)	Rs.10
Selling expenses (10% fixed)	Rs.13
Distribution expenses (20% fixed)	Rs.7
Administration expenses (Rs.50,000)	Rs.5
 Total cost per unit (to make and sell)	<u>Rs.155</u>

**Prepare a budget for production of:**

- 8,000 units;
- 6,000 units and indicate cost per unit at both the levels.

**Assume that administration expenses are rigid (fixed) for all levels of production.**

**15. Draw up a Flexible Budget for overhead expenses on the basis of the following data and determine the overhead rate at 70%, 80%, and 90% plan capacity:**

	70%	80%	90%
<b>Variable overheads:</b>			
Indirect labour	---	12,000	---
Stores including spares	---	4,000	---
<b>Semi-variable overheads:</b>			
Power (30% fixed)	---	20,000	---
Repairs (60% fixed)	---	2,000	---
<b>Fixed overheads:</b>			
Depreciation	---	11,000	---
Insurance	---	3,000	---
Salaries	---	10,000	---
 <b>Total overheads</b>		<u>Rs.62,000</u>	
 <b>Estimated direct labour hours</b>	---	<b>1,24,000 hrs.</b>	---

**16.** The following data are available for a manufacturing company for a yearly period.

<b>Particulars</b>	<b>Rs. in lakhs</b>
<b><u>FIXED EXPENSES</u></b>	
Wages and Salaries	9.5
Rent, Rates and Taxes	6.6
Depreciation	13.9
<b><u>SEMI-VARIABLE EXPENSES</u></b>	
Maintenance and Repairs	3.5
Indirect Labor	7.9
Sales Department's Salaries	3.8
Sundry Administrative Expenses	2.8
<b><u>VARIABLE EXPENSES [AT 50% CAPACITY]</u></b>	
Materials	21.7
Labor	20.4
Other Expenses	7.9
<b>Total</b>	<b>98.0</b>

Assume that the fixed expenses remain constant at all levels of production.

Semi variable expenses remain constant between 45% and 65% capacity, increasing by 10% between 65% and 80% capacity and by 20% between 80% and 100% capacity.

Sales at various levels are,

- At 50% Rs.100 lakhs
- At 60% Rs.120 lakhs
- At 75% Rs.150 lakhs
- At 90% Rs.180 lakhs
- At 100% Rs.200 lakhs

Prepare a flexible budget for the year at 60% and 90% capacity utilizations and calculate the profits at those levels.

**17.** The monthly budget for manufacturing overheads of a manufacturing company is given below.

Particulars	Capacity 60%	Capacity 100%
Budgeted Production	600 units	1000 units
Wages	Rs.1200	Rs.2000
Consumable Stores	Rs.900	Rs.1500
Maintenance	Rs.1100	Rs.1500
Power and Fuel	Rs.1600	Rs.2000
Depreciation	Rs.4000	Rs.4000
Insurance	Rs.1000	Rs.1000
<b>Total</b>	<b>Rs.9800</b>	<b>Rs.12000</b>

You are required to,

- Indicate which of the items are fixed, variable and semi variable
  - Prepare a budget for 80% capacity
  - Show the total cost, both fixed and variable per unit of output at 60%, 80% and 100% capacity levels.
- 

**18.** The following information relates to the production activities of Goodwish Ltd for 3 months ending on 31st December, 2019.

**Particulars**

**Amount in Rupees**

**Fixed Expenses:**

Management Salaries	2,10,000
Rent and Taxes	1,40,000
Depreciation of Machinery	1,75,000
Sundry Office Expenses	2,22,000
<b>Total Fixed Expenses</b>	<b>7,47,000</b>

**Semi - Variable Expenses at 50% capacity**

Plant Maintenance	62, 500
Labor	2,47,000
Salesmen's salaries	72,500
Sundry Expenses	65,000
<b>Total Semi-Variable Expenses</b>	<b>4,47,000</b>

**Variable Expenses:**

Materials	6,00,000
Labour	6,40,000
Salesmen's commission	95,000
<b>Total Variable Expenses</b>	<b>13,35,000</b>

It is further noted that semi-variable expenses remain constant between 40% and 70% capacity, increase by 10% of the above figures between 70% and 85% capacity and increase by 15% of the above figures between 85% and 100% capacity. Fixed expenses remain constant whatever the level of activity may be.

Sales at 60% capacity are Rs.25,50,000, at 80% capacity Rs.34,00,000 and at 100% capacity Rs.42,50,000. Assuming that all items of produced are sold, prepare a Flexible Budget at 60%, 80% and 100% productive capacity.

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**19.** S.M. Ltd. produces two products, A and B. The budget for these products [at 60% level of activity] for the year 2018-19 gives the following information.

**Particulars**

**Product A**

**Product B**

Raw Material Per Unit	Rs.7.50	Rs.3.50
Direct Labor Per Unit	Rs.4.00	Rs.3.00
Variable Overheads Per Unit	Rs.2.00	Rs.1.50

Fixed Overheads Per Unit	Rs.6.00	Rs.4.50
Selling Price Per Unit	Rs.20.00	Rs.15.00
Production and Sales [Units]	4,000	6,000

The Managing Director, not being satisfied, with the projected results presented above, referred the budget to the Marketing Director for his observations regarding performance improvement.

The Marketing Director suggested that the sales [in quantity] of both the products A and B could be increased by 50% provided the selling price were reduced by 5% and 10% for the products A and B respectively.

The price reduction should be made applicable to the entire sales [in quantity] of both the products A and B. **You are required to prepare a statement of overall profitability on the basis of original budget and the revised budget.**

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**20.**ABC Ltd. manufactures a single product for which market demand exists for additional quantity. Present sales of Rs.60,000 per month utilize only 60% capacity of the plant. Sales Manager assures that with a reduction of 10% in the price, he would be in a position to increase the sales by about 25% to 30%.

The following data are available.

Selling price: Rs.10 per unit

Variable cost: Rs.3 per unit

Semi variable cost: Rs.6,000 fixed plus Rs.0.50 per unit

Fixed cost: Rs.20,000 at present level estimated to be Rs.24,000 at 80% output

You are required to,

- Prepare a statement showing the operating profit at 60%, 70% and 80% levels of capacity utilization at current selling price and at proposed selling price.
  - The percentage increase in the present output which will be required to maintain the present profit margin at the proposed selling price.
-

**ADDITIONAL PROBLEMS FROM BUDGETARY CONTROL:**

21. From the following data, prepare a Production Budget for ABC Co. Ltd., for the six months period ending on 30<sup>th</sup> June, 2019.

Stocks for the budgeted period:

(in Units)

Product	As on 01 January, 2019	As on 30 June, 2019
A	6,000	10,000
B	9,000	8,000
C	12,000	17,500

Product	Normal loss in Production	Requirement to fulfill Sales programme (Units)
A	4%	60,000
B	2%	50,000
C	5%	80,000

22. CT Ltd. provides you the following information: Draw up a Flexible Budget at 90% capacity.

Production capacity	Costs and sales at 80%	(₹ Lakhs) at 60%
Direct Material	2.00	1.50
Direct Labour	2.00	1.50
Direct Expenses	1.60	1.20
Production overheads	4.00	3.85
Administrative overheads	4.00	3.80
Selling & Distribution overheads	4.00	3.75
Sales	20.00	15.00

23. DEFALI LTD. wishes to prepare cash budget for the period of December, 2019 to March, 2020. The Budgeted/Estimated Revenue and Expenses for the said period are as follows:

(Amount in ₹ Lakhs)

Months	Total Sales (₹)	Purchases (materials) (₹)	Wages (₹)	Expenses (Overheads)
September, 2019	80	45	20	4
October, 2019	80	50	22	5
November, 2019	75	52	18	6
December, 2019	90	60	20	6
January, 2020	85	40	18	8
February, 2020	80	35	15	9
March, 2020	95	46	24	9.5

You are further informed that:

- i. 20 % of purchases and the 30% of sales are for cash;
  - ii. Realization is made from debtors 30% in the month of sale, 50% in the month of following that and the balance in the month after that;
  - iii. The credit purchase are paid off regularly after one month;
  - iv. Wages are paid half monthly;
  - v. Rent of ₹ 50,000 per month included in expenses is paid monthly and remaining expenses are paid half monthly;
  - vi. Cash and bank balance as on 1<sup>st</sup> December, 2019 was ₹ 10,00,000 and the company wants to keep it at the end of every month below ₹ 10,00,000 but not less than ₹ 9,00,000, the excess cash being put in fixed deposit in multiples of ₹ 1,00,000.
- Required:** Prepare A CASH BUDGET for the four months ending March 31, 2020.

**Syll-12; Dec-2014; 12 marks**

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**24. ADAMAS Ltd.**, a newly established manufacturing company has an installed capacity to produce 1,00,000 units of a consumer product annually. However, its practical capacity is only 90%. The actual capacity utilization may be substantially lower, as the firm is new to the market and demand is uncertain. The following budget has been prepared for 90% capacity utilization:

	Cost per unit ₹
Direct Materials	12
Direct Labour	8
Direct Expenses	5
Production overheads	10 (40 % variable)
Administrative overheads	5 (100 % fixed)
Selling & Distribution	6 (50 % variable)

You are required to prepare Flexible Budget of a Consumer product at 70% and 80% levels of capacity utilization giving clearly the Variable Cost, Fixed Cost and the Total Costs under various heads at all stated levels.

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**25.** A glass manufacturing company requires you to calculate and present the **MASTER BUDGET** for the year 2019–20 from the following information:

Annual sales: Toughened glasses A	₹ 30,00,000
Toughened glasses B	₹ 50,00,000
Direct material cost	60% of sales
Direct wages	20 workers @ ₹ 1,500 p.m.

**Factory overheads & indirect labour:**

Works manager	₹ 5,000 p.m.
Foreman	₹ 4,000 p.m.
Stores and spares	2.50% of sales
Depreciation on machinery	₹ 1,26,000
Light and power	₹ 50,000
Repairs and maintenance	₹ 80,000
Other sundries	10% of direct wages
Administration, selling & distribution expenses	₹ 1,40,000 p.a.

(Present the fixed and variable overheads separately showing item wise breakup)

**26.** Three articles X, Y and Z are produced in a factory. They pass through two cost centers A and B. From the data furnished, compile a statement for budgeted machine utilization in both the centers.

(a) Sales budget for the year:

Product	Budgeted Sales (units)	Opening stock of finished products (units)	Closing stock
X	4800	600	Equivalent to 2 months sales
Y	2400	300	---do---
Z	2400	800	---do---

(b) Machine hours per unit of product

Product	Cost centers	
	A	B
X	30	70
Y	200	100
Z	30	20

(c) Total number of machines

Cost center A	284
B	256
Total	540

(d) Total working hours during the year: Estimated 2500 hours per machine.

**27.** Production costs of a factory for a year are as follows:

Direct Wages	80,000
Direct Materials	1,20,000
Production Overheads: Fixed	40,000
Variable	60,000

During the forthcoming year it is anticipated that:

- a) The average rate for direct labour remuneration will fall from Rs.0.80 per hour to Rs.0.75 per hour.
- b) Production efficiency will be reduced by 5%
- c) Price per unit of direct material and of other materials and services which comprise overheads will remain unchanged, and
- d) Production in the coming year will increase by  $33\frac{1}{3}\%$

**Draw up a production cost budget.**

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**28.** The following details apply to an annual budget for a manufacturing company.

QUARTER	1st	2nd	3rd	4th
Working days	65	60	55	60
Production (units per working day)	100	110	120	105
Raw material purchases (% by weight of annual total)	30%	50%	20%	---
Budgeted purchase price/Kg.(Rs.)	1	1.05	1.125	---

Quantity of raw material per unit of production 2 kg. Budgeted closing stock of raw material 2,000 kg. Budgeted opening stock of raw material 4,000 kg. (cost Rs.4,000). Issues are priced on FIFO basis.

Calculate the following budgeted figures.

- a) Quarterly and annual purchase of raw material by weight and value.
  - b) Closing quarterly stocks by weight and value
-

**7. Production budget for the quarter ended 31<sup>st</sup> March, 2020**

Month	Estimated Sales	Desired Closing stock	Opening stock	Production (units)
January	10,800	3,900	2,700	12,000
February	15,600	3,050	3,900	14,750
March	12,200	2,600	3,050	11,750

**Material Purchase Budget for the quarter ending 31<sup>st</sup> March, 2020 – Material 'A'**

Month	Estimated Consumption	Desired Closing stock	Opening stock	Purchases (kgs)
January	48,000	29,500	24,000	53,500
February	59,000	23,500	29,500	53,000
March	47,000	20,500	23,500	44,000

Note: Closing stock of March = Half of April month's consumption  
 $= 41,000 \times 50\% = 20,500 \text{ kgs}$

April month's consumption = April month's production x 4  
 $= 10,250 \times 4 = 41,000 \text{ kgs}$

Note: April month production =  $10,400 + 2,450 - 2600 = 10,250 \text{ units}$   
 $= \text{Sales} + \text{Desired closing stock} - \text{Opening stock}$

Note: Opening stock of January = Closing stock of December  
 Closing stock of December = half of January month's consumption  
 $= 48,000 \times 50\% = 24,000$

**Material Purchase Budget for the quarter ending 31<sup>st</sup> March, 2020 – Material 'B'**

Month	Estimated Consumption	Desired Closing stock	Opening stock	Purchases (kgs)
January	60,000	36,875	30,000	66,875
February	73,750	29,375	36,875	66,250
March	58,750	25,625	29,375	55,000

Note: Closing stock of March = Half of April month's consumption  
 $= 51,250 \times 50\% = 25,625 \text{ kgs}$

April month's consumption = April month's production x 4  
 $= 10,250 \times 5 = 51,250 \text{ kgs}$

Note: Opening stock of January = Closing stock of December  
 Closing stock of December = half of January month's consumption  
 $= 60,000 \times 50\% = 30,000$

**25. MASTER BUDGET FOR THE YEAR 2019-20**

**Sales**

- Toughened glass A	30,00,000	
- Toughened glass B	<u>50,00,000</u>	80,00,000

**Less: Cost of sales**

Direct Material (60% of sales)	48,00,000	
Direct Labour (20x1500x12)	<u>3,60,000</u>	
Prime cost		51,60,000

**Factory overheads (variable)**

Stores and spares (2.5% of sales)	2,00,000	
Light and power	50,000	
Repairs and maintenance	80,000	3,30,000

**Factory overheads (fixed)**

Works manager salary	60,000	
Foreman salary	48,000	
Depreciation	1,26,000	
Other sundries	36,000	<u>2,70,000</u>

Gross Profit

Less: Administration, Selling and Distribution overheads

**Net profit**

	57,60,000
	22,40,000
	<u>1,40,000</u>
	<b>21,00,000</b>

# **CHAPTER – 12:**

## **LABOUR**

### **I. Labour Turnover Rates:**

a. **Separation Method:**  $\frac{\text{No.of separations}}{\text{Avge.no.of workers}} \times 100$

b. **Replacement Method:**  $\frac{\text{No.of replacements}}{\text{Avge.no.of workers}} \times 100$

c. **Flux Method:**  $\frac{\text{No.of additions} + \text{No.of separations}}{\text{Avge.no.of workers}} \times 100$

### **Problems on Labour turnover ratios:**

1. From the following data provided to you find out the Labour Turnover Rates by applying: Flux method, Replacement method, Separation method.

No. of workers on the payroll:      At the beginning of the month: 500  
     At the end of the month: 600

During the month, 5 workers left, 20 persons were discharged and 75 workers were recruited. Of these, 10 workers were recruited in the vacancies of those leaving, while the rest were engaged for an expansion scheme.

2. The cost accountant of a company has computed labour turnover rates for the quarter ended 31.3.2019 as 10%, 5%, and 3% respectively under Flux method, Replacement method and Separation method. If the number of workers replaced during the quarter is 30, find out the number of:
- Workers recruited and joined and
  - Workers left and discharged.

### **Problems on calculation of wages and overtime wages:**

3. From the particulars given below, prepare labour cost per man-day of 8 hours:

- a) Basic salary : Rs.2 per day
- b) Dearness Allowance : 25 paise per every point over 100 cost of living index for working class. Current cost of living index is 700 points.
- c) Leave salary : 10% of (a) and (b)
- d) Employer's contribution to P.F : 8% of (a), (b) and (c)
- e) Employer's contribution to State Insurance : 2.5% of (a), (b), and (c)
- f) Expenditure on amenities to labour : Rs.20 per head per mensem
- g) Number of working days in a month : 25 days of 8 hours each.

### **Remuneration and Incentives under different methods:**

<b>Straight piece rate system</b>	:	No. of units produced (x) Rate per piece
<b>Taylor's Differential Piece Rate System</b>	:	Below Standard: 80% of Piece rate At or above standard: 120% of Piece Rate
<b>Merrick Multiple Piece Rate System</b>	:	Up to 83.33% : Ordinary Piece Rate Above 83.33% to 100% : 110% of Piece Rate Above 100% : 120% of Piece Rate
<b>Halsey Plan</b>	:	Earning = Wages for hours worked (+) Bonus for time saved Wages = Time taken (x) Rate per hour Bonus = 50% of time saved (x) Rate per hour
<b>Rowan Plan</b>	:	Earning = Wages for hours worked (+) Bonus for time saved Wages = Time taken (x) Rate per hour
		$\text{Bonus} = \frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{Rate per hour}$
<b>Piece rate with guaranteed time rate</b>	:	Time allowed (in hours) x Rate per hour
<b>Time rate method</b>	:	Time taken (in hours) (x) Rate per hour

4. Calculate earnings of workers A and B under Straight piece rate system and Taylor's differential piece rate system.

Normal Rate per hour Rs.2.40; Standard time per unit 30 seconds.

**Differentials to be applied.** 80% of piece rate below standard;  
120% of piece rate above standard.

Worker A produces 800 units per day and Worker B produces 1,000 units per day.

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

Normal rate per hour Rs.1.80; Standard time to produce 1 units is 20 seconds.

**Differentials to be applied** 80% of piece rate below standard;  
120% of piece rate above standard.

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

6. Calculate the earnings of workers A, B and C under **Merricks Multiple Piece** rate system:

Normal rate per hour Rs.1.80; Standard time per unit 1 minute.

**Output per day is as follows:**

A: 384 units      B: 450 units      C: 552 units

Working hours per day are 8.

7. Using the following data, discuss and illustrate the Halsey and the Rowan Premium Bonus System:

Time allowed 48 hours;      Time taken 40 hours;      Rate per hour Rs.1

8. A worker under the Halsey method of remuneration has a day rate of Rs.12 per week of 48 hours, plus a cost of living bonus of 10 ps. per hour worked. He is given 8 hours task to perform, which he performs in 6 hours, he is allowed 30% of the time saved as premium bonus. What would be his earnings under Halsey Plan and Rowan Plan.

9. Calculate total wages earned (including bonus) by a worker for a working day of 8 hours under Halsey and Rowan Plans: Standard production per hour: 6 units; Total production during the day 64 units; Wage rate Rs.2 per hour

10. A firm employs five workers at an hourly rate of Rs.2.00. During the week, they worked for four days for a total period of 40 hours each and completed a job for which the standard time was 48 hours for each worker. Calculate the labour cost under the Halsey and Rowan methods.

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

12. In an engineering works, the standard time (time allowed) for a job is 16 hours and the basic wage is Re.1 per hour. A bonus scheme is instituted so that worker is to receive his normal rate for hours actually worked and 50% bonus for the time saved. Materials for the job cost Rs.20 and overheads are charged on a basis of Rs.2 per labour hour.

Calculate the wages and effective rate of earnings per hour if the job is completed in:

a) 12 hours    b) 14 hours. Also calculate the cost of the job.

**13.** What will be the earnings of a worker at 55 paise per hour when he takes 140 hours to do a volume of work for which the standard time allowed is 200 hours. The plan of payment of bonus on a sliding scale is as under:

- a) Within the first 10% saving in standard time, the bonus is 40% of the time saved.
- b) Within the second 10% saving in standard time, the bonus is 50% of the time saved.
- c) Within the third 10% saving in standard time, the bonus is 60% of the time saved.
- d) Within the fourth 10% saving in standard time, the bonus is 70% of the time saved.
- e) For the rest the bonus is 75% of the time saved.

**14. Calculate the earnings of a worker from the following information as under:**

Time rate method;      Piece Rate method;      Halsey Plan, and;      Rowan Plan.

Standard time 30 hours;      Time taken 20 hours.

Hourly rate of wages is Re.1 per hour plus a dearness allowance at 50 paise per hour worked.

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

- a) Piece work plan
- b) Time rate
- c) Rowan Plan
- d) Halsey plan

**16.** During first week of April, 2019 the workman Mr.K manufactured 300 articles. He receives wages for a guaranteed 48 hour week at the rate of Rs.4 per hour. The estimated time to produce one article is 10 minutes and under incentive scheme the time allowed is increased by 20%.Calculate his gross wages according to:

- a) Piece work with a guaranteed weekly wages
- (b) Time rate method
- c) Rowan Premium Bonus
- (d) Halsey Premium Bonus.

**17.** Two workmen, Vishnu and Shiva, produce the same product using the same material. Their normal wage rate is also the same. Vishnu is paid bonus according to the Rowan System, while Shiva is paid bonus according to Halsey System. The time allowed to make the product is 100 hours. Vishnu takes 60 hours while Shiva takes 80 hours to complete the product.

The factory overhead rate is Rs.10 per man-hour actually worked. The factory cost for the product for Vishnu is Rs.7,280 and for Shiva it is Rs.7,600.

You are required:-

- (a) to find the normal rate of wages;
- (b) to find the cost of materials;
- (c) to prepare a statement comparing the factory cost of the products as made by the two workmen.

18. In a manufacturing concern the daily wage rate is Rs.2.50. The standard output in a 6-day week is 200 units representing 100% efficiency. The daily wage rate is paid without bonus to those workers who show up to 66 2/3% of the efficiency standards. Beyond this there is a bonus payable on a graded scale as below:-

82% efficiency	-	5% bonus
90% efficiency	-	9% bonus
100% efficiency	-	20% bonus

Further increase of 1% for every 1% further rise in efficiency. In a 6-day week A produced 180 units; B 164 units; C 200 units; D 208 units and E 130 units. **Calculate the earnings of these workers.**

19. A factory has a piece-work scheme for mass production of a certain component for a T.V. manufacturer. The standard production fixed for a day of 8 hours is 40 units. The piece work rate is Rs.4 per piece. The details of remuneration payable to the workers are as follows:

<b>Production</b>	<b>Wages</b>	<b>D.A.</b>	<b>Incentive bonus</b>
Upto 80% efficiency	Wages @ 4 per piece subject to guaranteed minimum wages of Rs.100/day	Rs.60/day	Nil
Above 80%	-do-	-do-	Rs.40 for every 1% increase in efficiency above 80%

Three workers Ram, Salim, Tom gave the following performance for May 2018:

Name of the worker	No. of days worked	Output (units)
Ram	20	480
Salim	24	864
Tom	25	1,100

Calculate their total earnings.

20. Two fitters, a labourer and a boy undertake a job on piece rate basis for Rs.1,290. The time spent by each of them is 220 ordinary working hours. The rates of pay on time rate basis, are Rs.1.50 per hour for each of the two fitters, Re.1 per hour for the labourer and Rs.0.50 per hour for the boy.

Compute the amount of piece-work premium and the share of each worker, when the piece-work premium is divided proportionately to the wages paid.

Compute the selling price of the above job on the basis of the following additional data:-

Cost of the direct material Rs.2,010; works overhead at 20% of prime cost; selling overhead at 10% of works cost and profit at 25% on cost of sales.

### **Calculation of Efficiency and Incentive Bonus and Total Earnings**

21. The standard labour time required for the production of a certain component has been fixed as 4 hours. An incentive scheme was introduced recently to raise labour productivity.

The relevant details of the scheme are as follows:

<i>Efficiency</i>	<i>Incentive as a % of basic wages</i>
Below 100%	No incentive
100% (i.e. 4 hrs./unit)	10%
Above 100%	1% additional incentive for every 1% increase in efficiency above 100%, fractions excluded.

Four workers A, B, C and D produced 16, 12, 14 and 10 units respectively in a particular week of 48 hours. The basic wages of all the workers is 15 per hour.

Calculate the efficiency (%), incentive bonus, total earnings and **labour cost per unit** in respect of each of the above four workers.

22. In a factory bonus system, bonus hours are credited to the employees in the proportion of time taken, which time saved bears to time allowed. Jobs are carried forward from one week to another. No overtime is worked and payment is made in full for all units worked on, including those subsequently rejected.

From the following information you are required to calculate for each employee. (i) The bonus hours and amount of bonus earned (ii) The total wage costs, and (iii) The wages cost of each good unit produced.

Particulars	Worker A	Worker B	Worker C
Basic rate per hour	Rs.10	Rs.16	Rs.12
Units produced	2,600	2,200	3,600
Time allowed for 100 units	2 hours 30 mins	3 hours	1 hour 30 mins
Time taken	52 hours	75 hours	48 hours
Rejects	100 units	40 units	400 units

### **Computation of profit foregone due to Labour Turnover**

23. The management of XYZ Ltd. is worried about the increasing labour turnover in the factory and before analyzing the causes and taking remedial steps; they want to have an idea of the profit foregone as a result of labour turnover during the last year. Last year's sales amounted to Rs.83,03,300 and the profit/volume ratio was 20%.

The total number of actual hours worked by the direct labour force was 4.45 lakhs. As a result of the delays by the Personnel Department in filling vacancies due to labour turnover, 1,00,000 potentially productive hours were lost. The actual direct labour hours included 30,000 hours attributable to training new recruits, out of which, half of the hours were unproductive.

The cost incurred consequent on labour turnover revealed, on analysis the following. Settlement cost due to leaving: Rs.43,820 & Recruitment costs: Rs.26,740. Selection costs: Rs.12,750, & Training costs: Rs.30,490.

Assuming that the potential production lost as a consequence of labour turnover could have been sold at prevailing prices, find the profit foregone last year on account of labour turnover.

---

### **Impact of mechanization on Profit**

24. Management of a manufacturing unit is considering extensive modernization of the factory through progressive mechanization which would result in improved productivity and reduced strength.

Through negotiations with the union, it was agreed that for every 1% increase in productivity, workers would be paid 0.5% incentive wages. It was also agreed that through voluntary retirement the staff strength would be reduced to 300 from the present level of 400.

The following further comparative data are available before and after the proposed mechanization:

<b>Particulars</b>	<b>Before Mechanization</b>	<b>After Mechanization</b>
No. of articles produced per month	50,000	48,000
Fringe benefits	50% of wages	
Wages paid per month	Rs.4,00,000	
Sales per month (value)	Rs.24,00,000	
P/V ratio	25%	

Based on the above data, you are required to work out the annual financial implication of the proposal.

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### **Impact of suggestion system on Total Cost and Earnings**

25. A company uses an old method of machining a part manufactured for sale. The estimates of operating details for the year 2018-19 are as under:

Number of parts to be manufactured and sold	30,000
Raw materials required per part	10 kgs. @ 2 per kg.
Average wage rate per worker	40 per day of 8 hrs.
<b>Average labour efficiency</b>	<b>60%</b>
Standard time required to manufacture one part	2 hrs.
Overhead rate	10 per clock hour
Material handling expenses	2% of the value of raw materials

The company has a suggestion box scheme and an award equivalent to three months saving in labour cost is passed on to the employee whose suggestion is accepted. In response to this scheme suggestion has been received from an employee to use a special Jig in the manufacture of the aforesaid part. The cost of the Jig which has life of one year is Rs.3,000 and the use of the Jig will reduce the standard time by 12 minutes.

Required:

- Compute the amount of award payable to the employee who has given the suggestion.
- Prepare a statement showing the annual cost of production before and after the implementation of the suggestion to use the Jig and indicate the annual savings.
- State the assumptions on which your calculations are based.

### **Impact of Labour Union's agreement on Company's Profit**

26. A firm manufactures a standard electronic component used in television sets. The details of current operations of the firm are as follows:

Number of workers employed	100
Weekly working hours (including lunch break)	48
Average number of hours lost due to idle time per employee per week	8
Standard time required per unit	2 hrs.
Hourly wage rate	Rs.15
Current level of efficiency	80%

For every unit sold the company is getting a cash profit of Rs.120 before charging labour cost [i.e. surplus of sales value over cost of production (only cash expenses), excluding labour cost].

In view of the increasing demand for the product, the firm came to an agreement with the labour union to raise the wage rate by Rs.3 per hour in return for the workers reducing the idle time by 4 hours and raising the operational efficiency to 90%. Evaluate the impact of the decision on the firm's profits.

**18. Calculation of earnings of workers:**

	A	B	C	D	E
A. No. of units produced	180	164	200	208	130
B. Standard output	200	200	200	200	200
C. % of efficiency (A/B*100)	90%	82%	100%	104%	65%
D. Wages @ (2.50 x 6 days)	15	15	15	15	15
E. Bonus(%) on wages	9%	5%	20%	24%	nil
F. Amount of bonus	1.35	.75	3	3.6	nil
G. Total earnings (D+F)	16.35	15.75	18	18.6	15

**19. Calculation of total earnings of workers:**

	Ram	Salim	Tom
A. No. of units produced	480	864	1,100
B. Standard output @ 40 units / day	800	960	1,000 (40 x 25)
C. % of efficiency (a/b x 100)	60%	90%	110%
D. Wages @ 4 / unit or min 100 / day	Rs.2,000	Rs.3,456	Rs.4,400
E. D.A. @ 60 per day	Rs.1,200	Rs.1,440	Rs.1,500
F. Incentive bonus	nil	Rs.400	Rs.1,200
G. Total earnings	<b>Rs.3,200</b>	<b>Rs.5,296</b>	<b>Rs.7,100</b>

Note: Wages for Ram: Rs.100 x 20 days (or) Rs.4 x 480 : Rs.2,000 or Rs.1,920

Wages for Salim: Rs.100 x 24 days (or) Rs.4 x 864: Rs.2,400 or Rs.3,456

Wages for Tom: Rs.100 x 25 days (or) Rs.4 x 1,100: Rs.2,500 or Rs.4,400

Note: Incentive bonus: Salim: 10 x 40 = Rs.400 and for Tom: 30 x 40 = Rs.1,200

**20. Statement showing computation of earnings of each person**

<b>Particulars</b>	<b>F1</b>	<b>F2</b>	<b>Labourer</b>	<b>Boy</b>	<b>Total</b>
Basic wages	330	330	220	110	990
Bonus (wages ratio)	100	100	67	33	300
Total	430	430	287	143	1290

**Computation of selling price of the job:**

Materials	2,010
Labour	<u>1,290</u>
Prime cost	3,300
Add: Work overhead 20%	<u>660</u>
Works cost	3,960
Add: S & D exps 10%	<u>396</u>
Cost of sales	4,356
Add: Profit @ 25%	<u>1,084</u>
Selling price	<u>5,445</u>

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
A. No. of units produced	16	12	14	10
B. Time allowed (4 hrs per unit)	64	48	56	40
C. Time taken	48	48	48	48
D. % efficiency (b/c x 100)	133.33%	100%	116.67%	83.33%
E. Incentive bonus (%)	43%	10%	26%	nil
F. Basic wages @ 15 per hour	Rs.720	Rs.720	Rs.720	Rs.720
G. Incentive bonus	Rs.309.6	Rs.72	Rs.187.20	nil
H. Total earnings	Rs.1,029.60	Rs.792	Rs.907.20	Rs.720
I. Labour cost per unit (h / a)	Rs.64.35	Rs.66	Rs.64.80	Rs.72

Note: Incentive bonus: A: For 133.33% (10% + 33%) ignore fraction

B: For 100% it is 10%

C: For 116.67% (10% + 16%) ignore fraction

	<b>A</b>	<b>B</b>	<b>C</b>
22.No of units produced	2600	2200	3600
Time allowed (hours)	65	66	54
Time taken (hours)	52	75	48
Time saved (bonus hours)	13	nil	6
Bonus earned	Rs.104	nil	Rs.64
Wages	Rs.520	Rs.1200	Rs.576
Earnings or total wage cost (TT x Rate)	Rs.624	Rs.1200	Rs.640
No of goods units produced	2500	2160	3200
Wage cost per good unit	Re..25	Re..56	Re..20

Note: Time allowed: For 100 units = 2.5 hours  
For 2600 units = ? For 100 units = 3 hours  
For 2200 units = ? hours

Note: Bonus = (TT / TA) x TS x Rate per hour  
For 'A' (52/65) x 13 x 10 = Rs.104

23. Actual hours worked	445000
Less: Unproductive hours	<u>15000</u> (30000 x 50%)
Productive hours	<b><u>430000</u></b>

Contribution lost due to labour turnover: Rs.3,86,200  
(83,03,300 / 4,30,000) x 1,00,000 x 20%

Add: Settlement cost	Rs.43,820
Recruitment cost	Rs.26,740
Selection cost	Rs.12,750
Training cost	<u>Rs.30,490</u>

**Total profit foregone due to labour turnover      Rs.5.00.000**

**24. Output per employee:**

Before mechanization:	$50,000/400 = 125$ articles
After mechanization:	$48,000/300 = 160$ articles
Increase in productivity:	$160 - 125 = 35$ articles
% increase in productivity:	$(35/125) \times 100 = 28\%$
Incentive (%):	$28 \times .50 = 14\%$

Selling price per unit: Rs.24 lacs / 50,000 units = Rs.48 per unit

Lower sales after mechanization:  $(50,000 - 48,000) = 2,000$  units

Decrease in sales  $(2,000 \times 12 \times 48) = \text{Rs.}11,52,000$

Loss of contribution due to lower sales:  $\text{Rs.}11,52,000 \times 25\% = \text{Rs.}2,88,000$

**Annual financial implication before and after mechanization:**

	Before <u>Mechanization</u>	After <u>Mechanization</u>
Wages	<u>Rs.48,00,000</u> (4 lacs x 12)	<u>Rs.36,00,000</u> (48 lacs/400 x 300)
Fringe benefits @ 50% of wages	<u>Rs.24,00,000</u>	<u>Rs.18,00,000</u>
Incentive wages (14% of Rs.36 lacs)	<u>nil</u> <u>Rs.72,00,000</u>	<u>Rs.5,04,000</u> <u>Rs.59,04,000</u>
Gross savings p.a. ( $72,00,000 - 59,04,000$ )		<u>Rs.12,96,000</u>
Less: Loss of contribution due to lower sales		<u>Rs.2,88,000</u> (see above)
Increase in annual contribution due to mechanization		<u>Rs.10,08,000</u>

**25.**

	Before <u>Suggestion</u>	After <u>Suggestion</u>
Raw materials ( $30,000 \times 10 \times 2$ )	<u>Rs.6,00,000</u>	<u>Rs.6,00,000</u>
Wages ( $30,000 \times 2)/60\% \times (40/8)$	<u>Rs.5,00,000</u>	<u>Rs.4,50,000</u> ( $90,000 \times 5$ )
Overheads ( $1,00,000 \times 10$ )	<u>Rs.10,00,000</u>	<u>Rs.9,00,000</u> ( $90,000 \times 10$ )
Material handling (2% of Rs.6,00,000)	<u>Rs.12,000</u>	<u>Rs.12,000</u>
Cost of jig	<u>nil</u>	<u>Rs.3,000</u>
Total cost	<u>Rs.21,12,000</u>	<u>Rs.19,65,000</u>
Gross savings in cost	<u>Rs.1,47,000</u>	
Less: Award amount	<u>Rs.12,500</u>	
Net savings in cost	<u>Rs.1,34,500</u>	

**No. of labour hours:**

Before suggestion: $(30,000 \times 2)/60\%$	1,00,000 hours
After suggestion: $(30,000 \times 108/60) / 60\%$	90,000 hours

Rate per hour:  $(\text{Rs.}40/8) = \text{Rs.}5$

Award to the employee: Three months savings in wages  
 $(5,00,000 - 4,50,000) \times 3/12 = \text{Rs.}12,500$

## **CHAPTER – 13:**      **BATCH COSTING**

$$\text{Economic Batch Quantity (EBQ)} = \sqrt{\frac{2AS}{C}}$$

A = Annual demand

S = Setting up cost per batch

C = Carrying cost per unit per annum

1. Calculate Economic Batch Quantity for a company using batch costing:

Annual demand for the components	2400 units
Setting up cost per batch	Rs.100
Manufacturing cost per unit	Rs.200
Carrying cost per unit	6% p.a.

2. OPTIMA LTD. is committed to supply 24000 bearings per annum to BKT Ltd. on a steady basis. It is estimated that it cost ₹0.20 as inventory holding cost per bearing per month and that set up cost per run of bearing manufacture is ₹ 648. What would be the optimum run (batch) size for bearing manufacture?
3. AB Ltd. is committed to supply 24,000 bearings per annum to CD Ltd on a steady basis. It is estimated that it costs 10 paise as inventory holding cost per bearing per month and that the set-up cost per run of bearing manufacture is Rs.324.
  - a) What would be the optimum run size for bearing manufacture?
  - b) What is the minimum inventory holding cost at optimum run size?
  - c) Assuming that the company has a policy of manufacturing 6000 bearing per run, how much extra costs would the company incur as compared to the optimum run suggested in (a)?
4. A factory has to produce and supply 48000 units of a component annually to a customer. The carrying cost per unit is Rs.2 per component per month. The production run set up cost is Rs.3,600 per production run.
  - (i) Find out the economic batch size that must be produced to minimize total cost.
  - (ii) If it is found that the dye and hydraulic mechanism get heated up and consequently the dye has to be replaced by a new one at a cost of Rs.1,200 for each run that has a batch quantity exceeding 1000 units, what batch size would you recommend to minimize overall costs? Substantiate your recommendations with appropriate calculations.
  - (iii) Between the quantities suggested in (i) and (ii) above, how much would be the amount of savings or incremental expenses in (ii) over (i) with cost of dye replacement?

## **JOB COSTING:**

5. A work order for 100 units of a commodity has to pass through four different machines of which the machine hour rates are: Machine P-Rs.1.25, Machine Q-Rs.2.50, Machine R-Rs.3 and Machine S-Rs.2.25. Following expenses have been incurred on the work order – Materials Rs.8,000 and Wages Rs.500.

Machine-P has been engaged for 200 hours. Machine-Q for 160 hours, Machine-R for 240 hours and Machine-S for 132 hours.

After the work order has been completed, materials worth Rs.400 are found to be surplus and are returned to stores.

Office overhead used to be 40% of works cost, but on account of all-round rise in the cost of administration, distribution and sale, there has been a 50% rise in the office overhead expenditure.

Moreover, it is known that 10% of production will have to be scrapped as not being up to the specification and the sale proceeds of the scrapped output will be only 5% of the cost of sale.

If the manufacturer wants to make a profit of 20% on the total cost of the work order, find out the selling price of a unit of commodity ready for sale. Pg.238 ill:2

6. In a factory following the Job Costing method, an abstract from the work in process as at 30th September, was prepared as under.

<b>Job No.</b>	<b>Materials</b>	<b>Direct Labour</b>	<b>Factory OH applied (Rs.)</b>
115	Rs.1,325	400 hrs	Rs.800
118	Rs.810	250 hrs	Rs.500
120	Rs.765	300 hrs	Rs.475
	<b>Rs.2,900</b>		<b>Rs.1,775</b>
			<b>Rs.1,420</b>

### **Materials used in October were as follows:**

Material requisitions no.	Job no.	Cost (Rs.)
54	118	300
55	118	425
56	118	515
57	120	665
58	121	910
59	124	720
		<b>3,535</b>

A summary of Labour hours deployed during October is as under:

JOB NO.	NUMBER OF HOURS	
	SHOP A	SHOP B
115	25 x 3	25 x 2
118	90 x 3	30 x 2
120	75 x 3	10 x 2
121	65	-
124	20	10
	275	75
<b>Indirect Labour:</b>		
Waiting for material	20	10
Machine breakdown	10	5
Idle time	5	6
Overtime premium	6	5
	316	101

A shop credit slip was issued in October, that material issued under requisition No.54 was returned back to stores as being not suitable. A material transfer note issued in October indicated that material issued under requisition No.55 for Job 118 was directed to Job 124.

The hourly rate in shop A per labour hour is Rs.3 while at shop B it is Rs.2 per hour.

The factory overhead is applied at the same rate as in September; Jobs 115, 118 and 120 were completed in October.

You are asked to compute the factory cost of the completed jobs.

It is practice of the management to put a 10% on the factory cost to cover administration and selling overheads and invoice the job to the customer on a total cost plus 20% basis what would be the invoice price of these three jobs?

P.g.243 ill-6

7. Component 'Gold' is made entirely in cost centre 100. Material cost is 6 paise per component and each component takes 10 minutes to produce. The machine operator is paid 72 paise per hour, and machine hour rate is Rs.1.50.

The setting up of the machine to produce the component 'Gold' takes 2 hours 20 minutes.

On the basis of this information, prepare a cost sheet showing the production and setting up cost, both in total and per component, assuming that a batch of:

- (a) 10 components,
- (b) 100 components, and
- (c) 1000 components is produced.

**Answer:**

	10 units		100 units		1000 units	
	Per unit	total	Per unit	total	Per unit	total
<b>Production cost:</b>						
A. Material	.06	.60	.06	6.00	.06	60
B. Labour (operator)	.12	1.20	.12	12.00	.12	120
C. Machine exps	.25	2.50	.25	25.00	.25	250
<b>Setting up cost:</b>						
A. Labour (operator)	.168	1.68	.0168	1.68	.00168	1.68
B. Mach exps	.35	3.50	.035	3.50	.0035	3.50
<b>Total Cost</b>	<b>.948</b>	<b>9.48</b>	<b>.4818</b>	<b>48.18</b>	<b>.43518</b>	<b>435.18</b>

- Note:** a. Material is variable cost  
 b. Operator wages includes both variable cost and fixed cost  
 c. Machine expenses includes both variable and fixed cost.

**Variable cost:**

Labour cost per unit: 1 unit in 10 mins. Hence in 1 hr = 6 units can be produced. Rate per unit (.72/6) = .12  
 Machine expenses: 1 unit in 10 mins. Hence in 1 hr = 6 units can be produced. Rate per unit (1.50/6) = .25

**Fixed cost - Setting up time:**

Wages to operator during setting up time: For 1 hour = Rs.0.72. Hence for 2 hrs and 20 mins or for 140 mins it is (.72 x 140)/60 = Rs.1.68

Machine expenses during setting up time: For 1 hour = Rs.1.50. Hence for 2 hrs and 20 mins or for 140 mins it is (1.50 x 140)/60 = Rs.3.50

8. **SARATHI & CO** is manufacturing building bricks and fire bricks. Both the products require two processes: Brick forming & Heat treatment. The requirements for the two bricks are:

	<b>Building Bricks</b>	<b>Fire Bricks</b>
Forming per 100 bricks	6 hours	4 hours
Heat treatment per 100 bricks	4 hours	10 hours

**Total costs of the two departments in one month were:**

Forming	Rs.42,400
Heat treatment	Rs.97,600

**Production during the month was:**

Building bricks	1,30,000 numbers
Fire bricks	70,000 numbers

**Required:** Prepare statement of manufacturing cost for the two varieties of bricks.

## COST ACCOUNTING STANDARDS

Cost Accounting Standards are set of standards that are designed to achieve uniformity and consistency in cost accounting principles and practices.

The Institute of Cost Accountants of India, recognising the need for structured approach to the measurement of cost in manufacture or service sector and to provide guidance to the user organisations, government bodies, regulators, research agencies and academic institutions to achieve **uniformity** and **consistency** in classification, measurement and assignment of cost to products and services, has constituted **Cost Accounting Standards Board (CASB)** with the objective of formulating the Cost Accounting Standards.

The Cost Accounting Standards:

- ▶ Provide a structured approach to measurement of costs in manufacturing process or service industry
- ▶ Integrate, harmonize, and standardize cost accounting principles and practicesProvide guidance to users to achieve uniformity and consistency in classification, measurement, assignment, and allocation of costs to products or services
- ▶ Arrive at the basis of computing the cost of product, activity, or service where required by legal or regulatory bodies
- ▶ Enable practicing members to make use of Cost Accounting Standards in the attestation of General Purpose Cost Statements and
- ▶ Assist in clear and uniform understanding of all the related issues of various user organizations, government bodies, regulators, research agencies and academic institutions.

## CAS-1

### Cost Accounting Standard on Classification of Cost

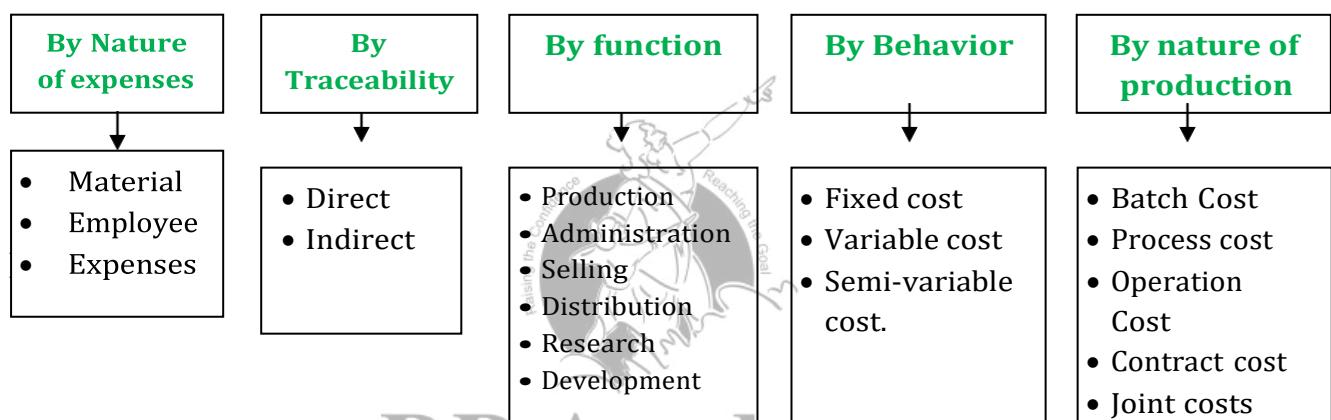
The standard deals with the Classification of cost.

**Objective:** - To bring uniformity and consistency

**Principles of Measurement:-**

Costs shall be classified by the process of grouping the components of cost under a common designation on the basis of similarities of nature, attributes or relations. items grouped together under common heads shall be further classified according to their fundamental differences.

**Classification of Costs:-**



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## CAS-2

### Cost Accounting Standard on Capacity Determination

The standard deals with the following issues.

- Standard deals with the principles and methods of determining the capacity
- Standard deals with the principles and methods of classification and determination of capacity

**Objective:**- To bring uniformity and consistency

**Definitions-**

- **Installed capacity:** Installed capacity is the maximum capacity of producing goods or providing services.
- **Normal Capacity:** Installed capacity - Internal factors (eg. Preventive Maintenance, lunch time etc.)
- **Actual capacity utilization:** Volume of production achieved or service provided in a specified period.

- ➡ **Abnormal Idle Capacity:** Abnormal idle capacity is the difference between normal capacity and actual capacity utilization.
- ➡ **Normal Idle Capacity:** Normal idle capacity is the difference between installed and normal capacity.

### **Principles of Measurement:-**

- ➡ Capacity shall be determined in terms of units of production or equivalent machine or man hours.
- ➡ **Installed capacity** is usually determined based on:
  1. Manufacturer's specification
  2. Individual or Inter-related production or Operation Centre Capacities
  3. Operational Constraints
  4. No. of shifts
  5. Technical evaluation
- ➡ **Normal capacity (PAC)** is determined after suitable adjustments to the Installed Capacity.
  - (i) Time lost due to preventive maintenance
  - (ii) Holidays, normal shut down days, normal idle time,
  - (iii) Normal time lost in batch change over

#### **Example:**

- A plant operates 3 shifts of 8 hours each for all days except Sundays and 8 holidays.
- Preventive maintenance is taken care in Sundays and annual maintenance in 8 holidays.
- Normal idle time for food, shift change and other work for the workers is 1 hour per shift.
- Installed Capacity of the machine = 1200 units per hour.
- Production during last 5 years & Current year are 69.4, 72.6, 71.4, 70.5, 70.8, 69.9 lakh units

Determine according to CAS 2, Installed capacity, Normal capacity, Actual capacity, Idle capacity, abnormal idle capacity.

## **CAS-3**

### **Cost Accounting Standard on Production and Operation Overhead**

#### **The standard deals with the following issues.**

- ➡ Standard deals with the principles and methods of determining the production and operation overhead.
- ➡ Standard deals with the principles and methods of classification, measurement and assignment of production and operation overhead.

#### **Objective:-** To bring uniformity and consistency

## Definitions-

- **Production or Operation Overheads:** Indirect costs involved in the production of a product or in providing service.

## Principles of Measurement:-

- Procurement of resources = Invoice price + Taxes + freight inwards, + Insurance + other expenditure- trade discount - rebate
- In House Production & Operation Overheads: Shall be valued at total of actual cost incurred for the activity.
- Finance Cost is not includable. Abnormal Cost is not includable.
- Imputed Cost is not includable (except depreciation) ( e.g : Salary for the proprietor)
- Subsidy, Grant on Service or incentive received from Govt. or other Money back agencies shall be reduced on products.
- Fines, penalties, damages paid to statutory authorities or other shall not form part of the Overheads.

## CAS-4

### Cost Accounting Standard on Cost of Production for Captive Consumption



**Objective:-** To bring uniformity and consistency

## Definitions-

- **Captive Consumption:** Captive Consumption means the consumption of goods manufactured by one division or unit and consumed by another division or unit of the same organization or related undertaking for manufacturing another product(s).

## Principles of Measurement:-

This standard should be applied to cost statements which require classification, measurement, assignment, presentation, and disclosure of related costs for determination of the following under the relevant provisions of GST Acts/Rules.

- (i) Determination of cost of production of goods;
- (ii) Determination of cost of acquisition of goods;
- (iii) Determination of cost of supply of goods;
- (iv) Determination of cost of provision/supply of services; and
- (v) Determination of value of supply of goods or services as per open market value or as per or as per goods or services of like kind and quality.

## CAS-5

### Cost Accounting Standard on Average Cost of Transportation

#### Objective:-

- To bring uniformity and consistency
- To provide transparency in the determination of cost of transportation.

#### Definitions-

- **Cost of Transportation** comprises of the cost of freight, cartage, transit insurance and cost of operating fleet and other incidental charges whether incurred internally or paid to an outside agency for transportation of goods but does not include detention and demurrage charges.
- **Inward Transportation** cost is the transportation expenses incurred in connection with materials /goods received at factory or place of use or sale/removal.
- **Outward Transportation** cost is the transportation expenses incurred in connection with the sale or delivery of materials or goods from factory or depot or any other place from where goods are sold / removed.
- **Freight** is the charges paid or payable for transporting materials/ goods from one location to another.
- **Cartage** is the expenses incurred for movement of goods covering short distance for further transportation for delivery to customer or storage.
- **Transit insurance** cost is the amount of premium to be paid to cover the risk of loss /damage to the goods in transit.
- **Depot** is the bounded premises /place managed internally or by an agent, including consignment agent and C & F agent, franchisee for storing of materials/goods for further dispatch including the premises of Consignment Agent and C&F Agent for the purpose.
- **Equalized transportation** cost means average transportation cost incurred during a specified period.

#### Principles of Measurement:-

- Inward transportation costs shall form the part of the cost of procurement of materials which are to be identified for proper allocation/ apportionment to the materials / products.
- Outward transportation cost shall form the part of the cost of sale and shall be allocated / apportioned to the materials and goods on a suitable basis.

- The following basis may be used, in order of priority, for apportionment of outward transportation cost depending upon the nature of products, unit of measurement followed and type of transport used :

Weight, Volume of goods, Tonne -Km, Value of goods, Percentage of usage of space

Once a basis of apportionment is adopted, the same should be followed consistently.

- Abnormal and non recurring cost shall not be a part of transportation cost.

## CAS-6

### Cost Accounting Standard on Material Cost

**The standard deals with the following issues.**

This standard deals with the principles and methods of classification, measurement and assignment of **material cost**, for determination of the Cost of product or service, and the presentation and disclosure in cost statements.

**Objective:-** To bring uniformity and consistency

#### Principles of Measurement:-

- Material Cost = Purchase price + Taxes + freight inwards, + Insurance + other expenditure - Trade Discount- rebate - Tax Credit
- **Finance costs** incurred in connection with the acquisition of materials shall not form part of material cost.
- **Self manufactured** components/sub-assemblies shall be valued= Direct material + employee cost+ expenses + factory overheads + administrative overheads (but excluding other administrative overheads, finance cost and marketing overheads.)
- **Normal loss** or spoilage of material prior to reaching the factory shall be absorbed in the cost of balance materials net of amounts recoverable from suppliers, insurers, carriers or recoveries from disposal.
- Losses due to **shrinkage** or **evaporation** and gain due to absorption of moisture etc., before the material is received shall be absorbed in material cost to the extent they are normal, with corresponding adjustment in the quantity. The adjustment for moisture will depend on whether dry weight is used for measurement.
- Subsidy/Grant/Incentive shall be reduced from cost.

**CAS-7****Cost Accounting Standard on Employee Cost**

**The standard deals with the following issues.**

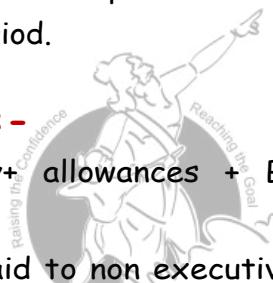
Principles and methods of classification, measurement and assignment of Employee cost.

**Objective:** - To bring uniformity and consistency

**Definitions-**

**Employee cost:** Benefits paid or payable for the services rendered by employees (including temporary, part time and contract employees) of an entity.

- ➡ Contract employees include employees directly engaged by the employer on contract basis but does not include employees of any contractor engaged in the organisation.
- ➡ Compensation paid to employees for the past period on account of any dispute / court orders shall not form part of employee cost.
- ➡ Short provisions of prior period made up in current period shall not form part of the employee cost in the current period.

**Principles of Measurement:-**

- ➡ Employee Cost = Gross Pay + allowances + Bonus + Ex Gratia + Managerial Remuneration + other
- ➡ **Explanation:** Remuneration paid to non executive directors shall not form part of Employee Cost but shall form part of Administrative Overheads.

**RR Academy****CAS-8****Cost Accounting Standard on Cost of Utility**

**The standard deals with the following issues.**

- ➡ Methods of determining the Cost of Utility.
- ➡ Principles and methods of classification, measurement and assignment of Cost of utility.

**Objective:-** To bring uniformity and consistency

**Definitions-**

- ➡ **Utilities:** Significant inputs such as power, steam, water, compressed air etc. which are used for manufacturing process but do not form part of the final product.

**Principles of Measurement:-**

- ➡ Cost of utilities **purchased** = Cost of purchase + Taxes + Transportation + Exp.- Trade
- ➡ Disc. Cost of **self generated** utilities for own consumption shall comprise direct material cost, direct employee cost, direct expenses and factory overheads.

- ➡ Cost of Utilities (**For inter company transfers**) = DM cost + Direct employee cost + direct expenses, factory overheads, distribution cost and share of administrative overheads.
- ➡ Cost of Utilities (**For Sale to outside parties**) = Direct material + direct employee + direct expenses, factory overheads, distribution cost, share of administrative overheads and marketing overheads.

## CAS-9

### Cost Accounting Standard on Packing Material Cost

**The standard deals with the following issues.**

- ➡ Principles and methods of classification, measurement and assignment of Packing
- ➡ Material cost. Packing material is classified into primary and secondary packing material.

**Objective:-** To bring uniformity and consistency.

#### Definitions-

- ➡ **Packing Materials:** Materials used to hold, identify, describe, store, protect, display, transport, promote and make the product marketable.
- ➡ **Packing Material Cost:** The cost of material for the purpose of packing of a product.
- ➡ **Primary Packing Material:** which is essential to hold and preserve the product for its use.
- ➡ **Secondary Packing Material:** Packing material that enables to store, transport, inform the customer, promote and otherwise make the product marketable.

#### Principles of Measurement:-

- ➡ **Packing Material Cost** = Purchase price + Taxes + freight inwards + Insurance + other. Self manufactured packing material shall be valued at total of direct material cost, direct employee cost, direct expenses, production overheads & administrative overheads relating to production, Administrative overheads not relating to production or marketing overheads includable or not part of cost.

## CAS-10

### Cost Accounting Standard on Direct Expenses

**The standard deals with the following issues.**

- ➡ Methods of determining the Direct Expenses.
- ➡ Principles and methods of classification, measurement and assignment of Direct Expenses.

**Objective:-** To bring uniformity and consistency.

## Definitions-

**Direct Expenses:** Expenses relating to manufacture of a product or rendering a service, which can be identified or linked with the cost object other than direct material cost and direct employee cost.

## Principles of Measurement:-

- Direct Expenses (Brought out resources) = Invoice price + Taxes + other expenditure

## CAS-11

### Cost Accounting Standard on Administrative Overheads

The standard deals with the following issues.

- Methods of determining the Administrative overheads.
- Principles and methods of classification, measurement and assignment of Administrative overheads.

**Objective:-** To bring uniformity and consistency in determining the Administrative overheads.



## Definitions-

- **Administrative Overheads:** Cost of all activities relating to general management and administration of an entity.

## Principles of Measurement:-

- Administrative overheads = Aggregate of cost of resources consumed in activities relating to general management and administration of an organization.
- In case of leased assets-
  - If the lease is an operating lease= Entire rentals
  - If the lease is a financial lease= finance cost portion shall be segregated and treated as part of finance costs.
- The cost of software = Amortised over its estimated useful life.
- Cost of administrative services (outside) = Invoice price + Taxes + other Expenditure- Trade Discount
- Administrative overheads shall not include any abnormal administrative cost.

## CAS-12

### Cost Accounting Standard on Repair and Maintenance Cost

**The standard deals with the following issues.**

- Methods of determining the Repair and Maintenance Cost.
- Principles and methods of classification, measurement and assignment of Repair and Maintenance Cost.

**Objective:** - To bring uniformity and consistency in determining the Repair and Maintenance Cost.

#### Definitions-

- **Repairs and maintenance cost:** Cost of all activities which have the objective of maintaining or restoring an asset in or to a state in which it can perform its required function at intended capacity and efficiency.

#### Principles of Measurement:-

- Repairs and maintenance cost = Direct + Indirect cost of repairs and maintenance activity.
- Cost of **in-house** repairs and maintenance activity shall include cost of materials, consumable stores, spares, manpower, equipment usage, utilities, and other resources used in such activity.
- Cost of repairs and maintenance activity carried out by **outside contractors** **inside the entity** shall include charges payable to the contractor and cost of materials, consumable stores, spares, manpower, equipment usage, utilities, and other costs incurred by the entity for such jobs.

## CAS-13

### Cost Accounting Standard on Cost of Service Cost Centre

**The standard deals with the following issues.**

- Methods of determining the cost of Service Cost Centre.
- Principles and methods of classification, measurement and assignment of cost of Service Cost Centre.

**Objective:** - To bring uniformity and consistency in determining the cost of Service Cost Centre.

## Definitions-

**Stand-by service:** Any facility created as backup against any failure of the main source of service.

**Support-Service Cost Centre:** The cost centre which primarily provides auxiliary services across the entity.

The cost centre which provides services to Production, Operation or other Service Cost Centre but not directly engaged in manufacturing process or operation is a service cost centre. A service cost centre renders services to other cost centres / other units and in some cases to outside parties.

- Cost of Service Cost Centre shall be presented as a separate cost.

## CAS-14

### Cost Accounting Standard on Pollution Control Cost

**The standard deals with the following issues.**

- Methods of determining the Pollution control cost.
- Principles and methods of classification, measurement and assignment of Pollution control cost.

**Objective:** - To bring uniformity and consistency in determining the Pollution control cost.

#### Principles of Measurement:-

- Pollution Control costs shall be the aggregate of direct and indirect cost relating to Pollution Control activity.
- Future remediation or disposal costs which are expected to be incurred with reasonable certainty as part of Onerous Contract or Constructive Obligation, legally enforceable shall be estimated and accounted based on the quantum of pollution generated in each period and the associated cost of remediation or disposal in future.
- Contingent future remediation or disposal costs e.g. those likely to arise on account of future legislative changes on pollution control shall not be treated as cost until the incidence of such costs become reasonably certain and can be measured.
- Cost of in-house = cost of materials, consumable stores, spares, manpower, equipment usage, utilities, and other resources used in such activity.

## CAS-15

### Cost Accounting Standard on Selling and Distribution Overheads

**The standard deals with the following issues.**

- ➡ Methods of determining the Selling and Distribution Overheads.
- ➡ Principles and methods of classification, measurement and assignment of Selling and Distribution Overheads.

**Objective:** - To bring uniformity and consistency in determining the Selling and Distribution Overheads.

#### **Definitions-**

**Selling Overheads:** Selling overheads are the expenses related to sale of products or services and include all indirect expenses incurred in selling the products or services.

For Example:

1. Salaries of sales personnel , 2. Travelling expenses of sales personnel, 3. Commission to sales agents 4. Sales and brand promotion expenses , 5. Receivable Collection costs,
6. After sales service costs 7. Warranty costs.

#### **Principles of Measurement:-**

- ➡ Selling and Distribution Overheads = Cost of resources consumed.
- ➡ Cost of resources (From Outside) = Invoice price + duties and taxes + other expenditure.
- ➡ Cost of after Sales Service provided in terms of sale agreement for a class of transactions, shall be determined on rational and scientific basis, net of any recovery on the service.
- ➡ Selling and Distribution Overheads, the benefits of which are expected to be derived over a long period, shall be amortised on a rational basis.
- ➡ Any abnormal cost relating to selling and distribution activity shall be excluded.

## CAS-16

### Cost Accounting Standard on Depreciation and Amortization

**The standard deals with the following issues.**

- ➡ Methods of determining the Depreciation.
- ➡ Principles and methods of classification, measurement and assignment of Depreciation & Amortization.

**Objective:-** To bring uniformity and consistency in determining the Depreciation & Amortization.

### **Definitions-**

- ➔ **Amortisation:** Amortization is the systematic allocation of the depreciable amount of an intangible asset over its useful life.
- ➔ **Depreciation:** Depreciation is the systematic allocation of the depreciable amount of an asset over its useful life.

### **Principles of Measurement:-**

- ➔ Depreciation and Amortization shall be measured based on the depreciable amount and the useful life.
- ➔ The residual value of an intangible asset shall be assumed to be zero unless:
  - (a) There is a commitment by a third party to purchase the asset at the end of its useful life; or
  - (b) There is an active market for the asset and: to reflect the changed pattern.

## **CAS-17**

### **Cost Accounting Standard on Interest and Financing Charges**

**The standard deals with the following issues.**

- ➔ Principles and methods of classification, measurement and assignment of Interest and Financing Charges.

**Objective:-** To bring uniformity and consistency in determining the Interest and Financing Charges.

### **Definitions-**

- ➔ **Interest and Finance charges:** Interest, including any payment in the nature of interest for use of non equity funds and incidental cost that an entity incurs in arranging those funds.
  - Interest and commitment charges on bank borrowings, other borrowings;
  - Amortization of discounts or premium related to borrowings;
  - Amortization of ancillary cost incurred in connection with the arrangements of borrowings;
  - Exchange differences arising from foreign currency borrowings.
  - Cash discount allowed to customers.

### **Principles of Measurement:**

- ➔ Interest and Financing Charges incurred shall be identified for :
  - (a) Acquisition / construction/ production of qualifying assets including fixed assets; and
  - (b) Other finance costs for production of goods/ operations or services rendered which cannot be classified as qualifying assets.

- Interest and Financing Charges directly attributable to the acquisition /construction/ production of a qualifying asset shall be included in the cost of the asset.
- Interest paid for or **received** on investment shall not form part of the other financing charges.
- Penal Interest for delayed payment, Fines, penalties, damages and similar levies paid to statutory authorities or other third parties shall not form part of the Interest and Financing Charges.
- In case the company delays the payment of Statutory dues beyond the stipulated date, interest paid for delayed payment shall not be treated as penal interest.

## CAS-18

### Cost Accounting Standard on Research and Development Costs

The standard deals with the following issues.

- Principles and methods of classification, measurement and assignment of Research and Development.

**Objective:** - To bring **uniformity and consistency** in determining the Research and Development Costs.

#### Definitions-

- **Research:** Research is original and planned investigation undertaken with the prospect of gaining new scientific or technical knowledge and understanding (Adapted AS 26).
- **Development cost:** Development cost is the cost for application of research finding or other knowledge to a plan or design for the production of new or substantially improved materials, devices, products, processes, systems, or services before the start of commercial production or use.
- **Research Cost:** Research cost is the cost of original and planned investigation undertaken with the prospect of gaining new scientific or technical knowledge and understanding.

#### Principles of Measurement:

- Research, and Development Costs shall include all the costs that are directly traceable to research and/or development activities or that can be assigned to research and development activities strictly on the basis of (a) cause and effect or (b) benefits received.
- Fines, penalties, damages and similar levies paid to statutory authorities or other third parties shall not form part of the Research and Development Costs.

## CAS-19

### Cost Accounting Standard on Joint Cost

**The standard deals with the following issues.**

- Principles and methods of classification, measurement and assignment of Joint Cost.

**Objective:-** To bring uniformity and consistency in determining the Joint Cost.

#### **Definitions-**

- **By-Product:** Product with relatively low value produced incidentally in the manufacturing of the product or service.
- **Joint Costs:** Joint costs are the cost of common resources used to produce two or more products or services simultaneously.
- **Joint product:** Products or services that are produced simultaneously, by the same process, identifiable at the end of the process and recognised as main products or services having sufficient value.
- **Split off point:** The point in the production process at which joint products become separately identifiable. The terms split off point and separation point are used interchangeably.
- **Waste:** Material lost during production or storage and discarded material which may or may not have any value.

#### **Principles of Measurement:**

- Joint costs upto the split off point = Same as stipulated in other cost accounting standards.
- Joint Cost after split-off point (Product separately identifiable) = Resources consumed.
- Cost incurred after split- off point (further processing) = Direct + Indirect costs.
- Cost of further processing (by outside parties)= Invoice price + duties and taxes - Discounts (other than cash discount).
- Realizable value of scrap and waste shall be deducted from the cost of Joint Product. Penalties, damages paid to statutory authorities or other third parties shall not form part of the cost of the joint product /By-Product.

## CAS-20

### Cost Accounting Standard on Royalty and Technical Know-How Fees

**The standard deals with the following issues.**

- Principles and methods of classification, measurement and assignment of Royalty and Technical Fees.

**Objective:-** To bring **uniformity and consistency** in determining the Royalty and Technical Fees.

### Definitions-

- ▶ **Royalty:** Royalty is any consideration for the use of asset (tangible and/or intangible) to the owner.
- ▶ **Technical service fee:** Technical service fee is any consideration payable to provider of technical or managerial services.

### Principles of Measurement:

- ▶ One - time payment shall be amortized on the basis of the estimated output or benefit to be derived from the related asset.
- ▶ On recurring basis = On any of the following basis:
  - a. Units produced
  - b. Units sold
  - c. Sales value

## CAS-21

### Cost Accounting Standard on Quality Control Cost

The standard deals with the following issues.

Principles and methods of classification, measurement and assignment of Quality

Control Cost. **Objective:-** To bring **uniformity and consistency** in determining the Quality Control Cost. **Definitions-**

- ▶ **Quality:** Quality is the conformance to requirements or specifications.
- ▶ **Quality control:** A procedure or a set of procedures exclusively designed to ensure that the manufactured products or performed service adhere to a defined set of quality criterion or meets requirement of the client or the customer.
- ▶ **Quality Control Cost:** Cost of resources consumed towards quality control procedures.

### Principles of Measurement:

- ▶ Quality Control Cost (In-house) = Cost of resources consumed.  
Procured from outside = Invoice Price + Taxes + Other expenditure - Discounts (other than cash discounts).

## CAS-22

### Cost Accounting Standard on Manufacturing Costs

**The standard deals with the following issues.**

- Principles and methods of classification, measurement and assignment of Manufacturing Cost.

**Objective:-** To bring **uniformity and consistency** in determining the Manufacturing Cost.

#### Definitions-

- **Manufacturing Cost:** Manufacturing cost of an excisable good is the aggregate of costs of all resources used in the process of its manufacturing.
- **Manufacturing Overheads:** Indirect costs involved in the manufacturing process

#### Assignment of costs

- Manufacturing Cost to the cost objects shall be based on either of the following two principles:
  - Cause and Effect - Cause is the process or activity and effect is the incurrence of cost.
  - Benefits received - Interest and Financing Charges are to be apportioned to the various cost objects in proportion to the benefits received by them.
- The variable manufacturing/production overheads shall be absorbed based on actual production.
- The fixed manufacturing/production overheads and other similar item of fixed costs such as quality control cost, research and development costs and administrative overheads relating to manufacturing shall be absorbed in the manufacturing cost on the basis of the normal capacity or actual capacity utilization of the plant, whichever is higher.

## CAS-23

### Cost Accounting Standard on Overburden removal Cost Costs

**The standard deals with the following issues.**

- Principles and methods of classification, measurement and assignment of overburden removal Cost.

**Objective:-** To bring **uniformity and consistency** in determining the overburden removal Cost.

### **Definitions-**

- ➡ **Overburden:** It is the overlying materials generally having no commercial value.
- ➡ **Overburden Removal cost:** is the cost incurred to remove the overlying material from the **mine site**.

### **Principles of Measurement:**

- ➡ Overburden Removal Cost shall be the aggregate of direct and indirect cost relating to overburden removal activity.
- ➡ Cost of overburden removal activity carried out by outsourcing shall be determined at agreed price as per contract price including duties and taxes and other expenditure directly attributable thereto. The cost shall also include the cost of resources provided to the contractor by the company.
- ➡ Cost of overburden removal activity of each mine shall be computed and considered separately.
- ➡ Interest paid for or received on investment shall not form part of the overburden removal Cost.
- ➡ Penal Interest for delayed payment, Fines, penalties, damages and similar levies paid to statutory authorities or other third parties shall not form part of the overburden removal Cost.



## **RR Academy** **CAS-24**

### **Cost Accounting Standard on Treatment of Revenue in Cost statements**

**The standard deals with the following issues.**

- ➡ Principles and methods of classification, measurement and assignment of revenue in Cost statements

**Objective:-** To bring **uniformity and consistency** in principles and methods for treatment of revenue in Cost statements with reasonable accuracy.

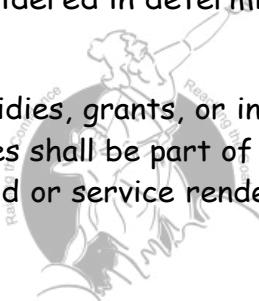
### **Definition:**

- ➡ **Net Sales Realization:** is the revenue from operations net of discounts and indirect taxes.
- ➡ **Other Income:** is the income that cannot be classified as revenue from operations.
- ➡ **Reporting Period:** is the period for which the cost statements are prepared.

- ▶ **Revenue:** The terms Revenue and Sales Realisation denote the same meaning and are used interchangeably.
- ▶ **Revenue from operations:** is the income arising in the course of the ordinary activities of an entity from the sale of goods or rendering of services.

## Principles of Measurement:

- ▶ **Revenue from sale** of goods or services provided during a reporting period shall be measured based on the net sales realization.
- ▶ **Revenue from sale of joint products** shall be measured separately for each main product or service sold.
- ▶ Revenue from sale of goods or services shall be measured separately for sale of each type of by-products, defectives, second grade products, rejects, scrap, spoilage, or wastes.
- ▶ Net Sales realization of defectives, second-grade products, rejects, scrap, spoilage, and waste products shall be adjusted against the cost of production of related goods sold.
- ▶ Other income shall not be considered in determining profit or loss as per cost accounts.
- ▶ Product or service related subsidies, grants, or incentives, received or receivable on sale of goods or rendering of services shall be part of revenue from operations and shall be identified with each product sold or service rendered.



# RR Academy

## INTERMEDIATE EXAMINATION

June 2024

P-8(CA)

Syllabus 2022

### COST ACCOUNTING

Time Allowed: 3 hours

Full Marks: 100

*The figures in the margin on the right side indicate full marks.*

*Where considered necessary, suitable assumptions may be made and clearly indicated in the respective answer.*

All working notes must form part of the answer.

#### Section-A

**Answer Question No. 1, which is Compulsory.**

**1. Choose the correct answer from the given alternatives (You may write only the Roman numeral and the alphabet chosen for your answer):**  $2 \times 15 = 30$

- (i) \_\_\_\_\_ is a method of dealing with overheads which involves spreading common costs over cost centres on the basis of benefit received.
- (A) Overhead analysis  
(B) Overhead apportionment  
(C) Overhead allocation  
(D) Overhead absorption
- (ii) Which of the following CAS deals with the principles and methods of determining the Production and Operation Overheads?
- (A) CAS - 2  
(B) CAS - 3  
(C) CAS - 5  
(D) CAS - 10
- (iii) Hotel Dream House is having 250 rooms of which 70% are normally occupied in summer and 40% are occupied in winter. Period of summer and winter be taken as 6 months each and normal days in a month be assumed to be 30. What is the value of total occupied room days?
- (A) 31,500 room days  
(B) 45,000 room days  
(C) 36,000 room days  
(D) 49,500 room days

- (iv) In which of the following methods of pricing, costs lag behind the current economic values?
- (A) Replacement price method  
(B) Weighted average price method  
(C) FIFO price method  
(D) LIFO price method
- (v) A Lorry starts with a load of 40 Metric Tonnes (MT) of goods from Station 'A'. It unloads 16 MT in Station 'B' and the balance goods in Station 'C'. On return trip, it reaches Station 'A' with a load of 32 MT, loaded at Station 'C'. The distance between A to B, B to C and C to A are 40 kms, 60 kms and 80 kms respectively. On the basis of above information, "Commercial MT-kilometers" are –
- (A) 5,600 MT-kilometers  
(B) 5,760 MT-kilometers  
(C) 6,200 MT-kilometers  
(D) 6,450 MT-kilometers
- (vi) In a process 800 units are introduced during 2023-24. 5% of input is normal loss. Closing work-in-progress 60% complete is 100 units. 660 completed units are transferred to next process. Equivalent production for the period is \_\_\_\_\_.  
(A) 900 units  
(B) 744 units  
(C) 540 units  
(D) 720 units
- (vii) Following information is available :

Opening stock	₹ 4,000
Closing stock	₹ 6,400
Material consumed	₹ 31,200

On the above basis, what is the Inventory Turnover Ratio?

- (A) 7.8  
(B) 5  
(C) 6  
(D) 3

- (viii) When P/V ratio is 20% and margin of safety ratio is 30%, profit is \_\_\_\_\_ of sales.
- (A) 4%  
(B) 6%  
(C) 8%  
(D) 10%
- (ix) In P Ltd., labour force at the beginning of July 2023 was 3,800 and at the end of July 2023 was 4,200. During the month, 50 workers left while 80 workers were discharged. 560 workers were engaged out of which only 60 were appointed in the vacancy created by the number of workers separated and the rest on account of expansion scheme. On the basis of above information, Labour Turnover Ratio of the firm by Flux Method is \_\_\_\_\_.
- (A) 14.00%  
(B) 3.25%  
(C) 1.50%  
(D) 8.63%
- (x) If an organisation has all the resources it needs for production, then the principal budget factor is most likely to be \_\_\_\_\_.
- (A) Cash supply  
(B) Sales demand  
(C) Raw materials  
(D) Labour supply
- (xi) The sum of direct labour and factory overheads is termed \_\_\_\_\_.
- (A) Sunk cost  
(B) Opportunity cost  
(C) Direct cost  
(D) Conversion cost
- (xii) RST & Co. has set up a laboratory for testing of products for compliance with standards. Salary of this laboratory staff is a part of \_\_\_\_\_.
- (A) Direct expenses  
(B) Works overhead  
(C) Quality control cost  
(D) Research and development cost

- (xiii) A company requires 1,00,000 units of an item annually. The cost per unit is ₹ 10. Ordering cost is ₹ 500 per order and inventory carrying cost is 50% per unit per annum. The Economic Order Quantity (EOQ) in this case is \_\_\_\_\_.
- (A) 4,470 units  
(B) 4,472 units  
(C) 6,420 units  
(D) 6,472 units
- (xiv) Which of the following method is used for evaluation of equivalent production when prices are fluctuating in the market?
- (A) FIFO method  
(B) LIFO method  
(C) Simple average method  
(D) Weighted average method
- (xv) In the year 2023-24, X & Co. used 2,820 kg of material at a total standard cost of ₹ 11,562. The material usage variance was ₹ 123 (Favourable). In the above case, Standard Weight of Material (SQ) for the period is \_\_\_\_\_.
- (A) 2,900 kg.  
(B) 2,850 kg.  
(C) 3,048 kg.  
(D) 2,648 kg.

### Section-B

Answer *any five* questions from question number 2 to 8.

Each question carries 14 marks.

14×5=70

2. (a) PQR & Co. is an advertising agency which has received an enquiry to submit the quotation. Bill of Materials prepared by the production department for the quotation states the following requirement of materials:

Paper 20 reams @ ₹ 2,200 per ream	
Ink and other printing material	₹ 8,000
Binding material and other consumables	₹ 4,000

Some photography is required for the job. The agency does not have a photographer as an employee. It decides to hire one by paying ₹ 20,000 to him. Estimated job card prepared by production department specifies that service of following employees will be required for this job:

Artist (₹ 18,000 per month)	80 hours
Copywriter (₹ 15,000 per month)	75 hours
Client servicing (₹ 13,500 per month)	30 hours

The primary packing material will be required to the tune of ₹ 6,000. Production Overheads 40% of Prime cost, while the Selling and Distribution Overheads are likely to be 20% on Production cost. The agency works 25 days in a month and 6 hours a day. The agency expects a profit of 20% on the quoted price.

**Required:**

Prepare a Statement of Profit showing quotation price.

7

- (b) The following particulars for the first week of July, 2023 relate to R, S and T three workers employed in Sun Ltd.:

	R	S	T
(a) Job completed (units)	5,000	4,000	7,200
(b) Out of above output rejected and unsaleable (units)	200	80	800
(c) Time allowed for 100 units	2 hrs. 36 min.	3 hrs.	1 hr. 30 min.
(d) Basic wage rate per hour (₹)	25	40	30
(e) Time taken (hours)	100	108	92

The normal working hours per week are fixed at 88 hours. Bonus is paid @ 60% of the basic wage rate for gross time worked and gross output produced without deduction for rejected output. The rate of overtime for first 10 hours is paid at time plus 1/3 and for next 10 hours is paid at time plus 1/2.

*Required:*

**Calculate the following for each worker:**

- (i) Number of bonus hours and amount of bonus earned.
- (ii) Total wages earned including basic wages, overtime premium and bonus.
- (iii) Direct wages cost per 100 saleable units.

7

3. (a) MOON LTD. has three Production Departments and two Service Departments. The overhead distribution sheet of the company showed the following totals:

<b>Production Department:</b>	<b>Amount (₹)</b>
A	3,02,000
B	2,88,000
C	3,86,000

**Service Department:**

X	46,250
Y	15,750

Working hours of production departments are A-12,452 hours; B-8,056 hours and C-8,132 hours. Given that the two service departments cater to the needs of the three production departments as per the following schedule (in percentage):

	A	B	C	X	Y
Department X	20%	30%	40%	-	10%
Department Y	40%	20%	30%	10%	-

*Required:*

- (i) Calculate the total overhead of production departments distributing the cost of service departments by Simultaneous Equation Method.
- (ii) Calculate the overhead rate per hour of production departments.

7

- (b) Pass the journal entries for the following transactions in a double entry cost accounting system:

**(Narration is not required)**

7

Particulars	Amount (₹)
(i) Issue of material:	
- Direct	5,00,000
- Indirect	2,50,000
(ii) Allocation of wages and salaries:	
- Direct	3,00,000
- Indirect	50,000
(iii) Overheads absorbed in jobs:	
- Factory	2,80,000
- Administration	1,00,000
- Selling	50,000
(iv) Under/over absorbed overheads:	
- Factory (over)	30,000
- Administration (under)	15,000

4. (a) ACODA Ltd. runs a holiday home in a small hill station. It has three types of suites for its customers with a capacity of 200 single rooms, 100 double rooms and 60 triple rooms. The average occupancy of single, double and triple rooms is expected to be 80%, 80% and 60% respectively. The rent for double room has been fixed at 125% and for triple room 150% of the rent of a single room. The costs are as under:

Variable costs:	Single rooms	₹ 220 each per day
	Double rooms	₹ 340 each per day
	Triple rooms	₹ 400 each per day
Fixed costs:	Single rooms	₹ 120 each per day
	Double rooms	₹ 240 each per day
	Triple	₹ 320 each per day

The holiday home runs throughout the year of 365 days and earns a margin of 20% on rent of rooms.

**Required:**

Calculate the rent to be charged for each type of suite (room).

7

- (b) MR. JOHN who prepares his accounts on 31st March each year, commenced a Contract No. A-26 on 1st July, 2022. The following information is revealed from his costing records on 31st March, 2023:

Particulars	(₹)
Materials cost	2,51,000
Labour cost	5,65,600
Foreman's salary	81,300

A machine costing ₹ 2,60,000 remained in use on site for two-fifth of the year. Its working life is estimated at 7 years and final scrap value at ₹ 15,000.

A supervisor is paid ₹ 8,000 per month and has devoted one-half of his time on the contract.

All other expenses amount to ₹ 1,36,500. Materials at site on 31st March, 2023 cost ₹ 35,400.

The contract price is ₹ 20,00,000. On 31st March, 2023 two-third of the contract was completed, however, the architect gave certificate only for 50% of the contract price and ₹ 7,50,000 had so far been paid on account.

**Required:**

Prepare Contract Account for the year ended on 31<sup>st</sup> March, 2023 showing the amount of profit/loss to be transferred to the Profit and Loss Account. 7

5. (a) XYZ Ltd. processes 1,50,000 kg. of raw materials in a month to produce two products, viz. P and Q.

The cost of raw material is ₹ 8 per kg.

**The process costs per month are:**

Direct Materials	₹ 3,50,000
Direct Wages	₹ 2,80,000
Variable Overheads	₹ 2,35,000
Fixed Overheads	₹ 1,45,000

The loss in process is 5% of input and the output ratio of P and Q which emerge simultaneously is 1:2. The selling prices of the two products at the point of split off are: P - ₹ 12 per kg. and Q - ₹ 20 per kg.

A proposal is available to further process the product P by mixing it with other purchased materials. The entire current output of P can be processed further to obtain a new product 'S'. The price per kg. of 'S' is ₹ 15 and each kg. of output of 'S' will require 1 kg. of input P. The cost of processing of P into 'S' (including other materials) is ₹ 1,85,000 per month.

**Required:**

Prepare a statement showing monthly profitability based both on the existing manufacturing operations and on further processing. Will you recommend further processing?

**Note:** Apportionment of joint costs are made on sales value basis by the company.

7

- (b) J & M Ltd. submits the following information regarding composition and wage rates of labour force engaged on Job No. R-40 which is scheduled to be completed in 80 hours:

Category of workers	Standard		Actual	
	No. of workers	Hourly wage rate per worker (₹)	No. of workers	Hourly wage rate per worker (₹)
Grade – P	60	2.50	55	3.00
Grade – Q	40	1.75	30	2.00
Grade – R	50	1.25	70	1.00

The work is actually completed in 88 hours.

**Required:****Calculate the following:**

- (i) Labour Cost Variance
- (ii) Labour Rate Variance
- (iii) Labour Efficiency Variance
- (iv) Labour Revised Efficiency Variance
- (v) Labour Mix Variance

7

6. Aristocrat Ltd. while operating at 70% level of activity produces and sells two products A and B. The cost and sales data of these two products are as under:

<u>Units Produced and Sold</u>	(₹ per unit)	
	Product A	Product B
<u>3,000</u>	<u>3,000</u>	<u>2,000</u>
Direct Materials	10	20
Direct Labour	20	20
Factory Overheads (40% fixed)	25	15
Administration & Selling Overheads (60% fixed)	<u>40</u>	<u>25</u>
Total Cost per unit	95	80
Selling Price per unit	<u>115</u>	<u>95</u>

Factory overheads are absorbed on the basis of machine hour which is the limiting factor. The machine hour rate is ₹ 10 per hour.

Aristocrat Ltd. receives an offer from USA for the purchase of product A at a price of ₹ 87.50 per unit. Alternatively, the company has another offer from UK for the purchase of product B at a price of ₹ 77.50 per unit. In both the cases, a special packing charge of ₹ 2.50 per unit has to be borne by the company. The company can accept either of the two export orders by utilising the balance 30% of its capacity.

**Required:**

Examine and advise the company as to which proposal should be accepted showing total profit in your support after incorporating the export proposal suggested by you. 14

7. (a) Jack & Jones Ltd. submits the following budgeted figures of revenue and expenditures for the month of July to December, 2023:

Month	Sales (₹)	Purchases (₹)	Wages (₹)	Expenses (₹)
July	13,00,000	8,00,000	2,40,000	1,00,000
August	14,00,000	9,60,000	3,00,000	1,00,000
September	15,00,000	9,00,000	3,00,000	1,20,000
October	16,00,000	9,60,000	3,60,000	1,20,000
November	16,40,000	8,00,000	3,60,000	1,60,000
December	17,80,000	10,00,000	4,00,000	1,60,000

The following further information is available:

- (i) 10% of purchases and sales are on cash basis.
- (ii) Advance payment of income tax in December, 2023 is ₹ 2,00,000.
- (iii) Plant purchased and price to be paid in October, 2023 is ₹ 80,000.
- (iv) Time lag –

Credit sales	2 months
Credit purchases	1 month
Wages	½ month
Expenses	½ month

**Required:**

Prepare a Cash Budget for 3 months starting on 1st October, 2023 when cash balance is ₹ 2,70,000.

- (b) (i) Mr. X, the Chairman of ABC Ltd. wants to know the advantages of adopting Cost Accounting Standards (CAS) in his company. You are required to prepare a list of advantages of adopting CAS for submitting to Mr. X.
- (ii) Explain the functions of Cost Accounting Standards Board (CASB).

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8. (a) State the essentials of a Cost Accounting System. 4
- (b) Discuss the advantages of ABC analysis. 5
- (c) Explain Idle Time as per CAS-7. Also discuss the treatment of idle time in Cost Accounts as per CAS-7. 5
-

# INTERMEDIATE EXAMINATION

December 2024

P-8(CA)  
Syllabus 2022

## COST ACCOUNTING

Time Allowed: 3 Hours

Full Marks: 100

*The figures in the margin on the right side indicate full marks.*

*All sections are compulsory. Each section contains instructions regarding the number of questions to be answered within the section.*

*All working notes must form part of the answer. Wherever necessary, candidates may make appropriate assumptions and clearly state them in the respective answer.*

*Answer Question No. 1 and any five from questions nos. 2 to 8.*

### Section-A

**Section A contains question number 1. All parts of this question are compulsory.**

**1. Choose the correct answer from the given alternatives (You may write only the Roman numeral and the alphabet chosen for your answer).  $2 \times 15 = 30$**

- (i) Which one of the following classification is meant for distinction between Direct Cost and Indirect Cost?
  - (A) Variability
  - (B) Function
  - (C) Element
  - (D) Controllability
- (ii) Which one of the following costs is the value of the best alternative course of action that was not chosen?
  - (A) Sunk Cost
  - (B) Relevant Cost
  - (C) Economic Cost
  - (D) Imputed Cost
- (iii) Which one of the following is an example of by-product?
  - (A) Mustard seeds and mustard oil
  - (B) Diesel and petrol in an oil industry
  - (C) Edible oils and oil cakes
  - (D) Curd and butter in a diary

- (iv) NOB Ltd., is committed to supply 45000 bearings per annum to CINY Ltd., it is estimated that it costs 20 paise as inventory holding cost per bearing per month. If its Economics Batch Quantity (EBQ) is 3000 units (bearings), what will be the minimum inventory holding cost at optimum run size?
- (A) ₹ 3,600  
(B) ₹ 4,200  
(C) ₹ 5,800  
(D) None of the above
- (v) State which of the following are the characteristics of Job Costing.
- (1) Homogeneous Products  
(2) Customer – driven production  
(3) Complete production possible within a single accounting period
- (A) (1) only  
(B) (1) and (2) only  
(C) (2) and (3) only  
(D) (1) and (3) only
- (vi) SOTON Ltd., producing product NB provides the following information:

	₹
Royalty paid on sales	50,000
Design charges paid for the product	20,000
Hire charges of equipment used for production	6,000

Direct expenses will be:

- (A) ₹ 76,000  
(B) ₹ 80,000  
(C) ₹ 60,000  
(D) None of the above
- (vii) Which one of CASs deals with the principle and methods of determining the repairs and maintenance cost?
- (A) CAS – 4 (Revised 2018)  
(B) CAS – 12 (Limited Revision 2017)  
(C) CAS – 15  
(D) CAS – 19

- (viii) GINT Ltd. made a loss of ₹ 2,00,000 during the year ending on March 31, 2024 as per costing records. If interest on investments, and Directors' fees were ₹ 10,000, and ₹ 40,000 respectively, what will be the Profit / Loss as per financial records?
- (A) Loss ₹ 3,80,000  
(B) Loss ₹ 2,30,000  
(C) Profit ₹ 1,40,000  
(D) None of the above
- (ix) RONO Ltd., maintains a Margin of Safety (MOS) of 25% on current sales and earns a profit of ₹ 30 lakhs per annum. If the company has a profit – volume (P/V) ratio of 40%, its current sales amount to
- (A) ₹ 200 lakh  
(B) ₹ 250 lakh  
(C) ₹ 300 lakh.  
(D) ₹ 325 lakh.
- (x) In the factory of ZAN Ltd. where standard costing is followed, 4000 kg of materials at ₹ 10 per kg were actually consumed resulting in materials price variance of ₹ 2,000 (Adv.). What will be the standard cost of material per kg?
- (A) ₹ 10.50  
(B) ₹ 9.50  
(C) ₹ 9.00  
(D) None of the above
- (xi) MR. KUNT a worker has time rate of ₹ 45 per hour, he takes 40 hours to complete a job. If time allowed for a job is 48 hours, what will be total earning of Mr. Kunt under Rowan Plan (Bonus Scheme)?
- (A) ₹ 2,100  
(B) ₹ 2,160  
(C) ₹ 2,200  
(D) None of the above
- (xii) Batch costing is applied effectively in the following situation:
- (A) Paper manufacturing  
(B) Drug manufacturing  
(C) Designer clothes manufacturing  
(D) Oil refining

- (xiii) If the raw material prices are suffering from inflation, which of the following methods of valuing stock will give the lowest gross profit?
  - (A) LIFO method
  - (B) FIFO method
  - (C) Replacement cost
  - (D) Inflated price method
- (xiv) Fixed costs are treated as
  - (A) Conversion Costs
  - (B) Prime Costs
  - (C) Period Costs
  - (D) Both (A) & (B)
- (xv) The Budget that is prepared first of all is
  - (A) Master Budget
  - (B) Budget, with key factor
  - (C) CASH Budget
  - (D) Capital Expenditure Budget

### SECTION – B

**(Answer any Five questions)**

**Each question carries 14 Marks.**

**14×5=70**

2. (a) The following financial parameters of ZONB Ltd. are available for the month of September 2024.

Direct Labour Cost	: ₹ 1,20,000 (120 % of Factory overheads)
Raw Materials Purchased	: ₹ 1,65,000
Sales	: ₹ 5,00,000
Cost of Sales	: ₹ 4,00,000

Accounts shows the following figures:

	1st September 2024 (₹)	30th September 2024 (₹)
<b>Inventory:</b>		
Raw material	20,000	35,000
Work-in-progress	20,000	30,000
Finished goods	50,000	60,000
<b>Other details:</b>		
Selling expenses		22,000
General & Admin expenses		18,000

General & Admin expenses are not relating to the production activity.

**Required:**

Summarize a Cost Sheet for the month of September 2024 showing:

- (i) Prime cost
- (ii) Work cost
- (iii) Cost of goods sold
- (iv) Cost of sales and profit earned

7

- (b) DONX Ltd. uses three types of materials P, Q, and R for production of product M for which the following data apply:

Raw Material	Usage per unit of product (kgs.)	Re-order quantity (kgs.)	Price per kg.	Delivery period (in weeks)			Re-order level (kgs.)	Minimum level (kgs.)
				Minimum	Average	Maximum		
P	10	10000	0.10	1	2	3	8000	?
Q	4	5000	0.30	3	4	5	4750	?
R	6	10000	0.15	2	3	4	?	2000

Weekly production varies from 175 to 225 units, averaging 200 units of the said product M.

**Required:**

Calculate the following quantities:

- (i) Minimum stock of P.
- (ii) Minimum stock of Q.
- (iii) Re-order level of R.
- (iv) Average stock level of P.

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3. (a) DOZIN Ltd. manufactures a single product. It recovers factory overheads at a pre-determined rate of ₹ 20 per man day.

During the year 2023-24, the total factory overheads incurred and the man-days actually worked were ₹ 35.50 lakhs and 1.50 lakh days respectively. Out of the amount of ₹ 35.50 lakhs, ₹ 2.00 lakhs were in respect of wages for strike period and ₹ 1.00 lakh was in respect of expenses of previous year booked in this current year. During the period, 50000 units were sold. At the end of the period, 12000 completed units were held in stock but there was no opening stock of finished goods. Similarly, there was no stock of uncompleted units at the beginning of the period but at the end of the period there were 20000 uncompleted units which may be treated as 65% complete in all respects.

On investigation, it was found that 40% of the unabsorbed overheads were due to factory inefficiency and the rest were attributable to increase in the cost of indirect materials and indirect labour.

**Required:**

- (i) Calculate the amount of unabsorbed overheads during the year 2023-24.
- (ii) Analyze the accounting treatment of unabsorbed overheads in cost Accounts. 7
- (b) The following information is available from the Financial Books of SONT Ltd. newly established company for the year ended 31st March 2024.

(Amount in ₹)

Direct Material Consumption	50,00,000
Direct Wages	30,00,000
Factory Overhead	16,00,000
Administrative Overhead	7,00,000
Selling and Distribution Overhead	9,60,000
Bad Debts	80,000
Preliminary Expenses written off	40,000
Legal Charges	10,000
Dividends Received	1,00,000
Interest Received on Deposits	20,000
Sales (120000 units)	120,00,000
Closing Stock:	
Finished Goods (4000 units)	3,20,000
Work-in-progress	2,40,000
Profit (Net) for the year 2023-24	12,90,000

The cost accounts for the same period reveal that the direct material consumption was ₹ 56,00,000. Factory overhead is recovered at 20% on prime cost.

Administration overhead is recovered at ₹ 6 per unit of production. Selling and distribution overheads are recovered at ₹ 8 per unit sold.

**Required:**

- (i) Prepare the Profit and Loss Accounts both as per financial records and as per cost records.
- (ii) Reconcile the profits as per the two records. 7

4. (a) PRANO SERVICES Ltd. owns a bus and operates a tourist service on daily basis. The bus starts from New Town to Sweet Village and return back to New Town the same day. Distance between New Town and Sweet Village is 250 kms. This trip operates for 10 days in a month. The bus also plies for another 10 days between New Town and Rajpur and returns back to New Town the same day, distance between these two place is 200 kms. The bus makes local sight seeing trips for 5 days in a month covering a total distance of 80 kms. per day.

The following data are given below :

Cost of bus ₹ 70,80,000. Depreciation : 20% (Charged by Straight Line Method)

Driver's salary - ₹ 20,000 p.m.

Conductor's salary - ₹ 12,000 p.m.

Part - time clerk's salary ₹ 6,000 p.m.

Insurance - ₹ 24,000 p.a.

Diesel consumption 10 kms. per litre @ ₹ 90 per litre

Token tax - ₹ 36,000 p.a.

Permit fee - ₹ 4,000 p.m.

Sundry expenses - ₹ 5,389 for the month

Lubricant oil - ₹ 800 for every 200 kms.

Repairs and maintenance ₹ 17,236 per month

Normal capacity of the bus : 60 passengers

While plying to and fro Sweet Village the bus occupies 90% of the capacity and 80% while it plies between New Town to Rajpur (Both ways). In the New Town the bus runs full capacity. The company earns a profit margin of 25% on takings. (Ignore interest & taxation).

You are required to calculate the bus fare rate to be charged to Sweet Village, and Rajpur from New Town and local trips per passenger. 7

- (b) XINOS Ltd., a contractor, prepares his accounts for the year ended March, 31 each year. The company commenced a contract on July 1, 2023. The following information related to the contract as on March 31, 2024.

	₹
Material	2,51,000
Labour Charges	5,65,600
Salary to Foreman	81,300

A machine costing ₹ 2,60,000 has been on the site for 146 days, its working life is estimated at 7 years and its final scrap value at ₹ 15,000.

A supervisor, who is paid ₹ 8,000 p.m. has devoted one – half of his time to this contract. All other expenses and administration charges amount to ₹ 1,36,500.

Material in hand at site costs ₹ 35,400 on 31.03.24. The contract price is ₹ 20,00,000. On March 31, 2024 two-third of the contract was completed. The architect issued certificates covering 50% of the contract price, and the contractor had been paid ₹ 7,50,000 on account.

**Required :**

- (i) Prepare Contract Account for the year ended March 31, 2024.  
(ii) Calculate the profit to be transferred to Profit Loss A/c. for the year ended March 31, 2024. 7
5. (a) MONTECH Ltd. is engaged in process engineering industry. Its product ZP passed through two process A and B. During the month of September 2024 the input to process A of basic Raw Material was 8000 units @ ₹ 9 per unit.

Other information for the month is as follows :	Process A	Process B
Output units	7500	4800
Normal loss (% to input)	5%	10%
Scrap value per unit (₹)	2	10
Direct wages (₹)	12000	24000
Direct expenses (₹)	6000	5000
Selling price per unit (₹)	15	25

Total overheads ₹ 17,400 were recovered as percentage of direct wages. Selling expenses were ₹ 5,000. They are not allocated to the processes. 2/3rd of the output of Process A was passed on to the next process and the balance was sold. The entire output of Process B was sold. It is assumed that Process A and Process B are not responsibility centre.

**Required :**

- (i) Prepare Process A and Process B Accounts.  
(ii) Calculate the profit of Process A and B for the month of September 2024.

- (b) The following information is extracted from the record of EMON Ltd., a manufacturing company using Standard Costing System for the week ended October 2024.

	Standard		Actual	
	Quantity	Unit Price	Quantity	Unit Price
Material S	60%	₹ 20	44 kg.	₹ 25
Material T	40%	₹ 10	66 kg.	₹ 5
Processing Loss	10 %	-	-	
				Actual output is 90 kg.

**Required :**

From the information stated Supra, analyse the following variances :

- (i) Material Cost Variance.
- (ii) Material Price Variance
- (iii) Material Usage Variance
- (iv) Material Mix Variance
- (v) Material Yield Variance

7

6. SENTOR Ltd., a manufacturing company, manufactures a single product with a capacity of 150000 units per annum. The summarized profitability statement for the year is as under :

		₹	₹
Sales : 100000 units @ ₹ 15 per unit			15,00,000
Cost of Sales :			
Direct Materials		3,00,000	
Direct Labour		2,00,000	
Production Overhead :	Variable	60,000	
	Fixed	3,00,000	
Administration Overheads (Fixed)		1,50,000	
Selling and Distribution Overheads:	Variable	90,000	
	Fixed	1,50,000	12,50,000
	Profit		2,50,000

**Required :**

Evaluate the following options : (Each option is to be treated independently).

- (i) Calculate the amount of sales required to earn a target profit of 25% on sales, if the packing is improved at a cost of ₹ 1 per unit.
  - (ii) There is an offer from a large retailer to purchase 30000 units per annum, subject to providing a packing with a different brand name at a cost of ₹ 2 per unit. However, in this case there will be no selling and distribution expenses. Also this will not, in any way, affect the company's existing business. Identify the break-even price for this additional offer.
  - (iii) If an expenditure of ₹ 3,00,000 is made on advertising, the sales would increase from the present level of 1,00,000 units to 1,20,000 units at a price of ₹ 18 per unit. Will that expenditure be justified ?
  - (iv) If the selling price is reduced by ₹ 2 per unit, there will be 100% capacity utilization. Will the reduction of selling price be Justified ?
- 14
7. (a) A department of SONEX Ltd., a manufacturing company, attains sales of ₹ 6,00,000 at 80% of its normal capacity. Its expenses are given below :

	₹	Selling Costs :	
Office salaries	90,000	Salaries	8% of sales
General expenses	2% of sales	Travelling expenses	2% of sales
Depreciation	7,500	Sales office	1% of sales
Rent and rates	8,750	General expenses	1% of sales
Distribution costs :			
Wages (₹)			15,000
Rent			1% of sales
Other expenses			4% of sales

**Note :** All fixed costs are assumed to remain unchanged, even at 110% capacity.

**Required :**

Prepare Flexible, Administration, Selling and Distribution Costs Budget, operating at 90 per cent, 100 per cent and 110 per cent of normal capacity for the month of September 2024.

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- (b) Summarize the objectives and scope of Cost Accounting Standard (CAS) – 5 on determination of Average (Equalized) Cost of Transportation.

7

**8. Answer the following questions :**

- (a) Summarize the objectives of Cost Accounting (Any Four) 4
- (b) JUST – in TIME (JIT) inventory system focuses on “the right material at the right time, at the right place and in the exact amount” without the safety net of inventory. In this context, enumerate the advantages of Just – in – Time (JIT). 5
- (c) Enumerate the disclosures of CAS – 3 on production and operation overheads (Any five). 5
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## INTERMEDIATE EXAMINATION

June 2025

P-8(CA)  
Syllabus 2022

### COST ACCOUNTING

Time Allowed: 3 hours

Full Marks: 100

*The figures in the margin on the right side indicate full marks.  
Where considered necessary, suitable assumptions may be made and  
clearly indicated in the respective answer.*

All working notes must from part of the answer.

#### Section-A

Answer Question No. 1, which is Compulsory.

1. Choose the correct answer from the given alternatives (You may write only the Roman numeral and the alphabet chosen for your answer):  $2 \times 15 = 30$
- (i) Which of the following statements is true?
    - (A) Batch costing is a variant of job costing.
    - (B) Job cost sheet may be used for estimating profit of jobs.
    - (C) Job costing cannot be used in conjunction with marginal costing.
    - (D) In cost plus contracts, the contractor runs a risk of incurring a loss.
  - (ii) Which of the following is applicable for Cost Control?
    - (A) It is a corrective function.
    - (B) It challenges the standards set.
    - (C) It ends when targets are achieved.
    - (D) It is related with the future.
  - (iii) Which of the following budget recognises the difference between fixed, semi-fixed and variable cost and is designed to change in relation to the change in level of activity?
    - (A) Master Budget
    - (B) Flexible Budget
    - (C) Operational Budget
    - (D) Activity Budget
  - (iv) Under net realisable value method of apportionment of joint costs to joint products, the selling and distribution cost is \_\_\_\_\_.
    - (A) Added to joint cost.
    - (B) Deducted from sales value.
    - (C) Added to sales value.
    - (D) Deducted from further processing cost.

- (v) Which of the following is not a potential benefit of using a budget?
- (A) More motivated managers
  - (B) Improved inter-departmental communication
  - (C) Enhanced coordination of firm activities
  - (D) More accurate external financial statements
- (vi) A & Co. calculates the prices of jobs by adding overheads to the prime cost and adding 30% to total costs as a profit margin. Job No. LM-24 was sold for ₹ 6,760 and incurred overheads of ₹ 2,776. The prime cost of the job is \_\_\_\_\_.  
  - (A) ₹ 1,956
  - (B) ₹ 2,424
  - (C) ₹ 3,984
  - (D) ₹ 5,200
- (vii) In a Non-integrated Accounting System, what is the primary objective of Overhead Ledger?  
  - (A) Managing general ledger entries
  - (B) Recording direct costs
  - (C) Controlling indirect costs
  - (D) Maintaining financial transactions
- (viii) Navi & Co. pays ₹ 8 per unit royalty to the designer of a product which it manufactures and sells. The royalty charge would be classified in the company's accounts as \_\_\_\_\_.  
  - (A) Direct expense
  - (B) Indirect expense
  - (C) Production overhead
  - (D) Selling overhead
- (ix) Blue Star Transport Co. operates two trucks. During a particular period, the two trucks travelled a total of 25,000 kms carrying goods. The average load was 3 tonnes per journey. In total they made 20 journeys. Total costs were ₹ 2,25,000. In this case, the average cost per tonne-km is \_\_\_\_\_.  
  - (A) ₹ 2.22
  - (B) ₹ 6.67
  - (C) ₹ 3.00
  - (D) ₹ 9.00
- (x) Which Section of the Companies Act, 2013 deals with the adoption and adherence to Cost Accounting Standards (CAS)?  
  - (A) Section 136
  - (B) Section 148
  - (C) Section 154
  - (D) Section 182

- (xi) Jolly Ltd. manufactures a student level fountain pen and sale each pen @ ₹ 40 per unit. The variable cost of each fountain pen is ₹ 22 and the fixed cost for a month is ₹ 16,000. The company wishes to earn a target profit of ₹ 20,000 for the month. In the above situation, sales volume (in units) required is \_\_\_\_\_.  
(A) 1,500 units  
(B) 1,800 units  
(C) 2,000 units  
(D) 2,400 units
- (xii) Which of the following would not be used to estimate standard direct material price?  
(A) Purchase contracts already agreed  
(B) The forecast movement of prices in the market  
(C) The availability of bulk purchase discounts  
(D) Performance standards in operation
- (xiii) During August 2024, there were 21 working days of 8 hours per day in a firm. The workforce consists of 20 workers and due to a machine breakdown, 480 hours were recorded as idle time during the month. During August, the workforce produced 10,800 units of output. The expected time per unit of output is 15 minutes (i.e. 0.25 hours). The Production Volume Ratio of the firm for the month of August 2024 is \_\_\_\_\_.  
(A) 80.36%  
(B) 85.71%  
(C) 89.73%  
(D) 93.75%
- (xiv) The operations to produce a unit of product R require 9 hours. Budgeted idle time of 10% of total hours paid for is to be incorporated into the standard times for all product. The wage rate is ₹16 per hour. The standard labour cost of one unit of product R is \_\_\_\_\_.  
(A) ₹ 129.60  
(B) ₹ 144.00  
(C) ₹ 158.40  
(D) ₹ 160.00
- (xv) In an integrated accounting system, the accounting entry for indirect wages incurred would be \_\_\_\_\_.  
(A) Debit Wages Control Account and Credit Work-in-progress Account  
(B) Debit Overheads Control Account and Credit Wages Control Account  
(C) Debit Work-in-progress Account and Credit Wages Control Account  
(D) Debit Wages Control Account and Credit Overheads Control Account

**Section-B**

**Answer any five questions from question number 2 to 8.**

**Each question carries 14 marks.**

**$14 \times 5 = 70$**

2. (a) Standard Engineering Limited (SEL) manufactures and sells standard size of machine. The SEL submits the following details for the accounting year ended on 31st March, 2025:

Particulars	Amount (₹)
Sales for the year	90,00,000
Purchases of raw material for the year	34,00,000
Direct labour	16,00,000
Inventories at the beginning of the year:	
Work-in-progress	1,20,000
Finished goods	3,60,000
Raw materials inventory:	
At the beginning of the year	80,000
At the end of the year	1,30,000
Inventories at the end of the year:	
Work-in-progress	1,80,000
Finished goods	2,20,000

Factory overheads were 60% of direct labour cost.

Administration overheads were 6% of sales and not related to the production activity. Selling & distribution overheads were 12% of sales.

**You are required to:**

Prepare a Cost and Profit Statement for the year ended on 31st March, 2025. 7

- (b) Babbu Small Industries employ two workmen, Vikas and Shiv. Both works to produce the same product, with the help of same raw material and also with the same normal wage rate. Vikas is paid bonus according to the Rowan System, while Shiv is paid bonus according to the Halsey System. The time allowed to make the product is 50 hours. Vikas takes 30 hours while Shiv takes 40 hours to complete the product. The factory overhead rate is ₹ 10 per man-hour actually worked. The factory cost of the product for Vikas is ₹ 14,560 and for Shiv it is ₹ 15,200.

**You are required to:**

- (i) Find the cost of materials;
- (ii) Prepare a Statement comparing the factory cost of the product as made by the two workmen. 7

3. (a) Following details are taken from the books of ABC Ltd. for the month of October, 2024:

**Indirect Materials:** Production Departments: X ₹19,000; Y ₹24,000; Z ₹4,000;  
Service Departments: Maintenance ₹30,000; Stores ₹8,000.

**Indirect Wages:** Production Departments: X ₹18,000; Y ₹22,000; Z ₹6,000;  
Service Departments: Maintenance ₹20,000; Stores ₹13,000.

**Other Expenses:** Power and Light ₹1,20,000; Rent and Rates ₹56,000; Insurance of Assets ₹20,000;

Meal Charges ₹60,000; Depreciation @ 6% p.a. on capital value of assets.

#### Departmental Data

Items	Production Departments			Service Departments	
	X	Y	Z	Maintenance	Stores
Area (Sq. Ft.)	4,000	4,000	3,000	2,000	1,000
Capital Value of Assets (₹)	20,00,000	24,00,000	16,00,000	12,00,000	8,00,000
Kilowatt Hours	2,000	2,200	800	750	250
Number of Employees	180	240	60	80	40

Service rendered by Maintenance Department to Production Departments:

X 50%; Y 30%; Z 20%.

Service rendered by Stores Department to Production Departments:

X 40%; Y 40%; Z 20%.

**You are required to:**

Prepare a Departmental Distribution Summary showing apportion of costs of Service Departments to the Production Departments and the Total Overheads of the Production Departments.

7

- (b) A summary of the Profit & Loss Account of ABC Ltd. for the year ended on 31st March, 2025 is as follows:

Particulars	Amount (₹)	Particulars	Amount (₹)
To Materials consumed	5,48,000	By Sales (24,000 units)	12,00,000
To Direct wages	3,02,000	By Finished stock (800 units)	32,000
To Factory overheads	1,66,000	By Work-in-progress:	
To Administration overheads	76,480	Material	12,800
To Selling and distribution overheads	90,000	Direct wages	7,200
To Preliminary expenses	12,000	Factory overheads	4,000
			24,000
		By Dividend received	3,600
To Net Profit	65,120		
	12,59,600		12,59,600

The company manufactures a standard unit. The cost accounting records of the company shows the following information:

- (i) Factory overheads have been charged at 20% on prime cost.
- (ii) Administration overheads have been recovered at ₹ 3 per finished unit.
- (iii) Selling and distribution overheads have been recovered at ₹ 4 per unit sold.
- (iv) Work-in-progress is valued at prime cost.

**Prepare:**

(I) A Costing Profit and Loss Account indicating Net Profit.

(II) A statement reconciling the profit as disclosed by cost accounts with that shown in financial accounts. 7

4. (a) Component 'Diamond' is made entirely in Machine Shop No. XYZ-II. Material cost is ₹10 per component and each component takes 6 minutes to produce. The machine operator is paid ₹12 per hour and machine hour rate is ₹72 per hour.

The setting up of the machine to produce the component 'Diamond' takes 3 hours for the operator.

**Required:**

Prepare a Cost Sheet showing the setting up costs and the production costs, both in total (i.e. for the batch) and per component, assuming a batch size of:

- (i) 100 components,
- (ii) 150 components, and
- (iii) 200 components. 7

- (b) PQR Ltd. undertook a contract on 1st April, 2023 for the construction of a building at a contract price of ₹ 45,00,000. During the first year 2023-24, the following amounts were spent against which a sum of ₹ 16,87,500 (representing 90% of the work certified) was received by the contractor:

	₹)
Materials used	7,87,500
Wages paid to the workers	4,50,000
Overhead expenses	1,12,500

During the second year 2024-25, the contractor spent the following amounts:

	₹)
Materials used	11,25,000
Wages paid to the workers	9,00,000
Overhead expenses	2,25,000

In the second year, the contract was completed and a sum of ₹ 26,25,000 was received by the contractor.

**Required:**

Prepare the Contract Account and the Contractee's Account for both the years and determine the profits. 7

5. (a) Moon Ltd. is the market leader in the manufacture and sale of specialized product "GPT". In manufacturing the main product 'GPT', Moon Ltd. processes the resulting waste into two by-products X and Y. From the records of the company, you receive the information as given below:

(i) Total cost up to the point of separation: ₹ 1,36,000

Particulars	GPT (₹)	X (₹)	Y (₹)
(ii) Sales realization (all output)	3,28,000	32,000	48,000
(iii) Cost incurred after separation	-	9,600	14,400
(iv) Estimated profit on sales value	-	20%	30%
(v) Selling expenses estimated (on sales value)	20%	20%	20%

**Required:**

Prepare Comparative Profit and Loss Statement using the Reverse Cost Method for by-products.

7

- (b) QTR Ltd., which is following standard costing system, furnishes the following information regarding production budget for December, 2024:  
Product X = 40,000 units and Product Y = 80,000 units

One standard hour represents 10 units of Product X and 8 units of Product Y.  
The standard wage rate per hour is ₹ 0.50.

During the month, 15,000 hours were paid (@ ₹ 0.60 per hour) which included 700 unproductive hours due to unbudgeted holidays and also loss of production of 500 units of Product X due to machine breakdown.

Actual production for the month was 48,000 units of X and 76,000 units of Y.

**Required to calculate the following Labour Variances:**

- (i) Direct Labour Rate Variance
- (ii) Direct Labour Idle Time Variance
- (iii) Direct Labour Efficiency Variance
- (iv) Direct Labour Total Variance

7

6. Man Limited manufactures and sells Product-X. Following data are available in this regard for the year ended March, 2025:

Particulars	₹ per unit
Raw materials	20.00
Conversion Cost (variable)	15.00
Dealer's Margin	5.00
Selling Price	50.00

Fixed Cost: ₹ 8,00,000

Present Sales: 1,50,000 units

Capacity Utilization: 60 per cent

There is an acute competition in the market. Extra efforts are necessary to sell the product. Following suggestions have been made for increasing sales:

- (i) To reduce selling price by 4 per cent.
- (ii) To increase dealer's margin by 20 per cent over the existing rate.

**Required:**

If the company desires to maintain the present level of profit in the next year, which of the above two suggestions would you recommend? Give your reasons. 14

7. (a) Sun & Moon Ltd. manufactures two products—Product R and Product S. During the year ending on 31st March, 2025, it is expected to sell 30,000 kg of Product R and 1,50,000 kg of Product S @ ₹ 120 and ₹ 64 per kg respectively.

The direct materials X, Y and Z are mixed in the proportion of 4:4:2 in the manufacture of Product R and in the proportion of 3:5:2 in the manufacture of Product S. The actual and budget inventories for the year are as follows:

Particulars	Opening Stock(kg)	Expected Closing Stock (kg)	Anticipated Cost per kg (₹)
Material X	4,500	3,600	20
Material Y	4,000	7,500	16
Material Z	22,000	24,500	12
Product R	1,800	2,800	-
Product S	4,200	4,700	-

**You are required to:**

Prepare the Production Budget and Materials Budget showing the purchase cost of materials for the year ending 31st March, 2025. 7

- (b) What are Direct Expenses as defined in CAS-10? Also discuss the general principles of measurement of direct expenses as per CAS-10. 7

8. Answer the following questions:

- (a) What are the essentials of a good Cost Accounting System (any four)? 4
- (b) What is ABC Analysis? State the main advantages (any three) of ABC Analysis. 5
- (c) State the objectives and scope of Cost Accounting Standard-8 (CAS-8) on 'Cost of Utilities'. 5