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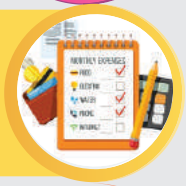

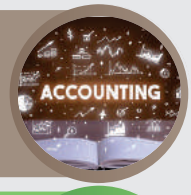

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1 CHAPTER Cost Sheet

Q.1 Calculation of Cost Sheet | PY May 18

Following information relate to a manufacturing concern for the year ended 31 st March, 2018:

	₹
Raw Material (opening)	2,28,000
Raw Material (closing)	3,05,000
Purchases of Raw Material	42,25,000
Freight Inwards	1,00,000
Direct wages paid	12,56,000
Direct wages-outstanding at the end of the year	1,50,000
Factory Overheads	20% of prime cost
Work-in-progress (opening)	1,92,500
Wo9rk-in-progres (closing)	1,40,700
Administrative Overheads (related to production)	1,73,000
Distribution Expenses	₹ 16 per unit
Finished Stock (opening)-1217 Units	6,08,500
Sale of scrap of material	8,000

The firm produced 14000 units of output during the year. The stock of finished goods at the end of the year is valued at cost of production. The firm sold 14153 units at a price of ₹ 618 per unit during the year.
Prepare cost sheet of the firm.

Ans. **Cost sheet for the year ended 31st March, 2018.**
Units produced - 14,000 units
Units sold - 14,153 units

Particulars	Amount (₹)
Raw materials purchased	42,25,000
Add: Freight Inward	1,00,000
Add: Opening value of raw materials	2,28,000
Less: Closing value of raw materials	(3,05,000)
	42,48,000
Less: Sale of scrap of material	8,000
Materials consumed	42,40,000
Direct Wages (12,56,000 + 1,50,000)	14,06,000
Prime Cost	56,46,000
Factory overheads (20% of ₹ Prime Cost)	11,29,200
Add: Opening value of W-I-P	1,92,500
Less: Closing value of W-I-P	(1,40,700)
Factory Cost	68,27,000
Add: Administrative overheads	1,73,000
Cost of Production	70,00,000
Add: Value of opening finished stock	6,08,500
Less: Value of closing finished stock	
[₹ 500(70,00,000/14,000) × 1,064) (1,217+ 14,000 – 14,153 = 1,064 units)	(5,32,000)
Cost of Goods Sold	70,76,500
Distribution expenses (₹ 16 × 14,153 units)	2,26,448
Cost of Sales	73,02,948

Profit (Balancing figure)	14,43,606
Sales (₹ 618 × 14,153 units)	87,46,554

Q.2 Calculation of Cost Sheet | PY Nov 18

Following details are provided by M/s ZIA Private Limited for the quarter ending 30 September, 2018:

(i)	Direct expenses	₹ 1,80,000
(ii)	Direct wages being 175% of factory overheads	₹ 2,57,250
(iii)	Cost of goods sold	₹ 18,75,000
(iv)	Selling & distribution overheads	₹ 60,000
(v)	Sales	₹ 22,10,000
(vi)	Administration overheads are 10% of factory overheads	

Stock details as per Stock Register:

Particulars	30.06.2018 ₹	30.09.2018 ₹
Raw material	2,45,600	2,08,000
Work-in-progress	1,70,800	1,90,000
Finished goods	3,10,000	2,75,000

You are required to prepare a cost sheet showing:

(i) Raw material consumed
(ii) Prime cost
(iii) Factory cost
(iv) Cost of goods sold
(v) Cost of sales and profit

Ans.

Cost Sheet
(for the quarter ending 30 September 2018)

	Amount (₹)
(i) Raw materials consumed	
Opening stock of raw materials	2,45,600
Add: Purchase of materials	12,22,650*
Less: Closing stock of raw materials	(2,08,000)
Raw materials consumed	12,60,250
Add: Direct wages (1,47,000×175%)	2,57,250
Direct Expenses	1,80,000
(ii) Prime cost	**16,97,500**
Add: Factory overheads (2,57,250/175%)	1,47,000
Gross Factory cost	18,44,500
Add: Opening work-in-process	1,70,800
Less: Closing work-in-process	(1,90,000)
(iii) Factory cost	**18,25,300**
Add: Administration overheads (10% of factory overheads)	14,700
Add: Opening stock of finished goods	3,10,000
Less: Closing stock of finished goods	(2,75,000)
(iv) Cost of goods sold	**18,75,000**
Add: Selling & distribution overheads	60,000
Cost of sales	19,35,000

(v) Net Profit	**2,75,000**
Sales	22,10,000

*(18,75,000 + 2,75,000 – 3,10,000 – (1,47,000 × 10%) + 1,90,000 –1,70,800 – (2,57,250 × 100/175%) - 1,80,000 – 2,57,250 + 2,08,000 – 2,45,600) = 12,22,650

Working notes

Purchase of raw materials = Raw material consumed + Closing stock - opening stock of raw material
Raw material consumed = Prime cost - Direct wages - Direct expenses
Factory Overheads = 2,57,250*100/175
Prime cost = Factory cost + Closing WIP – Opening WIP – Factory overheads
Factory Cost = Cost of Production goods sold + Closing stock of Finished goods – Opening stock of finished goods – Administrative overheads
Net Profit = Sales - Cost of sales

Alternative solution

Cost Sheet
(for the quarter ending 30 September 2018)

	Amount (₹)
(i) Raw materials consumed	
Opening stock of raw materials	2,45,600
Add: Purchase of materials	12,37,350*
Less: Closing stock of raw materials	(2,08,000)
Raw Material consumed	12,74,950
Add: Direct wages (1,47,000×175%	2,57,250
Direct Expenses	1,80,000
(ii) Prime cost	**17,12,,200**
Add: Factory overheads (2,57,250/175%)	1,47,000
Gross Factory cost	18,59,200
Add: Opening work-in-process	1,70,800
Less: Closing work-in-process	(1,90,000)
(iii) Factory cost/works cost/cost of production	**18,40,000**
Add: Opening stock of finished goods	3,10,000
Less: Closing stock of finished goods	(2,75,000)
(iv) Cost of goods sold	**18,75,000**
Add: Administration overheads (10% of factory overheads)	14,700
Add: Selling & distribution overheads	60,000
Cost of sales	19,49,700
(v) Net Profit	**2,60,300**
Sales	22,10,000

*(18,75,000 + 2,75,000 – 3,10,000 + 1,90,000 –1,70,800 – 1,47,500 - 1,80,000 – 2,57,250 + 2,08,000 – 2,45,600) = 12,37,350

Working notes

Purchase of raw materials = Raw material consumed + Closing stock - opening stock of raw material
Raw material consumed = Prime cost - Direct wages - Direct expenses Factory Overheads = 257250*100/175
Prime cost = Factory cost + Closing WIP – Opening WIP – Factory overheads
Factory Cost = Cost of Production goods sold + Closing stock of Finished goods – Opening stock of finished goods
Net Profit = Sales - Cost of sales

Q.3 Calculation of Cost Sheet | PY May 19

M/s Areeba Private Limited has a normal production capacity of 36,000 units of toys per annum. The estimated costs of production are as under:

(i) Direct Material ₹ 40 per unit
(ii) Direct Labour ₹ 30 per unit (subject to a minimum of ₹ 48,000 p.m.)
(iii) Factory Overheads:
  (a) Fixed ₹ 3,60,000 per annum
  (b) Variable ₹ 10 per unit
  (c) Semi-variable ₹ 1,08,000 per annum up to 50% capacity and additional ₹ 46,800 for every 20% increase in capacity or any part thereof.
(iv) Administrative Overheads ₹ 5, 18,400 per annum (fixed)
(v) Selling overheads are incurred at ₹ 8 per unit.
(vi) Each unit of raw material yields scrap which is sold at the rate of ₹ 5 per unit.
(vii) In year 2019, the factory worked at 50% capacity for the first three months but it was expected that it would work at 80% capacity for the remaining nine months.
(viii) During the first three months, the selling price per unit was ₹ 145.

You are required to:
(i) Prepare a cost sheet showing Prime Cost, Works Cost, Cost of Production and Cost of Sales.
(ii) Calculate the selling price per unit for remaining nine months to achieve the total annual profit of ₹ 8,76,600.

Ans. **(i) Cost Sheet of M/s Areeba Pvt. Ltd. for the year 2019.**
Normal Capacity: 36,000 units p.a.

Particulars	3 Months 4,500 Units		9 Months 21,600 units	
	Amount (₹)	Cost per unit (₹)	Amount (₹)	Cost per unit (₹)
Direct material	1,80,000		8,64,000	
Less: Scrap	(22,500)		(1,08,000)	
Materials consumed	1,57,500	35	7,56,000	35
Direct Wages	1,44,000	32	6,48,000	30
Prime Cost	**3,01,500**	67	**14,04,000**	65
Factory overheads:				
- Fixed	90,000		2,70,000	
- Variable	45,000		2,16,000	
- Semi variable	27,000	36	1,51,200	29.50
Works Cost	**4,63,500**	103	**20,41,200**	94.50
Add: Administrative overheads	1,29,600	28.80	3,88,800	18
Cost of Production	**5,93,100**	131.80	**24,30,000**	112.5
Selling Overheads	36,000	8	1,72,800	8
Cost of Sales	**6,29,100**	139.80	**26,02,800**	120.5

Working Notes:
Calculation of Costs

Particulars	4,500 units Amount (₹)	21,600 units Amount (₹)
Material	1,80,000 (₹ 40 × 4,500 units)	8,64,000 (₹40 × 21,600 units)
Wages	1,44,000 (Max. of ₹ 30 × 4,500 units = ₹1,35,000 and ₹ 48,000 × 3 months = ₹1,44,000)	6,48,000 (21600 Units × 30)
Variable Cost	45,000 (₹10 × 4,500 units)	2,16,000 (₹10 × 21,600 units)

Semi-variable Cost	27,000 $\left(\frac{1,08,000}{12 \text{ Months}} \times 3 \text{ Months}\right)$	1,51,200 $\left(\frac{1,08,000}{12 \text{ Months}} \times 9 \text{ Months}\right)$
		+46,800(for 20 % increase) +23,400(for 10% increase)
Selling Overhead	36,000 (₹8 × 4,500 units)	1,72,800(₹ 8 × 21,600 units)

Notes:

1. Alternatively scrap of raw material can also be reduced from Work cost.
2. Administrative overhead may be treated alternatively as a part of general overhead. In that case, Works Cost as well as Cost of Production will be same i.e. ₹ 4,63,500 and Cost of Sales will remain same as ₹ 6,29,100.

(ii) Calculation of Selling price for nine months period

Particulars	Amount (₹)
Total Cost of sales ₹ (6,29,100+26,02,800)	32,31,900
Add: Desired profit	8,76,600
Total sales value	41,08,500
Less: Sales value realised in first three months (₹145 × 4,500 units)	(6,52,500)
Sales Value to be realised in next nine months	**34,56,000**
No. of units to be sold in next nine months	21,600
Selling price per unit (₹34,56,000 ÷ 21,600 units)	**160**

Q.4 Calculation of Cost Sheet | PY Nov 19

XYZ a manufacturing firm, has revealed following information for September ,2019:

	1st September (₹)	30th September (₹)
Raw Materials	2,42,000	2,92,000
Works-in-progress	2,00,000	5,00,000

The firm incurred following expenses for a targeted production of 1,00,000 units during the month :

	(₹)
Consumable Stores and spares of factory	3,50,000
Research and development cost for process improvements	2,50,000
Quality control cost	2,00,000
Packing cost (secondary) per unit of goods sold	2
Lease rent of production asset	2,00,000
Administrative Expenses (General)	2,24,000
Selling and distribution Expenses	4,13,000
Finished goods (opening)	Nil
Finished goods (closing)	5000 units

Defective output which is 4% of targeted production, realizes ₹ 61 per unit. Closing stock is valued at cost of production (excluding administrative expenses) Cost of goods sold, excluding administrative expenses amounts to ₹ 78,26,000. Direct employees cost is 1/2 of the cost of material consumed.
Selling price of the output is ₹ 110 per unit. You are required to :

(i) Calculate the Value of material purchased
(ii) Prepare cost sheet showing the profit earned by the firm.

Ans. **Workings:**

1. Calculation of Sales Quantity:

Particular	Units
Production units	1,00,000
Less: Defectives (4%×1,00,000 units)	4,000
Less: Closing stock of finished goods	5,000
No. of units sold	91,000

2. **Calculation of Cost of Production**

Particular	Amount (₹)
Cost of Goods sold (given)	78,26,000
Add: Value of Closing finished goods $\left(\frac{78,26,000}{91,000 \text{ units}} \times 5,000 \text{ units}\right)$	4,30,000
Cost of Production	82,56,000

3. **Calculation of Factory Cost**

Particular	Amount (₹)
Cost of Production	82,56,000
Less: Quality Control Cost	(2,00,000)
Less: Research and Development Cost	(2,50,000)
Add: Credit for Recoveries/Scrap/By-Products/misc. income (1,00,000 units × 4% × ₹ 61)	2,44,000
Factory Cost	80,50,000

4. **Calculation of Gross Factory Cost**

Particular	Amount (₹)
Cost of Factory Cost	80,50,000
Less: Opening Work in Process	(2,00,000)
Add: Closing Work in Process	5,00,000
Cost of Gross Factory Cost	83,50,000

5. **Calculation of Prime Cost**

Particular	Amount (₹)
Cost of Gross Factory Cost	83,50,000
Less: Consumable stores & spares	(3,50,000)
Less: Lease rental of production assets	(2,00,000)
Prime Cost	78,00,000

6. **Calculation of Cost of Materials Consumed & Labour cost**

Let Cost of Material Consumed = M and Labour cost = 0.5M
Prime Cost = Cost of Material Consumed + Labour Cost 78,00,000 = M + 0.5M
M = 52,00,000
Therefore, Cost of Material Consumed = ₹ 52,00,000 and Labour Cost = ₹ 26,00,000

(i) Calculation of Value of Materials Purchased

Particular	Amount (₹)
Cost of Material Consumed	52,00,000
Add: Value of Closing stock	2,92,000
Less: Value of Opening stock	(2,42,000)
Value of Materials Purchased	**52,50,000**

Cost Sheet

Sl.	Particulars	Total Cost (₹)
1.	Direct materials consumed:	
	Opening Stock of Raw Material	2,42,000
	Add: Additions/ Purchases [balancing figure as perrequirement (i)]	**52,50,000**
	Less: Closing stock of Raw Material	(2,92,000)
	Material Consumed	**52,00,000**
2.	Direct employee (labour) cost	**26,00,000**
3.	**Prime Cost (1+2)**	**78,00,000**
4.	Add: Works/ Factory Overheads Consumable stores and spares	
	Lease rent of production asset	**3,50,000**
		2,00,000
5.	Gross Works Cost (3+4)	**83,50,000**
6.	Add: Opening Work in Process	**2,00,000**
7.	Less: Closing Work in Process	**(5,00,000)**
8.	**Works/ Factory Cost (5+6-7)**	**80,50,000**
9.	Add: Quality Control Cost	**2,00,000**
10.	Add: Research and Development Cost	**2,50,000**
11.	Less: Credit for Recoveries/Scrap/By-Products/misc. income	**(2,44,000)**
12.	**Cost of Production (8+9+10-11)**	**82,56,000**
13.	Add: Opening stock of finished goods	**-**
14.	Less: Closing stock of finished goods (5000 Units)	**(4,30,000)**
15.	**Cost of Goods Sold (12+13-14)**	**78,26,000**
16.	Add: Administrative Overheads (General)	**2,24,000**
17.	Add: Secondary packing	**1,82,000**
18.	Add: Selling Overheads& Distribution Overheads	**4,13,000**
19.	**Cost of Sales (15+16+17+18)**	**86,45,000**
20.	Profit	**13,65,000**
21.	Sales 91,000 units ₹ 110 per unit	**1,00,10,000**

Q.5 Calculation of Cost Sheet | PY Nov 20

X Ltd. manufactures two types of pens 'Super Pen' and 'Normal Pen'.

The cost data for the year ended 30th September, 2019 is as follows:

	(₹)
Direct Materials	*8,00,000*
Direct Wages	*4,48,000*
Production Overhead	*1,92,000*
Total	*14,40,000*

It is further ascertained that :

(1) Direct materials cost in Super Pen was twice as much of direct material in Normal Pen.

(2) Direct wages for Normal Pen were 60% of those for Super Pen.

(3) Production overhead per unit was at same rate for both the types.

(4) Administration overhead was 200% of direct labour for each.

(5) Selling cost was ₹ 1 per Super pen.

(6) Production and sales during the year were as follow

Production		Sales	
	No. of units		No. of units
Super Pen	40,000	Super Pen	36,000
Normal Pen	1,20,000		

(7) Selling price was ₹ 30 per unit for Super Pen.

Prepare a Cost Sheet for 'Super Pen' showing:

(i) Cost per unit and Total Cost

(ii) Profit per unit and Total Profit

Ans. **Preparation of Cost Sheet for Super Pen**

No. of units produced = 40,000 units

No. of units sold = 36,000 units

Particulars	Per unit (₹)	Total (₹)
Direct materials (Working note- (i))	8.00	**3,20,000**
Direct wages (Working note- (ii))	4.00	**1,60,000**
Prime cost	12.00	4,80,000
Production overhead (Working note- (iii))	1.20	**48,000**
Factory Cost	13.20	5,28,000
Administration Overhead* (200% of direct wages)	8.00	**3,20,000**
Cost of production	21.20	8,48,000
Less: Closing stock (40,000 units – 36,000 units)	-	**(84,800)**
Cost of goods sold i.e. 36,000 units	21.20	7,63,200
Selling cost	1.00	**36,000**
Cost of sales/ Total cost	**22.20**	**7,99,200**
Profit	**7.80**	**2,80,800**
Sales value (₹ 30 × 36,000 units)	30.00	**10,80,000**

Working Notes:

(i) Direct material cost per unit of Normal pen = M

Direct material cost per unit of Super pen = 2M

Total Direct Material cost = 2M × 40,000 units + M × 1,20,000 units

Or, ₹ 8,00,000 = 80,000 M + 1,20,000 M

Or, M $= \frac{8,00,000}{2,00,000}$ = ₹ 4

Therefore, Direct material Cost per unit of Super pen = 2 × ₹ 4 = ₹ 8

(ii) Direct wages per unit for Super pen = W

Direct wages per unit for Normal Pen = 0.6W

So, (W x 40,000) + (0.6W x 1,20,000) = ₹ 4,48,000

W = ₹ 4 per unit

(iii) Production overhead per unit = $\frac{1,92,000}{(40,000 + 1,20,000)}$ = ₹ 1.20

Production overhead for Super pen = ₹ 1.20 × 40,000 units = ₹ 48,000

* Administration overhead is specific to the product as it is directly related to direct labour as mentioned in the question and hence to be considered in cost of production only.

Assumption: It is assumed that in point (1) and (2) of the Question, direct materials cost and direct wages respectively is related to per unit only.

Note: Direct Material and Direct wages can be calculated in alternative ways.

Q.6 Calculation of Cost Sheet | PY Jan 21

The following data are available from the books and records of Q Ltd. for the month of April 2020:

Direct Labour Cost = ₹ 1,20,000 (120% of Factory Overheads)
Cost of Sales = ₹ 4,00,000
Sales = ₹ 5,00,000

Accounts show the following figures:

	1st April, 2020 (₹)	30th April, 2020 (₹)
Inventory:		
Raw material	20,000	25,000
Work-in-progress	20,000	30,000
Finished goods	50,000	60,000
Other details:		
Selling expenses		22,000
General & Admin. expenses		18,000

You are required to prepare a cost sheet for the month of April 2020 showing:

(i) Prime Cost
(ii) Works Cost
(iii) Cost of Production
(iv) Cost of Goods sold
(v) Cost of Sales and Profit earned.

Ans. **Cost Sheet for the Month of April 2020**

Particulars	(₹)
Opening stock of Raw Material	20,000
Add: Purchases [Refer Working Note-2]	1,65,000
Less: Closing stock of Raw Material	(25,000)
Raw material consumed	1,60,000
Add: Direct labour cost	1,20,000
Prime cost	**2,80,000**
Add: Factory overheads	1,00,000
Gross Works cost	**3,80,000**
Add: Opening work-in-progress	20,000
Less: Closing work-in-progress	(30,000)
Works Cost	**3,70,000**
Cost of Production	**3,70,000**
Add: Opening stock of finished goods	50,000
Less: Closing stock of finished goods	(60,000)
Cost of goods sold	**3,60,000**
Add: General and administration expenses*	18,000
Add: Selling expenses	22,000
Cost of sales	**4,00,000**
Profit {Balancing figure (₹ 5,00,000 – ₹ 4,00,000)}	1,00,000
Sales	5,00,000

*General and administration expenses have been assumed as not relating to the production activity.

Working Note:

1. **Computation of the raw material consumed**

Particulars	(₹)
Cost of Sales	4,00,000
Less: General and administration expenses	(18,000)
Less: Selling expenses Cost of goods sold	(22,000)
Add: Closing stock of finished goods	3,60,000
Less: Opening stock of finished goods Cost of	60,000
production/Gross works cost *Add:* Closing stock of work-	(50,000)
in-progress *Less:* Opening stock of work-in-progress	3,70,000
Works cost	30,000
Less: Factory overheads $\left(\frac{1,20,000}{120} x100\right)$	(20,000)
Prime cost	3,80,000
Less: Direct labour	(1,00,000)
Raw material consumed	2,80,000
	(1,20,000)
	1,60,000

2. Computation of the raw material purchased

Particulars	(₹)
Closing stock of Raw Material	25,000
Add: Raw Material consumed	1,60,000
Less: Opening stock of Raw Material	(20,000)
Raw Material purchased	1,65,000

Q.7 Calculation of Cost Sheet | PY Jan 21

XYZ Ltd. is engaged in the manufacturing of toys. It can produce 4,20,000 toys at its 70% capacity on per annum basis. Company is in the process of determining sales price for the financial year 2020-21. It has provided the following information:

Direct Material ₹ 60 per unit Direct Labour ₹ 30 per unit Indirect Overheads:

Fixed ₹ 65,50,000 per annum

Variable ₹ 15 per unit

Semi-variable ₹ 5,00,000 per annum up to 60% capacity and ₹ 50,000 for every 5% increase in capacity or part thereof up to 80% capacity and thereafter ₹ 75,000 for every 10% increase in capacity or part thereof.

Company desires to earn a profit of ₹ 25,00,000 for the year. Company has planned that the factory will operate at 50% of capacity for first six months of the year and at 75% of capacity for further three months and for the balance three months, factory will operate at full capacity.

You are required to :

(1) Determine the average selling price at which each of the toy should be sold to earn the desired profit.

(2) Given the above scenario, advise whether company should accept an offer to sell each Toy at:

(a) ₹ 130 per Toy

(b) ₹ 129 per Toy

Ans. **(1) Statement of Cost**

	For first 6 months	For further 3 months	For remaining 3 months	Total
	6,00,000 x 6/12 x 50% = 1,50,000 units	6,00,000 x 3/12 x 75% = 1,12,500 units	6,00,000 x 3/12 = 1,50,000 units	4,12,500 units

Direct Material	90,00,000	67,50,000	90,00,000	2,47,50,000
Direct labour	45,00,000	33,75,000	45,00,000	1,23,75,000
Indirect – Variable Expenses	22,50,000	16,87,500	22,50,000	61,87,500
Indirect – Fixed Expenses	32,75,000	16,37,500	16,37,500	65,50,000
Indirect Semi-variable expenses				
For first six months @ 5,00,000 per annum	2,50,000			
For further three months @ 6,50,000* per annum		1,62,500		
For further three months @ 8,50,000** per annum			2,12,500	6,25,000
Total Cost	1,92,75,000	1,36,12,500	1,76,00,000	5,04,87,500
Desired Profit				25,00,000
Sales value				5,29,87,500
Average Sales price per Toy				**128.45**

* ₹ 5,00,000+ [3 times (from 60% to 75%) x 50,000] = ₹ 6,50,000

** ₹ 6,50,000+ [1 time (from 75% to 80%) x 50,000] + [2 times (from 80% to 100%) × 75,000] = ₹ 8,50,000

(2) (a) Company Should accept the offer as it is above its targeted sales price of ₹ 128.45 per toy.

(b) Company Should accept the offer as it is above its targeted sales price of ₹ 128.45 per toy.

Q.8 EMPLOYEE COST CHAPTER

Z Ltd is working by employing 50 skilled workers. It is considering the introduction of an incentive scheme - either Halsey Scheme (with 50% Bonus) or Rowan Scheme - of wage payment for increasing the labour productivity to adjust with the increasing demand for its products by 40%. The company feels that if the proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers, it could act as sufficient incentive for them to produce more and the company has accordingly given assurance to the workers.

Because of this assurance, an increase in productivity has been observed as revealed by the figures for the month of April, 2020:

Hourly rate of wages (guaranteed)	₹ 50
Average time for producing one unit by one worker at the previous performance (this may be taken as time allowed)	1.975 hours
Number of working days in a month	24
Number of working hours per day of each worker	8
Actual production during the month	6,120 units

Required:

(i) Calculate the effective increase in earnings of workers in percentage terms under Halsey and Rowan scheme.

(ii) Calculate the savings to Z Ltd in terms of direct labour cost per unit under both the schemes.

(iii) Advise Z Ltd about the selection of the scheme that would fulfil its assurance of incentivising workers and also to adjust with the increase in demand.

Ans. **Working Notes:**

1. Total time wages of 50 workers per month:
   = No. of working days in the month × No. of working hours per day of each worker × Hourly rate of wages × No. of workers

= 24 days × 8 hrs. × ₹ 50 × 50 workers = ₹ 4,80,000

2. Time saved per month:

Time allowed per unit to a worker	1.975 hours
No. of units produced during the month by 50 workers	6,120 units
Total time allowed to produce 6,120 units (6,120 × 1.975 hrs)	12,087 hours
Actual time taken to produce 6,120 units (24 days × 8 hrs. × 50 workers)	9,600 hours
Time saved (12,087 hours – 9,600 hours)	2,487 hours

3. Bonus under Halsey scheme to be paid to 50 workers:

Bonus = (50% of time saved) × hourly rate of wages

= 50/100 × 2,487 hours × ₹ 50 = ₹ 62,175

Total wages to be paid to 50 workers are (₹ 4,80,000 + ₹ 62,175) ₹ 5,42,175, if Z Ltd. considers the introduction of Halsey Incentive Scheme to increase the worker productivity.

4. Bonus under Rowan Scheme to be paid to 50 workers:

$$\text{Bonus} = \frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{hourly rate}$$

$$= \frac{9,600 \text{ hours}}{12,087 \text{ hours}} \times 2,487 \text{ hours} \times ₹ 50 = ₹ 98,764$$

Total wages to be paid to 50 workers are (₹ 4,80,000 + ₹ 98,764) ₹ 5,78,764, if Z Ltd. considers the introduction of Rowan Incentive Scheme to increase the worker productivity.

(i) (a) Effective hourly rate of earnings under Halsey scheme:

(Refer to Working Notes 1, 2 and 3)

$$= \frac{\text{Total time wages of 50 workers} + \text{Total bonus under Halsey scheme}}{\text{Total hours worked}}$$

$$= \frac{4,80,000 + 62,175}{9,600 \text{ hours}} = ₹ \mathbf{56.48}$$

Effective increase in earnings of worker (in %) = $\frac{`56.48 - `50}{50} \times 100 = \mathbf{2.96\%}$

(b) Effective hourly rate of earnings under Rowan scheme:

(Refer to Working Notes 1, 2 and 4)

$$= \frac{\text{Total time wages of 50 workers} + \text{Total bonus under Rowan scheme}}{\text{Total hours worked}}$$

$$= \frac{4,80,000 + 96,875}{9,600 \text{ hours}} = ₹ \mathbf{60.29}$$

Effective increase in earnings of worker (in %) = $\frac{60.29 + 50}{50} \times 100 = \mathbf{20.58\%}$

(ii) (a) Saving in terms of direct labour cost per unit under Halsey scheme:

(Refer to Working Note 3)

Labour cost per unit (under time wage scheme)

= 1.975 hours × ₹ 50 = ₹ 98.75

Labour cost per unit (under Halsey scheme)

$$= \frac{\text{Total wages paid under the schem}}{\text{Total number of units produced}} = \frac{5,42,175}{6,120} = s₹ 88.60$$

Saving per unit = ₹ 98.75 – ₹ 88.60 = **₹ 10.15**

(b) Saving in terms of direct worker cost per unit under Rowan Scheme:

(Refer to Working Note 4)

Labour cost per unit under Rowan scheme = ₹ 5,78,764/6,120 units= ₹ 94.57

Saving per unit = ₹ 98.75 – ₹ 94.57 = **₹ 4.18**

(iii) Calculation of Productivity:

Normal Production Hours worked/Unit per Hour (9,600/1.975)	4,861
Actual Production Units	6,120
Increase in labour productivity	1,259

% Productivity i.e. increase in production/Normal production	**25.9%**

Advice: Rowan plan fulfils the company's assurance of 20% increase over the present earnings of workers. This would increase productivity by 25.9% only. It will not adjust with the increase in demand by 40%.

Q.9 Calculation of Cost Sheet | PY July 21

The following data relates to manufacturing of a standard product during the month of March, 2021:

Particulars	Amount (in ₹)
Stock of Raw material as on 01-03-2021	80,000
Work in Progress as on 01-03-2021	50,000
Purchase of Raw material	2,00,000
Carriage Inwards	20,000
Direct Wages	1,20,000
Cost of special drawing	30,000
Hire charges paid for Plant	24,000
Return of Raw Material	40,000
Carriage on return	6,000
Expenses for participation in Industrial exhibition	8,000
Legal charges	2,500
Salary to office staff	25,000
Maintenance of office building	2,000
Depreciation on Delivery van	6,000
Warehousing charges	1,500
Stock of Raw material as on 31-03-2021	30,000
Stock of Work in Progress as on 31-03-2021	24,000

- Store overheads on materials are 10% of material consumed.
- Factory overheads are 20% of the Prime cost.
- 10% of the output was rejected and a sum of ₹ 5,000 was realized on sale of scrap.
- 10% of the finished product was found to be defective and the defective products were rectified at an additional expenditure which is equivalent to 20% of proportionate direct wages.
- The total output was 8000 units during the month.

You are required to prepare a Cost Sheet for the above period showing the:

(i) Cost of Raw Material consumed.
(ii) Prime Cost
(iii) Work Cost
(iv) Cost of Production
(v) Cost of Sales.

Ans. Statement of Cost for the month of March, 2021

Particulars	**Amount (₹)**	**Amount (₹)**
(i) Cost of Material Consumed:		
Raw materials purchased (₹ 2,00,000 – ₹ 40,000)	1,60,000	
Carriage inwards	20,000	
Add: Opening stock of raw materials	80,000	
Less: Closing stock of raw materials	(30,000)	**2,30,000**
Direct Wages		1,20,000
Direct expenses:		
Cost of special drawing	30,000	
Hire charges paid for Plant	24,000	54,000

(ii) Prime Cost			**4,04,000**
Carriage on return		6,000	
Store overheads (10% of material consumed)		23,000	
Factory overheads (20% of Prime cost)		80,800	
Additional expenditure for rectification of defective products (refer working note)		2,160	1,11,960
Gross factory cost			5,15,960
Add: Opening value of W-I-P			50,000
Less: Closing value of W-I-P			(24,000)
(iii) Works/ Factory Cost			**5,41,960**
Less: Realisable value on sale of scrap			(5,000)
(iv) Cost of Production			**5,36,960**
Add: Opening stock of finished goods			-
Less: Closing stock of finished goods			-
Cost of Goods Sold			**5,36,960**
Administrative overheads:			
Maintenance of office building		2,000	
Salary paid to Office staff		25,000	
Legal Charges		2,500	29,500
Selling overheads:			
Expenses for participation in Industrial exhibition		8,000	8,000
Distribution overheads:			
Depreciation on delivery van		6,000	
Warehousing charges		1,500	7,500
(v) Cost of Sales			**5,81,960**

Alternative Solution

(considering Hire charges paid for Plant as indirect expenses)

Statement of Cost for the month of March, 2021

Particulars	Amount (₹)	Amount (₹)
Cost of Material Consumed:		
Raw materials purchased (₹ 2,00,000 - ₹ 40,000)	1,60,000	
Carriage inwards	20,000	
Add: Opening stock of raw materials	80,000	
Less: Closing stock of raw materials	(30,000)	**2,30,000**
Direct Wages		1,20,000
Direct expenses:		
Cost of special drawing	30,000	30,000
Prime Cost		**3,80,000**
Hire charges paid for Plant	24,000	
Carriage on return	6,000	
Store overheads (10% of material consumed)	23,000	
Factory overheads (20% of Prime cost)	76,000	
Additional expenditure for rectification of defective products (refer working note)	2,160	1,31,160
Gross factory cost		**5,11,160**
Add: Opening value of W-I-P		50,000
Less: Closing value of W-I-P		(24,000)
Works/ Factory Cost		**5,37,160**
Less: Realisable value on sale of scrap		(5,000)
Cost of Production		**5,32,160**

Add: Opening stock of finished goods		-
Less: Closing stock of finished goods		-
Cost of Goods Sold		**5,32,160**
Administrative overheads:		
Maintenance of office building	2,000	
Salary paid to Office staff	25,000	
Legal Charges	2,500	29,500
Selling overheads:		
Expenses for participation in Industrial exhibition	8,000	8,000
Distribution overheads:		
Depreciation on delivery van	6,000	
Warehousing charges	1,500	7,500
Cost of Sales		**5,77,160**

Working Notes:

1. **Number of Rectified units**

Total Output	8,000 units
Less: Rejected 10%	800 units
Finished product	7,200 units
Rectified units (10% of finished product)	**720 units**

2. **Proportionate additional expenditure on 720 units**
   = 20% of proportionate direct wages
   = 0.20 x (₹ 1,20,000/8,000) x 720
   = ₹ 2,160

Q.10 Calculation of Cost Sheet | PY Dec 21

G Ltd. manufactures leather bags for office and school purposes.

The following information is related with the production of leather bags for the month of September, 2021.

(1) Leather sheets and cotton clothes are the main inputs and the estimated requirement per bag is two metres of leather sheets and one metre of cott on cloth. 2,000 metre of leather sheets and 1,000 metre of cotton cloths are purchased at ₹ 3,20,000 and ₹ 15,000 respectively. Freight paid on purchases is ₹ 8,500.

(2) Stitching and finishing need 2,000 man hours at ₹ 80 per hour.

(3) Other direct costs of ₹ 10 per labour hour is incurred.

(4) G Ltd. have 4 machines at a total cost of ₹ 22,00,000. Machines have a life of 10 years with a scrap value of 10% of the original cost. Depreciation is charged on a straight-line method.

(5) The monthly cost of administration and sales office staffs are ₹ 45,000 and ₹ 72,000 respectively. G Ltd. pays ₹ 1,20,000 per month as rent for a 2,400 sq. feet factory premises. The administrative and sales office occupies 240 sq. feet and 200 sq. feet respectively of factory space.

(6) Freight paid on delivery of finished bags is ₹ 18,000.

(7) During the month, 35 kgs of scrap (cuttings of leather and cotton) are sold at ₹ 150 per kg.

(8) There are no opening and closing stocks of input materials. There is a finished stock of 100 bags in stock at the end of the month.

You are required to prepare a cost sheet in respect of above for the month of September 2021 showing:

(i) Cost of Raw Material Consumed
(ii) Prime Cost
(iii) Works/Factory Cost
(iv) Cost of Production
(v) Cost of Goods Sold
(vi) Cost of Sales

Ans. **No. of bags manufactured = 1,000 units**

Cost sheet for the month of September 2021

	Particulars	Total Cost (₹)	Cost per unit (₹)
1.	Direct materials consumed:		
	- Leather sheets	3,20,000	320.00
	- Cotton cloths	15,000	15.00
	Add: Freight paid on purchase	8,500	8.50
	(i) Cost of material consumed	3,43,500	343.50
2.	Direct wages (₹80 × 2,000 hours)	1,60,000	160.00
3.	Direct expenses (₹10 × 2,000 hours)	20,000	20.00
4.	**(ii) Prime Cost**	5,23,500	523.50
5.	Factory Overheads: Depreciation on machines {(₹ 22,00,000 × 90%) ÷ 120 months}	16,500	16.50
	Apportioned cost of factory rent	98,000	98.00
6.	**(iii) Works/ Factory Cost**	6,38,000	638.00
7.	*Less:* Realisable value of cuttings (₹150×35 kg.)	(5,250)	(5.25)
8.	**(iv) Cost of Production**	6,32,750	632.75
9.	*Add:* Opening stock of bags	0	
10.	*Less:* Closing stock of bags (100 bags × ₹632.75)	(63,275)	
11.	**(v) Cost of Goods Sold**	5,69,475	632.75
12.	*Add:* Administrative Overheads:		
	- Staff salary	45,000	50.00
	Apportioned rent for administrative office	12,000	13.33
13.	*Add:* Selling and Distribution Overheads		
	- Staff salary	72,000	80.00
	- Apportioned rent for sales office	10,000	11.11
	- Freight paid on delivery of bags	18,000	20.00
14.	**(vi) Cost of Sales**	7,26,475	807.19

Apportionment of Factory rent:
To factory building {(₹ 1,20,000 ÷ 2400 sq. feet) × 1,960 sq. feet} = ₹ 98,000 To administrative office {(₹ 1,20,000 ÷ 2400 sq. feet) × 240 sq. feet} = ₹ 12,000 To sale office {(₹ 1,20,000 ÷ 2400 sq. feet) × 200 sq. feet} = ₹ 10,000

Q.11 Calculation of Cost Sheet | PY May 22

The following data are available from the books and records of A Ltd. for the month of April 2022:

Particulars	Amount (₹)
Stock of raw materials on 1st April 2022	10,000
Raw materials purchased	2,80,000
Manufacturing wages	70,000
Depreciation on plant	15,000
Expenses paid for quality control check activities	4,000
Lease Rent of Production Assets	10,000
Administrative Overheads (Production)	15,000
Expenses paid for pollution control and engineering & maintenance	1,000
Stock of raw materials on 30th April 2022	40,000
Primary packing cost	8,000
Research & development cost (Process related)	5,000
Packing cost for redistribution of finished goods	1,500
Advertisement expenses	1,300

Stock of finished goods as on 1st April 2022 was 200 units having a total cost of ₹ 28,000. The entire opening stock of finished goods has been sold during the month.
Production during the month of April, 2022 was 3,000 units. Closing stock of finished goods as on 30th April, 2022 was 400 units.
You are required to:

I. Prepare a Cost Sheet for the above period showing the:
- (i) Cost of Raw Material consumed
- (ii) Prime Cost
- (iii) Factory Cost
- (iv) Cost of Production
- (v) Cost of goods sold
- (vi) Cost of Sales

II. Calculate selling price per unit, if sale is made at a profit of 20% on sales.

Ans. **I. Statement of Cost (for the month of April, 2022)**

S. No.	Particulars	Amount (₹)	Amount (₹)
	Opening stock of Raw material	10,000	
	Add: Purchase of Raw material	2,80,000	
	Less: Closing stock of raw materials	(40,000)	
	Raw material consumed		**2,50,000**
(i)	Manufacturing wages		70,000
(ii)	**Prime Cost**		**3,20,000**
	Factory/work overheads:		
	Depreciation on plant	15,000	
	Lease rent of production Asset	10,000	
	Expenses paid for pollution control and engineering & Maintenance	1,000	26,000
(iii)	**Factory/Work Cost**		**3,46,000**
	Expenses paid for quality control check activity		4,000
	Research and Development Cost		5,000
	Administration Overheads (Production)		15,000
	Primary Packing Cost		8,000
(iv)	**Cost of Production**		**3,78,000**
	Add: Opening stock of finished goods		28,000
	Less: Closing stock of finished goods		**(50,400)**
(v)	**Cost of Goods Sold**		**3,55,600**
	Advertisement expenses		1,300
	Packing cost for re-distribution of finished goods sold		1,500
(vi)	**Cost of Sales**		**3,58,400**

Note: Valuation of Closing stock of finished goods

$= \frac{3,78,000}{3000 \text{ units}} \times 400 \text{ units}$

= ₹50,400

II. Cost per unit sold $= \frac{3,58,400}{200 + 3,000 - 400} =$ ₹ 128 per unit

Selling Price $= \frac{128}{80\%} =$ **₹160 per unit**

Q.12 Calculation of Cost Sheet | PY Nov 22

PNME Ltd. manufactures two types of masks- 'Disposable Masks' and 'Cloth Masks'. The cost data for the year ended 31stMarch, 2022 is as follows:

	₹
Direct Materials	12,50,000
Direct Wages	7,00,000
Production Overhead	4,00,000
Total	23,50,000

It is further ascertained that:

- Direct material cost per unit of Cloth Mask was twice as much of Direct material cost per unit of Disposable Mask.
- Direct wages per unit for Disposable Mask were 60% of those for Cloth Mask.
- Production overhead per unit was at same rate for both the types of the masks.
- Administration overhead was 50% of Production overhead for each type of mask.
- Selling cost was ₹ 2 per Cloth Mask.
- Selling Price was ₹ 35 per unit of Cloth Mask.
- No. of units of Cloth Masks sold- 45,000
- No. of units of Production of
  Cloth Masks: 50,000
  Disposable Masks: 1,50,000

You are required to prepare a cost sheet for Cloth Masks showing:

(i) Cost per unit and Total Cost.

(ii) Profit per unit and Total Profit.

Ans. Preparation of Cost Sheet for Cloth Masks

No. of units produced = 50,000 units

No. of units sold = 45,000 units

Particulars	Per unit (₹)	Total (₹)
Direct materials (Working note- (i))	10.00	5,00,000
Direct wages (Working note- (ii))	5.00	2,50,000
Prime cost	15.00	7,50,000
Production overhead (Working note- (iii))	2.00	1,00,000
Factory Cost	17.00	8,50,000
Administration Overhead* (50% of Production Overhead)	1.00	50,000
Cost of production	18.00	9,00,000
Less: Closing stock (50,000 units – 45,000 units)	-	(90,000)
Cost of goods sold i.e. 45,000 units	18.00	8,10,000
Selling cost	2.00	90,000
Cost of sales/ Total cost	20.00	9,00,000
Profit	15.00	6,75,000
Sales value (₹ 35 × 45,000 units)	35.00	15,75,000

Working Notes:

(i) Direct material cost per unit of Disposable Mask = M
Direct material cost per unit of Cloth Mask = 2M
Total Direct Material cost = 2M × 50,000 units + M × 1,50,000 units
Or, ₹12,50,000 = 1,00,000 M + 1,50,000 M

Or, M = $\frac{12,50,000}{2,50,000}$ = ₹ 5

Therefore, Direct material Cost per unit of Cloth Mask = 2 × ₹ 5 = ₹ 10

(ii) Direct wages per unit for Cloth Mask = W
Direct wages per unit for Disposable Mask = 0.6W
So, (W x 50,000) + (0.6W x 1,50,000) = ₹ 7,00,000
W = ₹5 per unit
Therefore, Direct material Cost per unit of Cloth Mask = ₹ 5

(iii) Production overhead per unit = $\frac{`4,00,000}{(50,000 + 1,50,000)}$ = ₹ 2

Production overhead for Cloth Mask = ₹ 2 × 50,000 units = ₹ 1,00,000

* Administration overhead is related to production overhead in the question and hence to be considered in cost of production only.

Q.13 Calculation of Cost Sheet | PY May 23

The following information is available from SN Manufacturing Limited's for the month of April 2023.

	April 1	April 30
Opening and closing inventories data:		
Stock of finished goods	2,500 units	?
Stock of raw materials	₹ 42,500	₹ 38,600
Work-in progress	₹ 42,500	₹ 42,800
Other data are:		
Raw materials Purchased		₹ 6,95,000
Carriage inward		₹ 36,200
Direct wages paid		₹ 3,22,800
Royalty paid for production		₹ 35,800
Purchases of special designs, moulds and patterns (estimated life 12 Production cycles)		₹ 1,53,600
Power, fuel and haulage (factory)		₹ 70,600
Research and development costs for improving the production process (amortized)		₹ 31,680
Primary packing cost (necessary to maintain quality)		₹ 6920
Administrative Overhead		₹ 46,765
Salary and wages for supervisor and foremen		₹ 28,000

Other information:

- Opening stock of finished goods is to be valued at ₹ 8.05 per unit.
- During the month of April, 1,52,000 units were produced and 1,52,600 units were sold. The closing stock of finished goods is to be valued at the relevant month's cost of production. The company follows the FIFO method.
- Selling and distribution expenses are to be charged at 20 paisa per unit.
- Assume that one production cycle is completed in one month.

Required:

(i) Prepare a cost sheet for the month ended on April 30, 2023 , showing the various elements of cost (raw material consumed, prime cost, factory cost, cost of production, cost of goods sold, and cost of sales).

(ii) Calculate the selling price per unit if profit is charged at 20 percent on sales.

Ans.

Cost Sheet for the month of April 2023

Particulars	Amount (₹)	Amount (₹)

Raw materials consumed:		
Raw materials purchased	6,95,000	
Add: Carriage inward	36,200	
Add: Value of opening stock of raw materials	42,500	
Less: Value of closing stock of raw materials	(38,600)	**7,35,100**
Direct wages paid		3,22,800
Royalty paid for production		35,800
Amortised cost of special designs, moulds and patterns (₹153,600 ÷ 12)		12,800
Power, fuel and haulage (factory)*		70,600
Prime Cost*		**11,77,100**
Salary and wages of supervisor and foremen		28,000
Gross Works Cost		12,05,100
Add: Opening stock of WIP		42,500
Less: Closing stock of WIP		(42,800)
Factory/ Works Cost		**12,04,800**
Research and development cost	31,680	
Primary packing cost	6,920	38,600
Cost of Production		**12,43,400**
Add: Opening stock of finished goods (₹ 8.05 × 2,500 units)		20,125
Less: Value of closing stock [(2,500+152,000 -1,52,600) × (12,43,400÷152000)		(15,542)
Cost of Goods Sold		**12,47,983**
Add: Administrative overheads		46,765
Add: Selling and distribution expenses (₹ 0.20 × 1,52,600)		30,520
Cost of Sales		**13,25,268**
Add: Profit (20% on Sales or 25% on cost of sales)		3,31,317
Sales value		16,56,585
Selling price per unit (₹ 16,56,585 ÷ 1,52,600 units)		**10.86**

*May be taken as part of Factory / Works cost, however Total Factory Cost will remain the same. If taken as part of factory cost then prime cost will be ₹ 11,06,500.

Alternative Solution (Based on work-in-progress figure of ₹ 45,500 as on 1st April 2023 as per Hindi part of Question paper)

Particulars	Amount (₹)	Amount (₹)
Raw materials consumed:		
Raw materials purchased	6,95,000	
Add: Carriage inward	36,200	
Add: Value of opening stock of raw materials	42,500	
Less: Value of closing stock of raw materials	(38,600)	7,35,100
Direct wages paid		3,22,800
Royalty paid for production		35,800
Amortised cost of special designs, moulds and patterns (₹ 153,600 ÷ 12)		12,800
Power, fuel and haulage (factory)*		70,600
Prime Cost		**11,77,100**
Salary and wages of supervisor and foremen		28,000
Gross Works Cost		12,05,100
Add: Opening stock of WIP		45,500
Less: Closing stock of WIP		(42,800)
Factory/ Works Cost		**12,07,800**

Research and development cost	31,680	
Primary packing cost	6,920	38,600
Cost of Production		**12,46,400**
Add: Opening stock of finished goods (₹ 8.05 × 2,500 units)		20,125
Less: Value of closing stock [(2,500+1,52,000 -1,52,600) × (12,46,400÷1,52,000)		(15,580)
Cost of Goods Sold		**12,50,945**
Add: Administrative overheads		46,765
Add: Selling and distribution expenses (₹ 0.20 × 1,52,600)		30,520
Cost of Sales		**13,28,230**
Add: Profit (20% on Sales or 25% on cost of sales)		3,32,058
Sales value		16,60,288
Selling price per unit (₹ 16,60,288 ÷ 1,52,600 units)		**10.88**

*May be taken as part of Factory / Works cost, however Total Factory Cost will remain the same. If taken as part of factory cost then prime cost will be ₹ 11,06,500.

Q.14 Calculation of Cost Sheet | RTP May 18

From the following figures, CALCULATE cost of production and profit for the month of March 2018.

	Amount (₹)		Amount (₹)
Stock on 1st March, 2018		Purchase of raw materials	28,57,000
- Raw materials	6,06,000	Sale of finished goods	1,34,00,000
- Finished goods	3,59,000	Direct wages	37,50,000
Stock on 31st March, 2018		Factory expenses	21,25,000
- Raw materials	7,50,000	Office and administration expenses	10,34,000
- Finished goods	3,09,000	Selling and distribution expenses	7,50,000
Work-in-process:		Sale of scrap	26,000
- On 1st March, 2018	12,56,000		
- On 31st March, 2018	14,22,000		

Ans. Calculation of Cost of Production and Profit for the month ended April 2018:

Particulars	Amount (₹)	Amount (₹)
Materials consumed:		
- Opening stock	6,06,000	
- *Add:* Purchases	28,57,000	
	34,63,000	
- *Less:* Closing stock	(7,50,000)	27,13,000
Direct wages		37,50,000
Prime cost		64,63,000
Factory expenses		21,25,000
		85,88,000
Add: Opening W-I-P		12,56,000
Less: Closing W-I-P		(14,22,000)
Factory cost		84,22,000
Less: Sale of scrap		(26,000)
Cost of Production		**83,96,000**
Add: Opening stock of finished goods		6,06,000
Less: Closing stock of finished goods		(3,59,000)
Cost of Goods Sold		86,43,000

Office and administration expenses		10,34,000
Selling and distribution expenses		7,50,000
Cost of Sales		1,04,27,000
Profit (balancing figure)		**29,73,000**
Sales		1,34,00,000

Q.15 Calculation of Cost Sheet | RTP Nov 18

From the following data of Arnav Metallic Ltd., CALCULATE Cost of production:

		Amount (₹)
(i)	Repair & maintenance paid for plant & machinery	9,80,500
(ii)	Insurance premium paid for inventories	26,000
(iii)	Insurance premium paid for plant & machinery	96,000
(iv)	Raw materials purchased	64,00,000
(v)	Opening stock of raw materials	2,88,000
(vi)	Closing stock of raw materials	4,46,000
(vii)	Wages paid	23,20,000
(viii)	Value of opening Work-in-process	4,06,000
(ix)	Value of closing Work-in-process	6,02,100
(x)	Quality control cost for the products in manufacturing process	86,000
(xi)	Research & development cost for improvement in production process	92,600
(xii)	Administrative cost for:	
	- Factory & production	9,00,000
	- Others	11,60,000
(xiii)	Amount realised by selling scrap generated during the manufacturing process	9,200
(xiv)	Packing cost necessary to preserve the goods for further processing	10,200
(xv)	Salary paid to Director (Technical)	8,90,000

Ans. **Calculation of Cost of Production of Arnav Metallic for the period…..**

Particulars	Amount (₹)
Raw materials purchased	64,00,000
Add: Opening stock	2,88,000
Less: Closing stock	(4,46,000)
Material consumed	62,42,000
Wages paid	23,20,000
Prime cost	85,62,000
Repair and maintenance cost of plant & machinery	9,80,500
Insurance premium paid for inventories	26,000
Insurance premium paid for plant & machinery	96,000
Quality control cost	86,000
Research & development cost	92,600
Administrative overheads related with factory and production	9,00,000
	1,07,43,100
Add: Opening value of W-I-P	4,06,000
Less: Closing value of W-I-P	(6,02,100)
	1,05,47,000
Less: Amount realised by selling scrap	(9,200)
Add: Primary packing cost	10,200
Cost of Production	1,05,48,000

Notes:

(i) Other administrative overhead does not form part of cost of production.

(ii) Salary paid to Director (Technical) is an administrative cost.

Q.16 Calculation of Cost Sheet | RTP May 19

Following information relate to a manufacturing concern for the year ended 31 st March, 2019:

	(₹)
Raw Material (opening)	2,28,000
Raw Material (closing)	3,05,000
Purchases of Raw Material	42,25,000
Freight Inwards	1,00,000
Direct wages paid	12,56,000
Direct wages-outstanding at the end of the year	1,50,000
Factory Overheads	20% of prime cost
Work-in-progress (opening)	1,92,500
Work-in-progress (closing)	1,40,700
Administrative Overheads (related to production)	1,73,000
Distribution Expenses	₹16 per unit
Finished Stock (opening)- 1,217 Units	6,08,500
Sale of scrap of material	8,000

The firm produced 14,000 units of output during the year. The stock of finished goods at the end of the year is valued at cost of production. The firm sold 14,153 units at a price of ₹618 per unit during the year.
PREPARE cost sheet of the firm.

Ans.

Cost sheet for the year ended 31st March, 2019.

Units produced - 14,000 units

Units sold - 14,153 units

Particulars	Amount (₹)
Raw materials purchased	42,25,000
Add: Freight Inward	1,00,000
Add: Opening value of raw materials	2,28,000
Less: Closing value of raw materials	(3,05,000)
	42,48,000
Less: Sale of scrap of material	(8,000)
Materials consumed	42,40,000
Direct Wages (12,56,000 + 1,50,000)	14,06,000
Prime Cost	56,46,000
Factory overheads (20% of Prime Cost)	11,29,200
Add: Opening value of W-I-P	1,92,500
Less: Closing value of W-I-P	(1,40,700)
Factory Cost	68,27,000
Add: Administrative overheads	1,73,000
Cost of Production	70,00,000
Add: Value of opening finished stock	6,08,500
Less: Value of closing finished stock [₹ 500(70,00,000/14,000) × 1,064] (1,217+ 14,000 – 14,153 = 1,064 units)	(5,32,000)
Cost of Goods Sold	70,76,500
Distribution expenses (₹16 × 14,153 units)	2,26,448

Cost of Sales	73,02,948
Profit (Balancing figure)	14,43,606
Sales (₹ 618 × 14,153 units)	87,46,554

Q.17 Calculation of Cost Sheet | RTP Nov 19

DFG Ltd. manufactures leather bags for office and school purpose. The following information is related with the production of leather bags for the month of September 2019.

(i) Leather sheets and cotton cloths are the main inputs, and the estimated requirement per bag is two meters of leather sheets and one meter of cotton cloth. 2,000 meter of leather sheets and 1,000 meter of cotton cloths are purchased at ₹3,20,000 and ₹15,000 respectively. Freight paid on purchases is ₹8,500.

(ii) Stitching and finishing need 2,000 man hours at ₹80 per hour.

(iii) Other direct cost of ₹10 per labour hour is incurred.

(iv) DFG has 4 machines at a total cost of ₹22,00,000. Machine has a life of 10 years with a scrape value of 10% of the original cost. Depreciation is charged on straight line method.

(v) The monthly cost of administrative and sales office staffs are ₹45,000 and ₹72,000 respectively. DFG pays ₹1,20,000 per month as rent for a 2400 sq.feet factory premises. The administrative and sales office occupies 240 sq. feet and 200 sq. feet respectively of factory space.

(vi) Freight paid on delivery of finished bags is ₹18,000.

(vii) During the month 35 kg. of leather and cotton cuttings are sold at ₹150 per kg.

(viii) There is no opening and closing stocks for input materials. There is 100 bags in stock at the end of the month.

Required:

PREPARE a cost sheet following functional classification for the month of September 2019.

Ans. No. of bags manufactured = 1,000 units

Cost sheet for the month of September 2019

	Particulars	Total Cost (₹)	Cost per unit (₹)
1.	Direct materials consumed:		
	- Leather sheets	3,20,000	320.00
	- Cotton cloths	15,000	15.00
	Add: Freight paid on purchase	8,500	8.50
2.	Direct wages (₹80 × 2,000 hours)	1,60,000	160.00
3.	Direct expenses (₹10 × 2,000 hours)	20,000	20.00
4.	**Prime Cost**	**5,23,500**	523.50
5.	Factory Overheads: Depreciation on machines {(₹22,00,000×90%)÷120 months}	16,500	16.50
	Apportion cost of factory rent	98,000	98.00
6.	**Works/ Factory Cost**	**6,38,000**	638.00
7.	Less: Realisable value of cuttings (₹150×35 kg.)	(5,250)	(5.25)
8.	**Cost of Production**	**6,32,750**	632.75
9.	Add: Opening stock of bags	0	
10.	Less: Closing stock of bags (100 bags × ₹632.75)	(63,275)	
11.	**Cost of Goods Sold**	**5,69,475**	632.75
12.	Add: Administrative Overheads:		
	- Staff salary	45,000	45.00
	- Apportioned rent for administrative office	12,000	12.00
13.	Add: Selling and Distribution Overheads		
	- Staff salary	72,000	80.00
	- Apportioned rent for sales office	10,000	11.11
	- Freight paid on delivery of bags	18,000	20.00

14.	**Cost of Sales (18+19+20)**	**7,26,475**	800.86

Apportionment of Factory rent:
To factory building {(₹ 1,20,000 ÷ 2400 sq. feet) × 1,960 sq. feet} = ₹98,000
To administrative office {(₹ 1,20,000 ÷ 2400 sq. feet) × 240 sq. feet} = ₹12,000
To sale office {(₹ 1,20,000 ÷ 2400 sq. feet) × 200 sq. feet} = ₹ 10,000

Q.18 Calculation of Cost Sheet | RTP May 20

From the following data of Arnav Metallic Ltd., CALCULATE Cost of production:

		Amount (₹)
(i)	Repair & maintenance paid for plant & machinery	9,80,500
(ii)	Insurance premium paid for plant & machinery	96,000
(iii)	Raw materials purchased	64,00,000
(iv)	Opening stock of raw materials	2,88,000
(v)	Closing stock of raw materials	4,46,000
(vi)	Wages paid	23,20,000
(vii)	Value of opening Work-in-process	4,06,000
(viii)	Value of closing Work-in-process	6,02,100
(ix)	Quality control cost for the products in manufacturing process	86,000
(x)	Research & development cost for improvement in production process	92,600
(xi)	Administrative cost for:	
	- Factory & production	9,00,000
	- Others	11,60,000
(xii)	Amount realised by selling scrap generated during the manufacturing process	9,200
(xiii)	Packing cost necessary to preserve the goods for further processing	10,200
(xiv)	Salary paid to Director (Technical)	8,90,000

Ans. **Calculation of Cost of Production of Arnav Metallic Ltd. for the period…..**

Particulars	Amount (₹)
Raw materials purchased	64,00,000
Add: Opening stock	2,88,000
Less: Closing stock	(4,46,000)
Material consumed	62,42,000
Wages paid	23,20,000
Prime cost	85,62,000
Repair and maintenance cost of plant & machinery	9,80,500
Insurance premium paid for plant & machinery	96,000
Quality control cost	86,000
Research & development cost	92,600
Administrative overheads related with factory and production	9,00,000
	1,07,17,100
Add: Opening value of W-I-P	4,06,000
Less: Closing value of W-I-P	(6,02,100)
	1,05,21,000
Less: Amount realised by selling scrap	(9,200)
Add: Primary packing cost	10,200
Cost of Production	1,05,22,000

Notes:
(i) Other administrative overhead does not form part of cost of production.
(ii) Salary paid to Director (Technical) is an administrative cost.

Q.19 Calculation of Cost Sheet | RTP Nov 20

The following details are available from the books of R Ltd. for the year ending 31st March 2020:

Particulars	Amount (₹)
Purchase of raw materials	84,00,000
Consumable materials	4,80,000
Direct wages	60,00,000
Carriage inward	1,72,600
Wages to foreman and store keeper	8,40,000
Other indirect wages to factory staffs	1,35,000
Expenditure on research and development on new production technology	9,60,000
Salary to accountants	7,20,000
Employer's contribution to EPF & ESI	7,20,000
Cost of power & fuel	28,00,000
Production planning office expenses	12,60,000
Salary to delivery staffs	14,30,000
Income tax for the assessment year 2019-20	2,80,000
Fees to statutory auditor	1,80,000
Fees to cost auditor	80,000
Fees to independent directors	9,40,000
Donation to PM-national relief fund	1,10,000
Value of sales	2,82,60,000
Position of inventories as on 01-04-2019:	
- Raw Material	6,20,000
- W-I-P	7,84,000
- Finished goods	14,40,000
Position of inventories as on 31-03-2020:	
- Raw Material	4,60,000
- W-I-P	6,64,000
- Finished goods	9,80,000

From the above information PREPARE a cost sheet for the year ended 31st March 2020.

Ans. Statement of Cost of R Ltd. for the year ended 31st March, 2020:

Sl. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		
	- Raw materials purchased	84,00,000	
	- Carriage inward	1,72,600	
	Add: Opening stock of raw materials	6,20,000	
	Less: Closing stock of raw materials	(4,60,000)	87,32,600
(ii)	Direct employee (labour) cost:		
	- Direct wages	60,00,000	
	- Employer's Contribution towards PF & ESIS	7,20,000	67,20,000
(iii)	Direct expenses:		
	- Consumable materials	4,80,000	
	- Cost of power & fuel	28,00,000	32,80,000
	Prime Cost		1,87,32,600
(iv)	Works/ Factory overheads:		
	- Wages to foreman and store keeper	8,40,000	
	- Other indirect wages to factory staffs	1,35,000	9,75,000

	Gross factory cost		1,97,07,600
	Add: Opening value of W-I-P		7,84,000
	Less: Closing value of W-I-P		(6,64,000)
	Factory Cost		1,98,27,600
(v)	Research & development cost paid for improvement in production process		9,60,000
(vi)	Production planning office expenses		12,60,000
	Cost of Production		2,20,47,600
	Add: Opening stock of finished goods		14,40,000
	Less: Closing stock of finished goods		(9,80,000)
	Cost of Goods Sold		2,25,07,600
(vii)	Administrative overheads:		
	- Salary to accountants	7,20,000	
	- Fees to statutory auditor	1,80,000	
	- Fees to cost auditor	80,000	
	- Fee paid to independent directors	9,40,000	
	- Income tax for the assessment year 2019-20	2,80,000	
	- Donation to PM-national relief fund	1,10,000	23,10,000
(viii)	Selling overheads& Distribution overheads:		
	- Salary to delivery staffs		14,30,000
	Cost of Sales		2,62,47,600
	Profit (balancing figure)		20,12,400
	Sales		2,82,60,000

Q.20 Calculation of Cost Sheet | RTP May 21

RTA Ltd. has the following expenditures for the year ended 31 st December, 2020:

Sl. No.		Amount (₹)	Amount (₹)
(i)	Raw materials purchased		5,00,00,000
(ii)	Freight inward		9,20,600
(iii)	Wages paid to factory workers		25,20,000
(iv)	Royalty paid for production		1,80,000
(v)	Amount paid for power & fuel		3,50,000
(vi)	Job charges paid to job workers		3,10,000
(vii)	Stores and spares consumed		1,10,000
(viii)	Depreciation on office building		50,000
(ix)	Repairs & Maintenance paid for:		
	- Plant & Machinery	40,000	
	- Sales office building	20,000	60,000
(x)	Insurance premium paid for:		
	- Plant & Machinery	28,200	
	- Factory building	18,800	47,000
(xi)	Expenses paid for quality control check activities		18,000
(xii)	Research & development cost paid for improvement in production process		20,000
(xiii)	Expenses paid for pollution control and engineering & maintenance		36,000
(xiv)	Salary paid to Sales & Marketing mangers		5,60,000
(xv)	Salary paid to General Manager		6,40,000
(xvi)	Packing cost paid for:		

	- Primary packing necessary to maintain quality	46,000	
	- For re-distribution of finished goods	80,000	1,26,000
(xvii)	Fee paid to independent directors		1,20,000
(xviii)	Performance bonus paid to sales staffs		1,20,000
(xix)	Value of stock as on 1stJanuary, 2020:		
	- Raw materials	10,00,000	
	- Work-in-process	8,60,000	
	- Finished goods	12,00,000	30,60,000
(xx)	Value of stock as on 31stDecember, 2020:		
	- Raw materials	8,40,000	
	- Work-in-process	6,60,000	
	- Finished goods	10,50,000	25,50,000

Amount realized by selling of scrap and waste generated during manufacturing process – ₹ 48,000/-
From the above data you are requested to PREPARE Statement of Cost for RTA Ltd. for the year ended 31st December, 2020, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales.

Ans. **Statement of Cost of RTA Ltd. for the year ended 31st December, 2020:**

Sl.No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		
	- Raw materials purchased	5,00,00,000	
	- Freight inward	9,20,600	
	Add: Opening stock of raw materials	10,00,000	
	Less: Closing stock of raw materials	(8,40,000)	5,10,80,600
(ii)	Direct employee (labour) cost:		
	- Wages paid to factory workers		25,20,000
(iii)	Direct expenses:		
	- Royalty paid for production	1,80,000	
	- Amount paid for power & fuel	3,50,000	
	- Job charges paid to job workers	3,10,000	8,40,000
	Prime Cost		5,44,40,600
(iv)	Works/ Factory overheads:		
	- Stores and spares consumed	1,10,000	
	- Repairs & Maintenance paid for plant & machinery	40,000	
	- Insurance premium paid for plant & machinery	28,200	
	- Insurance premium paid for factory building	18,800	
	- Expenses paid for pollution control and engineering & maintenance	36,000	2,33,000
	Gross factory cost		5,46,73,600
	Add: Opening value of W-I-P		8,60,000
	Less: Closing value of W-I-P		(6,60,000)
	Factory Cost		5,48,73,600
(v)	Quality control cost:		
	- Expenses paid for quality control check activities		18,000
(vi)	Research & development cost paid for improvement in production process		20,000
(vii)	Less: Realisable value on sale of scrap and waste		(48,000)
(viii)	Add: Primary packing cost		46,000
	Cost of Production		5,49,09,600
	Add: Opening stock of finished goods		12,00,000
	Less: Closing stock of finished goods		(10,50,000)

	Cost of Goods Sold		5,50,59,600
(ix)	Administrative overheads:		
	- Depreciation on office building	50,000	
	- Salary paid to General Manager	6,40,000	
	- Fee paid to independent directors	1,20,000	8,10,000
(x)	Selling overheads:		
	- Repairs & Maintenance paid for sales office building	20,000	
		5,60,000	
		1,20,000	
(xi)	- Salary paid to Manager- Sales & Marketing	5,60,000	
	- Performance bonus paid to sales staffs	1,20,000	7,00,000
	Distribution overheads:		
	- Packing cost paid for re-distribution of finished goods		80,000
	Cost of Sales		5,66,49,600

Q.21 Calculation of Cost Sheet | RTP Nov 21

Impact Ltd. provides you the following details of its expenditures for the year ended 31st March, 2021:

S.No.	Particulars	Amount (₹)	Amount (₹)
(i)	Raw materials purchased		5,00,00,000
(ii)	GST paid under Composition scheme		10,00,000
(iii)	Freight inwards		5,20,600
(iv)	Trade discounts received		10,00,000
(v)	Wages paid to factory workers		15,20,000
(vi)	Contribution made towards employees' PF & ESIS		1,90,000
(vii)	Production bonus paid to factory workers		1,50,000
(viii)	Fee for technical assistance		1,12,000
(ix)	Amount paid for power & fuel		2,62,000
(x)	Job charges paid to job workers		4,50,000
(xi)	Stores and spares consumed		1,10,000
(xii)	Depreciation on:		
	Factory building	64,000	
	Office building	46,000	
	Plant & Machinery	86,000	1,96,000
(xiii)	Salary paid to supervisors		1,20,000
(xiv)	Repairs & Maintenance paid for:		
	Plant & Machinery	58,000	
	Sales office building	50,000	
	Vehicles used by directors	20,600	1,28,600
(xv)	Insurance premium paid for:		
	Plant & Machinery	31,200	
	Factory building	28,100	59,300
(xvi)	Expenses paid for quality control check activities		25,000
(xvii)	Research & development cost paid for improvement in production process		48,200
(xviii)	Expenses paid for administration of factory work		1,38,000
(xix)	Salary paid to functional mangers:		
	Production control	4,80,000	
	Finance & Accounts	9,60,000	
	Sales & Marketing	12,00,000	26,40,000
(xx)	Salary paid to General Manager		13,20,000

(xxi)	Packing cost paid for:		
	Primary packing necessary to maintain quality	1,06,000	
	For re-distribution of finished goods	1,12,000	2,18,000
(xxii)	Interest and finance charges paid (for usage of non- equity fund)		3,50,000
(xxiii)	Fee paid to auditors		1,80,000
(xxiv)	Fee paid to legal advisors		1,20,000
(xxv)	Fee paid to independent directors		2,40,000
(xxvi)	Payment for maintenance of website for online sales		1,80,000
(xxvii)	Performance bonus paid to sales staffs		2,40,000
(xxviii)	Value of stock as on 1st April, 2020:		
	Raw materials	9,00,000	
	Work-in-process	4,00,000	
	Finished goods	7,00,000	20,00,000
(xxix)	Value of stock as on 31st March, 2021:		
	Raw materials	5,60,000	
	Work-in-process	2,50,000	
	Finished goods	11,90,000	20,00,000

Amount realized by selling of waste generated during manufacturing process – ₹ 66,000/-

From the above data, you are required to PREPARE Statement of cost of Impact Ltd. for the year ended 31st March, 2021, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales.

Ans.

Statement of Cost of Impact Ltd. for the year ended 31st March, 2021:

Sl.No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		
	Raw materials purchased	5,00,00,000	
	GST paid under Composition scheme*	10,00,000	
	Freight inwards	5,20,600	
	Less: Trade discounts received	(10,00,000)	
	Add: Opening stock of raw materials	9,00,000	
	Less: Closing stock of raw materials	(5,60,000)	5,08,60,600
(ii)	Direct employee (labour) cost:		
	Wages paid to factory workers	15,20,000	
	Contribution made towards employees' PF & ESIS	1,90,000	
	Production bonus paid to factory workers	1,50,000	18,60,000
(iii)	Direct expenses:		
	Fee for technical assistance	1,12,000	
	Amount paid for power & fuel	2,62,000	
	Job charges paid to job workers	4,50,000	8,24,000
	Prime Cost		**5,35,44,600**
(iv)	Works/ Factory overheads:		
	Stores and spares consumed	1,10,000	
	Depreciation on factory building	64,000	
	Depreciation on plant & machinery	86,000	
	Repairs & Maintenance paid for plant & machinery	58,000	
	Insurance premium paid for plant & machinery	31,200	
	Insurance premium paid for factory building	28,100	
	Salary paid to supervisors	1,20,000	4,97,300
	Gross factory cost		**5,40,41,900**

	Add: Opening value of W-I-P		4,00,000
	Less: Closing value of W-I-P		(2,50,000)
	Factory Cost		**5,41,91,900**
(v)	Quality control cost:		
	Expenses paid for quality control check activities		25,000
(vi)	Research & development cost paid for improvement in production process		48,200
(vii)	Administration cost related with production:		
	-Expenses paid for administration of factory work	1,38,000	
	-Salary paid to Production control manager	4,80,000	6,18,000
(viii)	Less: Realisable value on sale of scrap and waste		(66,000)
(ix)	Add: Primary packing cost		1,06,000
	Cost of Production		**5,49,23,100**
	Add: Opening stock of finished goods		7,00,000
	Less: Closing stock of finished goods		(11,90,000)
	Cost of Goods Sold		**5,44,33,100**
(x)	Administrative overheads:		
	Depreciation on office building	46,000	
	Repairs & Maintenance paid for vehicles used by directors	20,600	
	Salary paid to Manager- Finance & Accounts	9,60,000	
	Salary paid to General Manager	13,20,000	
	Fee paid to auditors	1,80,000	
	Fee paid to legal advisors	1,20,000	
	Fee paid to independent directors	2,40,000	28,86,600
(xi)	Selling overheads:		
	Repairs & Maintenance paid for sales office building	50,000	
	Salary paid to Manager- Sales & Marketing	12,00,000	
	Payment for maintenance of website for online sales	1,80,000	
	Performance bonus paid to sales staffs	2,40,000	16,70,000
(xii)	Packing cost paid for re-distribution of finished goods		1,12,000
(xiii)	Interest and finance charges paid		3,50,000
	Cost of Sales		**5,94,51,700**

* GST paid under Composition scheme would be included under cost of material as it is not eligible for input tax credit.

Q.22 Calculation of Cost Sheet | RTP May 22

A Ltd. produces a single product X. During the month of December 2021, the company has produced 14,560 tonnes of X. The details for the month of December 2021 are as follows:

(i) Materials consumed ₹ 15,00,000
(ii) Power consumed 13,000 Kwh @ ₹ 7 per Kwh
(iii) Diesels consumed 1,000 litres @ ₹ 93 per litre
(iv) Wages & salary paid – ₹ 64,00,000
(v) Gratuity & leave encashment paid – ₹ 44,20,000
(vi) Hiring charges paid for HEMM- ₹ 13,00,000
(vii) Hiring charges paid for cars used for official purpose – ₹ 80,000
(viii) Reimbursement of diesel cost for the cars – ₹ 20,000
(ix) The hiring of cars attracts GST under RCM @5% without credit.
(x) Maintenance cost paid for weighing bridge (used for weighing of final goods at the time of despatch) – ₹ 7,000

(xi) AMC cost of CCTV installed at weighing bridge (used for weighing of final goods at the time of despatch) and factory premises is ₹ 6,000 and ₹ 18,000 per month respectively.
(xii) TA/ DA and hotel bill paid for sales manager- ₹ 16,000
(xiii) The company has 180 employees works for 26 days in a month. Required:
(a) PREPARE a Cost sheet for the month of December 2021.
(b) COMPUTE Earnings per manshift (EMS) and Output per manshift (OMS) for the month of December 2021.

Ans. **(a) Cost Sheet of A Ltd. for the month of December 2021**

Particulars	Amount (₹)	Amount (₹)
Materials consumed		15,00,000
Wages & Salary	64,00,000	
Gratuity & leave encashment	44,20,000	1,08,20,000
Power cost (13,000 kwh × ₹ 7)	91,000	
Diesel cost (1,000 ltr × ₹ 93)	93,000	1,84,000
HEMM hiring charges		13,00,000
Prime Cost		**1,38,04,000**
AMC cost of CCTV installed at factory premises		18,000
Cost of Production/ Cost of Goods Sold		**1,38,22,000**
Hiring charges of cars	80,000	
Reimbursement of diesel cost	20,000	
	1,00,000	
Add: GST @5% on RCM basis	5,000	1,05,000
Maintenance cost for weighing bridge	7,000	
AMC cost of CCTV installed at weigh bridge	6,000	13,000
TA/ DA & hotel bill of sales manager		16,000
Cost of Sales		**1,39,56,000**

(b) Manshift = 180 employees × 26 days = 4,680 manshifts

Computation of earnings per manshift (EMS):

$$EMS = \frac{\text{Total employee benefits paid}}{\text{Manshift}}$$

$$= \frac{1,08,20,000}{4,680} = ₹\ 2,312$$

Computation of Output per manshift (OMS):

$$OMS = \frac{\text{Total Output/ Production}}{\text{Manshift}}$$

$$= \frac{14,560\ \text{Tonne}}{4,680} = 3.11\ \text{tonne}$$

Q.23 Calculation of Cost Sheet | RTP Nov 22

CT Limited is engaged in producing medical equipment. It has furnished following details related to its products produced during a month:

	Units	Amount (₹)
Raw materials		
Opening stock	1,000	90,00,000
Purchases	49,000	44,10,00,000
Closing stock	1,750	1,57,50,000
Works-in-progress		
Opening	2,000	1,75,50,000

Closing	1,000	94,50,000
Direct employees' wages, allowances etc.		6,88,50,000
Primary packaging cost (per unit)		1,440
R&D expenses & Quality control expenses		2,10,60,000
Consumable stores, depreciation on plant		3,42,00,000
Administrative overheads related to production		3,15,00,000
Selling expenses		4,84,30,800
Royalty paid for production		3,64,50,000
Cost of web-site (for online sale) maintenance		60,75,000
Secondary packaging cost (per unit)		225

There was a normal scrap of 250 units of direct material which realized ₹ 5,400 per unit. The entire finished product was sold at a profit margin of 20% on sales.
You are required to PREPARE a cost sheet showing:
(i) Prime cost
(ii) Gross works cost
(iii) Factory costs
(iv) Cost of production
(v) Profit
(vi) Sales

Ans.

Cost Sheet

Particulars	Units	Amount (₹)
Material		
Opening stock	1,000	90,00,000
Add: Purchases	49,000	44,10,00,000
Less: Closing stock	(1,750)	(1,57,50,000)
	48,250	**43,42,50,000**
Less: Normal wastage of materials realized @ ₹ 5,400 per unit	(250)	**(13,50,000)**
Material consumed		43,29,00,000
Direct employee's wages and allowances		6,88,50,000
Direct expenses- Royalty paid for production		3,64,50,000
Prime cost	48,000	**53,82,00,000**
Factory overheads - Consumable stores, depreciation etc.		3,42,00,000
Gross Works Cost	48,000	**57,24,00,000**
Add: Opening WIP	2,000	1,75,50,000
Less: Closing WIP	(1,000)	(94,50,000)
Factory/Works Cost	49,000	**58,05,00,000**
Administration Overheads related to production		3,15,00,000
R&D expenses and Quality control cost		2,10,60,000
Add: Primary packaging cost @ ₹ 1,440 per unit		**7,05,60,000**
Cost of production	49,000	**70,36,20,000**
Selling expenses		4,84,30,800
Cost of maintaining website for online sale		60,75,000
Secondary packaging cost @ ₹ 225 per unit	49,000	**1,10,25,000**
Cost of sales		76,91,50,800
Add: Profit @ 20% on sales or 25% of cost		**19,22,87,700**
Sales value		**96,14,38,500**

Q.24 Calculation of Cost Sheet | RTP May 23

From the following data of Motilal Ltd., CALCULATE Cost of production:

		(₹)
(i)	Repair & maintenance paid for plant & machinery	9,80,500
(ii)	Insurance premium paid for inventories	26,000
(iii)	Insurance premium paid for plant & machinery	96,000
(iv)	Raw materials purchased	64,00,000
(v)	Opening stock of raw materials	2,88,000
(vi)	Closing stock of raw materials	4,46,000
(vii)	Wages paid	23,20,000
(viii)	Value of opening Work-in-process	4,06,000
(ix)	Value of closing Work-in-process	6,02,100
(x)	Quality control cost for the products in manufacturing process	86,000
(xi)	Research & development cost for improvement in production process	92,600
(xii)	Administrative cost for:	
	- Factory & production	9,00,000
	- Others	11,60,000
(xiii)	Amount realised by selling scrap generated during the manufacturing process	9,200
(xiv)	Packing cost necessary to preserve the goods for further processing	10,200
(xv)	Salary paid to Director (Technical)	8,90,000

Ans. Calculation of Cost of Production of Motilal Ltd for the period.....

Particulars	(₹)
Raw materials purchased	64,00,000
Add: Opening stock	2,88,000
Less: Closing stock	(4,46,000)
Material consumed	62,42,000
Wages paid	23,20,000
Prime cost	85,62,000
Repair and maintenance cost of plant & machinery	9,80,500
Insurance premium paid for inventories	26,000
Insurance premium paid for plant & machinery	96,000
Quality control cost	86,000
Research & development cost	92,600
Administrative overheads related with factory and production	9,00,000
	1,07,43,100
Add: Opening value of W-I-P	4,06,000
Less: Closing value of W-I-P	(6,02,100)
	1,05,47,000
Less: Amount realised by selling scrap	(9,200)
Add: Primary packing cost	10,200
Cost of Production	1,05,48,000

Notes:

(i) Other administrative overhead does not form part of cost of production.

(ii) Salary paid to Director (Technical) is an administrative cost.

Q.25 Calculation of Cost Sheet | RTP Nov 23

A Ltd. produces a single product X. During the month of July 2023, the company has produced 14,560 tonnes of X. The details for the month of July 2023 are as follows:

(i) Materials consumed ₹ 15,00,000

(ii) Power consumed in operating production machinery 13,000 Kwh @ ₹ 7 per Kwh
(iii) Diesels consumed in operating production machinery 1,000 litres @ ₹ 93 per litre
(iv) Wages & salary paid – ₹ 64,00,000
(v) Gratuity & leave encashment paid – ₹ 44,20,000
(vi) Hiring charges paid for Heavy Earth Moving machines (HEMM) engaged in production - ₹ 13,00,000. Hiring charges is paid on the basis of production.
(vii) Hiring charges paid for cars used for official purpose – ₹ 80,000
(viii) Reimbursement of diesel cost for the cars – ₹ 20,000
(ix) The hiring of cars attracts GST under RCM @5% without credit.
(x) Maintenance cost paid for weighing bridge (used for weighing of final goods at the time of despatch) – ₹ 7,000
(xi) AMC cost of CCTV installed at weighing bridge (used for weighing of final goods at the time of despatch) and factory premises is ₹ 6,000 and ₹ 18,000 per month respectively.
(xii) TA/ DA and hotel bill paid for sales manager- ₹ 16,000
(xiii) The company has 180 employees works for 26 days in a month.

Required: PREPARE a Cost sheet for the month of July 2023.

Ans. **Cost Sheet of A Ltd. for the month of July 2023**

Particulars	Amount (₹)	Amount (₹)
Materials consumed		15,00,000
Wages & Salary	64,00,000	
Gratuity & leave encashment	44,20,000	1,08,20,000
Power cost (13,000 kwh × ₹ 7)	91,000	
Diesel cost (1,000 ltr × ₹ 93)	93,000	1,84,000
HEMM hiring charges		13,00,000
Prime Cost		**1,38,04,000**
AMC cost of CCTV installed at factory premises		18,000
Cost of Production/ Cost of Goods Sold		**1,38,22,000**
Hiring charges of cars	80,000	
Reimbursement of diesel cost	20,000	
	1,00,000	
Add: GST @5% on RCM basis	5,000	1,05,000
Maintenance cost for weighing bridge	7,000	
AMC cost of CCTV installed at weigh bridge	6,000	13,000
TA/ DA & hotel bill of sales manager		16,000
Cost of Sales		**1,39,56,000**

Q.26 Calculation of Cost Sheet | MTP Nov 19

From the following data of A Ltd., CALCULATE
(i) Material Consumed;
(ii) Prime Cost and
(iii) Cost of production.

		Amount (Rs.)
(i)	Repair & maintenance paid for plant & machinery	9,80,500
(ii)	Insurance premium paid for inventories	26,000
(iii)	Insurance premium paid for plant & machinery	96,000
(iv)	Raw materials purchased	64,00,000
(v)	Opening stock of raw materials	2,88,000
(vi)	Closing stock of raw materials	4,46,000

(vii)	Wages paid	23,20,000
(viii)	Value of opening Work-in-process	4,06,000
(ix)	Value of closing Work-in-process	6,02,100
(x)	Quality control cost for the products in manufacturing process	86,000
(xi)	Research & development cost for improvement in production	92,600
(xii)	Administrative cost for:	
	- Factory & production	9,00,000
	- Others	11,60,000
(xiii)	Amount realised by selling scrap generated during the manufacturing process	9,200
(xiv)	Packing cost necessary to preserve the goods for further processing	10,200
(xv)	Salary paid to Director (Technical)	8,90,000

Ans. **Calculation of Cost of Production of A Ltd. for the period…..**

Particulars	Amount (Rs.)
Raw materials purchased	64,00,000
Add: Opening stock	2,88,000
Less: Closing stock	(4,46,000)
Material consumed	62,42,000
Wages paid	23,20,000
Prime cost	85,62,000
Repair and maintenance cost of plant & machinery	9,80,500
Insurance premium paid for inventories	26,000
Insurance premium paid for plant & machinery	96,000
Quality control cost	86,000
Research & development cost	92,600
Administrative overheads related with factory and production	9,00,000
	1,07,43,100
Add: Opening value of W-I-P	4,06,000
Less: Closing value of W-I-P	(6,02,100)
	1,05,47,000
Less: Amount realised by selling scrap	(9,200)
Add: Primary packing cost	10,200
Cost of Production	1,05,48,000

Notes:

(i) Other administrative overhead does not form part of cost of production.

(ii) Salary paid to Director (Technical) is an administrative cost.

Q.27 Calculation of Cost Sheet | MTP May 20

Following figures has been extracted from the books of M/s A&R Brothers:

	Amount (Rs.)
Stock on 1st March, 2020	
- Raw materials	6,06,000
- Finished goods	3,59,000
Stock on 31st March, 2020	
- Raw materials	7,50,000
- Finished goods	3,09,000

Work-in-process:	
- On 1st March, 2020	12,56,000
- On 31st March, 2020	14,22,000
Purchase of raw materials	28,57,000
Sale of finished goods	1,34,00,000
Direct wages	37,50,000
Factory expenses	21,25,000
Office and administration expenses	10,34,000
Selling and distribution expenses	7,50,000
Sale of scrap	26,000

You are required to COMPUTE:

(i) Value of material consumed
(ii) Prime cost
(iii) Cost of production
(iv) Cost of goods sold
(v) Cost of sales
(vi) Profit/ loss

Ans. Cost Sheet of M/s A&R Brothers for the month ended March 2020:

	Particulars	Amount (Rs.)	Amount (Rs.)
(i)	Materials consumed:		
	- Opening stock	6,06,000	
	- Add: Purchases	28,57,000	
		34,63,000	
	- Less: Closing stock	(7,50,000)	27,13,000
	Direct wages		37,50,000
(ii)	Prime cost		64,63,000
	Factory expenses		21,25,000
			85,88,000
	Add: Opening W-I-P		12,56,000
	Less: Closing W-I-P		(14,22,000)
	Factory cost		84,22,000
	Less: Sale of scrap		(26,000)
(iii)	Cost of Production		83,96,000
	Add: Opening stock of finished goods		3,59,000
	Less: Closing stock of finished goods		(3,09,000)
(iv)	Cost of Goods Sold		84,46,000
	Office and administration expenses		10,34,000
	Selling and distribution expenses		7,50,000
(v)	Cost of Sales		1,02,30,000
(vi)	Profit (balancing figure)		31,70,000
	Sales		1,34,00,000

Q.28 Calculation of Cost Sheet | MTP Nov 20

Aloe Ltd. has the capacity to produce 2,00,000 units of a product every month. Its works cost at varying levels of production is as under:

Level	Works cost per unit (₹)
10%	400
20%	390
30%	380
40%	370
50%	360
60%	350
70%	340
80%	330
90%	320
100%	310

Its fixed administration expenses amount to ₹ 3,60,000 and fixed marketing expenses amount to ₹ 4,80,000 per month respectively. The variable distribution cost amounts to ₹ 30 per unit.

It can sell 100% of its output at ₹ 500 per unit provided it incurs the following further expenditure:

(i) It gives gift items costing ₹ 30 per unit of sale;

(ii) It has lucky draws every month giving the first prize of ₹ 60,000; 2nd prize of ₹ 50,000, 3rd prize of ₹ 40,000 and ten consolation prizes of ₹ 5,000 each to customers buying the product.

(iii) It spends ₹ 2,00,000 on refreshments served every month to its customers;

(iv) It sponsors a television programme every week at a cost of ₹ 20,00,000 per month.

It can market 50% of its output at ₹ 560 by incurring expenses referred from (ii) to (iv) above and 30% of its output at ₹ 600 per unit without incurring any of the expenses referred from (i) to (iv) above.

PREPARE a cost sheet for the month showing total cost and profit at 30%, 50% and 100% capacity level & COMPARE its profit.

Ans.

Cost Sheet (For the month)

Level of Capacity	30%		50%		100%	
	60,000 units		1,00,000 units		2,00,000 units	
	Per unit (₹)	Total (₹)	Per unit (₹)	Total (₹)	Per unit (₹)	Total (₹)
Works Cost	**380.00**	**2,28,00,000**	**360.00**	**3,60,00,000**	**310.00**	**6,20,00,000**
Fixed administration expenses	6.00	3,60,000	3.60	3,60,000	1.80	3,60,000
Add: Fixed marketing expenses	8.00	4,80,000	4.80	4,80,000	2.40	4,80,000
Variable distribution cost	30.00	18,00,000	30.00	30,00,000	30.00	60,00,000
Add: Special Costs:						
- Gift items costs	-	-	-	-	30.00	60,00,000
- Customers' prizes*	-	-	2.00	2,00,000	1.00	2,00,000
- Refreshments	-	-	2.00	2,00,000	1.00	2,00,000
programme sponsorship cost	-	-	20.00	20,00,000	10.00	20,00,000
Cost of sales	**424.00**	**2,54,40,000**	**422.40**	**4,22,40,000**	**386.20**	**7,72,40,000**

Profit (Bal. fig.)	176.00	1,05,60,000	137.60	1,37,60,000	113.80	2,27,60,000
Sales revenue	**600.00**	**3,60,00,000**	**560.00**	**5,60,00,000**	**500.00**	**10,00,00,000**

* Customers' prize cost:

Particulars	Amount (₹)
1st Prize	60,000
2nd Prize	50,000
3rd Prize	40,000
Consolation Prizes (10 × ₹ 5,000)	50,000
Total	**2,00,000**

Comparison of Profit

30% capacity	50% capacity	100% capacity
$\frac{Rs.176}{Rs.600} \times 100$	$\frac{Rs.137.6}{Rs.560} \times 100$	$\frac{Rs.113.8}{Rs.500} \times 100$
29.33 %	24.57%	22.76%

Profit (in value as well as in percentage) is higher at 30% level of capacity than that at 50% and 100% level of capacity.

Q.29 Calculation of Cost Sheet MTP May 21(1)

A Ltd. has the following expenditures for the year ended 31st March 2021:

Sl. No.		Amount (Rs.)	Amount (Rs.)
(i)	Raw materials purchased		10,00,00,000
(ii)	Freight inward		11,20,600
(iii)	Wages paid to factory workers		29,20,000
(iv)	Royalty paid for production		1,72,600
(v)	Amount paid for power & fuel		4,62,000
(vi)	Job charges paid to job workers		8,12,000
(vii)	Stores and spares consumed		1,12,000
(viii)	Depreciation on office building		56,000
(ix)	Repairs & Maintenance paid for:		
	- Plant & Machinery	48,000	
	- Sales office building	18,000	66,000
(x)	Insurance premium paid for:		
	- Plant & Machinery	31,200	
	- Factory building	18,100	49,300
(xi)	Expenses paid for quality control check activities		19,600
(xii)	Research & development cost paid for improvement in production process		18,200
(xiii)	Expenses paid for pollution control and engineering & maintenance		26,600
(xiv)	Salary paid to Sales & Marketing mangers:		10,12,000
(xv)	Salary paid to General Manager		12,56,000
(xvi)	Packing cost paid for:		
	- Primary packing necessary to maintain quality	96,000	

	- For re-distribution of finished goods	1,12,000	2,08,000
(xvii)	Fee paid to independent directors		2,20,000
(xviii)	Performance bonus paid to sales staffs		1,80,000
(xix)	Value of stock as on 1st April, 2020:		
	- Raw materials	18,00,000	
	- Work-in-process	9,20,000	
	- Finished goods	11,00,000	38,20,000
(xx)	Value of stock as on 31st March, 2021:		
	- Raw materials	9,60,000	
	- Work-in-process	8,70,000	
	- Finished goods	18,20,000	36,50,000

Amount realized by selling of scrap and waste generated during manufacturing process – Rs. 86,000/-
From the above data you are requested to PREPARE Statement of cost for A Ltd. for the year ended 31st March, 2021, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales.

Ans. **Statement of Cost of A Ltd. for the year ended 31st March, 2021:**

Sl. No.	Particulars	Amount (Rs.)	Amount (Rs.)
(i)	Material Consumed:		
	- Raw materials purchased	10,00,00,000	
	- Freight inward	11,20,600	
	Add: Opening stock of raw materials	18,00,000	
	Less: Closing stock of raw materials	(9,60,000)	10,19,60,600
(ii)	Direct employee (labour) cost:		
	- Wages paid to factory workers		29,20,000
(iii)	Direct expenses:		
	- Royalty paid for production	1,72,600	
	- Amount paid for power & fuel	4,62,000	
	- Job charges paid to job workers	8,12,000	14,46,600
	Prime Cost		10,63,27,200
(iv)	Works/ Factory overheads:		
	- Stores and spares consumed	1,12,000	
	- Repairs & Maintenance paid for plant & machinery	48,000	
	- Insurance premium paid for plant & machinery	31,200	
	- Insurance premium paid for factory building	18,100	
	- Expenses paid for pollution control and engineering & maintenance	26,600	2,35,900
	Gross factory cost		10,65,63,100
	Add: Opening value of W-I-P Less: Closing value of W-I-P		9,20,000 (8,70,000)
	Factory Cost		10,66,13,100
(v)	Quality control cost:		

	- Expenses paid for quality control check activities		19,600
(vi)	Research & development cost paid for improvement in production process		18,200
(vii)	Less: Realisable value on sale of scrap and waste		(86,000)
(viii)	Add: Primary packing cost		96,000
	Cost of Production		10,66,60,900
	Add: Opening stock of finished goods Less: Closing stock of finished goods		11,00,000 (18,20,000)
	Cost of Goods Sold		10,59,40,900
(ix)	Administrative overheads:		
	- Depreciation on office building	56,000	
	- Salary paid to General Manager	12,56,000	15,32,000
	- Fee paid to independent directors	2,20,000	
(x)	Selling overheads:		
	- Repairs & Maintenance paid for sales office building	18,000	
	- Salary paid to Manager- Sales & Marketing	10,12,000 1,80,000	
	- Performance bonus paid to sales staffs		12,10,000
(xi)	Distribution overheads:		
	- Packing cost paid for re-distribution of finished goods		1,12,000
	Cost of Sales		10,87,94,900

Q.30 Calculation of Cost Sheet | MTP Dec 21(1)

G Ltd. has the following expenditures for the year ended 31st March, 2021:

Sl. No.		Amount (₹)	Amount (₹)
(i)	Raw materials purchased		20,00,00,000
(ii)	Freight inward		22,41,200
(iii)	Wages paid to factory workers		58,40,000
(iv)	Royalty paid for production		3,45,200
(v)	Amount paid for power & fuel		9,24,000
(vi)	Job charges paid to job workers		16,24,000
(vii)	Stores and spares consumed		2,24,000
(viii)	Depreciation on office building		1,12,000
(ix)	Repairs & Maintenance paid for:		
	- Plant & Machinery	96,000	
	- Sales office building	36,000	1,32,000
(x)	Insurance premium paid for:		
	- Plant & Machinery	62,400	
	- Factory building	36,200	98,600
(xi)	Expenses paid for quality control check activities		39,200

(xii)	Research & development cost paid improvement in production process		36,400
(xiii)	Expenses paid for pollution control and engineering & maintenance		53,200
(xiv)	Salary paid to Sales & Marketing Managers:		20,24,000
(xv)	Salary paid to General Manager		25,12,000
(xvi)	Packing cost paid for:		
	- Primary packing necessary to maintain quality	1,92,000	
	- For re-distribution of finished goods	2,24,000	4,16,000
(xvii)	Performance bonus paid to sales staffs		7,20,000
(xviii)	Value of stock as on 1st April, 2020:		
	- Raw materials	36,00,000	
	- Work-in-process	18,40,000	
	- Finished goods	22,00,000	76,40,000
(xix)	Value of stock as on 31st March, 2021:		
	- Raw materials	19,20,000	
	- Work-in-process	17,40,000	
	- Finished goods	36,40,000	73,00,000

Amount realized by selling of scrap and waste generated during manufacturing process – ₹1,72,000/-
From the above data you are requested to PREPARE Statement of cost for G Ltd. for the year ended 31st March, 2021, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales.

Ans. Statement of Cost of G Ltd. for the year ended 31st March, 2021:

Sl. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		
	- Raw materials purchased	20,00,00,000	
	- Freight inward	22,41,200	
	Add: Opening stock of raw materials	36,00,000	
	Less: Closing stock of raw materials	(19,20,000)	20,39,21,200
(ii)	Direct employee (labour) cost:		
	- Wages paid to factory workers		58,40,000
(iii)	Direct expenses:		
	- Royalty paid for production	3,45,200	
	- Amount paid for power & fuel	9,24,000	
	- Job charges paid to job workers	16,24,000	28,93,200
	Prime Cost		21,26,54,400
(iv)	Works/ Factory overheads:		
	- Stores and spares consumed	2,24,000	
	- Repairs & Maintenance paid for plant & machinery	96,000	
	- Insurance premium paid for plant & machinery	62,400	
	- Insurance premium paid for factory building	36,200	
	- Expenses paid for pollution control and engineering & maintenance	53,200	4,71,800
	Gross factory cost		21,31,26,200

	Add: Opening value of W-I-P		18,40,000
	Less: Closing value of W-I-P		(17,40,000)
	Factory Cost		21,32,26,200
(v)	Quality control cost:		
	- Expenses paid for quality control check activities		39,200
(vi)	Research & development cost paid improvement in production process		36,400
(vii)	Less: Realisable value on sale of scrap and waste		(1,72,000)
(viii)	Add: Primary packing cost		1,92,000
	Cost of Production		21,33,21,800
	Add: Opening stock of finished goods		22,00,000
	Less: Closing stock of finished goods		(36,40,000)
	Cost of Goods Sold		21,18,81,800
(ix)	Administrative overheads:		
	- Depreciation on office building	1,12,000	
	- Salary paid to General Manager	25,12,000	26,24,000
(x)	Selling overheads:		
	- Repairs & Maintenance paid for sales office building	36,000	
	- Salary paid to Manager- Sales & Marketing	20,24,000	
	- Performance bonus paid to sales staffs	7,20,000	27,80,000
(xi)	Distribution overheads:		
	- Packing cost paid for redistribution of finished goods		2,24,000
	Cost of Sales		**21,75,09,800**

Q.31 Calculation of Cost Sheet | MTP Dec 21(2)

Xim Ltd. manufactures two types of boxes 'Super' and 'Normal'. The cost data for the year ended 31st March, 2021 is as follows:

	(₹)
Direct Materials	12,00,000
Direct Wages	6,72,000
Production Overhead	2,88,000
Total	21,60,000

There was no work-in-progress at the beginning or at the end of year. It is further ascertained that:

1. Direct materials cost per unit in 'Super' was twice as much of direct material in 'Normal'.
2. 2% cash discount was received for payment made within 30 days to the creditors of Direct materials.
3. Direct wages per unit for 'Normal' were 60% of those of 'Super'.
4. Production overhead per unit was at same rate for both the types of boxes.
5. Administration overhead was 200% of direct labour for each type.
6. Selling cost was ₹ 1 per 'Super' type.
7. Production and sales during the year were as follows:

Production		Sales	
Type	**No. of units**	**Type**	**No. of units**
Super	60,000	Super	54,000

Normal	1,80,000		

8. Selling price was ₹ 30 per unit for 'Super'.
9. Company was also involved in a copyright infringement case related to the manufacturing process of 'Super' production. As per the verdict, it had to pay penalty of ₹ 50,000.

PREPARE Cost Sheet of Xim Ltd. for 'Super' showing:
(i) Cost per unit and Total Cost
(ii) Profit per unit and Total Profit

Ans.

Cost Sheet of 'Super'

Particulars	Per unit (₹)	Total (₹)
Direct materials (Working note- (i))	8.00	4,80,000
Direct wages (Working note- (ii))	4.00	2,40,000
Prime cost	12.00	7,20,000
Production overhead (Working note- (iii))	1.20	72,000
Factory Cost	13.20	7,92,000
Administration Overhead (200% of direct wages)	8.00	4,80,000
Cost of production	21.20	12,72,000
Less: Closing stock (60,000 units – 54,000 units)	-	1,27,200
Cost of goods sold i.e. 54,000 units	21.20	11,44,800
Selling cost	1.00	54,000
Cost of sales/ Total cost	22.20	11,98,800
Profit	7.80	4,21,200
Sales value (₹ 30 × 54,000 units)	30.00	16,20,000

Working Notes:

(i) Direct material cost per unit of 'Normal' = M
Direct material cost per unit of 'Super' = 2M
Total Direct Material cost = 2M × 60,000 units + M × 1,80,000 units
Or, ₹ 12,00,000 = 1,20,000 M + 1,80,000 M
Or, M = $\frac{12,00,000}{3,00,000}$ = ₹ 4
Therefore, Direct material Cost per unit of 'Super' = 2 × ₹ 4 = ₹ 8

(ii) Direct wages per unit for 'Super' = W
Direct wages per unit for 'Normal' = 0.6W
So, (W x 60,000) + (0.6W x 1,80,000) = ₹ 6,72,000
W = ₹ 4 per unit

(iii) Production overhead per unit = $\frac{2,88,000}{(60,000 + 1,80,000)}$ = ₹ 1.20
Production overhead for 'Super' = ₹ 1.20 × 60,000 units = ₹ 72,000

Notes:

1. Administration overhead is specific to the product as it is directly related to direct labour as mentioned in the question and hence to be considered in cost of production only.
2. Cash discount is treated as interest and finance charges; hence , it is ignored.
3. Penalty paid against the copyright infringement case is an abnormal cost; hence, not included.

Q.32 Calculation of Cost Sheet | MTP May 22(1)

The following data relates to manufacturing of a standard product during the month of February, 2022:

Particulars	Amount (in ₹)
Stock of Raw material as on 01-02-2022	1,20,000

Work in Progress as on 01-02-2022	75,000
Purchase of Raw material	3,00,000
Carriage Inwards	30,000
Direct Wages	1,80,000
Cost of special drawing	45,000
Hire charges paid for Plant (Direct)	36,000
Return of Raw Material	60,000
Carriage on return	9,000
Expenses for participation in Industrial exhibition	12,000
Maintenance of office building	3,000
Salary to office staff	37,500
Legal charges	3,750
Depreciation on Delivery van	9,000
Warehousing charges	2,250
Stock of Raw material as on 28-02-2022	45,000
Stock of Work in Progress as on 28-02-2022	36,000

- Store overheads on materials are 10% of material consumed.
- Factory overheads are 20% of the Prime cost.
- 10% of the output was rejected and a sum of ₹ 7,500 was realized on sale of scrap.
- 10% of the finished product was found to be defective and the defective products were rectified at an additional expenditure which is equivalent to 20% of proportionate direct wages.
- The total output was 8,000 units during the month.

You are required to PREPARE a Cost Sheet for the above period showing the: (i) Cost of Raw Material consumed.
(ii) Prime Cost
(iii) Work Cost
(iv) Cost of Production
(v) Cost of Sales

Ans.

Statement of Cost for the month of February, 2022

Particulars	Amount (₹)	Amount (₹)
(i) Cost of Material Consumed:		
Raw materials purchased (₹ 3,00,000 – ₹ 60,000)	2,40,000	
Carriage inwards	30,000	
Add: Opening stock of raw materials	1,20,000	
Less: Closing stock of raw materials	(45,000)	3,45,000
Direct Wages		1,80,000
Cost of special drawing	45,000	
Hire charges paid for Plant (Direct)	36,000	81,000
(ii) Prime Cost		**6,06,000**
Carriage on return	9,000	
Store overheads (10% of material consumed)	34,500	
Factory overheads (20% of Prime cost)	1,21,200	
Additional expenditure for rectification of defective products (refer working note)	3,240	1,67,940
Gross factory cost		7,73,940
Add: Opening value of W-I-P		75,000
Less: Closing value of W-I-P		(36,000)

(iii)	**Works/ Factory Cost**		**8,12,940**
	Less: Realisable value on sale of scrap		(7,500)
(iv)	**Cost of Production**		**8,05,440**
	Add: Opening stock of finished goods		-
	Less: Closing stock of finished goods		-
	Cost of Goods Sold		**8,05,440**
	Administrative overheads:		
	Maintenance of office building	3,000	
	Salary paid to Office staff	37,500	
	Legal Charges	3,750	44,250
	Selling overheads:		
	Expenses for participation in Industrial exhibition	12,000	12,000
	Distribution overheads:		
	Depreciation on delivery van	9,000	
	Warehousing charges 2,250	11,250	
(v)	**Cost of Sales**		**8,72,940**

Working Notes:

1. **Number of Rectified units**

Total Output	8,000 units
Less: Rejected 10%	800 units
Finished product	7,200 units
Rectified units (10% of finished product)	**720 units**

2. **Proportionate additional expenditure on 720 units**

= 20% of proportionate direct wages
= 0.20 x (₹ 1,80,000/8,000) x 720
= ₹ 3,240

Q.33 Calculation of Cost Sheet | MTP May 22(2)

Compute Ltd. has capacity to produce 1,00,000 units of a product every month. Its fixed general administration expenses amount to ₹ 7,50,000 and fixed marketing expenses amount to ₹ 12,50,000 per month respectively. The variable distribution cost amounts to ₹ 150 per unit.

Its works cost at varying levels of production is as under:

Level	Works cost per unit (₹)
10%	2,000
20%	1,950
30%	1,900
40%	1,850
50%	1,800
60%	1,750
70%	1,700
80%	1,650
90%	1,600
100%	1,550

It can sell 100% of its output at ₹ 2,500 per unit provided it incurs the following additional expenditure:
(i) it spends ₹ 5,00,000 on refreshments served every month to its customers;
(ii) it gives gift items costing ₹ 150 per unit of sale;
(iii) it sponsors a television programme every week at a cost of ₹ 1,00,00,000 per month.

(iv) it has lucky draws every month giving the first prize of ₹ 2,50,000; 2nd prize of ₹ 1,25,000, 3rd prize of ₹ 50,000 and three consolation prizes of ₹ 25,000 each to customers buying the product.

However, it can market 30% of its output at ₹ 2,750 per unit without incurring any of the expenses referred to in (i) to (iv) above.

PREPARE a cost sheet for the month showing total cost and profit at 30% and 100% capacity level.

Ans.

Cost Sheet (For the month)

Level of Capacity	**30%**		**100%**	
	30,000 units		**1,00,000 units**	
	Per unit (₹)	**Total (₹)**	**Per unit (₹)**	**Total (₹)**
Works Cost	**1,900.00**	**5,70,00,000**	**1,550.00**	**15,50,00,000**
Add: Fixed general administration expenses	25.00	7,50,000	7.50	7,50,000
Add: Fixed marketing expenses	41.67	12,50,000	12.50	12,50,000
Add: Variable distribution cost	150.00	45,00,000	150.00	1,50,00,000
Add: Special Costs:				
- Refreshments	-	-	5.00	5,00,000
- Gift items costs	-	-	150.00	1,50,00,000
- Television programme sponsorship cost	-	-	100.00	1,00,00,000
- Customers' prizes*	-	-	5.00	5,00,000
Cost of sales	**2,116.67**	**6,35,00,000**	**1,980.00**	**19,80,00,000**
Profit (Balancing figure)	633.33	1,90,00,000	520.00	5,20,00,000
Sales revenue	**2,750.00**	**8,25,00,000**	**2,500.00**	**25,00,00,000**

***Customers' prize cost:**

	Amount (₹)
1st Prize	2,50,000
2nd Prize	1,25,000
3rd Prize	50,000
Consolation Prizes (3 × ₹ 25,000)	75,000
Total	**5,00,000**

Q.34 Calculation of Cost Sheet | MTP Nov 22(1)

The following information pertains to A Limited for the year 1st April 2021 to 31st March 2022:

Particulars	**Amount (₹)**
Sales	50,00,000
Direct labour	10,50,000
Administrative overheads (relating to production activity) Selling expenses	1,50,000
	2,50,000

Inventory details are as follows:

	As on 1st April 2021 (Amount in ₹)	**As on 31st March 2022 (Amount in ₹)**

Raw materials	5,00,000	6,30,000
Finished goods	9,80,000	10,50,000
Work in Progress	6,00,000	8,00,000

Additional Information:

- Direct labour would be 175% of works overheads.
- Cost of goods sold would be ₹ 6,900 per unit
- Selling expenses would be ₹ 500 per unit.

You are required to PREPARE a cost sheet for the year ended 31st March, 2022 showing:

(a) Value of material purchased
(b) Prime cost
(c) Works cost
(d) Cost of production
(e) Cost of goods sold
(f) Cost of Sales
(g) Profit earned
(h) Profit as a percentage of sales

Ans. **Cost Sheet of A Limited for the year ended 31st March 2022**

Particulars	Amount (₹)	Amount (₹)
Opening Stock of Raw materials	5,00,000	
Add: **Purchases** (balancing figure)	**20,50,000**	
Less: Closing stock of raw materials	6,30,000	
Direct material consumed (balancing figure)		19,20,000
Direct labour		10,50,000
Prime Cost		**29,70,000**
Add: Factory Overheads (10,50,000 / 175%)		**6,00,000**
Add: Opening Stock of Work in Progress		6,00,000
		41,70,000
Less: Closing Stock of Work in Progress		8,00,000
Works Cost		**33,70,000**
Add: Administrative Overheads (relating to production activity)		1,50,000
COST OF PRODUCTION		**35,20,000**
Add: Opening stock of finished goods		9,80,000
Cost of Goods available for sale		45,00,000
Less: Closing Stock of finished goods		10,50,000
COST OF GOODS SOLD (Working Note: (iv))		**34,50,000**
Add: Selling and Distribution Overhead		2,50,000
COST OF SALES		**37,00,000**
Add: **Profit** (Balancing figure) [Sales - Cost of Sales]		13,00,000
SALES		**50,00,000**

Profit as a % of sales = $\frac{13 \text{ Lakhs}}{50 \text{ Lakhs}}$ x 100 = 26%

Working Notes:

(i) The cost sheet is completed by Reverse Working. Purchases amount is the balancing figure.

(ii) Direct labour = 175% of factory overhead (given). Hence, if direct labour = 10,50,000, then Factory Overhead = 10,50,000 / 175% = **₹ 6,00,000**

(iii) Selling Overhead ₹ 2,50,000 (total), selling per unit ₹ 500.
Number of units sold = ₹ 2,50,000/ ₹ 500 = 500 units

(iv) Cost of goods sold = 500 units x ₹ 6,900 = ₹ 34,50,000

Q.35 ACTIVITY BASED COST

ANI Limited is a trader of a Product Z. It has decided to analyse the profitability of its five new customers. It buys Z article at ₹5,400 per unit and sells to retail customers at a listed price of ₹6,480 per unit. The data pertaining to five customers are:

	Customers				
	A	B	C	D	E
Units sold	4,500	6,000	9,500	7,500	12,750
Listed Selling Price	₹6,480	₹6,480	₹6,480	₹6,480	₹6,480
Actual Selling Price	₹6,480	₹6,372	₹5,940	₹6,264	₹5,832
Number of Purchase orders	15	25	30	25	30
Number of Customer visits	2	3	6	2	3
Number of deliveries	10	30	60	40	20
Kilometers travelled per delivery	20	6	5	10	30
Number of expedited deliveries	0	0	0	0	1

Its five activities and their cost drivers are:

Activity	Cost Driver Rate
Order taking	₹4,500 per purchase order
Customer visits	₹3,600 per customer visit
Deliveries	₹7.50 per delivery Km travelled
Product handling	₹22.50 per case sold
Expedited deliveries	₹13,500 per expedited delivery

Required:

(i) **COMPUTE** the customer-level operating income of each of five retail customers (A, B, C, D and E).

(ii) **STATE** the factors ANI Limited should consider in deciding whether to drop a customer.

Ans. **Working note:**

1. Computation of revenues (at listed price), discount, cost of goods sold and customer level operating activities costs:

	Customers				
	A	B	C	D	E
Units sold: (a)	4,500	6,000	9,500	7,500	12,750
Revenues (at listed price) (Rs.): (b) {(a) ×Rs.6,480)}	2,91,60,000	3,88,80,000	6,15,60,000	4,86,00,000	8,26,20,000
Revenues (at listed price) (Rs.): (c) {(a) × Actual selling	2,91,60,000 (4,500×6,480)	3,82,32,000 (6,000×6,372)	5,64,30,000 (9,500×5,940)	4,69,80,000 (7,500×6,264)	7,43,58,000 (12,750×5,832)

price)}					
Discount (Rs.) (d) {(b) – (c)}	0	6,48,000	51,30,000	16,20,000	82,62,000
Cost of goods sold (Rs.) : (d) {(a) x Rs.5,400}	2,43,00,000	3,24,00,000	5,13,00,000	4,05,00,000	6,88,50,000
Customer level operating activities costs					
Order taking costs (Rs.): (No. of purchase orders × Rs. 4,500)	67,500	1,12,500	1,35,000	1,12,500	1,35,000
Customer visits costs (Rs.) (No. of customer visits x Rs. 3,600)	7,200	10,800	21,600	7,200	10,800
Delivery vehicles travel costs (Rs.) (Kms travelled by	1,500	1,350	2,250	3,000	4,500
delivery vehicles x Rs. 7.50 per km.)					
Product handling costs (Rs.) {(a) x Rs. 22.50}	1,01,250	1,35,000	2,13,750	1,68,750	2,86,875
Cost of expediting deliveries (Rs.) {No. of expedited deliveries x Rs. 13,500}	-	-	-	-	13,500
Total cost of customer level operating activities (Rs.)	1,77,450	2,59,650	3,72,600	2,91,450	4,50,675

(i) Computation of Customer level operating income

	Customers				
	A	B	C	D	E
	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Revenues (At list price) (Refer to working note)	2,91,60,000	3,82,32,000	5,64,30,000	4,69,80,000	7,43,58,000
Less: Cost of goods sold (Refer to working note)	(2,43,00,000)	(3,24,00,000)	(5,13,00,000)	(4,05,00,000)	(6,88,50,000)
Gross margin	48,60,000	58,32,000	51,30,000	64,80,000	55,08,000

Less: Customer level operating activities costs (Refer to working note)	(1,77,450)	(2,59,650)	(3,72,600)	(2,91,450)	(4,50,675)
Customer level operating	46,82,550	55,72,350	47,57,400	61,88,550	50,57,325

(ii) Factors to be considered for dropping a customer:

Dropping customers should be the last resort to be taken by an entity. Factors to be considered should include:

- What is the expected future profitability of each customer?
- Are the currently least profitable or low profitable customers are likely to be highly profitable in the future?
- What costs are avoidable if one or more customers are dropped?
- Can the relationship with the "problem" customers be restructured so that there is at "win- win" situation

Q.36 Calculation of Cost Sheet | MTP May 23(1)

Following information obtained from the records of a Manufacturing Company for the month of March:
Direct labour cost ₹ 25,000 being 150% of works overheads.
Cost of goods sold excluding administrative expenses ₹ 75,000.
Inventory accounts showed the following opening and closing balances:

	March 1 (₹)	March 31 (₹)
Raw materials	11,600	15,370
Work-in-progress	15,225	21,025
Finished goods	25,520	27,550

Other information is as follows:	(₹)
Selling expenses	6,125
General and administration expenses	4,375
Sales for the month	1,05,250

Required to:
(i) FIND out the value of materials purchased.
(ii) PREPARE a cost statement showing the various elements of cost and also the profit earned.

Ans. (i) Computation of the value of materials purchased

To find out the value of materials purchased, reverse calculations from the given data can be presented as below:

Particulars	(₹)
Cost of goods sold	**75,000**
Add: Closing stock of finished goods	27,550
Less: Opening stock of finished goods	(25,520)
Cost of production	**77,030**
Add: Closing stock of work-in-progress	21,025

Less: Opening stock of work-in-progress	(15,225)
Works cost	**82,830**
Less: Factory overheads: [₹25,000×100/150]	(16,667)
Prime cost	**66,163**
Less: Direct labour	(25,000)
Raw material consumed	**41,163**
Add: Closing stock of raw materials	15,370
Raw materials available	56,533
Less: Opening stock of raw materials	(11,600)
Value of materials purchased	**44,933**

(ii) Cost statement

	(₹)
Raw material consumed [Refer to statement (i) above]	41,163
Add: Direct labour cost	25,000
Prime cost	**66,163**
Add: Factory overheads	16,667
Works cost	**82,830**
Add: Opening work-in-progress	15,225
Less: Closing work-in-progress	(21,025)
Cost of production	**77,030**
Add: Opening stock of finished goods	25,520
Less: Closing stock of finished goods	(27,550)
Cost of goods sold	**75,000**
Add: General and administration expenses	4,375
Add: Selling expenses	6,125
Cost of sales	**85,500**
Profit (sales i.e ₹1,05,250 – Cost of sales i.e ₹ 85,500)	19,750
Sales	**1,05,250**

Q.37 Calculation of Cost Sheet | MTP May 23(2)

K Ltd. has the following expenditures for the year ended 31st March, 2023:

Sl. No.		Amount (₹)	Amount (₹)
(i)	Raw materials purchased		10,00,00,000
(ii)	Freight inward		11,20,600
(iii)	Wages paid to factory workers		29,20,000
(iv)	Royalty paid for production		1,72,600
(v)	Amount paid for power & fuel (Directly related to production)		4,62,000
(vi)	Job charges paid to job workers		8,12,000

(vii)	Stores and spares consumed		1,12,000
(viii)	Depreciation on office building		56,000
(ix)	Repairs & Maintenance paid for:	48,000	
	- Plant & Machinery		
	- Sales office building	18,000	66,000
(x)	Insurance premium paid for:		
	- Plant & Machinery	31,200	
	- Factory building	18,100	49,300
(xi)	Expenses paid for quality control check activities		19,600
(xii)	Research & development cost paid improvement in production process		18,200
(xiii)	Expenses paid for pollution control and engineering & maintenance		26,600
(xiv)	Salary paid to Sales & Marketing mangers:		10,12,000
(xv)	Salary paid to General Manager		12,56,000
(xvi)	Packing cost paid for:		
	- Primary packing necessary to maintain quality	96,000	
	- For re-distribution of finished goods	1,12,000	2,08,000
(xvii)	Fee paid to independent directors		2,20,000
(xviii)	Performance bonus paid to sales staffs		1,80,000
(xix)	Value of stock as on 1st April, 2022:		
	- Raw materials	18,00,000	
	- Work-in-process	9,20,000	
	- Finished goods	11,00,000	38,20,000
(xx)	Value of stock as on 31st March, 2023:		
	- Raw materials	9,60,000	
	- Work-in-process	8,70,000	
	- Finished goods	18,20,000	36,50,000

Amount realized by selling of scrap and waste generated during manufacturing process – ₹86,000/- From the above data you are requested to PREPARE Statement of cost for K Ltd. for the year ended 31st March, 2023, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales.

Ans. **Statement of Cost of K Ltd. for the year ended 31st March, 2023:**

Sl. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		
	- Raw materials purchased	10,00,00,000	
	- Freight inward	11,20,600	
	Add: Opening stock of raw materials	18,00,000	
	Less: Closing stock of raw materials	(9,60,000)	10,19,60,600
(ii)	Direct employee (labour) cost:		
	- Wages paid to factory workers		29,20,000
(iii)	Direct expenses:		
	- Royalty paid for production	1,72,600	
	- Amount paid for power & fuel	4,62,000	

	- Job charges paid to job workers	8,12,000	14,46,600
	Prime Cost		10,63,27,200
(iv)	Works/ Factory overheads:		
	- Stores and spares consumed	1,12,000	
	- Repairs & Maintenance paid for plant & machinery	48,000	
	- Insurance premium paid for plant & machinery	31,200	
	- Insurance premium paid for factory building	18,100	
	- Expenses paid for pollution control and engineering & maintenance	26,600	2,35,900
	Gross factory cost		10,65,63,100
	Add: Opening value of W-I-P		9,20,000
	Less: Closing value of W-I-P		(8,70,000)
	Factory Cost		10,66,13,100
(v)	Quality control cost:		
	- Expenses paid for quality control check activities		19,600
(vi)	Research & development cost paid improvement in production process		18,200
(vii)	Less: Realisable value on sale of scrap and waste		(86,000)
(viii)	Add: Primary packing cost		96,000
	Cost of Production		10,66,60,900
	Add: Opening stock of finished goods		11,00,000
	Less: Closing stock of finished goods		(18,20,000)
	Cost of Goods Sold		10,59,40,900
(ix)	Administrative overheads:		
	- Depreciation on office building	56,000	
	- Salary paid to General Manager	12,56,000	
	- Fee paid to independent directors	2,20,000	15,32,000
(x)	Selling overheads:		
	- Repairs & Maintenance paid for sales office building	18,000	
	- Salary paid to Manager- Sales & Marketing	10,12,000	
	- Performance bonus paid to sales staffs	1,80,000	12,10,000
(xi)	Distribution overheads:		
	- Packing cost paid for re-distribution of finished goods		1,12,000
	Cost of Sales		10,87,94,900

Q.38 Calculation of Cost Sheet | MTP Nov 23(1)

Following figures has been extracted from the books of M/s A&R Brothers:

	Amount (₹)
Stock on 1st March, 2023	
- Raw materials	6,06,000
- Finished goods	3,59,000
Stock on 31st March, 2023	
- Raw materials	7,50,000
- Finished goods	3,09,000
Work-in-process:	
- On 1st March, 2023	12,56,000

- On 31st March, 2023	14,22,000
Purchase of raw materials	28,57,000
Sale of finished goods	1,34,00,000
Direct wages	37,50,000
Factory expenses	21,25,000
Office and administration expenses	10,34,000
Selling and distribution expenses	7,50,000
Sale of scrap	26,000

You are required to compute:
(i) Value of material consumed
(ii) Prime cost
(iii) Cost of production
(iv) Cost of goods sold
(v) Cost of sales
(vi) Profit/ loss

Ans. **Cost Sheet of M/s A&R Brothers for the month ended March 2023:**

	Particulars	Amount (₹)	Amount (₹)
(i)	**Materials consumed:**		
	- Opening stock	6,06,000	
	- Add: Purchases	28,57,000	
		34,63,000	
	- Less: Closing stock	(7,50,000)	**27,13,000**
	Direct wages		37,50,000
(ii)	**Prime cost**		**64,63,000**
	Factory expenses		21,25,000
			85,88,000
	Add: Opening W-I-P		12,56,000
	Less: Closing W-I-P		(14,22,000)
	Factory cost		84,22,000
	Less: Sale of scrap		(26,000)
(iii)	**Cost of Production**		**83,96,000**
	Add: Opening stock of finished goods		3,59,000
	Less: Closing stock of finished goods		(3,09,000)
(iv)	**Cost of Goods Sold**		**84,46,000**
	Office and administration expenses		10,34,000
	Selling and distribution expenses		7,50,000
(v)	**Cost of Sales**		**1,02,30,000**
(vi)	**Profit** (balancing figure)		**31,70,000**
	Sales		1,34,00,000

Q.39 Calculation of Cost Sheet | MTP May 23(2)

G Ltd. has the following expenditures for the year ended 31st March, 2023:

Sl. No.		Amount (₹)	Amount (₹)
(i)	Raw materials purchased		20,00,00,000
(ii)	Freight inward		22,41,200
(iii)	Wages paid to factory workers		58,40,000
(iv)	Royalty paid for production		3,45,200
(v)	Amount paid for power & fuel		9,24,000
(vi)	Job charges paid to job workers		16,24,000
(vii)	Stores and spares consumed		2,24,000
(viii)	Depreciation on office building		1,12,000
(ix)	Repairs & Maintenance paid for:		
	- Plant & Machinery	96,000	
	- Sales office building	36,000	1,32,000
(x)	Insurance premium paid for:		
	- Plant & Machinery	62,400	
	- Factory building	36,200	98,600
(xi)	Expenses paid for quality control check activities		39,200
(xii)	Research & development cost paid improvement in production process		36,400
(xiii)	Expenses paid for pollution control and engineering & maintenance		53,200
(xiv)	Salary paid to Sales & Marketing mangers:		20,24,000
(xv)	Salary paid to General Manager		25,12,000
(xvi)	Packing cost paid for:		
	- Primary packing necessary to maintain quality	1,92,000	
	- For re-distribution of finished goods	2,24,000	4,16,000
(xvii)	Performance bonus paid to sales staffs		7,20,000
(xviii)	Value of stock as on 1st April, 2022:		
	- Raw materials	36,00,000	
	- Work-in-process	18,40,000	
	- Finished goods	22,00,000	76,40,000
(xix)	Value of stock as on 31st March, 2023:		
	- Raw materials	19,20,000	
	- Work-in-process	17,40,000	
	- Finished goods	36,40,000	73,00,000

Amount realized by selling of scrap and waste generated during manufacturing process - ₹1,72,000/-
From the above data you are requested to PREPARE Statement of cost for G Ltd. for the year ended 31st March, 2023, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales.

Ans. **Statement of Cost of G Ltd. for the year ended 31st March, 2023:**

Sl. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		
	- Raw materials purchased	20,00,00,000	

	- Freight inward	22,41,200	
	Add: Opening stock of raw materials	36,00,000	
	Less: Closing stock of raw materials	(19,20,000)	20,39,21,200
(ii)	Direct employee (labour) cost:		
	- Wages paid to factory workers		58,40,000
(iii)	Direct expenses:		
	- Royalty paid for production	3,45,200	
	- Amount paid for power & fuel	9,24,000	
	- Job charges paid to job workers	16,24,000	28,93,200
	Prime Cost		21,26,54,400
(iv)	Works/ Factory overheads:		
	- Stores and spares consumed	2,24,000	
	- Repairs & Maintenance paid for plant & machinery	96,000	
	- Insurance premium paid for plant & machinery	62,400	
	- Insurance premium paid for factory building	36,200	
	- Expenses paid for pollution control and engineering & maintenance	53,200	4,71,800
	Gross factory cost		21,31,26,200
	Add: Opening value of W-I-P		18,40,000
	Less: Closing value of W-I-P		(17,40,000)
	Factory Cost		21,32,26,200
(v)	Quality control cost:		
	- Expenses paid for quality control check activities		39,200
(vi)	Research & development cost paid improvement in production process		36,400
(vii)	Less: Realisable value on sale of scrap and waste		(1,72,000)
(viii)	Add: Primary packing cost		1,92,000
	Cost of Production		21,33,21,800
	Add: Opening stock of finished goods		22,00,000
	Less: Closing stock of finished goods		(36,40,000)
	Cost of Goods Sold		21,18,81,800
(ix)	Administrative overheads:		
	- Depreciation on office building	1,12,000	
	- Salary paid to General Manager	25,12,000	26,24,000
(x)	Selling overheads:		
	- Repairs & Maintenance paid for sales office building	36,000	
	- Salary paid to Manager- Sales & Marketing	20,24,000	
	- Performance bonus paid to sales staffs	3,60,000	24,20,000
(xi)	Distribution overheads:		
	- Packing cost paid for re-distribution of finished goods		2,24,000
	Cost of Sales		21,71,49,800

Q.40 Calculation of Cost Sheet | ICAI MAT

The following data relates to the manufacture of a standard product during the month of April:

Particulars	(₹)
Raw materials	₹ 1,80,000
Direct wages	₹ 90,000
Machine hours worked (hours)	10,000
Machine hour rate (per hour)	₹ 8
Administration overheads (general)	₹ 35,000
Selling overheads (per unit)	₹ 5
Units produced	4,000
Units sold	3,600
Selling price per unit	₹ 125

You are required to PREPARE a cost sheet in respect of the above showing:

(i) Cost per unit

(ii) Profit for the month

Ans. **(i) Cost Sheet** **Output: 4,000 units**

Particulars	Total Cost (₹)	Cost per (unit) (₹)
Raw materials	1,80,000	45.00
Direct wages	90,000	22.50
Prime cost	**2,70,000**	**67.50**
Add: Factory overheads (10,000 hrs × ₹ 8 per hour)	80,000	20.00
Cost of Production	**3,50,000**	**87.50**
Less: Closing Stock of finished goods (4,000 – 3,600 units)	(35,000)	--
Cost of Goods Sold	**3,15,000**	**87.50**
Add: Administration overheads (general)	35,000	9.72
Add: Selling Overheads (3,600 units × ₹ 5 unit)	18,000	5.00
Cost of sales (total Cost)	**3,68,000**	**102.22**

(ii) Statement of Profit

Particulars	Total Cost (₹)
Sales revenue (3,600 units @ ₹ 125)	4,50,000
Less: Cost of sales	3,68,000
Profit	**82,000**

Q.41 Calculation of Cost Sheet | ICAI MAT

The following information has been obtained from the records of ABC Corporation for the period from June 1 to June 30.

	On June 1 (₹)	On June 30 (₹)
Cost of raw materials	60,000	50,000
Cost of work-in-process	12,000	15,000
Cost of stock of finished goods	90,000	1,10,000
Purchase of raw materials during June 2020		4,80,000
Wages paid		2,40,000
Factory overheads		1,00,000
Administration overheads (related to production)		50,000
Selling & distribution overheads		25,000
Sales		10,00,000

PREPARE a statement giving the following information:

(a) Raw materials consumed;

(b) Prime cost;

(c) Factory cost;

(d) Cost of goods sold; and

(e) Net profit.

Ans.

Statement of Cost & Profit
(for the month of June)

	(₹)
Opening stock of raw materials	60,000
Add: Purchase of raw materials during the month of June	4,80,000
Less: Closing stock of raw materials	(50,000)
(a) Raw materials consumed	**4,90,000**
Add: Direct wages	2,40,000
(b) Prime cost	**7,30,000**
Add: Factory overheads	1,00,000
Works cost	8,30,000
Add: Opening work-in-process	12,000
Less: Closing work-in-process	(15,000)
(c) Factory cost	**8,27,000**
Add: Administration overheads	50,000
Cost of production	8,77,000

Add: Opening stock of finished goods	90,000
Less: Closing stock of finished goods	(1,10,000)
(d) Cost of goods sold	**8,57,000**
Add: Selling & distribution overheads	25,000
Cost of sales	8,82,000
(e) Net Profit	**1,18,000**
Sales	10,00,000

Q.42 Calculation of Cost Sheet | ICAI MAT

Arnav Inspat Udyog Ltd. has the following expenditures for the year ended 31st March 2023:

Sl. No.		(₹)	(₹)
(i)	Raw materials purchased		10,00,00,000
(ii)	GST paid on the above purchases @18% (eligible for input tax credit)		1,80,00,000
(iii)	Freight inwards		11,20,600
(iv)	Wages paid to factory workers		29,20,000
(v)	Contribution made towards employees' PF & ESIS		3,60,000
(vi)	Production bonus paid to factory workers		2,90,000
(vii)	Royalty paid for production		1,72,600
(viii)	Amount paid for power & fuel		4,62,000
(ix)	Amount paid for purchase of moulds and patterns (life is equivalent to two years production)		8,96,000
(x)	Job charges paid to job workers		8,12,000
(xi)	Stores and spares consumed		1,12,000
(xii)	Depreciation on:		
	Factory building	84,000	
	Office building	56,000	
	Plant & Machinery	1,26,000	
	Delivery vehicles	86,000	3,52,000
(xiii)	Salary paid to supervisors		1,26,000
(xiv)	Repairs & Maintenance paid for: Plant & Machinery	48,000	
	Sales office building	18,000	
	Vehicles used by directors	19,600	85,600
(xv)	Insurance premium paid for:		
	Plant & Machinery	31,200	
	Factory building	18,100	
	Stock of raw materials & WIP	36,000	85,300

(xvi)	Expenses paid for quality control check activities		19,600
(xvii)	Salary paid to quality control staffs		96,200
(xviii)	Research & development cost paid for improvement in production process		18,200
(xix)	Expenses paid for pollution control and engineering & maintenance		26,600
(xx)	Expenses paid for administration of factory work		1,18,600
(xxi)	Salary paid to functional mangers:		
	Production control	9,60,000	
	Finance & Accounts	9,18,000	
	Sales & Marketing	10,12,000	28,90,000
(xxii)	Salary paid to General Manager		12,56,000
(xxiii)	Packing cost paid for:		
	Primary packing necessary to maintain quality	96,000	
	For re-distribution of finished goods	1,12,000	2,08,000
(xxiv)	Interest and finance charges paid (for usage of non-equity fund)		7,20,000
(xxv)	Fee paid to auditors		1,80,000
(xxvi)	Fee paid to legal advisors		1,20,000
(xxvii)	Fee paid to independent directors		2,20,000
(xxviii)	Performance bonus paid to sales staffs		1,80,000
(xxix)	Value of stock as on 1st April, 2022:		
	Raw materials	18,00,000	
	Work-in-process	9,20,000	
	Finished goods	11,00,000	38,20,000
(xxx)	Value of stock as on 31st March, 2023:		
	Raw materials	9,60,000	
	Work-in-process	8,70,000	
	Finished goods	18,00,000	36,30,000

Amount realized by selling of scrap and waste generated during manufacturing process – ₹ 86,000/-

From the above data you are required to PREPARE Statement of cost for Arnav Ispat Udyog Ltd. for the year ended 31st March, 2023, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales.

Ans.

Statement of Cost of Arnav Ispat Udyog Ltd. for the year ended 31st March, 2023:

Sl.No.	Particulars	(₹)	(₹)
(i)	Material Consumed:		
	Raw materials purchased	10,00,00,000	
	Freight inwards	11,20,600	
	Add: Opening stock of raw materials	18,00,000	

	Less: Closing stock of raw materials	(9,60,000)	10,19,60,600
(ii)	Direct employee (labour) cost:		
	Wages paid to factory workers	29,20,000	
	Contribution made towards employees' PF & ESIS	3,60,000	
	Production bonus paid to factory workers	2,90,000	35,70,000
(iii)	Direct expenses:		
	Royalty paid for production	1,72,600	
	Amount paid for power & fuel	4,62,000	
	Amortised cost of moulds and patterns	4,48,000	
	Job charges paid to job workers	8,12,000	18,94,600
	Prime Cost		**10,74,25,200**
(iv)	Works/ Factory overheads:		
	Stores and spares consumed	1,12,000	
	Depreciation on factory building	84,000	
	Depreciation on plant & machinery	1,26,000	
	Repairs & Maintenance paid for plant & machinery	48,000	
	Insurance premium paid for plant & machinery	31,200	
	Insurance premium paid for factory building	18,100	
	Insurance premium paid for stock of raw materials & WIP	36,000	
	Salary paid to supervisors	1,26,000	
	Expenses paid for pollution control and engineering & maintenance	26,600	6,07,900
	Gross factory cost		**10,80,33,100**
	Add: Opening value of W-I-P		9,20,000
	Less: Closing value of W-I-P		(8,70,000)
	Factory Cost		**10,80,83,100**
(v)	Quality control cost:		
	Expenses paid for quality control check activities	19,600	
	Salary paid to quality control staffs	96,200	1,15,800
(vi)	Research & development cost paid for improvement in production process		18,200
(vii)	Administration cost related with production:		
	-Expenses paid for administration of factory work	1,18,600	
	-Salary paid to Production control manager	9,60,000	10,78,600
(viii)	Less: Realisable value on sale of scrap and waste		(86,000)
(ix)	Add: Primary packing cost		96,000
	Cost of Production		**10,93,05,700**
	Add: Opening stock of finished goods		11,00,000
	Less: Closing stock of finished goods		(18,00,000)

	Cost of Goods Sold		**10,86,05,700**
(x)	Administrative overheads:		
	Depreciation on office building	56,000	
	Repairs & Maintenance paid for vehicles used by directors	19,600	
	Salary paid to Manager- Finance & Accounts	9,18,000	
	Salary paid to General Manager	12,56,000	
	Fee paid to auditors	1,80,000	
	Fee paid to legal advisors	1,20,000	
	Fee paid to independent directors	2,20,000	27,69,600
(xi)	Selling overheads:		
	Repairs & Maintenance paid for sales office building	18,000	
	Salary paid to Manager- Sales & Marketing	10,12,000	
	Performance bonus paid to sales staffs	1,80,000	12,10,000
(xii)	Distribution overheads:		
	Depreciation on delivery vehicles	86,000	
(xiii)	Packing cost paid for re-distribution of finished goods	1,12,000	1,98,000
(xiv)	Interest and finance charges paid		7,20,000
	Cost of Sales		**11,35,03,300**

Note:
GST paid on purchase of raw materials would not be part of cost of materials as it is eligible for input tax credit.

Q.43 Calculation of Cost Sheet | ICAI MAT

The books of Adarsh Manufacturing Company present the following data for the month of April:
Direct labour cost ₹ 17,500 being 175% of works overheads. Cost of goods sold excluding administrative expenses ₹ 56,000.
Inventory accounts showed the following opening and closing balances:

	April 1 (₹)	April 30 (₹)
Raw materials	8,000	10,600
Work-in-progress	10,500	14,500
Finished goods	17,600	19,000

Other data are:

	(₹)
Selling expenses	3,500
General and administration expenses	2,500
Sales for the month	75,000

You are required to:
(i) FIND out the value of materials purchased.
(ii) PREPARE a cost statement showing the various elements of cost and also the profit earned.

Ans. **(i) Computation of the value of materials purchased**

To find out the value of materials purchased, reverse calculations from the given data can be presented as below:

Particulars	(₹)
Cost of goods sold	**56,000**
Add: Closing stock of finished goods	19,000
Less: Opening stock of finished goods	(17,600)
Cost of production	**57,400**
Add: Closing stock of work-in-progress	14,500
Less: Opening stock of work-in-progress	(10,500)
Works cost	**61,400**
Less: Factory overheads: $\frac{17,500 \times 100}{175}$	(10,000)
Prime cost	**51,400**
Less: Direct labour	(17,500)
Raw material consumed	**33,900**
Add: Closing stock of raw materials	10,600
Raw materials available	44,500
Less: Opening stock of raw materials	(8,000)
Value of materials purchased	**36,500**

(ii) Cost statement

	(₹)
Raw material consumed [Refer to statement (i) above]	33,900
Add: Direct labour cost	17,500
Prime cost	**51,400**
Add: Factory overheads	10,000
Works cost	**61,400**
Add: Opening work-in-progress	10,500
Less: Closing work-in-progress	(14,500)
Cost of production	**57,400**
Add: Opening stock of finished goods	17,600
Less: Closing stock of finished goods	(19,000)
Cost of goods sold	**56,000**
Add: General and administration expenses	2,500
Add: Selling expenses	3,500
Cost of sales	**62,000**
Profit (Balance figure ₹ 75,000 – ₹ 62,000)	13,000
Sales	**75,000**

Q.44 Calculation of Cost Sheet | ICAI MAT

From the following particulars, you are required to PREPARE monthly cost sheet of Aditya Industries:

Opening Inventories:	(₹)
- Raw materials	12,00,000
- Work-in-process	18,00,000
- Finished goods (10,000 units)	9,60,000
Closing Inventories:	
- Raw materials	14,00,000
- Work-in-process	16,04,000
- Finished goods	?
Raw materials purchased	1,44,00,000
GST paid on raw materials purchased (ITC available)	7,20,000
Wages paid to production workers	36,64,000
Expenses paid for utilities	1,45,600
Office and administration expenses paid	26,52,000
Travelling allowance paid to office staffs	1,21,000
Selling expenses	6,46,000

Machine hours worked- 21,600 hours

Machine hour rate- ₹ 8.00 per hour

Units sold- 1,60,000

Units produced- 1,94,000

Desired profit- 15% on sales

Ans. **Cost sheet of Aditya Industries for month of……**

Units produced- 1,94,000

Units sold- 1,60,000

Particulars	(₹)	**Cost per unit (₹)**
Raw materials purchased	1,44,00,000	
Add: Opening value of raw materials	12,00,000	
Less: Closing value of raw materials	(14,00,000)	
Materials consumed	1,42,00,000	73.19
Wages paid to production workers	36,64,000	18.89
Expenses paid for utilities	1,45,600	0.75
Prime Cost	**1,80,09,600**	**92.83**
Factory overheads (₹ 8 × 21,600 hours)	1,72,800	
Add: Opening value of W-I-P	18,00,000	
Less: Closing value of W-I-P	(16,04,000)	
Cost of Production	**1,83,78,400**	**94.73**

Add: Value of opening finished stock	9,60,000	
Less: Value of closing finished stock (₹ 94.73 × 44,000)	(41,68,120)	
Cost of Goods Sold	**1,51,70,280**	**94.81**
Office and administration expenses paid	26,52,000	16.58
Travelling allowance paid to office staffs	1,21,000	0.75
Selling expenses	6,46,000	4.04
Cost of Sales	1,85,89,280	116.18
Add: Profit	32,80,461	20.50
	2,18,69,741	**136.68**

Q.45 Calculation of Cost Sheet | ICAI MAT

The following figures are extracted from the Trial Balance of G.K Co. on 31st March:

	Dr. (`)	Cr. (`)
Inventories:		
Finished Stock	80,000	
Raw Materials	1,40,000	
Work-in-Process	2,00,000	
Office Appliances	17,400	
Plant & Machinery	4,60,500	
Building	2,00,000	
Sales		7,68,000
Sales Return and Rebates	14,000	
Materials Purchased	3,20,000	
Freight incurred on Materials	16,000	
Purchase Returns		4,800
Direct employee cost	1,60,000	
Indirect employee cost	18,000	
Factory Supervision	10,000	
Repairs and factory up-keeping expenses	14,000	
Heat, Light and Power	65,000	
Rates and Taxes	6,300	
Miscellaneous Factory Expenses	18,700	
Sales Commission	33,600	
Sales Travelling	11,000	
Sales Promotion	22,500	
Distribution Deptt.—Salaries and Expenses	18,000	
Office Salaries and Expenses	8,600	
Interest on Borrowed Funds	2,000	

With the help of the above information, you are required to PREPARE a condensed Profit and Loss Statement of G.K Co. for the year ended 31st March along with supporting schedules of:

(i) Cost of Sales.

(ii) Selling and Distribution Expenses.

(iii) Administration Expenses

Ans.

Profit and Loss Statement of G.K Co.
for the year ended 31st March

	(₹)	(₹)
Gross Sales	7,68,000	
Less: Returns and rebates	(14,000)	7,54,000
Less: Cost of Sales (excluding interest on borrowed funds) [Refer to Schedule (i)]		(7,14,020)
Net Operating Profit		39,980
Less: Interest on borrowed funds (2,000+2,000)		(4,000)
Net Profit		**35,980**

(i) Schedule of Cost of Sales

	(₹)	(₹)
Raw Material (Inventory opening balance)		1,40,000
Add: Material Purchased	3,20,000	
Add: Freight on Material	16,000	
Less: Purchase Returns	(4,800)	3,31,200
		4,71,200
Less: Closing Raw Material Inventory		(1,80,000)
Materials consumed in Production		2,91,200
Direct employee cost (₹1,60,000 + ₹8,000)		1,68,000
Prime Cost		**4,59,200**
Factory Overheads:		
Indirect employee cost (₹18,000 + ₹1,200)	19,200	
Factory Supervision	10,000	
Repairs and factory up-keeping expenses	14,000	
Heat, Light and Power (₹65,000 × 8/10)	52,000	
Rates and Taxes (₹6,300 × 2/3rd)	4,200	
Miscellaneous Factory Expenses	18,700	
Depreciation of Plant (10% of ₹4,60,500)	46,050	
Depreciation of Buildings (4% of ₹2,00,000 × 8/10)	6,400	1,70,550
Gross Works Cost		**6,29,750**
Add: Opening Work-in-Process inventory		2,00,000

Less: Closing Work-in-Process inventory		(1,92,000)
Cost of production		**6,37,750**
Add: Opening Finished Goods inventory		80,000
Less: Closing Finished Goods inventory		(1,15,000)
Cost of Goods Sold		**6,02,750**
Add: Administration Expenses [*See* Schedule (*iii*)]		18,870
Add: Selling and Distribution Expenses [*See* Schedule (*ii*)]		92,400
Cost of Sales (excluding interest on borrowed funds)		**7,14,020**

Alternatively, Interest on borrowed funds of ₹ 4,000 (₹ 2,000 + ₹ 2,000) may be added to arrive at cost of sales.

(ii) Schedule of Selling and Distribution Expenses

	(₹)
Sales Commission	33,600
Sales Travelling	11,000
Sales Promotion	22,500
Distribution Deptt.—Salaries and Expenses	18,000
Heat, Light and Power	6,500
Depreciation of Buildings	800
	92,400

(iii) Schedule of Administration Expenses

	(₹)
Office Salaries and Expenses	8,600
Depreciation of Office Appliances	870
Depreciation of Buildings	800
Heat, Light and Power	6,500
Rates and Taxes	2,100
	18,870

2 CHAPTER MATERIAL COST

Q.1 ABC Analysis | PY July 21

MM Ltd. has provided the following information about the items in its inventory.

Item Code Number	Units	Unit Cost (₹)
101	25	50
102	300	01
103	50	80
104	75	08
105	225	02
106	75	12

MM Ltd. has adopted the policy of classifying the items constituting 15% or above of Total Inventory Cost as 'A' category, items constituting 6% or less of Total Inventory Cost as 'C' category and the remaining items as 'B' category.

You are required to:

(i) Rank the items on the basis of % of Total Inventory Cost.

(ii) Classify the items into A, B and C categories as per ABC Analysis of Inventory Control adopted by MM Ltd.

Ans. (i) Statement of Total Inventory Cost and Ranking of items

Item code no.	Units	% of Total units	Unit cost (₹)	Total Inventory cost (₹)	% of Total Inventory cost	Ranking
101	25	3.33	50	1,250	16.67	**2**
102	300	40.00	1	300	4.00	**6**
103	50	6.67	80	4,000	53.33	**1**
104	75	10.00	8	600	8.00	**4**
105	225	30.00	2	450	6.00	**5**
106	75	10.00	12	900	12.00	**3**
	750	100	153	7,500	100	

(ii) Classifying items as per ABC Analysis of Inventory Control

Basis for ABC Classification as % of Total Inventory Cost

15% & above -- 'A' items

7% to 14% -- 'B' items

6% & Less -- 'C' items

Ranking	em code No.	of Total units	Total Inventory cost (₹)	% of Total Inventory Cost	Category
1	103	6.67	4,000	53.33	
2	101	3.33	1,250	16.67	
Total	2	10.00	5,250	70.00	A
3	106	10.00	900	12.00	
4	104	10.00	600	8.00	

Total	2	20.00	1,500	20.00	B
5	105	30.00	450	6.00	
6	102	40.00	300	4.00	
Total	2	70.00	750	10.00	C
Grand Total	6	100	7,500	100	

Q.2 ABC Analysis | MTP May 18

A store keeper has prepared the below list of items kept in the store of the factory.

Item	Units	Unit cost (₹)
A	12,000	30.00
B	18,000	3.00
C	6,000	35.00
D	750	220.00
E	3,800	75.00
F	400	105.00
G	600	300.00
H	300	350.00
I	3,000	250.00
J	20,000	7.50
K	11,500	27.50
L	2,100	75.00

The store keeper requires your help to classify the items for prioritization. You are required to APPLY ABC analysis to classify the store items as follows:
Store items which constitutes approx 70%, 20% and 10% of total value as A, B and C respectively.

Ans. Statement of Total Cost and Ranking

Item	Units	% of Total units	Unit cost (₹)	Total cost (₹)	% of Total cost	Ranking
A	12,000	15.30%	30.00	3,60,000	12.97%	2
B	18,000	22.94%	3.00	54,000	1.95%	11
C	6,000	7.65%	35.00	2,10,000	7.57%	5
D	750	0.96%	220.00	1,65,000	5.95%	7
E	3,800	4.84%	75.00	2,85,000	10.27%	4
F	400	0.51%	105.00	42,000	1.51%	12
G	600	0.76%	300.00	1,80,000	6.49%	6
H	300	0.38%	350.00	1,05,000	3.78%	10
I	3,000	3.82%	250.00	7,50,000	27.03%	1
J	20,000	25.49%	7.50	1,50,000	5.41%	9
K	11,500	14.66%	27.50	3,16,250	11.40%	3
L	2,100	2.68%	75.00	1,57,500	5.68%	8
	78,450	100.00%		27,74,750	100.00%	

Q.3 All Formulas | RTP Nov 22

M/s Tanishka Materials Private Limited produces a product which names "ESS". The consumption of raw material for the production of "ESS" is 210 Kgs to 350 Kgs per week. Other information is as follows:

Procurement Time:	5 to 9 Days
Purchase price of Raw Materials:	₹ 100 per kg
Ordering Cost per Order:	₹ 200
Storage Cost:	1% per month plus ₹ 2 per unit per annum

Consider 365 days a year.

You are required to CALCULATE:

(a) Economic Order Quantity
(b) Re-Order Level (ROL)
(c) Maximum Stock Level
(d) Minimum Stock Level
(e) Average Stock Level
(f) Number of Orders to be placed per year
(g) Total Inventory Cost
(h) If the supplier is willing to offer 1% discount on purchase of total annual quantity in two orders, whether offer is acceptable?
(i) If the answer is no, what should be the counteroffer w.r.t. percentage of discount?

Ans. As procurement time is given in days, consumption should also be calculated in days:

Maximum Consumption per Day: $\frac{350}{7}$ = 50 Kgs

Minimum Consumption per Day: $\frac{210}{7}$ = 30 Kgs.

Average Consumption per Day: $\frac{(50+30)}{2}$ = 40 Kgs

(a) Calculation of Economic Order Quantity (EOQ)

Annual consumption of Raw Materials (A): 40 Kgs x 365 days = 14,600 Kgs

Storage or Carrying Cost per unit per annum (C):(₹ 100 x 1% x 12 months) + ₹ 2 = ₹ 14

Ordering Cost (O): ₹ 200 per Order

$$EOQ = \sqrt{\frac{2 \times A \times O}{C}}$$

$$= \sqrt{\frac{2 \times 14600{,}600 \times 200}{14}} = 646 \text{ Kgs.}$$

(b) Re-Order Level (ROL) = (Maximum consumption Rate × Maximum Procurement Time)
= 50 kgs per day × 9 days
= 450 kgs

(c) Maximum Stock Level = Recorder Level + Recorder Quantity – (Minimum Consumption Rate × Minimum Procurement Time)
= 450 kgs + 646 kgs - (30 kgs X 5 days)
= 946 kgs

(d) Minimum Stock Level = Recorder Level – (Average consumption Rate × Average Procurement Time)
= 450 kgs – (40 kgs X 7 days)

= 170 kgs

(e) Average Stock Level = $\frac{\text{Maximum Stock Level} + \text{Minimum Stock Level}}{2}$

= $\frac{946 \text{ kgs} + 170 \text{ kgs}}{2}$

= 558 kgs

(f) Number of Orders to be placed per year

= $\frac{\text{Annual Consumption of Raw Materials}}{\text{EOQ}}$

= $\frac{14600 \text{ kg}}{646 \text{ kgs}}$

= 22.60 Orders or 23 Orders

(g) Total Inventory Cost

Cost of Materials (A x Purchase Price) (14600 kgs x ₹ 100)	=	₹14,60,000
Total Ordering Cost (No. of Orders x O) (23 Orders x 200)	=	₹ 4,600
Total Carrying Cost (EOQ / 2 x C) (646 kgs / 2 x ₹ 14	=	₹ 4,522
Total Inventory Cost	=	₹ 14,69,122

(h) If the supplier is willing to offer 1% discount on purchase of total annual quantity in two orders:

Offer Price	= ₹ 100 x 99%	= ₹ 99
Revised Carrying Cost = (₹ 99 x 1% x 12 months) + ₹2	= ₹ 13.88	
Revised Order Quantity = 14600 kgs / 2 Orders	= 7300 kgs	

Total Inventory Cost at Offer Price

Cost of Materials (A x Purchase Price) (14600 kgs x ₹ 99)	=	₹14,45,400
Total Ordering Cost (No. of Orders x O) (2 Orders x 200)	=	₹ 400
Total Carrying Cost (EOQ / 2 x C) (7300 kgs / 2 x ₹13.88)	=	₹ 50,662
Total Inventory Cost	=	₹ 14,96,462

Advice: As total inventory cost at offer price is ₹ 27,340 (14,96,462 – 14,69,122) higher, offer should not be accepted.

(i) Counter-offer:

Let Discount Rate = z%

Counter-Offer Price = ₹ 100 – z% = ₹ 100 – z

Revised Carrying Cost = [(₹ 100 – z) x 1% x 12 months] + ₹ 2 = ₹ 12 -0.12z + ₹ 2

= ₹ 14 – 0.12z

Total Inventory Cost at Counter-Offer Price

Cost of Materials (A x Purchase Price) [14600 kgs x (₹ 100 – z)]	= ₹ 14,60,000 – 14,600z
Total Ordering Cost (No. of Orders x O) (2 Orders x 200)	= ₹ 400
Total Carrying Cost (EOQ / 2 x C) [7300 kgs / 2 x (₹ 14 – 0.12z)]	= ₹ 51,100 – 438z
Total Inventory Cost	=₹ 15,11,500 – 15038z
	₹ 14,69,122 = ₹ 15,11,500 – 15038z

Or 15038z = 42,378

Or z = 2.82

Therefore, discount should be at least 2.82% in offer price.

Q.4 Bill of Material | PY Dec 21

What is Bill of Material? Describe the uses of Bill of Material in following departments:

a. Purchases Department

b. Production Department

c. Stores Department

d. Cost/Accounting Department

Ans. **Bill of Material:** It is a detailed list specifying the standard quantities and qualities of materials and components required for producing a product or carrying out of any job.

Uses of Bill of Material in different department:

Purchase Department	Production Department	Stores Department	Cost/ Accounting Department
Materials are procured (purchased) on the basis of specifications mentioned in it.	Production is planned according to the nature, volume of the materials required to be used. Accordingly, material requisition lists are prepared.	It is used as a reference document while issuing materials to the requisitioning department.	It is used to estimate cost and profit. Any purchase, issue and usage are compared/ verified against this document.

Q.5 Calculate Material Cost | MTP May 22(1)

SKY Company Ltd., not registered under GST, purchased material 'RPP' from a company, registered under GST. The following information is available for one lot of 5,000 units of material purchased:

Listed price of one lot	₹ 7,50,000
Trade discount	@ 10% on Listed price.
CGST and SGST (Credit Not available)	12% (6% CGST + 6% SGST)
Road Tax paid	₹ 15,000
Freight and Insurance	₹ 51,000
Detention Charges	₹ 15,000
Commission and brokerage on purchases	₹ 30,000
Amount deposited for returnable containers	₹ 90,000
Amount of refund on returning the container	₹ 60,000
Other Expenses	@ 2% of total cost

20% of material shortage is due to normal reasons.

You are required to CALCULATE cost per unit of material purchased to SKY Company Ltd.

Ans. **Computation of Total cost of material purchased of SKY Manufacturing Company**

Particulars		Units	(Amount in ₹)
Listed Price of Materials		5,000	7,50,000
Less: Trade discount @ 10% on invoice price			(75,000)
			6,75,000
Add: CGST @ 6% of ₹ 6,75,000			40,500
SGST @ 6% of ₹ 6,75,000			40,500
			7,56,000
Add: Road Tax paid			15,000
Freight and Insurance			51,000
Commission and Brokerage Paid			30,000
Add: Cost of returnable containers:			
Amount deposited	₹ 90,000		
Less: Amount refunded	₹ 60,000		30,000

		8,82,000
Add: Other Expenses @ 2% of Total Cost $\left(\frac{8,82,000}{98} x2\right)$		18,000
Total cost of material		9,00,000
Less: Shortage due to Normal Loss @ 20%	1,000	-
Total cost of material of good units	**4,000**	**9,00,000**
Cost per unit (₹ 9,00,000/4,000 units)		**225**

Notes:

1. GST is payable on net price i.e., listed price less discount.
2. Detention charges/ fines imposed for non-compliance of rule or law by any statutory authority It is an abnormal cost and not included with cost of purchase.
3. Shortage due to normal reasons should not be deducted from cost to ascertain total cost of good units.

Q.6 Calculate Cost of Material | MTP May 22(2)

M/s SE Traders is a distributor of an electronic items. A periodic inventory of electronic items on hand is taken when books are closed at the end of each quarter. The following information is available for the quarter ended on 30th September, 2021:

Sales	₹ 2,19,30,000
Opening Stock	12,500 units @ ₹ 600 per unit
Administrative Expenses	₹ 5,62,500
Purchases (including freight inward):	
July 1, 2021	25,000 units @ ₹ 573 per unit
September 30, 2021	12,500 units @ ₹ 630 per unit
Closing stock- September 30, 2021	16,000 units

You are required to COMPUTE the following by WAM (Weighted Average Method), FIFO method and LIFO method assuming issue/ consumption pattern was even throughout the quarter:

(i) Value of Inventory on 30th September, 2021.

(ii) Profit or loss for the quarter ended 30th September, 2021.

Ans. **(i) Computation of Value of Inventory as on 30th September 2021:**

Date	Particulars	Units	WAM (₹)	FIFO (₹)	LIFO (₹)
01-07-21	Opening Stock	12,500	75,00,000 (₹600×12,500)	75,00,000 (₹600×12,500)	75,00,000 (₹600×12,500)
01-07-21	Purchases	25,000	1,43,25,000 (₹573×25,000)	1,43,25,000 (₹573×25,000)	1,43,25,000 (₹573×25,000)
30-09-21	Purchases	12,500	78,75,000 (₹630×12,500)	78,75,000 (₹630×12,500)	78,75,000 (₹630×12,500)
01-07-21 to 30-09-21	Issues/ Consumption (Balancing figure)	34,000	**2,01,96,000***	**1,98,19,500****	**2,01,94,500*****
30-09-21	Closing Stock	16,000	**95,04,000**	**98,80,500**	**95,05,500**

Weighted average rate = $\frac{`75,00,000 + `1,43,25,000 + `78,75,000}{(12,500 + 25,000 + 12,500) \text{ units}} = ₹ 594$

* ₹ 594 x 34,000 = ₹ 2,01,96,000
** ₹ 600 × 12,500 + ₹ 573 × 21,500 = ₹ 1,98,19,500
*** ₹ 630 × 12,500 + ₹ 573 × 21,500 = ₹ 2,01,94,500

(ii) Computation of Profit or Loss for the Quarter ended 30th September 2021

Particulars	WAM (₹)	FIFO (₹)	LIFO (₹)
Sales	2,19,30,000	2,19,30,000	2,19,30,000
Less: Consumption	2,01,96,000	1,98,19,500	2,01,94,500
Less: Administrative Exp.	5,62,500	5,62,500	5,62,500
Profit or Loss	**11,71,500**	**15,48,000**	**11,73,000**

Q.7 Calculate Cost of Material | RTP May 22

Sky & Co., an unregistered supplier under GST, purchased material from Vye Ltd. which is registered under GST. The following information is available for one lot of 5,000 units of material purchased:

Listed price of one lot	₹ 2,50,000
Trade discount	@ 10% on listed price
CGST and SGST (Credit Not available)	12% (6% CGST + 6% SGST)
Cash discount	@ 10%
(Will be given only if payment is made within 30 days.)	
Toll Tax paid	₹ 5,000
Freight and Insurance	₹ 17,000
Demurrage paid to transporter	₹ 5,000
Commission and brokerage on purchases	₹ 10,000
Amount deposited for returnable containers	₹ 30,000
Amount of refund on returning the container	₹ 20,000
Other Expenses	@ 2% of total cost

20% of material shortage is due to normal reasons.
The payment to the supplier was made within 21 days of the purchases.
You are required to CALCULATE cost per unit of material purchased by Sky & Co.

Ans. Calculation of cost per unit:

Particulars	Units	(₹)
Listed Price of Materials	5,000	2,50,000
Less: Trade discount @ 10% on invoice price		(25,000)
		2,25,000
Add: CGST @ 6% of ₹ 2,25,000		13,500
Add: SGST @ 6% of ₹ 2,25,000		13,500
		2,52,000
Add: Toll Tax		5,000
Freight and Insurance		17,000
Commission and Brokerage Paid		10,000
Add: Cost of returnable containers:		

Amount deposited	₹ 30,000		
Less: Amount refunded	₹ 20,000		10,000
			2,94,000
Add: Other Expenses @ 2% of Total Cost (₹ 2,94,000 ×2)/98			6,000
Total cost of material			3,00,000
Less: Shortage material due to normal reasons @ 20%		1,000	-
Total cost of material of good units		4,000	3,00,000
Cost per unit (₹ 3,00,000/4,000 units)			75

Note:

1. GST is payable on net price i.e., listed price less discount.
2. Cash discount is treated as interest and finance charges; hence it is ignored.
3. Demurrage is penalty imposed by the transporter for delay in uploading or off -loading of materials. It is an abnormal cost and not included.
4. Shortage due to normal reasons should not be deducted from cost to ascertain total cost of good units.

Q.8 Economic Order Qty (EOQ) | MTP Nov 19

A Ltd. manufactures a product X which requires two raw materials A and B in a ratio of 1:4.
The sales department has estimated a demand of 5,00,000 units for the product for the year. To produce one unit of finished product, 4 units of material A is required.
Stock position at the beginning of the year is as below:
Product- X 12,000 units
Material A 24,000 units
Material B 52,000 units
To place an order the company has to spend Rs.15,000. The company is financing its working capital using a bank cash credit @13% p.a.
Product X is sold at Rs.1,040 per unit. Material A and B are purchased at Rs.150 and Rs.200 respectively.

Required:
COMPUTE economic order quantity (EOQ):
(i) If purchase order for the both materials is placed separately.
(ii) If purchase order for the both materials is not placed separately.

Ans.

Workings:
Annual production of Product X = Annual demand – Opening stock
= 5,00,000 – 12,000 = 4,88,000 units
Annual requirement for raw materials = Annual production× Material per unit – Opening stock of material
Material A = 4,88,000 × 4 units – 24,000 units = 19,28,000 units
Material B = 4,88,000 × 16 units – 52,000 units = 77,56,000 units

(i) Computation of EOQ when purchase order for the both materials is placed separately

$$EOQ = \sqrt{\frac{2 \times \text{Annual Requirement for material} \times \text{Ordering cost}}{\text{Carrying cost per unit per annum}}}$$

$$\text{Material A} = \sqrt{\frac{2 \times 19,28,000 \text{ units}}{\text{Rs.}15,000}} = \sqrt{\frac{38,56,000 \times \text{Rs.}15,000}{\text{Rs.}19.5}}$$

13%of Rs.150
= 54,462 units

Material B = $\sqrt{\frac{2 \times 19,28,000 \text{ units}}{\text{Rs.15,000}}} = \sqrt{\frac{1,55,12,000 \times \text{Rs.15,000}}{\text{Rs.26}}}$

13%of Rs.200
= 94,600 units

(ii) Computation of EOQ when purchase order for the both materials is not placed separately

Material A & B = $\sqrt{\frac{2 \times (19,28,000 + 77,56,000) \text{ units} \times \text{Rs.15,000}}{13\% \text{ of Rs.190 } *}}$

= $\sqrt{\frac{1,93,68,000 \times \text{Rs.15,000}}{\text{Rs.24.7}}}$ = 1,08,452 units

Material A = $\frac{= 1,08,452 \times 19,28,000}{96,84,000}$ = 21,592 units

Material A = $\frac{1,08,452 \times 77,56,000}{96,84,000}$ = 86,860 units

$\frac{* (\text{Rs.150} \times 19,28,000) + (\text{Rs.200} \times 77,56,000)}{(19,28,000 + 77,56,000)}$ = Rs.190

Q.9 PY Nov 19

A Factory produces two products, 'A' and 'B' from a single process. The joint processing costs during a particular month are :

Direct Material	₹30,000
Direct Labour	₹ 9,600
Variable Overheads	₹ 12,000
Fixed Overheads	₹ 32,000

Sales: A- 100 units@ ₹ 600 per unit;
B - 120 units @ ₹ 200 per unit.

Apportion joints costs on the basis of:
Physical Quantity of each product.
Contribution Margin method, and
Determine Profit or Loss under both the methods.

Ans. **Total Joint Cost**

	Amount (₹)
Direct Material	30,000
Direct Labour	9,600
Variable Overheads	12,000
Total Variable Cost	51,600
Fixed Overheads	32,000
Total joint cost	83,600

Apportionment of Joint Costs:

			Product-A	Product-B
I.	(i)	Apportionment of Joint Cost on the basis of 'Physical Quantity'	₹ 38,000 $\left(\frac{\text{₹ } 83,600}{100 + 120\text{units}} \times 100\right)$	₹ 45,600 $\left(\frac{\text{₹ } 83,600}{100 + 120\text{units}} \times 120\right)$

	(ii)	Apportionment of Joint Cost on the basis of 'Contribution Margin Method':		
		- Variable Costs (on basis of physical units)	**₹ 23,455** $\left(\frac{`\ 51,600}{100\ +120\text{units}} x100\right)$	**₹ 28,145** $\left(\frac{`\ 51,600}{100\ +\ 120\text{units}} x120\right)$
		Contribution Margin	**36,545** (₹600×100 – 23,455)	**-4,145** (₹200×120 – 28,145)
		Fixed Costs*	₹ 32,000	
		Total apportioned cost	₹ 55,455	₹ 28,145
II.	**(iii)**	**Profit or Loss:**		
	When Joint cost apportioned on basis of physical units			
	A.	Sales Value	₹ 60,000	₹ 24,000
	B.	Apportioned joint cost on basis of 'Physical Quantity':	₹ 38,000	₹ 45,600
	A-B	**Profit or (Loss)**	**22,000**	**(21,600)**
	When Joint cost apportioned on basis of 'Contribution Margin Method'			
	C	Apportioned joint cost on basis of 'Contribution Margin Method'	₹ 55,455	₹ 28,145
	A-C	**Profit or (Loss)**	₹ 4,545	₹ (4,145)

The fixed cost of ₹ 32,000 is to be apportioned over the joint products A and B in the ratio of their contribution margin but contribution margin of Product B is Negative so fixed cost will be charged to Product A only.

Q.10 Economic Order Qty (EOQ) | RTP Nov 19

HBL Limited produces product 'M' which has a quarterly demand of 20,000 units. Each product requires 3 kg. and 4 kg. of material X and Y respectively. Material X is supplied by a local supplier and can be procured at factory stores at any time, hence, no need to keep inventory for material X. The material Y is not locally available, it requires to be purchased from other states in a specially designed truck container with a capacity of 10 tons. The cost and other information related with the materials are as follows:

Particulars	Material -X	Material-Y
Purchase price per kg. (excluding GST)	₹140	₹640
Rate of GST	18%	18%
Freight per trip (fixed, irrespective of quantity)	-	₹28,000
Loss of materials in transit*	-	2%
Loss in process*	4%	5%

On purchased quantity

Other information:

The company has to pay 15% p.a. to bank for cash credit facility.

Input credit is available on GST paid on materials.

Required:

(i) CALCULATE cost per kg. of material X and Y

(ii) CALCULATE the Economic Order quantity for both the materials.

Ans. **Working Notes:**

Annual purchase quantity for material X and Y:

Annual demand for product M- 20,000 units × 4 = 80,000 units

Particulars	Mat-X	Mat-Y
Quantity required for per unit of product M	3 kg.	4 kg.
Net quantity for materials required	2,40,000 kg.	3,20,000 kg.
Add: Loss in transit	-	6,881 kg.
Add: Loss in process	10,000 kg.	17,204 kg.
Purchase quantity	**2,50,000 kg.**	**3,44,085 kg.**

Note - Input credit on GST paid is available; hence, it will not be included in cost of material.

(i) **Calculation of cost per kg. of material X and Y:**

Particulars	Mat-X	Mat-Y
Purchase quantity	2,50,000 kg.	3,44,085 kg.
Rate per kg.	₹140	₹640
Purchase price	₹3,50,00,000	₹22,02,14,400
Add: Freight	0	₹9,80,000*
Total cost	₹3,50,00,000	₹22,11,94,400
Net Quantity	2,40,000 kg.	3,20,000 kg
Cost per kg.	₹145.83	₹691.23

*No. of trucks = $\frac{3,44,085 kg.}{10 \text{ ton} \times 1,000}$ = 34.40 trucks or 35 trucks

Therefore, total freight = 35 trucks × ₹28,000 = ₹9,80,000

(ii) **Calculation of Economic Order Quantity (EOQ) for Mat.-X and Y:**

$$EOQ = \sqrt{\frac{2 \times \text{Annual Requirement} \times \text{Order cost}}{\text{Carrying cost per unit p.a.}}}$$

Particulars	Mat-X	Mat-Y
Annual Requirement	2,50,000 kg.	3,44,085 kg.
Ordering cost	0	₹28,000
Cost per unit	₹145.83	₹691.23
Carrying cost	15%	15%
Carrying cost per unit p.a.	0*	₹103.68
EOQ	0	13,632.62 kg.

Q.11 EOQ / Frequently Order | PY May 22

A Limited a toy company purchases its requirement of raw material from S Limited at ₹ 120 per kg. The company incurs a handling cost of ₹ 400 plus freight of ₹ 350 per order. The incremental carrying cost of inventory of raw material is ₹ 0.25 per kg per month. In addition the cost of working capital finance on the investment in inventory of raw material is ₹ 15 per kg per annum. The annual production of the toys is 60,000 units and 5 units of toys are obtained from one kg. of raw material.

Required:

(i) Calculate the Economic Order Quantity (EOQ) of raw materials.

(ii) Advise, how frequently company should order to minimize its procurement cost. Assume 360 days in a year.

(iii) Calculate the total ordering cost and total inventory carrying cost per annum as per EOQ.

Ans. Annual requirement of raw material in kg. (A) = $\frac{60,000 \text{ units}}{5 \text{ units per kg}} = 12000kg$

Ordering Cost (Handling & freight cost) (O) = ₹ 400 + ₹ 350 = ₹ 750
Carrying cost per unit per annum i.e. inventory carrying cost + working capital cost (c × i)
= (₹ 0.25 × 12 months) + ₹15
= ₹ 18 per kg.

$$\sqrt{\frac{2x12,000kgs.\ x750}{`\ 18}} = 1000kg$$

(i) E.O.Q.=

(ii) Frequency of orders for procurement:

Annual consumption (A) = 12,000 kg.

Quantity per order (EOQ) = 1,000 kg.

No. of orders per annum $\left(\frac{A}{EOQ}\right) = \frac{12000kg}{1000kg} = 12$

Frequency of placing orders (in months) = $\frac{12Months}{12Orders} = 1Months$

Or, (in days)= $\frac{360days}{12orders}$ = **30 days**

(iii) Calculation of total ordering cost and total inventory carrying cost as per EOQ:

	Amount/Quantity
Size of the order	1,000 kg.
No. of orders	12
Cost of placing orders	**₹ 9,000** (12 orders × ₹ 750)
Inventory carrying cost	**₹ 9,000** (1,000 kg. × ½ × ₹ 18)
Total Cost	₹18,000

Q.12 EOQ / Frequently Order | RTP May 23

Reliable India Pvt Ltd is a startup company engaged in manufacturing of Agro Tech product from a raw material, which is purchased at ₹190 per kg. The company incurs a handling cost of ₹1,470 plus, freight of ₹770 per order. The incremental carrying cost of inventory of raw material is ₹3 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is ₹20 per kg per annum. The annual production of the product is 1,50,000 units and 3 units are obtained from one kg. of raw material. Assume 360 days in a year.

Required:

Calculate the economic order quantity of raw materials.
Determine, how frequently company should order for procurement be placed.
If the company proposes to rationalize placement of orders on quarterly basis, determine the percentage of discount in the price of raw materials should be negotiated?

Ans.

(i) Calculation of Economic Order Quantity (E.O.Q)

Annual requirement (usage) of raw material in kg. (A) = $\frac{1,50,000 \text{units}}{3 \text{units per kg}} = 50,000 \text{kg.}$

Ordering Cost (Handling & freight cost) (O) = ₹1,470 + ₹770 = ₹2,240
Carrying cost per unit per annum (C) i.e. inventory carrying cost + working capital cost= (₹3 × 12 months) + ₹20 = ₹56 per kg.

E.O.Q = $\sqrt{\frac{2AC}{C}} = \sqrt{\frac{2 \times 50,000 \text{ kg.} \times ` 2,240}{` 56}}$ 2,000 kg

(ii) Frequency of placing orders for procurement :

Annual consumption (A) = 50,000 kg.
Quantity per order (E.O.Q) = 2,000 kg.

No. of orders per annum = $\frac{A}{E.O.Q} = \frac{50,000 \text{kg}}{2,000 \text{kg.}} = 25$ orders

Frequency of placing orders (in days) = $\frac{360 \text{days}}{25 \text{orders}} = 14.4$ Days

(iii) Percentage of discount in the price of raw materials to be negotiated:

Particulars	On Quarterly Basis	On E.O.Q Basis
1. Annual Usage (in Kg.)	50,000 kg.	50,000 kg.
2. Size of the order	12,500 kg.	2,000 kg.
3. No. of orders (1 ÷ 2)	4	25
4. Cost of placing ordersor Ordering cost (No. of orders × Costper order)	₹8,960 (4 order × ₹2,240)	₹56,000 (25 orders × ₹2,240)
5. Inventory carryingcost (Average inventory ×Carrying cost per unit)	₹3,50,000 (12,500 kg. × ½ × ₹56)	₹56,000 (2,000 kg. × ½ × ₹56)
6. Total Cost (4 + 5)	₹ 3,58,960	₹ 1,12,000

When order is placed on quarterly basis the ordering cost and carrying cost increased by ₹2,46,960 (₹3,58,960 - ₹1,12,000). So, discount required = ₹ 2,46,960
Total annual purchase = 50,000 kg. × ₹190 = ₹95,00,000

So, Percentage of discount to be negotiated = $\frac{` 2,46,960}{` 95,00,000} \times 100 = 2.60\%$

Q.13 EOQ / Frequently Order | MTP Nov 18(2)

A company manufactures a product from a raw material, which is purchased at Rs. 54 per kg. The company incurs a handling cost of Rs.1,500 plus freight of Rs.4,000 per order. The incremental carrying cost of inventory of raw material is Rs.1.50 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is Rs.8 per kg per annum. The annual production of the product is 96,000 units and 4 units are obtained from one kg of raw material.

Required:

(i) CALCULATE the economic order quantity of raw materials.
(ii) ADVISE, how frequently orders should be placed for procurement.
(iii) If the company proposes to rationalize placement of orders on quarterly basis, DETERMINE what percentage of discount in the price of raw materials should be negotiated?

Ans. (i) $EOQ = \sqrt{\frac{2AC}{C}}$

A = Annual consumption = $\frac{96,000 \text{units } 1\text{kg}}{4\text{units}} = 24,000\text{kgs.}$

O = Cost of placing order = Handling cost + Freight = Rs. 1,500 +Rs.4,000 = Rs.5,500

C = Carrying cost per kg. per annum

Carrying cost (Rs.1.50 × 12) = Rs.18

Finance charges on investment in inventory = Rs.8

= Rs.26

$EOQ = \sqrt{\frac{2 \times 24,000 \text{ kg.} \times ` 5500}{` 26}} = = 3,186.5 \text{ kgs}$

(ii) Number of orders = 24,000 kgs./ 3,186.5 kgs. = 7.53 or 8 orders Frequency in placing orders = 365 days / 8 orders = 45.63 or 46 days

(iii) If company places orders on quarterly basis, percentage of discount in price of raw material to be negotiated:

Cost under EOQ:

Ordering cost	8 orders × Rs. 5,500	44,000.00
Carrying cost	3,186.5kgs. × ½ × Rs.26	41,424.50
Total		85,424.50

Cost under Ordering on Quarterly Basis:

Ordering cost	4 orders × Rs.5,500	22,000.00
Carrying cost	(24,000 kgs./ 4 orders) × ½ × Rs.26	78,000.00
Total		1,00,000.00

Incremental cost if orders are placed on quarterly basis

= Rs.1,00,000- Rs. 85,424.50 = Rs. 14,575.50

Reduction in purchase price to be negotiated

= Rs.14,575.50 ÷ 24,000 kgs. = Rs.0.61 per kg.

Percentage of discount to be negotiated 0.61 ÷ 54 × 100 = 1.13%

Q.14 EOQ / Frequently Order | MTP May 20

A company manufactures a product from a raw material, which is purchased at Rs.180 per kg. The company incurs a handling cost of Rs.1,460 plus freight of Rs.940 per order. The incremental carrying cost of inventory of raw material is Rs.2.5 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is Rs.18per 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:

(i) CALCULATE the economic order quantity of raw materials.

(ii) DETERMINE, how frequently company should order for procurement be placed.

(iii) If the company proposes to rationalize placement of orders on quarterly basis, DETERMINE the percentage of discount in the price of raw materials should be negotiated? Assume 360 days in a year.

Ans. (i) Calculation of Economic Order Quantity (E.O.Q)

Annual requirement (usage) of raw material in kg. (A) = $\frac{1,00,000 \text{units}}{2.5 \text{units per kg}}$ = 40,000kg.

Ordering Cost (Handling & freight cost) (O) = Rs.1,460 + Rs.940 = Rs.2,400

Carrying cost per unit per annum (C) i.e. inventory carrying cost + working capital cost
= (Rs.2.5 × 12 months) + Rs.18 = Rs.48 per kg.

E.O.Q. = $\sqrt{\frac{2AC}{C}}$ = $\sqrt{\frac{2 \times 40,000 \text{kg.} \times \text{Rs.}2,400}{\text{Rs.}48}}$ = 2,000 kg.

(ii) Frequency of placing orders for procurement:

Annual consumption (A) = 40,000 kg.

Quantity per order (E.O.Q) = 2,000 kg.

No. of orders per annum $\left(\frac{A}{EOQ}\right)$ = $\frac{40,000 \text{kg}}{2,000 \text{kg}}$ = 20 orders

Frequency of placing orders (in days) = $\frac{360 \text{days}}{20 \text{orders}}$ = 18 days

(iii) Percentage of discount in the price of raw materials to be negotiated:

Particulars	On Quarterly Basis	On E.O.Q Basis
1. Annual Usage (in Kg.)	40,000 kg.	40,000 kg.
2. Size of the order	10,000 kg.	2,000 kg.
3. No. of orders (1 ÷ 2)	4	20
4. Cost of placing orders or Ordering cost (No. of orders × Cost per order)	Rs.9,600 (4 order × Rs2,400)	Rs.48,000 (20 orders × Rs2,400)
5. Inventory carrying cost (Average inventory × Carrying cost per unit)	Rs.2,40,000 (10,000 kg. × ½ × Rs.48)	Rs.48,000 (2,000 kg. × ½ × Rs.48)
6. Total Cost (4 + 5)	Rs.2,49,600	Rs.96,000

When order is placed on quarterly basis the ordering cost and carrying cost increased by Rs.1,53,600 (Rs.2,49,600 - Rs.96,000). So, discount required = Rs.1,53,600

Total annual purchase = 40,000 kg. × Rs.180 = Rs.72,00,000

So, Percentage of discount to be negotiated = $\frac{\text{Rs.}1,53,600}{\text{Rs.}72,00,000} \times 100$ = 2.13%

Q.15 EOQ / Max. Stock Level | MTP Nov 22(1)

A company produces a product 'AB' by using two raw materials - 'Material Ae' and 'Material Be' in the ratio of 5:3.

A sales volume of 50,000 kgs is estimated for the month of December by the managers expecting the trend will continue for entire year. The ratio of input and output is 8:5.

Other Information about Raw Material Ae is as follows:

Purchase Price ₹ 150 per kg

Re-order period 2 to 3 days

Carrying Cost 12%

Note: Material Ae is perishable in nature and if not used within 3.5 days of purchase it becomes obsolete.

To place an order for material 'Ae', the company has to incur an administrative cost of ₹ 375 per order. At present, material 'Ae' is purchased in a lot of 7,500 kgs. to avail the discount on purchase. Company works for 25 days in a month and production is carried out evenly. Calculate (i) EOQ and (ii) Maximum Stock Level

Ans. (i) Monthly production of AB = 50,000 kgs
Raw material required = 50,000/5 x 8 = 80,000 kgs
Material Ae and Material Be ratio = 5:3
Therefore, material Ae = 80,000/8 x 5 =50,000 kgs

Calculation of EOQ $= \sqrt{\frac{2 \times (\text{Annual demand} \times \text{cost per order})}{\text{Annual holding cost per unit}}}$

EOQ $= \sqrt{\frac{2 \times 50{,}000 \text{ kgs} \times 12 \times 375}{12\% \text{ of } ` 150}} = 5{,}000 \text{ kgs}$

(ii) Calculation of maximum stock level of Material Ae which is perishable in nature and is required to be used within 3.5 days.

(a) Stock equals to 3.5 days consumption = 50,000 kgs/ 25 days x 3.5 days = 7,000 kgs
(b) Maximum stock level for Material Ae
Maximum stock= Reorder quantity + reorder level – (minimum consumption x minimum lead time)
Where, reorder quantity = 7,500 kgs
Reorder level = maximum consumption* x maximum lead time
= 50,000/ 25 x 3 days = 6,000 kgs
Now, Maximum stock level = 7,500 kgs + 6,000 kgs – (50,000 /25 days x 2 days) = 9,500 kgs
Stock required for 3.5 days consumption is lower than the maximum stock level calculated above. Therefore, maximum stock level will be 7,000 kgs.
(*since production is processed evenly throughout the month hence material consumption will also be even.)

Q.16 EOQ / Next Order be placed | RTP May 18

Aditya Brothers supplies surgical gloves to nursing homes and polyclinics in the city. These surgical gloves are sold in pack of 10 pairs at price of ₹ 250 per pack.
For the month of April 2018, it has been anticipated that a demand for 60,000 packs of surgical gloves will arise. Aditya Brothers purchases these gloves from the manufacturer at ₹ 228 per pack within a 4 to 6 days lead time. The ordering and related cost is ₹ 240 per order. The storage cost is 10% p.a. of average inventory investment.
Required:
(i) CALCULATE the Economic Order Quantity (EOQ)
(ii) CALCULATE the number of orders needed every year
(iii) CALCULATE the total cost of ordering and storage of the surgical gloves.
(iv) DETERMINE when should the next order to be placed. (Assuming that the company does maintain a safety stock and that the present inventory level is 10,033 packs with a year of 360 working days

Ans. (i) Calculation of Economic Order Quantity:

$$EOQ = \sqrt{\frac{2xAxO}{Ci}} = \sqrt{\frac{2' (60{,}000 \text{ packs}' 12 \text{ months}) '' 240}{` 228' 10\%}}$$

= 3,893.3 packs or 3,893 packs.

(ii) Number of orders per year

$$\frac{\text{Annual requirements}}{\text{E.O.Q}} = \frac{7{,}20{,}000 \text{ packs}}{3{,}893 \text{ packs}} = 184.9 \text{or} 185 \text{orders a year}$$

(iii) Ordering and storage costs

	(₹)

Ordering costs :- 185 orders □ ₹ 240	44,400.00
Storage cost :- ½ (3,893 packs □ 10% of ₹228)	44,380.20
Total cost of ordering & storage	88,780.20

(iv) Timing of next order

(a) Day's requirement served by each order.

$$\text{Number of days requirements} = \frac{\text{No.of working days}}{\text{No.of order in a year}} = \frac{360 \text{ days}}{185 \text{ Orders}} = 1.94 \text{ days}$$

Supply.

This implies that each order of 3,893 packs supplies for requirements of 1.94 days only.

(b) Days requirement covered by inventory

$$= \frac{\text{Units in inventory}}{\text{Economic order quantity}} \times \text{(Day's requirement served by an order)}$$

$$\frac{10,033 \text{ packs}}{3,893 \text{ packs}} \times 1.94 \text{ days} = 5 \text{ days requirement}$$

(c) Time interval for placing next order

Inventory left for day's requirement – Average lead time of delivery

5 days – 5 days = 0 days

This means that next order for the replenishment of supplies has to be placed immediately

Q.17

The annual demand for an item of raw material is 4,000 units and the purchase price is expected to be Rs. 90 per unit. The incremental cost of processing an order is Rs. 135 and the annual cost of storage is estimated to be Rs. 12 per unit. COMPUTE the optimal order quantity and total relevant cost of this order quantity?

Suppose that Rs. 135 as estimated to be the incremental cost of processing an order is incorrect and should have been Rs. 80. All other estimates are correct. ESTIMATE the difference in cost on account of this error?

Assume at the commencement of the period that a supplier offers 4,000 units at a price of Rs. 86. The materials will be delivered immediately and placed in the stores. Assume that the incremental cost of placing the order is zero and original estimate of Rs. 135 for placing an order for the economic batch is correct. ANALYSE, should the order be accepted?

Ans.

(i) Optimal order quantity i.e. E.O.Q.

$$\sqrt{\frac{2 \times 4000 \times 135}{12}} = \sqrt{90,000} = 300 \text{ units}$$

Relevant Cost of this order quantity	Rs.
Ordering cost = $\frac{4,000}{300}$ = 13.33 say 14 orders at Rs. 135	1,890
Carrying Cost = $\frac{1}{2}$ × 300 × 12	1,800
Relevant cost	3,690

(ii) Revised EOQ = $\sqrt{\frac{2 \times 4000 \times 80}{12}}$ = 231 units

Ordering cost $= \frac{4,000}{231}$ = 17.32 say 18 orders at Rs. 80	1,440
Carrying cost = × 231 × 12	1,386
	2,826

Different in cost on account of this error = 3,690 – 2,826 = Rs. 864

(iii) In case of discount in purchase price, the total cost of Purchase cost, ordering cost and carrying cost should be compared.

Original offer at Rs. 90 per unit		Supplier offered at Rs. 86 per unit	
	Rs.		Rs.
Purchase Cost	3,60,000	Purchase cost 4,000 × 86	3,44,000
Ordering cost	1,890	Ordering cost	Nil
Carrying cost	1,800	Carrying cost $\frac{1}{2}$ × 4,000 × 12	24,000
Total cost	3,63,690		3,68,000

This special offer at Rs. 86 per unit should not be accepted as its total cost is higher by Rs. 4,310 (3,68,000 – 3,63,690) as compared to original offer.

Q.18 EOQ / Qty Discount | PY May 18

M/s. X Private Limited is manufacturing a special product which requires a component "SKY BLUE". The following particulars are available for the year ended 31st March, 2018:

Annual demand of "SKY BLUE"	12000 Units
Cost of placing an order	₹ 1,800
Cost per unit of "SKY BLUE	₹ 640
Carrying cost per annum	18.75%

The company has been offered a quantity discount of 5 on the purchases of "SKY BLUE" provided the order size is 3000 components at a time.

You are required to:

(i) Compute the Economic Order Quantity.

(ii) Advise whether the quantity discount offer can be accepted

Ans.

(i) Calculation of Economic Order Quantity

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 12,000 \text{ units} \times ₹1,800}{₹640 \times 18.75 / 10}} = 600 \text{ units}$$

(ii) Evaluation of Profitability of Different Options of Order Quantity

When EOQ is ordered

		(₹)
Purchase Cost	(12,000 units x ₹ 640)	76,80,000
Ordering Cost	$\left[\frac{A}{Q} xQ - (12,000 \text{ units}/ 600 \text{ units}) \times 1,800\right]$	36,000

Carrying Cost $\left[\frac{Q}{2} xCxi - 600 \text{ units x } 640x1/2x\ 18.75/100)\right]$	36,000
Total Cost	77,52,000

Q.19 EOQ / Qty Discount | MTP Nov 20

A company deals in trading of a toy car 'Terminato'. The annual demand for the toy car is 9,680 units. The company incurs fixed order placement and transportation cost of ₹ 200 each time an order is placed. Each toy costs ₹ 400 and the trader has a carrying cost of 20 percent p.a.
The company has been offered a quantity discount of 5% on the purchase of 'Terminato' provided the order size is 4,840 units at a time.

Required:

(i) COMPUTE the economic order quantity

(ii) STATE whether the quantity discount offer can be accepted.

Ans. (i) Calculation of Economic Order Quantity

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2'9,680units'Rs.200}{Rs.400'20\%}} = 220 \text{ units}$$

(ii) Evaluation of Profitability of Different Options of Order Quantity

(A) When EOQ is ordered

		(₹)
Purchase Cost	(9,680 units × ₹ 400)	38,72,000
Ordering Cost	[(9,680 units/220 units) × ₹ 200]	8,800
Carrying Cost	(220 units × ½ × ₹ 400 × 20%)	8,800
Total Cost		**38,89,600**

(B) When Quantity Discount is accepted

		(₹)
Purchase Cost	(9,680 units x ₹ 380)	36,78,400
Ordering Cost	[(9,680 units/4,840 units) x ₹ 200]	400
Carrying Cost	(4,840 units x ½ x ₹ 380 x 20%)	1,83,920
Total Cost		**38,62,72**

Advise – The total cost of inventory is lower if quantity discount is accepted. The company would save ₹ 26,880 (₹ 38,89,600 - ₹ 38,62,720).

Q.20 EOQ / Qty Discount | MTP Dec 21(1)

The annual demand for an item of raw material is 48,000 units and the purchase price is ₹ 80 per unit. The cost of processing an order is ₹ 1,350 and the annual cost of storage is ₹ 15 per unit.

(i) DETERMINE is the optimal order quantity and total relevant cost for the order?

(ii) If he cost of processing an order is ₹ 800 and all other data remain same, then DETERMINE the differential cost?

(iii) If the supplier offers bulk purchase of 48,000 units at a price of ₹ 72 and cost of placing the is Nil, SHOULD the order be accepted?

Ans. **(i)** Optimal order quantity i.e. E.O.Q.

$\sqrt{\frac{2 \times 48,000 \times 1,350}{15}} = \sqrt{86,40,000} = 2,939$ units

Relevant Cost of this order quantity

Ordering cost $= \frac{48,000}{2,939}$ =16.33, say 17 orders at ₹1,350	22,950.00
Relevant Cost	**44,992.50**

(ii) **Revised EOQ** = $\sqrt{\frac{2 \times 48,000 \times 800}{15}} = 2,263$ units

Relevant Cost of this order quantity	₹
Ordering cost = $= \frac{48,000}{2,263}$ = 21.21, say 22 orders at ₹ 800	17,600.00
Carrying cost $= \frac{1}{2} \times 2,263 \times 15$	16,972.50
Relevant cost	**34,572.50**

Differential cost = 44,992.50 – 34,572.50 = ₹ 10,420

(iii) In case of discount in purchase price, the total cost of Purchase cost, ordering cost and carrying cost should be compared.

Original offer at ₹ 80 per unit		**Supplier offered at ₹ 72 per unit**	
	₹		₹
Purchase Cost (48,000 × 80)	38,40,000.00	Purchase cost (48,000 × 72)	34,56,000.00
Ordering cost	22,950.00	Ordering cost	0.00
Carrying cost	22,042.50	Carrying cost $\frac{1}{2}$ × 48,000 × 15	3,60,000.00
Total cost	38,84,992.50		38,16,000.00

Q.21 EOQ / Qty Discount | MTP May 23(1)

Joy Toy Limited deals in trading of 'superhero' toy figure. The annual demand for the toy car is 14,400 units. The company incurs fixed order placement and transportation cost of ₹212 each time an order is placed. Each toy costs ₹ 450 and the trader has a carrying cost of 25 percent p.a. The company has been offered a quantity discount of 8% on the purchase of 'superhero' toy figure provided the order size is 5,000 units at a time.

Required:

(i) COMPUTE the economic order quantity

(ii) STATE whether the quantity discount offer can be accepted.

Ans. (i) Calculation of Economic Order Quantity (EOQ) = $\sqrt{\frac{2AO}{C}}$

$\sqrt{\frac{2 \times 14,400 \text{ units} \times ` 212}{` 450 \times 25\%}} = 233$ units

(ii) Evaluation of Profitability of Different Options of Order Quantity

(A)	When EOQ is ordered	(₹)
Purchase Cost	(14,400 units x Rs. 450)	64,80,000
Ordering Cost	[(14,400 units/233 units) x Rs. 212]	13,102
Carrying Cost	(233 units x 1/2 x 450 x 25%)	13,106
Total Cost		**65,06,208**

(B) When Quantity Discount of 8% is accepted

		(₹)

Purchase Cost	(14,400 units x Rs. 414)	59,61,600
Ordering Cost	[(14,400 units/5,000 units) x Rs212]	611
Carrying Cost	(5,000 units x 1/2 x Rs.414 x 25%)	2,58,750
Total Cost		**62,20,961**

Advise – The total cost of inventory is lower if quantity discount is accepted. The company would save Rs. 2,85,247 (Rs. 65,06,208 - Rs. 62,20,961).
Note: Figures may change slightly because of approximation and decimals)

Q.22 EOQ / Reorder Level | PY Nov 20

An automobile company purchases 27,000 spare parts for its annual requirements. The cost per order is ₹ 240 and the annual carrying cost of average inventory is 12.5%. Each spare part costs ₹ 50. At present, the order size is 3,000 spare parts. (Assume that number of days in a year = 360 days)

Find out:

(i) How much the company's cost would be saved by opting EOQ model?
(ii) The Re-order point under EOQ model if lead time is 12 days.
(iii) How frequently should orders for procurement be placed under EOQ model?

Ans.

Working Notes:

Annual requirement (A) = 27,000 units
Cost per order (O) = ₹ 240
Inventory carrying cost (i) = 12.5%
Cost per unit of spare (c) = ₹ 50
Carrying cost per unit (i × c) = ₹ 50 × 12.5% = ₹ 6.25

Economic Order Quantity (EOQ) $= \sqrt{\frac{2xAxO}{ixc}}$

$= \sqrt{\frac{2 \times 27,000 \times 240}{6.25}}$ = 1440 units

(i) Calculation of saving by opting EOQ:

	Existing Order policy	EOQ Model
No. of orders	9 $\left(\frac{27,000}{3,000}\right)$	**18.75 or 19** $\left(\frac{27,000}{1,440}\right)$
A. Ordering Cost (₹)	**2,160** (₹ 240 × 9)	**4,500** $\left\{240x\left(\frac{27,000}{1,440}\right)\right\}$
B. Carrying cost (₹)	**9,375** $\left(\frac{3,000x6.25}{2}\right)$	**4,500** $\left(\frac{1,440 \times 6.25}{2}\right)$
Total cost (A+B) (₹)	**11,535**	**9,000**

Savings of Cost by opting EOQ Model = ₹ 11,535 – ₹ 9,000 = ₹ 2,535

(ii) Re-order point under EOQ:

Re-order point/ Re-order level = Maximum consumption × Maximum lead time

Consumption per day = 27,000units $= \frac{27,000units}{360days}$ = **75 units**

Re-order point/ Re-order level = 75 units × 12 days = **900 units**

(iii) Frequency of Orders (in days):

$$= \frac{360 \text{days}}{\text{No.of ordersayear}} = \frac{360 \text{days}}{19} = 18.95 \text{ days or } 19 \text{ days}$$

Q.23 EOQ / Reorder Level | PY Nov 22

MM Ltd. uses 7500 valves per month which is purchased at a price of ₹ 1.50 per unit. The carrying cost is estimated to be 20% of average inventory investment on an annual basis. The cost to place an order and getting the delivery is ₹ 15. It takes a period of 1.5 months to receive a delivery from the date of placing an order and a safety stock of 3200 valves is desired.

You are required to determine:

(i) The Economic Order Quantity (EOQ) and the frequency of orders.

(ii) The re-order point.

(iii) The Economic Order Quantity (EOQ) if the valve cost ₹ 4.50 each instead of 1.50 each.

Ans.

(i) Calculation of Economic Order Quantity

Annual requirement (A) = 7500×12= 90,000 Valves Cost per order (O) = ₹ 15

Inventory carrying cost (i) = 20% Cost per unit of spare (c)= ₹ 1.5

Carrying cost per unit (i × c) = ₹ 1.5 × 20% = ₹ 0.30

Economic Order Quantity (EOQ) $= \sqrt{\frac{2xAxO}{ixc}}$

$= \sqrt{\frac{2x90,000x15}{0.3}}$ = 3,000 Valves

Frequency of order or Number of Orders = 90,000/3,000 = 30 orders.

So Order can be placed in every 12 (360days/30) days

(ii) **Re-order Quantity** = {Maximum Consumption X Maximum lead time} + safety Stock

= {7500X1.5} + 3200 = 14,450 Valves

(iii) Calculation of Economic Order Quantity if valve costs ₹ 4.50

Carrying cost is 20% of ₹ 4.50 = ₹ 0.90

Economic Order Quantity (EOQ) $= \sqrt{\frac{2xAxO}{ixc}}$

$= \sqrt{\frac{2x90,000x15}{0.9}}$

= 1732.0508 units or 1733 Valves

Q.24 EOQ / Reorder Level | RTP Nov 18

Rounak Ltd. is the manufacturer of monitors for PCs. A monitor requires 4 units of Part-M. The following are the details of its operation during 20X8:

Average monthly market demand	2,000 Monitors
Ordering cost	₹ 1,000 per order
Inventory carrying cost	20% per annum
Cost of Part	₹ 350 per part
Normal usage	425 parts per week
Minimum usage	140 parts per week
Maximum usage	710 parts per week
Lead time to supply	3-5 weeks

COMPUTE from the above:

(i) Economic Order Quantity (EOQ). If the supplier is willing to supply quarterly 30,000 units

of Part-M at a discount of 5%, is it worth accepting?

(ii) Reorder level

(iii) Maximum level of stock

(iv) Minimum level of stock.

Ans.

1. A = Annual usage of parts = Monthly demand for monitors × 4 parts × 12 months
= 2,000monitors × 4 parts × 12 months = 96,000units O = Ordering cost per order = ₹ 1,000/- per order
C1 = Cost per part =₹ 350/-
iC1 = Inventory carrying cost per unit per annum
= 20% × ₹ 350 = ₹ 70/- per unit, per annum Economic order quantity (EOQ):

$$E.O.Q = \sqrt{\frac{2Ao}{ic1}} = \sqrt{\frac{2{,}96{,}000 \text{ units } 1{,}000}{70}} = 1{,}656 \text{ parts (approx.)}$$

The supplier is willing to supply 30,000 units at a discount of 5%, therefore cost of each part shall be ₹350 – 5% of 350 = ₹332.5

Total cost (when order size is 30,000 units):

= Cost of 96,000 units + Ordering cost + Carrying cost.

$$= (96{,}000 \text{ units} \times ₹\ 332.50) + \left(\frac{96{,}000 \text{units}}{30{,}000 \text{ units}} x1{,}000\right) + \frac{1}{2} \text{ (30,000 units} \times 20\% \times ₹\ 332.50)$$

= ₹3,19,20,000 + ₹3,200* + ₹9,97,500= ₹3,29,20,700

Total cost (when order size is 1,656 units):

$$= (96{,}000 \text{ units} \times ₹350) + \left(\frac{96{,}000 \text{units}}{1656 \text{units}} x1{,}000\right) \frac{1}{2} \text{ (1,656 units} \times 20\% \times ₹350)$$

= ₹3,36,00,000 + ₹57,970* + ₹57,960 = ₹3,37,15,930

Since, the total cost under the supply of 30,000 units with 5% discount is lower than that when order size is 1,656 units, therefore the offer should be accepted.

Note: While accepting this offer consideration of capital blocked on order size of 30,000 units has been ignored. *Order size can also be taken in absolute figure.

(2) Reorder level

= Maximum consumption × Maximum re-order period
= 710 units × 5 weeks = 3,550 units

(3) Maximum level of stock

= Re-order level + Reorder quantity – (Min. usage × Min. reorder period)
= 3,550 units + 1,656 units – (140 units × 3 weeks) = 4,786 units.

(4) Minimum level of stock

= Re-order level – Normal usage × Average reorder period
= 3,550 units – (425 units × 4 weeks) = 1,850 units.

Q.25 EOQ / Reorder Level | RTP May 19

Ananya Ltd. produces a product 'Exe' using a raw material Dee. To produce one unit of Exe, 2 kg of Dee is required. As per the sales forecast conducted by the company, it will able to sale 10,000 units of Exe in the coming year. The following is the information regarding the raw material Dee:

(i) The Re-order quantity is 200 kg. less than the Economic Order Quantity (EOQ).

(ii) Maximum consumption per day is 20 kg. more than the average consumption per day.

(iii) There is an opening stock of 1,000 kg.

(iv) Time required to get the raw materials from the suppliers is 4 to 8 days.

(v) The purchase price is ₹125 per kg.

There is an opening stock of 900 units of the finished product Exe. The rate of interest charged by bank on Cash Credit facility is 13.76%.

To place an order company has to incur ₹ 720 on paper and documentation work. From the above information FIND OUT the followings in relation to raw material Dee:

(a) Re-order Quantity
(b) Maximum Stock level
(c) Minimum Stock level
(d) CALCULATE the impact on the profitability of the company by not ordering the EOQ.

[Take 364 days for a year]

Ans. (i) Computation of Annual consumption & Annual Demand for raw material 'Dee':

Sales forecast of the product 'Exe'	10,000 units
Less: Opening stock of 'Exe'	900 units
Fresh units of 'Exe' to be produced	9,100 units

Raw material required to produce 9,100 units of 'Exe' (9,100 units × 2 kg.)	18,200 kg.
Less: Opening Stock of 'Dee'	1,000 kg.
Annual demand for raw material 'Dee'	17,200 kg.

(ii) Computation of Economic Order Quantity (EOQ):

$$EOQ = \sqrt{\frac{2 \times Annual\ demand\ of\ 'Dee' \times Ordering\ cost}{Carrying\ cost\ per\ unit\ per\ annum}}$$

$$= \sqrt{\frac{2 \times 17,200kg \times ₹720}{₹125 \times 13.76\%}} = \sqrt{\frac{2 \times 17,200kg \times ₹720}{₹17.2}} = 1,200\ kg$$

(iii) Re- Order level:

= (Maximum consumption per day × Maximum lead time)

$$\left\{\left(\frac{Annual\ Consumption\ of\ 'Dee'}{364 days} + 20kg\right) \times 8 days\right\}$$

$$\left\{\left(\frac{18,200kg}{364 days} + 20kg\right) \times 8 days\right\} = 560kg$$

(iv) Minimum consumption per day of raw material 'Dee':

Average Consumption per day = 50 Kg.

Hence, Maximum Consumption per day = 50 kg. + 20 kg. = 70 kg.

So Minimum consumption per day will be

$$\text{Average Consumption} = \frac{\text{Min. consumption} + \text{Max. consumption}}{2}$$

$$\text{Or, 50 kg.} = \frac{\text{Min. consumption} + 70kg}{2}$$

Or, Min. consumption = 100 kg – 70 kg. = 30 kg.

(a) Re-order Quantity :

EOQ – 200 kg. = 1,200 kg. – 200 kg. = 1,000 kg.

(b) Maximum Stock level:

= Re-order level + Re-order Quantity – (Min. consumption per day × Min. lead time)

= 560 kg. + 1,000 kg. – (30 kg. × 4 days)

= 1,560 kg. – 120 kg. = 1,440 kg.

(c) Minimum Stock level:

= Re-order level – (Average consumption per day × Average lead time)

= 560 kg. – (50 kg. × 6 days) = 260 kg.

(d) Impact on the profitability of the company by not ordering the EOQ.

		When purchasing the ROQ	When purchasing the EOQ
I	Order quantity	1,000 kg.	1,200 kg.
II	No. of orders a year	$\frac{17,200kg.}{1,000kg.}$ = 17.2or18orders	$\frac{17,200kg.}{1,200kg.}$ = 14.33or15orders
III	Ordering Cost	18 orders × ₹ 720 = ₹12,960	15 orders × ₹ 720 = ₹10,800
IV	Average Inventory	$\frac{1,000kg.}{2}$ = 500kg.	$\frac{1,200kg.}{2}$ = 600kg.
V	Carrying Cost	500 kg. × ₹ 17.2 = ₹ 8,600	600 kg. × ₹ 17.2 = ₹ 10,320
VI	Total Cost	₹ 21,560	₹ 21,120

Extra Cost incurred due to not ordering EOQ = ₹ 21,560 - ₹ 21,120 = ₹440

Q.26 Material Turnover | PY May 18

(i) The following details are provided by M/s. SKU Enterprises for the year ended 31st March, 2018:

Particulars	*Material-M (₹)*	*Material-N (₹)*
Stock as on 01-04-2017	*6,00,000*	*10,00,000*
Stock as on 31-03-2018	*4,50,000*	*7,25,000*
Purchases during the year	*9,50,000*	*18,40,000*

You are required to:

(i) Calculate Turnover Ratio of both the materials.

(ii) Advise which of the two materials is fast moving. (Assume 360 days in a year).

(iii) Beta Ltd. is manufacturing Product N. This is manufactured by mixing two materials namely Material P and Material Q. The Standard Cost of Mixture is as under:

Material P 150 ltrs. @ ₹ 40 per ltr. Material Q 100 ltrs. @ ₹ 60 per ltr.

Standard loss @ 20 of total input is expected during production. The cost records for the period exhibit following consumption: Material P 140 ltrs. @ ₹ 42 per ltr,

Material Q 110 ltrs. @ ₹ 56 per ltr,

Quantity produced was 195 ltrs.

Calculate:

(i) Material Cost Variance

(ii) Material Usage Variance.

(iii) Material Price Variance

Ans. (i)

Material M	Material N
Turnover ratio $= \frac{\text{Cost of stock of raw material consumed}}{\text{Average stock of raw material}}$ $= \frac{6,00,000 + 9,50,000 - 4,50,000}{(6,00,000 + 4,50,000) / 2} = 2.09$ Average number of days for which the average inventory is held $= \frac{360}{\text{Inventory turnover ratio}}$	**Turnover ratio** $= \frac{\text{Cost of stock of raw material consumed}}{\text{Average stock of raw material}}$ $= \frac{10,00,000 + 18,40,000 - 7,25,000.}{(10,00,000 + 7,25,000) / 2} = 2.45$ Average number of days for which the average inventory is held $= \frac{360}{\text{Inventory turnover ratio}}$

$= \frac{360 days}{2.09}$ = 172.25 days	$= \frac{360 days}{2.45}$ = 146.94 days = 146.94 days

(ii) Advice

Comparatively Material M is slower than Material N since Inventory holding period of 'M' is 172.25 days in Comparison to 'N' i.e. 146.94 days. Infact, both materials have slow inventory turnover. Though, different business has their own expected rates for inventory turnover like food shops have fast inventory turnover, shop selling furniture etc. will have slower inventory turnover while manufacturers of large items of plant will have very long inventory turnover.

If it is not as per the Industry Standard, then a slow turnover may indicate that excessive inventory is held and risk of obsolete or spoiled inventory will increase. Large quantity of slow moving material means that capital is locked up in business and not earning revenue. It is advisable to make proper investigations into slow moving materials and take steps to minimize the loss arises therefrom as it may impact overall financial health of the organisation.

(ii) Workings:

Take the good output of 195 ltr. The standard quantity of material required for 195 ltr. of output is

$= \frac{195}{80} x100$ = 243.75 ltr.

Statement showing computation of Standard Cost/Actual Cost/ Revised Actual Quantity

Material	Standard Cost			Actual Cost		
	Quantity [SQ] (Kg.)	Rate [SP] (₹)	Amount [SQ × SP] (₹)	Quantity [AQ] (Kg.)	Rate [AP] (₹)	Amount [AQ × AP] (₹)
A (60% of 243.75 ltr.)	146.25	40	5,850.00	140	42	5,880
B (40% of 243.75 Kg.)	97.50	60	5,850.00	110	56	6,160
	243.75		11,700.00	200		12,040

Note:
SQ = Standard Quantity = Expected Consumption for Actual Output
AQ = Actual Quantity of Material Consumed
SP = Standard Price Per Unit
AP = Actual Price Per Unit

Computation of Variances:

Material Cost Variance = SQ × SP – AQ × AP
A = ₹ 146.25 ltr. × ₹ 40– 140 ltr. × ₹ 42 = ₹ 30.00 (A)
B = ₹ 97.50 ltr. × ₹ 60 – 110 ltr. × ₹ 56 = ₹ 310.00 (A)
Total = ₹ 30.00 (A) + ₹ 310.00 (A)
= ₹ 340.00 (A)
Material Usage Variance = SP × (SQ – AQ)
A = ₹ 40 × (146.25 ltr. –140 ltr.) = ₹ 250.00 (F)
B = ₹ 60 × (97.50 ltr. – 110 ltr.) = ₹ 750.00 (A)
Total = ₹ 250.00 (F) + ₹ 750.00 (A)
= ₹ 500.00 (A)
Material Price Variance = AQ × (SP – AP)
A = 140 Kg. × (₹ 40 – ₹ 42) = ₹ 280 (A)
B = 110 Kg. × (₹ 60 – ₹ 56) = ₹ 440 (F)

Total = ₹ 280 (A) + ₹ 440 (F)
= ₹ 160 (F)

Q.27 Material Turnover | PY Dec 21

XYZ Ltd. uses two types of raw materials – 'Material A' and 'Material B' in the production process and has provided the following data for the year ended on 31 st March, 2021:

Particulars	*Material A (₹)*	*Material B (₹)*
Opening stock as on 01.04.2020	*30,000*	*32,000*
Purchase during the year	*90,000*	*51,000*
Closing stock as on 31.03.2021	*20,000*	*14,000*

(i) You are required to calculate:
(a) The inventory turnover ratio of 'Material A' and 'Material B'.
(b) The number of days for which the average inventory is held for both materials 'A' and 'B'.
(ii) Based on above calculations, give your comments. (Assume 360 days in a year.)

Ans. **(i) Calculation of Inventory Turnover ratios and number of days:**

	Material A (₹)	**Material B (₹)**
Opening stock	30,000	32,000
Add: Purchases	90,000	51,000
	1,20,000	83,000
Less: Closing stock	20,000	14,000
Materials consumed	1,00,000	69,000
Average inventory: (Opening Stock + Closing Stock) x 2	25,000	23,000
(a) Inventory Turnover ratio: (Consumption x Average inventory)	4 times	3 times
(b) Number of days for which the average inventory held (Number of Days in a year/IT ratio)	90 days	120 ys

(ii) **Comments:** Material A is moving faster than Material B. Or Material A has a less holding period.

Q.28 Material Turnover | RTP Dec 21

The following data are available in respect of material X for the year ended 31st March, 2021:

Opening stock	9,00,000
Purchases during the year	1,70,00,000
Closing stock	11,00,000

(i) CALCULATE:
(a) Inventory turnover ratio, and
(b) The number of days for which the average inventory is held.
(ii) INTERPRET the ratio calculated as above if the industry inventory turnover rate is 10.

Ans. **(i)** (a) Inventory turnover ratio (Refer to working note)

$$= \frac{\text{Cost of stock of raw material consumed}}{\text{Averagestock of raw material}}$$

$$= \frac{1,68,00,000}{10,00,000} = 16.8$$

(b) Average number of days for which the average inventory is held

$$= \frac{365}{\text{Inventory turnover ratio}} = \frac{365 days}{16.8} = 21.73 \text{ days}$$

Working Note:

Particulars	(₹)
Opening stock of raw material	9,00,000
Add: Material purchases during the year	1,70,00,000
Less: Closing stock of raw material	11,00,000
	1,68,00,000

(iii) The Inventory turnover ratio for material X is 16.8 which mean an inventory item takes only 21.73 or 22 days to issue from stores for production process. The rate is better than the industry rate which is 10 time or 36.5 days. This inventory turnover ratio indicates better inventory management system and good demand for the final product in market.

Q.29 Max & Min Consumption | RTP Nov 23

Following details are related to a manufacturing concern:

Re-order Level	1,60,000 units
Economic Order Quality	90,000
Minimum Stock Level	1,00,000 units
Maximum Stock Level	1,90,000 units
Average Lead Time	6 days
Difference between minimum lead time and Maximum lead time	4 days

Calculate:

(i) Maximum consumption per day
(ii) Minimum consumption per day

Ans.

Difference between Minimum lead time Maximum lead time = 4 days
Max. lead time – Min. lead time = 4 days
Or, Max. lead time = Min. lead time + 4 days (i)
Average lead time is given as 6 days i.e.

$$= \frac{\text{Max.lead time+Min.lead time}}{2} = 6 days = 6 \text{ days} \quad \text{(ii)}$$

Putting the value of (i) in (ii),

$$= \frac{\text{Max.lead time+4 days} + \text{Min.lead time}}{2} = 6 days$$

Or, Min. lead time + 4 days + Min. lead time = 12 days

$$\text{Or, 2 Min. lead time} = \frac{8 days}{2} = 4 days$$

Putting this Minimum lead time value in (i), we get
Maximum lead time = 4 days + 4 days = 8 days

(i) Maximum consumption per day:

Re-order level = Max. Re-order period × Maximum Consumption per day
1,60,000 units = 8 days × Maximum Consumption per day

$$\text{Or, Maximum Consumption per day} = \frac{1,60,000 units}{8 days} = 20 units$$

(ii) Minimum Consumption per day:

Maximum Stock Level = Re-order level + Re-order Quantity – (Min. lead time × Min. Consumption per day)
Or, 1,90,000 units = 1,60,000 units + 90,000 units – (4 days × Min. Consumption per day)

Or, 4 days × Min. Consumption per day = 2,50,000 units – 1,90,000 units

Or, Minimum Consumption per day $= \frac{60,000 \text{ units}}{4 days} = 15,000 \text{ units}$

Q.30 Min Inventory & Opt. Run Size | PY Jan 21

GHI Ltd. manufactures 'Stent' that is used by hospitals in heart surgery. As per the estimates provided by Pharmaceutical Industry Bureau, there will be a demand of 40 Million 'Stents' in the coming year. GHI Ltd. is expected to have a market share of 2.5% of the total market demand of the Stents in the coming year. It is estimated that it costs ₹ 1.50 as inventory holding cost per stent per month and that the set-up cost per run of stent manufacture is ₹ 225.

Required:

(i) What would be the optimum run size for Stent manufacture?

(ii) What is the minimum inventory holding cost?

(iii) Assuming that the company has a policy of manufacturing 4,000 stents per run, how much extra costs the company would be incurring as compared to the optimum run suggested in (i) above?

Ans. (i) Computation of Optimum Run size of 'Stents' or Economic Batch Quantity (EBQ)

Economic Batch Quantity (EBQ) $= \sqrt{\frac{2Ds}{C}}$

Where, D = Annual demand for the Stents
= 4,00,00,000 × 2.5% = 10,00,000 units

S = Set- up cost per run
= ₹ 225

C = Carrying cost per unit per annum
= ₹ 1.50 × 12 = ₹ 18

EBQ $= \sqrt{\frac{2 \ 10,00,000x225}{18}}$
= 5,000 units of Stents

(ii) Minimum inventory holding cost

Minimum Inventory Cost = Average Inventory × Inventory Carrying Cost per unit per annum
= (5,000 ÷ 2) × ₹ 18
= ₹ 45,000

(iv) Calculation of the extra cost due to manufacturing policy

	When run size is 4,000 units	When run size is 5,000 units i.e. at EBQ
Total set up cost	$= \frac{10,00,000}{4000} x225$ = ₹ 56,250	$= \frac{10,00,000}{5000} x225$ = ₹ 45,000
Total Carrying cost	½ × 4,000 × ₹ 18 = ₹ 36,000	½ × 5,000 × ₹ 18 = ₹ 45,000
Total Cost	**₹ 92,250**	**₹ 90,000**

Extra cost = 92,250 - 90,000 = 2,250

Q.31 Min, Max, Avg Stock / Reorder | RTP Nov 20

A company uses four raw materials A, B, C and D for a particular product for which the following data apply :-

Raw Material	Usage per unit of product (Kg.)	Re-order Quantity (Kg.)	Price per Kg. (₹)	Delivery period (in weeks)			Re- order level (Kg.)	Minimum level (Kg.)
				Minimum	Average	Maximum		
A	12	12,000	12	2	3	4	60,000	?

B	8	8,000	22	5	6	7	70,000	?
C	6	10,000	18	3	5	7	?	25,500
D	5	9,000	20	1	2	3	?	?

Weekly production varies from 550 to 1,250 units, averaging 900 units of the said product. What would be the following quantities:-

(i) Minimum Stock of A?
(ii) Maximum Stock of B?
(iii) Re-order level of C?
(v) Average stock level of A?
(vi) Re-order level of D?
(vii) Minimum Stock level of D?

Ans.

(i) Minimum stock of A

Re-order level – (Average consumption × Average time required to obtain delivery)
= 60,000 kg. – (900units × 12 kg. × 3 weeks) = 27,600 kg.

(ii) Maximum stock of B

Re-order level + Re-order quantity– (Min. Consumption × Min. Re-order period)
= 70,000 kg.+ 8,000 kg– (550units ×8 kg.× 5 weeks).
=78,000–22,000 = 56,000 kg.

(iii) Re-order level of C

Maximum re-order period × Maximum Usage
= 7 weeks × (1,250units × 6 kg.) = 52,500 kg.

OR

= Minimum stock of C+(Average consumption × Average delivery time)
= 25,500 kg.+ [(900 units ×6 kg.)×5 weeks] =52,500 kg.

(iv) Average stock level of A

$$= \frac{\text{Minimum stock} + \text{Maximum stock}}{2} = \text{(Refer to Working Note)}$$

$$= \frac{27,600 + 58,800}{2} = 43,200 \text{ kg.}$$

Working note

Maximum stock of A = ROL + ROQ – (Minimum consumption × Minimum re-order period)
= 60,000 kg. + 12,000 kg. – [(550units × 12 kg.) × 2 weeks] = 58,800 kg.

(v) Re-order level of D

Maximum re-order period × Maximum Usage
3 weeks × (1,250 units × 5 kg.) = 18,750 kg

(vi) Minimum stock of D

Re-order level – (Average consumption × Average time required to obtain delivery)
= 18,750 kg. – (900units × 5 kg. × 2 weeks) = 9,750 kg.

Q.32 Min, Max, Avg Stock / Reorder | RTP July 21

A Ltd. produces a product 'X' using a raw material 'D'. To produce one unit of X, 4 kg of D is required. As per the sales forecast conducted by the company, it will be able to sale 20,000 units of X in the coming year.
The following are the information related to the raw material D:

(i) The Re-order quantity is 400 kg. less than the Economic Order Quantity (EOQ).
(ii) Maximum consumption per day is 40 kg. more than the average consumption per day.
(iii) There is an opening stock of 2,000 kg.

(iv) Time required to get the raw materials from the suppliers is 4 to 8 days.
(v) The purchase price is ₹ 250 per kg.

There is an opening stock of 1,800 units of the finished product X. The carrying cost of inventory is 14% p.a. To place an order company has to incur ₹ 1,340 on paper and documentation work. From the above information FIND OUT the followings in relation to raw material D:

(a) Re-order Quantity
(b) Maximum Stock level
(c) Minimum Stock level
(d) Calculate the impact on the profitability of the company by not ordering the EOQ.

Ans.

Working Notes:

(i) Computation of Annual consumption & Annual Demand for raw material 'D':

Sales forecast of the product 'X'	20,000 units
Less: Opening stock of 'X'	1,800 units
Fresh units of 'X' to be produced	18,200 units
Raw material required to produce 18,200 units of 'X' (18,200 units × 4 kg.)	72,800 kg.
Less: Opening Stock of 'D'	2,000 kg.
Annual demand for raw material 'D'	70,800 kg.

(ii) Computation of Economic Order Quantity (EOQ):

$$EOQ = \sqrt{\frac{2 \times Annual\ demand\ of\ 'D' \times Ordering\ cost}{Carrying\ cost\ per\ unit\ per\ annum}}$$

$$= \sqrt{\frac{2 \times 70,800kg \times 1,340}{250 \times 14\%}} = \sqrt{\frac{2 \times 70,800kg \times 1,340}{35}} = 2,328\ kg.$$

(iii) Re- Order level:

= (Maximum consumption per day × Maximum lead time)

$$= \left\{\left(\frac{Annual\ Consumption\ of\ 'D'}{300 days} + 40kg\right) \times 8 days\right\}$$

$$= \left\{\left(\frac{70,800kg.}{300 days} + 40kg\right) \times 2,208kg\right\}$$

(iv) Minimum consumption per day of raw material 'D':

Average Consumption per day = 236 Kg.

Hence, Maximum Consumption per day = 236 kg. + 40 kg. = 276 kg.

So Minimum consumption per day will be

$$\text{Average Consumption } \frac{\text{Min.consumption+Max.consumption}}{2}$$

$$\text{Or, 236 kg. } \frac{\text{Min.consumption+276kg}}{2}$$

Or, Min. consumption = 472 kg – 276 kg. = 196 kg.

(a) Re-order Quantity :
EOQ – 400 kg. = 2,328 kg. – 400 kg.= 1,928 kg.

(b) Maximum Stock level:
= Re-order level + Re-order Quantity – (Min. consumption per day × Min. lead time)
= 2,208 kg. + 1,928 kg. – (196 kg. × 4 days) = 4,136 kg. – 784 kg. = 3,352 kg.

(c) Minimum Stock level:
= Re-order level – (Average consumption per day × Average lead time)
= 2,208 kg. – (236 kg. × 6 days) = 792 kg.

(d) Impact on the profitability of the company by not ordering the EOQ.

		When purchasing the ROQ	When purchasing the EOQ
I	Order quantity	1,928 kg.	2,328 kg.
II	No. of orders a year	$\frac{70,800kg}{1,928kg} = 36.72$ or 37orders	$\frac{70,800kg}{1,928kg} = 36.72$ or 37orders
III	Ordering Cost	37 orders × ₹ 1,340 = ₹ 49,580	31 orders × ₹ 1,340= ₹ 41,540
IV	Average Inventory	$\frac{1,928kg}{2} = 964kg$	$\frac{2,328kg.}{2}$ = 1,164kg
V	Carrying Cost	964 kg. × ₹ 35 = 33,740	1,164 kg. × ₹ 35 = ₹ 40,740
VI	Total Cost	83,320	82,280

Extra Cost incurred due to not ordering EOQ = ₹83,320 - ₹82,280 = ₹1,040

Q.33 Min, Max, Avg Stock / Reorder | MTP May 19

A Ltd. produces a product 'Exe' using a raw material Dee. To produce one unit of Exe, 2 kg of Dee is required. As per the sales forecast conducted by the company, it will able to sale 20,000 units of Exe in the coming year. The following is the information regarding the raw material Dee:

(i) The Re-order quantity is 200 kg. less than the Economic Order Quantity (EOQ).
(ii) Maximum consumption per day is 20 kg. more than the average consumption per day.
(iii) There is an opening stock of 2,000 kg.
(iv) Time required to get the raw materials from the suppliers is 4 to 8 days.
(v) The purchase price is Rs.125 per kg.

There is an opening stock of 1,800 units of the finished product Exe.
The rate of interest charged by bank on Cash Credit facility is 13.76%.
To place an order company has to incur Rs. 720 on paper and documentation work.
From the above information COMPUTE the followings in relation to raw material Dee:

(a) Re-order Quantity
(b) Maximum Stock level
(c) Minimum Stock level
(d) Impact on the profitability of the company by not ordering the EOQ.
[Take 364 days for a year]

Ans. **Working Notes:**

(i) Computation of Annual consumption & Annual Demand for raw material 'Dee':

Sales forecast of the product 'Exe'	20,000 units
Less: Opening stock of 'Exe'	1,800 units
Fresh units of 'Exe' to be produced	18,200 units
Raw material required to produce 18,200 units of 'Exe' (18,200 units × 2 kg.)	36,400 kg.
Less: Opening Stock of 'Dee'	2,000 kg.
Annual demand for raw material 'Dee'	34,400 kg.

(ii) Computation of Economic Order Quantity (EOQ):

$$Eoq = \sqrt{\frac{2 \text{ 'Annual demand of 'Dee'' Ordering cost}}{\text{Carrying cost per unit per annum}}}$$

$$\sqrt{\frac{2x34,400kgx720}{125x13.76\%}} = \sqrt{\frac{2x34,400kgx720}{17.2}} = 1,697 \text{ kg.}$$

(ii) Re- Order level:

= (Maximum consumption per day × Maximum lead time)

$$\left\{\left(=\frac{Annual Consumption of dee}{364 DAYS} X 20KG\right) X 8 DAYS\right\}$$

$$\left\{\left(=\frac{36,400KG}{364 DAYS} X 20KG\right) X 8 DAYS\right\} = 960kg$$

(iv) Minimum consumption per day of raw material 'Dee':

Average Consumption per day = 100 kg.

Hence, Maximum Consumption per day = 100 kg. + 20 kg. = 120 kg.

So, Minimum consumption per day will be

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

$$\text{Or, 100 kg.} = \frac{\text{Minimum stock} + 120kg}{2}$$

Or, Min. consumption = 200 kg – 120 kg. = 80 kg.

(a) Re-order Quantity:

EOQ – 200 kg. = 1,697 kg. – 200 kg. = 1,497 kg.

(b) Maximum Stock level:

= Re-order level + Re-order Quantity – (Min. consumption per day × Min. lead time)

= 960 kg. + 1,497 kg. – (80 kg. × 4 days)

= 2,457 kg. – 320 kg. = 2,137 kg.

(c) Minimum Stock level:

= Re-order level – (Average consumption per day × Average lead time)

= 960 kg. – (100 kg. × 6 days) = 360 kg.

(d) Impact on the profitability of the company by not ordering the EOQ.

		When purchasing the ROQ	When purchasing the EOQ
I	Order quantity	1,497 kg.	1,697 kg.
II	No. of orders a year	$= \frac{34,400kg}{1,497kg.} = 22.9 \text{or } 23 \text{orders}$	$= \frac{34,400kg}{1,697kg} = 20.27 \text{or } 21 \text{orders}$
III	Ordering Cost	23 orders × Rs. 720 = Rs.16,560	21 orders × Rs. 720 = Rs.15,120
IV	Average Inventory	$= \frac{1,497kg}{2} = 748.5kg$	$= \frac{1,697kg}{2} = 848.5kg$
V	Carrying Cost	748.5 kg. × Rs. 17.2 = Rs.12,874.2	848.5 kg. × Rs. 17.2 = Rs.14,594.2
VI	Total Cost	Rs. 29,434.20	Rs. 29,714.20

Cost saved by not ordering EOQ = Rs. 29,714.20 - Rs. 29,434.20 = Rs.280.

Q.34 Min, Max, Avg Stock / Reorder | MTP May 21

A company manufactures 10,000 units of a product per month. The cost of placing an order is Rs.200. The purchase price of the raw material is Rs. 20 per kg. The re-order period is 4 to 8 weeks. The consumption of raw

materials varies from 200 kg to 900 kg per week, the average consumption being 550 kg. The carrying cost of inventory is 20% per annum.

You are required to CALCULATE:

(i) Re-order quantity
(ii) Re-order level
(iii) Maximum level
(iv) Minimum level
(v) Average stock level

Ans.

(i) Reorder Quantity(ROQ) = 1,691 kg. (Refer to working note)

(ii) Reorder level (ROL) = Maximum usage × Maximum re-order period
= 900 kg. × 8 weeks = 7,200 kg.

(iii) Maximum level = ROL + ROQ – (Min. usage × Min. re-order period)
= 7,200 kg. + 1,691 kg. – (200 kg.× 4 weeks)
= 8,091 kg.

(iv) Minimum level = ROL – (Normal usage × Normal re-order period)
= 7,200 kg. – (550 kg. × 6 weeks)
= 3,900 kg.

(v) Average stock level = $\frac{1}{2}$ (Maximum level + Minimum level)

= $\frac{1}{2}$ (8,091 kg. + 3,900 kg.) = 5,995.5 kg.

Or

= Minimum level + $\frac{1}{2}$ ROQ

= 3,900 kg. + $\frac{1}{2}$ 1,691 kg. = 4,745.5 kg.

Working Note:

Annual consumption of raw material (A) (550 kg. × 52 weeks) = 28,600 kg.
Cost of placing an order (O) = Rs. 200
Carrying cost per kg. per annum (C) = Rs. 20 × 20% = Rs. 4

Economic order quantity (EOQ) = $\sqrt{\frac{2AO}{C}}$

= $\sqrt{\frac{2 \times 28,600 \text{ kgs.} \times \text{Rs.}200}{\text{Rs.}4}}$ = 1,691 Kg. (Approx)

Q.35 Min, Max, Avg Stock / Reorder | MTP May 23

A company manufactures 10,000 units of a product per month. The cost of placing an order is ₹200. The purchase price of the raw material is ₹20 per kg. The re-order period is 4 to 8 weeks. The consumption of raw materials varies from 200 kg to 900 kg per week, the average consumption being 550 kg. The carrying cost of inventory is 20% per annum.

You are required to CALCULATE:

(i) Re-order quantity
(ii) Re-order level
(iii) Maximum level
(iv) Minimum level
(v) Average stock level

Ans.

(i) Reorder Quantity (ROQ) = 1,691 kg. (Refer to working note)

(ii) Reorder level (ROL) = Maximum usage × Maximum re-order period

= 900 kg. × 8 weeks = 7,200 kg.

(iii) Maximum level = ROL + ROQ – (Min. usage × Min. re-order period)
= 7,200 kg. + 1,691 kg. – (200 kg.× 4 weeks)
= 8,091 kg.

(iv) Minimum level = ROL – (Normal usage × Normal re-order period)
= 7,200 kg. – (550 kg. × 6 weeks)
= 3,900 kg.

(v) Average stock level = $\frac{1}{2}$ (Maximum level + Minimum level)

= $\frac{1}{2}$(8,091 kg. + 3,900 kg.) = 5,995.5 kg.

= Minimum level + $\frac{1}{2}$ ROQ

= 3,900 kg. + $\frac{1}{2}$1,691 kg. = 4,745.5 kg.

Working Note

Annual consumption of raw material (A) = (550 kg. × 52 weeks) = 28,600 kg.
Cost of placing an order (O) = ₹ 200
Carrying cost per kg. Per annum (c × i) = ₹ 20 × 20% = ₹4
Economic order quantity (EOQ) = $\sqrt{\frac{2AO}{Cxi}}$

= $\sqrt{\frac{2x\ 28,600\ kgs.x\ 200}{4}}$ = 1,691 Kg. (Approx)

Q.36 Min, Max, Avg Stock / Reorder | RTP May 20

Arnav Electronics manufactures electronic home appliances. It follows weighted average Cost method for inventory valuation. Following are the data of component X:

Date	Particulars	Units	Rate per unit(₹)
15-12-19	Purchase Order- 008	10,000	9,930
30-12-19	Purchase Order- 009	10,000	9,780
01-01-20	Opening stock	3,500	9,810
05-01-20	GRN*-008 (against the Purchase Order- 008)	10,000	-
05-01-20	MRN**-003 (against the Purchase Order- 008)	500	-
06-01-20	Material Requisition-011	3,000	-
07-01-20	Purchase Order- 010	10,000	9,750
10-01-20	Material Requisition-012	4,500	-
12-01-20	GRN-009 (against the Purchase Order- 009)	10,000	-
12-01-20	MRN-004 (against the Purchase Order- 009)	400	-
15-01-20	Material Requisition-013	2,200	-
24-01-20	Material Requisition-014	1,500	-
25-01-20	GRN-010 (against the Purchase Order- 010)	10,000	-
28-01-20	Material Requisition-015	4,000	-
31-01-20	Material Requisition-016	3,200	-

*GRN- Goods Received Note; **MRN- Material Returned Note

Based on the above data, you are required to CALCULATE:

(i) Re-order level

(ii) Maximum stock level
(iii) Minimum stock level
(iv) PREPARE Store Ledger for the period January 2020 and DETERMINE the value of stock as on 31-01-2020.
(v) Value of components used during the month of January, 2020.
(vi) Inventory turnover ratio.

Ans. **Workings:**

Consumption is calculated on the basis of material requisitions:

Maximum component usage = 4,500 units (Material requisition on 10-01-20)

Minimum component usage = 1,500 units (Material requisition on 24 -01-20)

Lead time is calculated from purchase order date to material received date

Maximum lead time = 21 days (15-12-2019 to 05-01-2020)

Minimum lead time = 14 days (30-12-2019 to 12-01-2020)

Calculations:

(i) Re-order level
= Maximum usage × Maximum lead time
= 4,500 units × 21 days = 94,500 units

(ii) Maximum stock level
= Re-order level + Re-order Quantity – (Min. Usage × Min. lead time)
= 94,500 units + 10,000 units – (1,500 units × 14 days)
= 1,04,500 units – 21,000 units = 83,500 units

(iii) Minimum stock level
= Re-order level – (Avg. consumption × Avg. lead time)
= 94,500 units – (3,000 units × 17.5 days)
= 94,500 units – 52,500 units
= 42,000 units

(iii) Store Ledger for the month of January 2020:

Date	Receipts				Issue				Balance		
	GRN/ MRN	Units	Rate ₹	Amt. (₹ '000)	MRN/ MR	Units	Rate ₹	Amt. (₹ '000)	Units	Rate ₹	Amt. (₹ '000)
01-01-20	-	-	-	-	-	-	-	-	3,500	9,810	34,335
05-01-20	008	10,000	9,930	99,300	003	500	9,930	4,965	13,000	9,898	1,28,670
06-01-20	-	-	-	-	011	3,000	9,898	29,694	10,000	9,898	98,980
10-01-20	-	-	-	-	012	4,500	9,898	44,541	5,500	9,898	54,439
12-01-20	009	10,000	9,780	97,800	004	400	9,780	3,912	15,100	9,823	1,48,327
15-01-20	-	-	-	-	013	2,200	9,823	21,611	12,900	9,823	1,26,716
24-01-20	-	-	-	-	014	1,500	9,823	14,734	11,400	9,823	1,11,982
25-01-20	010	10,000	9,750	97,500	-	-	-	-	21,400	9,789	2,09,482
28-01-20	-	-	-	-	015	4,000	9,789	39,156	17,400	9,789	1,70,326
31-01-20	-	-	-	-	016	3,200	9,789	31,325	14,200	9,789	1,39,001

[Note: Decimal figures may be rounded-off to the nearest rupee value wherever required)

Value of stock as on 31 01-2020 ('000) = ₹1,39,001

(v) Value of components used during the month of January 2020:
Sum of material requisitions 011 to 016 ('000)
= ₹ 29,694 + ₹ 44,541 + ₹ 21,611 + ₹ 14,734 + ₹ 39,156 + ₹ 31,325 = ₹ 1,81,061

(vi) Inventory Turnover Ratio

$$= \frac{\text{Value of materialsused}}{\text{Averagestock value}} = \frac{1,81,061}{(1,39,001 + 34,335) / 2} = \frac{`1,81,061}{86,668} = 2.09$$

Q.37 Total Cost / EOQ / Reorder | MTP Dec 21 (2)

The yearly production of a company's product which has a steady market is 40,000 units. Each unit of a product requires 1 kg. of raw material. The cost of placing one order for raw material is ₹ 1,000 and the inventory carrying cost is ₹ 20 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 (kg.)	Discount (₹) Upto 6,000
6,001 – 8,000	4,000
8,001 – 16,000	20,000
16,001 – 30,000	32,000
30,001 – 45,000	4,0000

You are REQUIRED to:

(i) Calculate the re-order point considering 30 days in a month.

(ii) Prepare a statement showing the total cost of procurement and storage of raw material after considering the discount of the company elects to place one, two, four or five orders in the year.

(iii) State the number of orders which the company should place to minimize the costs after taking EOQ also into consideration.

Ans.

Working notes

1. Annual production = 40,000 units
2. Raw material required for 40,000 units (40,000 units × 1 kg.) = 40,000 kg.
3. EOQ $= \sqrt{\frac{2 \times 40,000\ kgs. \times `1,000}{20}} = 20,000 kgs$
4. Total cost of procurement and storage when the order size is equal to EOQ or 2,000 kg.

No. of orders (40,000 kg. ÷ 2,000 kg.	= 20 times
Ordering cost (20 orders × ₹1,000)	= ₹ 20,000
Carrying cost (₹) (½ × 2,000 kg. × ₹ 20)	= ₹ 20,000
Total cost	₹ 40,000

(i) Re-order point = Safety stock + Lead time consumption

$$= 1,000 \text{ kg.} + \frac{40,000 \text{ kg.}}{360 \text{days}} x 360 days$$

= 1,000 kg. + 4,000 kg. = 5,000 kg.

(ii) Statement showing the total cost of procurement and storage of raw materials (after considering the discount)

Order size	No. of orders	Total cost of procurement	Average stock	Total cost of storage of raw materials	Discount	Total cost
Kg.		(₹)	Kg.	(₹)	(₹)	(₹)
(1)	(2)	(3)=(2)×₹1,000	(4)=½×(1)	(5)=(4)×₹20	(6)	(7)=[(3)+(5)– (6)
40,000	1	1,000	20,000	4,00,000	40,000	3,61,000
20,000	2	2,000	10,000	2,00,000	32,000	1,70,000
10,000	4	4,000	5,000	1,00,000	20,000	84,000
8,000	5	5,000	4,000	80,000	4,000	81,000

(iv) Number of orders which the company should place to minimize the costs after taking EOQ also into

consideration is 20 orders each of size 2,000 kg. The total cost of procurement and storage in this case comes to ₹ 40,000, which is minimum.

Q.38 Stores Ledger | PY May 19

The following are the details of receipt and issue of material 'CXE' in a manufacturing Co. during the month of April 2019:

Date	Particulars	Quantity (kg)	Rate per kg
April 4	Purchase	3,000	₹ 16
April8	Issue	1,000	
April15	Purchase	1,500	₹ 18
April 20	Issue	1,200	
April 25	Return to supplier out of purchase made on April 15	300	
April 26	Issue	1,000	
April 28	Purchase	500	₹ 17

Opening stock as on 01-04-2019 is 1,000 kg @ ₹ 15 per kg.

On 30th April, 2019 it was found that 50 kg of material 'CXE' was fraudulently misappropriated by the store assistant and never recovered by the Company.

Required:

(i) Prepare a store ledger account under each of the following method of pricing the issue:
  (a) Weighted Average Method
  (b) LIFO

(ii) What would be the value of material consumed and value of closing stock as on 30-04-2019 as per these two methods?

Ans. **(i) (a) Stores Ledger Account for the month of April, 2019 (Weighted Average Method)**

	Receipt			Issue			Balance		
Date	Qty Units	Rate (₹)	Amount (₹)	Qty Units	Rate (₹)	Amount (₹)	Qty Units	Rate (₹)	Amount (₹)
1-4-19	_	_	_	_	_	_	1,000	15.00	15,000
4-4-19	3,000	16.00	48,000	_	_	_	4,000	15.75	63,000
8-4-19	_	_	_	1,000	15.75	15,750	3,000	15.75	47,250
15-4-19	1,500	18.00	27,000	_	_	_	4,500	16.50	74,250
20-4-19	_	_	_	1,200	16.50	19,800	3,300	16.50	54,450
25-4-19	_	_	_	300	18.00	5,400	3,000	16.35	49,050
26-4-19	_	_	_	1,000	16.35	16,350	2,000	16.35	32,700
28-4-19	500	17.00	8,500	_	_	_	2,500	16.48	41,200
30-4-19	_	_	_	50	16.48	824	2,450	16.48	40,376

(b) Stores Ledger Account for the month of April, 2019 (LIFO)

	Receipt			Issue			Balance		
Date	Qty	Rate	Amount	Qty	Rate	Amount	Qty	Rate	Amount

	Units	(₹)	(₹)	Units	(₹)	(₹)	Units	(₹)	(₹)
1-4-19	_	_	_	_	_	_	1,000	15	15,000
4-4-19	3,000	16	48,000	_	_	_	1,000	15	15,000
							3,000	16	48,000
8-4-19	_	_	_	1,000	16	16,000	1,000	15	15,000
							2,000	16	32,000
15-4-19	1,500	18	27,000	_	_	_	1,000	15	15,000
							2,000	16	32,000
							1,500	18	27,000
20-4-19	_	_	_	1,200	18	21,600	1,000	15	15,000
							2,000	16	32,000
							300	18	5,400
25-4-19	_	_	_	300	18	5,400	1,000	15	15,000
							2,000	16	32,000
26-4-19	_	_	_	1,000	16	16,000	1,000	15	15,000
							1,000	16	16,000
28-4-19	500	17	8,500	_	_	_	1,000	15	15,000
							1,000	16	16,000
							500	17	8,500
30-4-19	_	_	_	50	17	850	1,000	15	15,000
							1,000	16	16,000
							450	17	7,650

(ii) Value of Material Consumed and Closing Stock

	Weighted Average method (₹)	LIFO method (₹)
Opening stock as on 01-04-2019	15,000	15,000
Add: Purchases	83,500	83,500
	98,500	98,500
Less: Return to supplier	5,400	5,400
Less: Abnormal loss	824	850
Less: Closing Stock as on 30-04-2019	**40,376**	**38,650**
Value of Material Consumed	**51,900**	**53,600**

Q.39 Stores Ledger | PY May 23

A Limited has furnished the following information for the months from 1 stJanuary to 30th April, 2023:

	January	February	March	April
Number of Working days	25	24	26	25
Production (in units) per working day	50	55	60	52
Raw Material Purchases (% by weights to total of 4 months)	21%	26%	30%	23%
Purchase price of raw material (per kg)	₹ 10	₹ 12	₹ 13	₹ 11

Quantity of raw material per unit of product: 4 kg.

Opening stock of raw material on 1stJanuary: 6,020 kg. (Cost ₹ 63, 210)
Closing stock of raw material on 30thApril: 5,100 kg.
All the purchases of material are made at the start of each month.

Required:

(i) Calculate the consumption of raw materials (in kgs) month-by- month and in total.
(ii) Calculate the month-wise quantity and value of raw materials purchased.
(iii) Prepare the priced stores ledger for each month using the FIFO method.

Ans.

(i) Calculation of consumption of Raw Material (in kgs) month by month and total

Particulars	Jan	Feb	March	April	Total
No. of working days	25	24	26	25	-
Production (Per day)	50	55	60	52	-
Production	1,250	1,320	1,560	1,300	5,430
Raw Material Consumed (in kgs)	**5,000**	**5,280**	**6,240**	**5,200**	21,720

Calculation of Raw Material Purchased

Purchased	(Kg)
Closing stock on 30th April	5,100
Add: Raw Material consumed	21,720
Less: Opening stock on 1st January	(6,020)
Raw Material purchased	20,800

(ii) Calculation of month wise quantity and value of raw material purchased

	%	Purchased (Kg)	Price (₹)	Value (₹)
January	21	4,368	10	43,680
February	26	5,408	12	64,896
March	30	6,240	13	81,120
April	23	4,784	11	52,624
Total		20,800		2,42,320

(iii) Store Price Ledger by using FIFO method.

Months	Particulars	Receipts			Issue			Balance		
		Qty	Rate	Amount (₹)	Qty	Rate	Amount (₹)	Qty	Rate	Amount (₹)
Jan	Opening							6,020	10.5	63,210
	Purchases	4,368	10	43,680				6,020	10.5	63,210
								4,368	10	43,680
	Consumption				**5,000**	**10.5**	**52,500**	**1,020**	**10.5**	**10,710**
								4,368	**10**	**43,680**
Feb	Purchases	5,408	12	64,896				1,020	10.5	10,710
								4,368	10	43,680
								5,408	12	64,896
	Consumption				**1,020**	**10.5**	**10,710**	**108**	**10**	**1,080**
					4,260	**10**	**42,600**	**5,408**	**12**	**64,896**
March	Purchase	6,240	13	81,120				108	10	1,080
								5,408	12	64,896
								6,240	13	81,120
	Consumption				**108**	**10**	**1,080**			

						5,408	**12**	**64,896**			
						724	**13**	**9,412**	**5,516**	**13**	**71,708**
	April	Purchases	4,784	11	52,624				5,516	13	71,708
									4,784	11	52,624
		Consumption				**5,200**	**13**	**67,600**	**316**	**13**	**4,108**
									4,784	**11**	**52,624**
											56,732

Q.40 Stores Ledger | MTP Nov 22(2)

The following are the details of receipts and issues of a material of stores in a manufacturing company for the period of three months ending 30th June, 2022:

Receipts:

Date	Quantity (kg.)	Rate per kg. (₹)
April 10	1,600	50.00
April 20	2,400	49.00
May 5	1,000	51.00
May 17	1,100	52.00
May 25	800	52.50
June 11	900	54.00
June 24	1,400	55.00

There was 1,500 kg. in stock at April 1, 2022 which was valued at ₹ 48.00 per kg.

Issues:

Date	Quantity (kg.)
April 4	1,100
April 24	1,600
May 10	1,500
May 26	1,700
June 15	1,500
June 21	1,200

Issues are to be priced on the basis of weighted average method.

The stock verifier of the company reported a shortage of 80 kgs. on 31st May, 20 22 and 60 kgs. on 30th June, 2022.

Ans.

Stores Ledger Account
for the three months ending 30th June, 2022
(Weighted Average Method)

	Receipts				Issues				Balance		Rate for further Issue (Rs.)
	GRN No.	Qty. (Kg.)	Rates (Rs.)	Amounts	MR No.	Qty. (Kg.)	Rates (Rs.)	Amount (Rs.)	Qty. (Kg.)	Amount (Rs.)	
April 1									1,500	72,000	48.00
April 4						1,100	48.00	52,800	400	19,200	48.00

April 10		1,600	50.00	80,000					2,000	99,200	$\frac{99,200}{2,000} = 49.60$
April 20		2,400	49.00	1,17,600					4,400	216,800	$\frac{2,16,800}{4,400} = 49.30$
April 24						1,600	49.30	78,880	2,800	137,920	$\frac{1,37,920}{2,800} = 49.30$
May 5		1,000	51.00	51,000					3,800	188,920	$\frac{1,88,920}{3,800} = 49.70$
May 10						1,500	49.70	74,550	2,300	114,370	$\frac{1,14,370}{2,300} = 49.70$
May 17		1,100	52.00	57,200					3,400	171,570	$\frac{1,71,570}{3,400} = 50.50$
May 25		800	52.50	42,000					4,200	213,570	$\frac{2,13,570}{4,200} = 50.90$
May 26						1,700	50.90	86,530	2,500	127,040	$\frac{1,27,040}{2,500} = 49.30$
May 31					Short age	80			2,420	127,040	$\frac{1,27,040}{2,420} = 52.50$
June 11		900	54.00	48,600					3,320	175,640	$\frac{1,75,640}{3,320} = 52.90$
June 15						1,500	52.90	79,350	1,820	96,290	$\frac{96,290}{1,820} = 52.90$
June 21						1,200	52.90	63,480	620	32,810	$\frac{32,810}{620} = 52.90$
June 24		1,400	55.00	77,000					2,020	109,810	$\frac{1,09,810}{2,020} = 54.40$
June 30					Short age	60			1,960	109,810	$\frac{1,09,810}{1,960} = 56.00$

Q.41 EOQ | ICAI MAT

Anil & Company buys its annual requirement of 36,000 units in 6 instalments. Each unit costs ₹ 1 and the ordering cost is ₹25. The inventory carrying cost is estimated at 20% of unit value. FIND the total annual cost of the existing inventory policy. CALCULATE, how much money can be saved by Economic Order Quantity?

Ans. **(a) Total Annual Cost in Existing Inventory Policy**

	(₹)
Ordering cost (6 orders @ ₹ 25)	150
Carrying cost of average inventory (36,000 x 6) = 6,000 units per order	
Average inventory = 3,000 units	
Carrying cost = 20% of ₹1 x 3,000 = 3,000 x 0.20	600
Total cost	**A 750**

(b) Total Annual Cost in E.O.Q

$$EOQ = \sqrt{\frac{2 \times 36{,}000 \text{ kgs.} \times 25}{1 \times 20\%}} = 3000 \text{ units}$$

	(₹)
No. of orders = 36,000 ÷3,000 units = 12 orders	
Ordering cost (12 x ₹25) =	300
Carrying cost of average inventory (3,000 x 0.20) ÷ 2 =	300
Total Cost	**B 600**
Savings due to E.O.Q ₹ (750 – 600) **(A – B)**	**150**

Note: As the units purchase cost of ₹ 1 does not change in both the computation, the same has not been considered to arrive at total cost of inventory for the purpose of savings.

Q.42 EOQ / Qty Discount | ICAI MAT

A Company manufactures a special product which requires a component 'Alpha'. The following particulars are collected for the year 2022-23:

(i) Annual demand of Alpha 8,000 units
(ii) Cost of placing an order ₹ 200 per order
(iii) Cost per unit of Alpha ₹ 400
(iv) 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:

(i) COMPUTE the economic order quantity
(ii) STATE whether the quantity discount offer can be accepted.

Ans. **(i)** Calculation of Economic Order Quantity

$$EOQ = \sqrt{\frac{2Ao}{c}} = \sqrt{\frac{2 \times 8{,}000 units \times 200}{400x20/100}} = 200 \text{ units}$$

(ii) Evaluation of Profitability of Different Options of Order Quantity

(a) When EOQ is ordered

		(₹)
Purchase Cost	(8,000 units x ₹ 400)	32,00,000
Ordering Cost	[(8,000 units/200 units) x ₹ 200]	8,000
Carrying Cost	(200 units x ₹400 x½ x20/100)	8,000
Total Cost		**32,16,000**

(b) When Quantity Discount is accepted

		(₹)
Purchase Cost	(8,000 units x ₹ 384*)	30,72,000
Ordering Cost	[(8,000 units/4000 units) x ₹200]	400
Carrying Cost	(4000 units x 384 x ½ x 20/100)	1,53,600
Total Cost		**32,26,000**

*Unit Cost ₹400
Less Quantity Discount @ 4% = 16 Purchase Cost = 400- 16 = ₹384

Advise – The total cost of inventory is lower if EOQ is adopted. Hence, the company is advised not to accept the quantity discount.

Q.43 EOQ | ICAI MAT

The complete Gardener is deciding on the economic order quantity for two brands of lawn fertilizer - Super Grow and Nature's Own. The following information is collected:

	FERTILIZER	
	Super Grow	Nature's Own
Annual demand	2,000 bags	1,280 bags
Relevant ordering cost per purchaseorder	₹ 1,200	₹ 1,400
Annual relevant carrying cost per bag	₹ 480	₹ 560

Required:

(i) COMPUTE EOQ for Super Grow and Nature's own.

(ii) For the EOQ, WHAT is the sum of the total annual relevant ordering costs and total annual relevant carrying costs for Super Grow and Nature's own?

(iii) For the EOQ, COMPUTE the number of deliveries per year for Super Grow and Nature's own.

Ans.

$EOQ = \sqrt{\frac{2Ao}{c}}$

where,

A = Annual Demand

O = Ordering cost per order

C = Inventory carrying cost per unit per annum

(i) Calculation of EOQ

Super Grow	Nature's Own
$EOQ = \sqrt{\frac{2 \times 2,000 \times 1,200}{480}}$ = 10,000 or 100 bags	$EOQ = \sqrt{\frac{2\ 1,280\ 1,400}{560}}$ = 6,400 or or 80 bags

(ii) Total annual relevant cost = Total annual relevant ordering costs + Total annual relevant carrying cost

	Super Grow	Nature's Own
Number of Orders = Annual Requirement ÷EOQ	2,000/100 =20 orders	1,280/80 =16 orders
Ordering Cost	20 × 1200 = ₹ 24000	16 × 1400 = ₹22,400
Carrying Cost	½ × 100 × 480 =₹24,000	½ × 80 × 560 = ₹22,400
Total of Orderingand Carrying Cost	=₹ 24,000 + ₹ 24,000 = ₹48,000	₹ 22,400 + ₹ 22,400 = ₹44,800

(iii) Number of deliveries for Super Grow and Nature's own fertilizer per year

$$= \frac{\text{Annual demand for fertilizer bags}}{\text{EOQ}}$$

Super Grow	Nature's Own
$= \frac{2,000 \text{bags}}{100 \text{ bags}} = 20 \text{oreders}$	$= \frac{1,280 \text{bags}}{80 \text{ bags}} = 16 \text{oreders}$

Q.44 EOQ | ICAI MAT

A Company uses three raw materials A, B and C for a particular product 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		
A	10	10,000	10	1	2	3	8,000	?
B	4	5,000	30	3	4	5	4,750	?
C	6	10,000	15	2	3	4	?	2,000

Weekly production varies from 175 to 225 units, averaging 200 units of the said product. COMPUTE the following quantities:

(i) Minimum stock of A,
(ii) Maximum stock of B,
(iii) Re-order level of C,
(iv) Average stock level of A.

Ans.

(i) Minimum stock of A

Re-order level – (Average rate of consumption X Average time required to obtain fresh delivery)
= 8,000 – (200 × 10 × 2) = **4,000 kgs.**

(ii) Maximum stock of B

Re-order level + Re-order quantity – (Minimum consumption × Minimum delivery period)
= 4,750 + 5,000 – (175 × 4 × 3)
= 9,750 – 2,100 = **7,650 kgs.**

(iii) Re-order level of C

Maximum delivery period × Maximum usage
= 4 × 225 × 6 = 5,400 kgs.
OR
Re-order level of C
= Minimum level of C + [Average rate of consumption × Average time required to obtain fresh delivery]
= 2,000 + [(200 × 6) × 3] kgs = **5,600 kgs.**

(iv) Average stock level of A

= Minimum stock level of A + ½ Re-order quantity of A
= 4,000 + ½ × 10,000 = 4,000 + 5,000 = **9,000 kgs**

OR

Average Stock level of A

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

(Refer to working note)

$$\frac{4,000 + 16,250}{2} = 10,125 \text{ kgs}$$

Working note:

Maximum stock of A = ROL+ ROQ – (Minimum consumption x Minimum re-order period)
= 8,000 + 10,000 – [(175 x 10) x 1] = 16,250 kgs

Q.45 EOQ | ICAI MAT

(a) EXE Limited has received an offer of quantity discounts on its order of materials as under:

Price per ton (₹)	*Ton (Nos.)*
1,200	*Less than 500*
1,180	*500 and less than 1,000*
1,160	*1,000 and less than 2,000*
1,140	*2,000 and less than 3,000*
1,120	*3,000 and above.*

The annual requirement for the material is 5,000 tons. The ordering cost per order is ₹ 1,200 and the stock holding cost is estimated at 20% of material cost per annum. You are required to COMPUTE the most economical purchase level.

(b) WHAT will be your answer to the above question if there are no discounts offered and the price per ton is ₹ 1,500?

Ans. **(a)**

Total annual requirement (A)	Order size (Tonne)(q)	No. of orders A/q	Cost of inventory A x Per tonne cost (₹)	Ordering cost A/q x ₹ 1200 (₹)	Carrying cost p.t. p.a 1/2x q x 20% of cost p.t. (₹)	Total Cost (4+5+6) (₹)
1	2	3	4	5	6	7
5,000 Ton	400	12.5 (13)*	60,00,000 (5,000x₹1200)	15,600	48,000 (200 x ₹ 240)	60,63,600
	500	10	59,00,000 (5,000 x ₹ 1180)	12,000	59,000 (250 x ₹ 236)	59,71000
	1,000	5	58,00,000 (5,000x ₹ 1160)	6,000	1,16,000 (500 x ₹ 232)	59,22,000
	2,000	2.5 (3)*	57,00,000 (5,000x₹ 1140)	3,600	2,28,000 (1,000x₹228)	59,31,600
	3,000	1.666 (2)*	56,00,000 (5,000x₹ 1120)	2,400	3,36,000 (1,500x₹224)	59,38,400

* Since number of orders cannot be in decimals, thus 12.5 orders are taken as 13 orders, 2.5 are taken as 3 order and 1.66 orders are taken as 2 orders.

The above table shows that the total cost of 5,000 units including ordering and carrying cost is minimum (₹ 59,22,000) when the order size is 1,000 units. Hence the most economical purchase level is 1,000 units.

(b) If there will are no discount offer then the purchase quantity should be equal to EOQ. The EOQ is as follows:

$$EOQ = \sqrt{\frac{2Ao}{c}}$$

where A = annual inventory requirement,
O = ordering cost per order and
C = carrying cost per unit per annum

$$\sqrt{\frac{2 \times 5,000 \text{ units} \times 1,200}{20\% \times 1,500}} = 200 \text{ units}$$

Q.46 Min, Max, Avg Stock / Danger | ICAI MAT

From the details given below, CALCULATE:
(i) Re-ordering level
(ii) Maximum level
(iii) Minimum level
(iv) Danger level.
Re-ordering quantity is to be calculated on the basis of following information: Cost of placing a purchase order is ₹ 4,000 Number of units to be purchased during the year is 5,00,000 Purchase price per unit, inclusive of transportation cost is ₹ 50 Annual cost of storage per unit is ₹ 10.
Details of lead time : Average - 10 days, Maximum - 15 days Minimum- 5 days, for emergency purchases- 4 days.
Rate of consumption: Average: 1,500 units per day,
Maximum: 2,000 units per day.

Ans.

Basic Data:

A	(Number of units to be purchased annually)	=	5,00,000 units
O	(Ordering cost per order)	=	₹ 4,000
C	(Annual cost of storage per unit)	=	₹ 10
Purchase price per unit inclusive of transportation cost		=	₹ 50

Computations:

(i) Re-ordering level (ROL) = Maximum usage per period × Maximum lead time
= 2,000 units per day × 15 days
= 30,000 units

(ii) Maximum level = ROL + ROQ – [Min. rate of consumption × Min. lead time] (Refer to working notes 1 and 2)
= 30,000 units + 20,000 units – [1,000 units per day×5 days]
= 45,000 units

(iii) Minimum level = ROL–Average rate of consumption× Average re-order-period
= 30,000 units – (1,500 units per day × 10 days)
= 15,000 units

(iv) Danger level = Average consumption × Lead time for emergency purchases
= 1,500 units per day × 4 days
= 6,000 units

Working Notes:

1. Minimum rate of consumption per day

Minimum rate of Maximum rate of

$$\text{Av. rate of consumption} = \frac{\text{Consumption} + \text{Consumption}}{2}$$

$$1,500 \text{ units per day} = \frac{X \text{ units / day} + 2,000 \text{ units per day}}{2} \text{ or } x$$

= 1,000 units per day.

2. Re-order Quantity (ROQ)= $\sqrt{\frac{2 \times 5,0000 \text{ units} \times 4,000}{10}} = 20,000 \text{ units}$

EOQ / Extra Cost | ICAI MAT

Q.47

G. Ltd. produces a product which has a monthly demand of 4,000 units. The product requires a component X which is purchased at ₹ 20. For every finished product, one unit of component is required. The ordering cost is ₹ 120 per order and the holding cost is 10% p.a.

You are required to CALCULATE:

(i) Economic order quantity.

(ii) If the minimum lot size to be supplied is 4,000 units, what is the extra cost, the company has to incured?

(iii) What is the minimum carrying cost, the company has to incur?

Ans.

(i) Economic order quantity:

A (Annual requirement or Component 'X') = 4,000 units per month × 12 months = 48,000 units

C (Purchase cost p.u.) = ₹20 O (Ordering cost per order) = ₹ 120

Ci (Holding cost) = 10% per annum

$$E.O.Q. = \sqrt{\frac{2Ao}{ci}} = \sqrt{\frac{2 \times 48{,}000 \text{ units} \times 120}{10\% of 20}} = 2{,}400 \text{ units}$$

(ii) Extra cost incurred by the company:

A. Total cost when order size is equal 4,000 units:

Total cost = Total ordering cost + Total carrying cost

$$\frac{A}{Q} xO + \frac{1}{2} xQ\,(Ci)$$

$$\left(\frac{48,units}{4,000units} x120\right) + \left(\frac{1}{2} x4,000units x10\% x20\right)$$

1,440 + 4,000 = 5,440

B. Total cost when order size is equal EOQ i.e. 2,400 units:

$$\text{Total cost} = \left(\frac{48,units}{2,400units} x120\right) + \left(\frac{1}{2} x2,400units x10\% x20\right)$$

= ₹ 2,400 + ₹ 2,400 = ₹ 4,800

Extra cost that the company has to incur = (A) – (B)

= ₹ 5,440 – ₹ 4,800

= ₹ 640

(iii) Minimum carrying cost: Carrying cost depends upon the size of the order. It will be minimum on the least order size. (In this part of the question the two order sizes are 2,400 units and 4,000 units. Here 2,400 units is the least of the two order sizes. At this order size carrying cost will be minimum.)

The minimum carrying cost in this case can be computed as under:

Minimum carrying cost = $\frac{1}{2} x2,400units x10\% x20$ =2,400.

Q.48 Stores Ledger | ICAI MAT

'AT' Ltd. furnishes the following store transactions for September, 2022:

1-9-22	Opening balance	25 units value ₹ 162.50
4-9- 22	Issues Req. No. 85	8 units
6-9- 22	Receipts from B & Co. GRN No. 26	50 units @ ₹ 5.75 per unit
7-9- 22	Issues Req. No. 97	12 units
10-9- 22	Return to B & Co.	10 units
12-9- 22	Issues Req. No. 108	15 units
13-9- 22	Issues Req. No. 110	20 units
15-9- 22	Receipts from M & Co. GRN. No. 33	25 units @ ₹ 6.10 per unit

17-9- 22	Issues Req. No. 121	10 units
19-9- 22	Received replacement from B & Co. GRN No. 38	10 units
20-9- 22	Returned from department, material of M & Co. MRR No. 4	5 units
22-9- 22	Transfer from Job 182 to Job 187 in the dept. MTR 6	5 units
26-9- 22	Issues Req. No. 146	10 units
29-9- 22	Transfer from Dept. "A" to Dept. "B" MTR 10	5 units
30-9- 22	Shortage in stock taking	2 units

PREPARE the priced stores ledger on FIFO method and STATE how would you treat the shortage in stock taking.

Ans.

Working Notes:

1. The material received as replacement from vendor is treated as fresh supply.
2. In the absence of any information, the price of the material returned from a user department on 20-9-22 has been taken at the price of the latest issue made on 17-9-22. In FIFO method, physical flow of the material is irrelevant, and issue price is based on first in first out.
3. The issue of material on 26-9-22 is made out of the material received from a user department on 20-9-22.
4. The entries for transfer of materials from one job and department to another on 22-9-22 and 29-9-22 respectively, do not affect the store ledger. However, adjustment entries to calculation of cost of respective jobs and departments are made in cost accounts.
5. The material found short as a result of stock taking has been written off at relevant issue price.

Stores Ledger of AT Ltd. for the month of September, 2022 (FIFO Method)

	RECEIPT				ISSUE				BALANCE		
Date	GRN No MRR No.	Qty. Units	Rate (₹)	Amount (₹)	Requisition No	Qty. Units	Rate (₹)	Amount (₹)	Qty. Units	Rate (₹)	Amount (₹)
1	2	3	4	5	6	7	8	9	10	11	12
1-9-22	—	—	—	—	—	—	—	—	25	6.50	162.50
4-9-22	—	—	—	—	85	8	6.50	52	17	6.50	110.50
6-9-22	26	50	5.75	287.50	—	—	—	—	17 50	6.50 5.75	398.00
7-9-22	—	—	—	—	97	12	6.50	78	5 50	6.50 5.75	320.00
10-9-22	—	—	—	—	*Return*	10	5.75	57.50	 40	6.50 5.75	262.50
12-9-22	—	—	—	—	108	5 10	6.50 5.75	90	30	5.75	172.50
13-9-22	—	—	—	—	110	20	5.75	115	10	5.75	57.50
15-9-22	33	25	6.10	152.50	—	—	—	—	10 25	5.75 6.10	210.00
17-9-22	—	—	—	—	121	10	5.75	57.50	25	6.10	152.50
									25	6.10	

19-9-22	38	10	5.75	57.50	—	—	—	—	10	5.75	210.00
									5	5.75	
20-9-22	4	5	5.75	28.75	—	—	—	—	25	6.10	238.75
									10	5.75	
26-9-22	—	—	—	—	146	5 5	5.75 6.10	59.25	20 10	6.10 5.75	179.50
30-9-22	—	—	—	—	Shortage	2	6.10	12.20	18 10	6.10 5.75	167.30

Q.49 Stores Ledger | ICAI MAT

The following information is extracted from the Stores Ledger:

Material X

Opening Stock Nil

Purchases:

Jan. 1 100 @ ₹ 1 per unit

Jan. 20 100 @ ₹ 2 per unit

Issues:

Jan. 22 60 for Job W 16

Jan. 23 60 for Job W 17

Complete the receipts and issues valuation by adopting the First-In-First-Out, Last-In-First-Out and the Weighted Average Method. TABULATE the values allocated to Job W 16, Job W 17 and the closing stock under the methods aforesaid and discuss from different points of view which method you would prefer.

Ans.

From the point of view of cost of material charged to each job, it is minimum under FIFO and maximum under LIFO (Refer to Tables). During the period of rising prices, the use of FIFO give rise to high profits and that of LIFO low profits. In the case of weighted average, there is no significant adverse or favourable effect on the cost of material as well as on profits.

From the point of view of valuation of closing stock, it is apparent from the above statement, that it is maximum under FIFO, moderate under weighted average and minimum under LIFO.

It is clear from the tables that the use of weighted average evens out the fluctuations in the prices. Under this method, the cost of materials issued to the jobs and the cost of material in hands reflects greater uniformity than under FIFO and LIFO. Thus, from different points of view, weighted average method is preferred over LIFO and FIFO.

Statement of receipts and issues by adopting First-in-First-Out Method

Date	Particulars	Receipts			Issues			Balance		
		Units No.	Rate (₹)	Value (₹)	Units No.	Rate (₹)	Value (₹)	Units No.	Rate (₹)	Value (₹)
Jan. 1	Purchase	100	1	100	—	—	—	100	1	100
Jan. 20	Purchase	100	2	200	—	—	—	100	1	100
								100	2	200
Jan. 22	Issue to Job W 16	—	—	—	60	1	60	40	1	40
								100	2	200
					40	1	40			

Jan. 23	Issue to Job W 17	—	—	—	20	2	40	80	2	160

Statement of receipts and issues by adopting Last-In-First-Out method

Date	Particulars	Receipts			Issues			Balance		
		Units No.	Rate (₹)	Value (₹)	Units No.	Rate (₹)	Value (₹)	Units No.	Rate (₹)	Value (₹)
Jan. 1	Purchase	100	1	100	—	—	—	100	1	100
Jan. 20	Purchase	100	2	200	—	—	—	100	1	100
								100	2	200
Jan. 22	Issue to Job W 16	—	—	—	60	2	120	100	1	100
								40	2	80
Jan. 23	Issue to Job W 17	—	—	—	40	2	80	80	1	80
					20	1	20			

Statement of Receipt and Issues by adopting Weighted Average method

Date	Particulars	Receipts			Issues			Balance		
		Units No.	Rate (₹)	Value (₹)	Units No.	Rate (₹)	Value (₹)	Units No.	Rate (₹)	Value (₹)
Jan. 1	Purchase	100	1	100	—	—	—	100	1	100
Jan. 20	Purchase	100	2	200	—	—	—	200	1.50	300
Jan. 22	Issue to Job W 16	—	—	—	60	1.50	90	140	1.50	210
Jan. 23	Issue to Job W 17	—	—	—	60	1.50	90	80	1.50	120

Statement of Material Values allocated to Job W 16, Job 17 and Closing Stock, under aforesaid methods

	FIFO (₹)	LIFO (₹)	Weighted Average (₹)
Material for Job W 16	60	120	90
Material for Job W 17	80	100	90
Closing Stock	160	80	120
	300	300	300

3 CHAPTER EMPLOYEE COST

Q.1 Calculate Labour Cost | RTP Dec 21

Textile Ltd. pays following overtime premium for its labour beside normal wages of ₹ 100 per hour:

Before and after normal working hours	80% of basic wage rate
Sundays and holidays	150% of basic wage rate

During the previous year 2019-20, the following hours were worked:

Normal time	3,00,000 hours
Overtime before and after normal working hours	60,000 hours
Overtime on Sundays and holidays	15,000 hours
Total	**3,75,000 hours**

During the current year 2020-21, the following hours have been worked on job 'Spinning':

Normal	4,000 hours
Overtime before and after normal working hours	400 hours
Overtime on Sundays and holidays	100 hours
Total	4,500 hours

You are required to CALCULATE the labour cost chargeable to job 'Spinning' and overhead in each of the following instances:

(a) Where overtime is worked regularly throughout the year as a policy due to the workers' shortage.

(b) Where overtime is worked irregularly to meet the requirements of production.

(c) Where overtime is worked at the request of the customer to expedite the job.

Ans.

Workings:

Basic wage rate = ₹ 100 per hour

Overtime wage rate before and after working hours = ₹ 100 + (₹ 100 × 80%) = ₹ 180 per hour

Overtime wage rate for Sundays and holidays = ₹ 100 + (₹ 100 × 150%) = ₹ 250 per hour

Computation of average inflated wage rate (including overtime premium):

Particulars	Amount (₹)
Annual wages for the previous year for normal time (3,00,000 hrs. × ₹ 100)	3,00,00,000
Wages for overtime before and after normal working hours (60,000 hrs. × ₹ 180)	108,00,000
Wages for overtime on Sundays and holidays (15,000 hrs. × ₹ 250)	37,50,000
Total wages for 3,75,000 hrs.	**4,45,50,000**

$$\text{Average inflated wage rate} = \frac{4,45,50,000}{3,75,000 \text{ hours}} = 118.80$$

(a) **Where overtime is worked regularly as a policy due to workers' shortage**

The overtime premium is treated as a part of employee cost and job is charged at an inflated wage rate.

Hence, employee cost chargeable to job 'Spinning'

= Total hours × Inflated wage rate = 4,500hrs. × 118.80 = 5,34,600

(b) Where overtime is worked irregularly to meet the requirements of production

Basic wage rate is charged to the job and overtime premium is charged to factory overheads as under:

Employee cost chargeable to Job 'Spinning' = 4,500hours @ 100 per hour
= 4,50,000

Factory overhead = {400 hrs. × (₹ 100 × 80%)} + {100 hrs. × (100 × 150%)}
= {32,000 + 15,000} = 47,000

(c) Where overtime is worked at the request of the customer, overtime premium is also charged to the job as under:

		(₹)
Job 'Spinning' Employee cost: 4,500hrs. @ 100	=	4,50,000
Overtime premium: 400 hrs. @ (100 × 80%)	=	32,000
100 hrs. @ (100 × 150%)	=	15,000
Total		**4,97,000**

Q.2 Calculates wages & allocate | PY Nov 20

Following are the particulars of two workers 'R' and 'S' for a month:

Particulars	*R*	*S*
(i) Basic Wages (₹)	*15,000*	*30,000*
(ii) Dearness Allowance	*50%*	*50%*
(iii) Contribution to EPF (on basic wages)	*7%*	*7.5%*
(iv) Contribution to ESI (on basic wages)	*2%*	*2%*
(v) Overtime (hours)	*20*	*-*

The normal working hours for the month are 200 hrs. Overtime is paid at double the total of normal wages and dearness allowance. Employer's contribution to State Insurance and Provident Fund are at equal rates with employees' contributions.

Both workers were employed on jobs A, B and C in the following proportions :

Jobs	*A*	*B*	*C*
R	*75%*	*10%*	*15%*
S	*40%*	*20%*	*40%*

Overtime was done on job 'A'. You are required to :

(i) Calculate ordinary wage rate per hour of 'R' and 'S'.

(ii) Allocate the worker's cost to each job 'A', 'B' and 'C'.

Ans. **(i) Calculation of Net Wages paid to Worker 'R' and 'S'**

Particulars	**R (₹)**	**S (₹)**
Basic Wages	15,000.00	30,000.00
Dearness Allowance (DA) (50% of Basic Wages)	7,500.00	15,000.00
Overtime Wages (Refer to Working Note 1)	4,500.00	----
Gross Wages earned	27,000.00	45,000.00
Less: Provident Fund (7% × ₹ 15,000); (7.5% × ₹ 30,000)	(1,050.00)	(2,250.00)
Less: ESI (2% × ₹ 15,000); (2% × ₹ 30,000)	(300.00)	(600.00)
Net Wages paid	**25,650.00**	**42,150.00**

Calculation of ordinary wage rate per hour of Worker 'R' and 'S'

	R (₹)	S (₹)
Gross Wages (Basic Wages + DA) (excluding overtime)	22,500.00	45,000.00
Employer's contribution to P.F. and E.S.I.	1,350.00	2,850.00
	23,850.00	47,850.00
Ordinary wages Labour Rate per hour (₹ 23,850 ÷ 200 hours); (₹ 47,850 ÷ 200 hours)	**119.25**	**239.25**

(ii) Statement Showing Allocation of workers cost to each Job

	Total Wages	Jobs		
		A	B	C
Worker R				
Ordinary Wages (15:2:3)	23,850.00	17,887.50	2,385.00	3577.50
Overtime	4500.00	**4500.00**	-	--
Worker S				
Ordinary Wages (2:1:2)	47,850.00	19,140.00	9,570.00	19,140.00
	76,200.00	**41,527.50**	**11,955.00**	**22,717.50**

Working Note:

Normal Wages are considered as basic wages.

$$\text{Over time} = \frac{2 \times (\text{Basic wage} + \text{D.A.}) \times 20\text{hours}}{200\text{hours}}$$

$$= 2 \times \frac{22,500}{200} \times 20\text{hours}$$

$$= 4,500$$

Q.3 Calculates wages & allocate RTP Nov 20

GZ Ld. pays the following to a skilled worker engaged in production works. The following are the employee benefits paid to the employee:

(a)	Basic salary per day	1,000
(b)	Dearness allowance (DA)	20% of basic salary
(c)	House rent allowance	16% of basic salary
(d)	Transport allowance	50 per day of actual work
(e)	Overtime	Twice the hourly rate (considers basic and DA), only if works more than 9 hours a day otherwise no overtime allowance. If works for more than 9 hoursa day then overtime is considered after 8th hours.
(f)	Work of holiday and Sunday	Double of per day basic rate provided works atleast 4 hours. The holiday and Sunday basic is eligible for all allowances and statutory deductions.
(g)	Earned leave & Casual leave	These are paid leave.
(h)	Employer's contribution to Provident fund	12% of basic and DA
(i)	Employer's contribution to Pension fund	7% of basic and DA

The company normally works 8-hour a day and 26-day in a month. The company provides 30 minutes lunch break in between.

During the month of August 2020, Mr.Z works for 23 days including 15th August and a Sunday and applied for 3 days of casual leave. On 15th August and Sunday he worked for 5 and 6 hours respectively without lunch break. On 5th and 13th August he worked for 10 and 9 hours respectively.

During the month Mr. Z worked for 100 hours on Job no.HT200.
You are required to CALCULATE:
(i) Earnings per day
(ii) Effective wages rate per hour of Mr. Z.
(iii) Wages to be charged to Job no.HT200.

Ans.

Workings:

1. Normal working hours in a month = (Daily working hours – lunch break) × no. of days
   = (8 hours – 0.5 hours) × 26 days = 195 hours
2. Hours worked by Mr.Z = No. of normal days worked + Overtime + holiday/ Sunday worked
   = (21 days × 7.5 hours) + (9.5 hours + 8.5 hours) + (5 hours + 6 hours)
   = 157.5 hours + 18 hours + 11 hours = 186.50 hours.

(i) Calculation of earnings per day

Particulars	Amount (₹)
Basic salary (₹1,000 × 26 days)	26,000
Dearness allowance (20% of basic salary)	5,200
	31,200
House rent allowance (16% of basic salary)	4,160
Employer's contribution to Provident fund (12% × 31,200)	3,744
Employer's contribution to Pension fund (7% × 31,200)	2,184
	41,288
No. of working days in a month (days)	26
Rate per day	1,588
Transport allowance per day	50
Earnings per day	**1,638**

(ii) Calculation of effective wage rate per hour of Mr. Z:

Particulars	Amount (₹)
Basic salary (₹1,000 × 26 days)	26,000
Additional basic salary for Sunday & holiday (₹1,000 × 2 days)	2,000
Dearness allowance (20% of basic salary)	5,600
	33,600
House rent allowance (16% of basic salary)	4,480
Transport allowance (50 × 23 days)	1,150
Overtime allowance (160 × 2 × 2 hours)*	640
Employer's contribution to Provident fund (12% × 33,600)	4,032
Employer's contribution to Pension fund (7% × 33,600)	2,352
Total monthly wages	46,254
Hours worked by Mr. Z (hours)	186.5
Effective wage rate per hour	**248**

*(Daily Basic + DA) ÷ 7.5 hours
= (1,000+200) ÷ 7.5 = ₹160 per hour

(iii) Calculation of wages to be charged to Job no. HT200
= 248 × 100 hours = 24,800

Q.4 Calculates wages & allocate | RTP May 22

A total of 108 labour hours have been put in a particular job card for repair work engaging a semi-skilled and skilled labour (Mr. Deep and Mr. Sam respectively).

The hours devoted by both the workers individually on daily basis for this particular job are given below:

Monday	Tuesday	Wednesday	Thursday	Friday
10.5	8.0	10.5	9.5	10.5

The skilled labour also worked on Saturday for 10 hours.

Sunday is a weekly holiday and each worker has to work for 8 hours on all week days and 5 hours on Saturdays; the workers are however paid full wages for Saturday (8 hours for 5 hours worked).

Semi-skilled and skilled worker is paid ordinary wage @ 400 and 600 respectively per day of 8 hours labour. Further, the workers are also paid dearness allowance @ 20%.

Extra hours worked over and above 8 hours are also paid at ordinary wage rate however, overtime premium of 100% of ordinary wage rate is paid if a worker works for more than 9 hours in a day AND 48 hours in a week.

You are required to COMPUTE the wages payable to Mr. Deep (Semi-skilled) and Mr. Sam (Skilled).

Ans. **Calculation of total normal hours to be paid for Mr. Deep (Semi-skilled):**

Day	Normal hours	Extra hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours
	A	B	C	D = C×2	E = A+B+D
Monday	8	1	1½	3	12
Tuesday	8	--	--	--	8
Wednesday	8	1	1½	3	12
Thursday	8	1	½	1	10
Friday	8	1	1½	3	12
Saturday	--	--	--	--	--
Total	40	4	5	10	54

*Mr. Sam will be paid for equivalent 8 normal working hours at ordinary wage rate, though 5 hours of working is required on Saturday. Further, extra 9th hour worked will also be paid at ordinary wage rate.

** Overtime of 1 hour worked over and above 9 hours will be paid at overtime rate.

Wages payable:

	Mr. Deep	Mr. Sam
Basic Wages per hour (₹ 400/8, ₹ 600/8) (₹)	50	75
Dearness allowance per hour (@ 20%) (₹)	10	15
Hourly rate (₹)	60	90
Total equivalent normal hours	54	65
Total Wages payable (₹)	**3,240**	**5,850**

Q.5 Calculates wages & allocate | MTP Nov 22(1)

Archika Tyre Manufacturing Private Limited has four workers Ram, Shyam, Mohan & Kundan who are paid wages on the basis of ₹ 100 per day, ₹ 120 per day, ₹ 130 per day & ₹ 2500 per month respectively.

Standard working days in a week are six of 8 hours per day. For the month of Octob er 2022, there was only one holiday other than Sunday for which no payment was made to employees except Kundan who was paid for full month. Sundays are considered paid holidays i.e. employees are paid for Sunday also even there is no working on that day. Provident fund contribution is 8% of monthly wages by employer and employee each. ESI contribution is 5% of monthly wages by employer and 4% of monthly wages by employee.

On the basis of above information, you are required to CALCULATE (regarding the month of October 2022):

(i) Amount of net wages receivable by each employee from the employer.

(ii) What is the total amount of Provident Fund required to be deposited by employer?

(iii) What is the total amount of ESI required to be deposited by employer?

(iv) What is the total labour cost to employer?

(v) If total material cost is ₹ 20,000 for October 2022 and overheads are charged equal to labour cost, calculate total cost for the month.

Ans.

(i) Calculation of net wages receivable by each employee from the employer (October 2022):

	Ram (₹)	Shyam (₹)	Mohan (₹)	Kundan (₹)	Total (₹)
Wages for October 2022	3,000 (₹ 100 x 30 days)	3,600 (₹ 120 x 30 days)	3,900 (₹ 130 x 30 days)	2,500	13,000
Less: Employee Contribution to PF @ 8%	240	288	312	200	1,040
Less: Employee Contribution to ESI @ 4%	120	144	156	100	520
Net Wages Receivable	**2,640**	**3,168**	**3,432**	**2,200**	**11,440**

(ii) Calculation of total amount of Provident Fund required to be deposited by employer (October 2022):

	(₹)
Total Wages for the month	13,000
Employer's Contribution to Provident Fund @8% of ₹ 13,000	1,040
Add: Employee's Contribution to Provident Fund @8% of ₹ 13,000	1,040
Total amount of Provident Fund required to be deposited by employer	**2,080**

(iii) Calculation of total amount of ESI required to be deposited by employer (October 2022):

	(₹)
Total Wages for the month	13,000
Employer's Contribution to ESI @5% of ₹ 13,000	650
Add: Employee's Contribution to ESI @4% of ₹ 13,000	520
Total amount of ESI required to be deposited by employer	**1,170**

(iv) Total labour cost to employer (October 2022):

	(₹)
Total Wages for the month	13,000
Add: Employer's Contribution to Provident Fund @8% of ₹ 13,000	1,040
Add: Employer's Contribution to ESI @5% of ₹ 13,000	650
Total labour cost to employer	**14,690**

(v) Calculation of Total Cost for October 2022

	(₹)
Total Material Cost	20,000
Total Labour Cost	14,690
Total Overheads (Equal to Labour Cost)	14,690
Total Cost	**49,380**

Q.6 Calculates wages & allocate | MTP May (23)

A transport company has a fleet of three trucks of 10 tonnes capacity each plying in different directions for transport of customer's goods. The trucks run loaded with goods and return empty. The distance travelled, number of trips made and the load carried per day by each truck are as under:

Truck No.	One way Distance Km	No. of trips per day	Load carried per trip / day tonnes
1	16	4	6
2	40	2	9
3	30	3	12

The analysis of maintenance cost and the total distance travelled during the last two years is as under

Year	Total distance travelled	Maintenance Cost (₹)
1	1,60,200	46,050
2	1,56,700	45,175

The following are the details of expenses for the year under review:

Diesel	₹ 65 per litre. Each litre gives 4 km per litre of diesel on an average.
Driver's salary	₹ 24,000 per month
Licence and taxes	₹ 25,000 per annum per truck
Insurance	₹ 45,000 per annum for all the three vehicles
Purchase Price per truck	₹ 30,00,000, Life 10 years. Scrap value at the end of life is ₹ 1,00,000.
Oil and sundries	₹ 250 per 100 km run.
General Overhead	₹ 1,15,600 per annum

The vehicles operate 24 days per month on an average.

On the basis of commercial tone-km, you are required to:

(i) PREPARE an Annual Cost Statement covering the fleet of three vehicles.
(ii) CALCULATE the cost per km. run.
(iii) DETERMINE the freight rate per tonne km. to yield a profit of 10% on freight.

Ans. **(i) Annual Cost Statement of three vehicles**

	(₹)
Diesel {(1,34,784 km. ÷ 4 km) × ₹ 65) (Refer to Working Note 1)	21,90,240
Oil & sundries {(1,34,784 km. ÷ 100 km.) × ₹ 250}	3,36,960

Maintenance {(1,34,784 km. × ₹ 0.25) + ₹ 6,000} (Refer to Working Note 2)	39,696
Drivers' salary {(₹24,000 × 12 months) × 3 trucks}	8,64,000
Licence and taxes (₹ 25,000 × 3 trucks)	75,000
Insurance	45,000
Depreciation {(₹ 29,00,000 ÷ 10 years) × 3 trucks}	8,70,000
General overhead	1,15,600
Total annual cost	45,36,496

(ii) Cost per km. run

$$\text{Cost per kilometer run} = \frac{\text{Total annual cos t of vehicles}}{\text{Total kilometre travelled annually}} \text{(Refer to Working Note 1)}$$

$$= \frac{45,36,496}{1,34,784 \text{ Kms}} 33.66$$

(iii) Freight rate per tonne km (to yield a profit of 10% on freight)

$$\text{Cost per tonne km.} = \frac{\text{Total annual cos t of three vehicles}}{\text{Total effective tonnes kms. per annum}} \text{(Refer to Working Note 1)}$$

$$= \frac{45,36,496}{6,06,528 \text{ kms}} = 7.48$$

$$\text{Freight rate per tonne km.} \left(\frac{7.48}{0.9}\right) x1 = 8.31$$

Working Notes:

1. Total kilometer travelled and Commercial tonnes kilometer (load carried) by three trucks in one year

Truck	One way distance in kms	No. of trips	Total distance covered in km per day (with load)	Total distance covered in km per day (up & down)	Load carried per trip / day in tonnes	Total effective tonnes km
	a	b	c = a × b	d = c × 2	e	f = 27/3 × c
1	16	4	64	128	6	576
2	40	2	80	160	9	720
3	30	3	90	180	12	810
Total			234	468	27	2,106

Total kilometre travelled by three trucks in one year
(468 km. × 24 days × 12 months) = 1,34,784
Total effective tonnes kilometre of load carried by three trucks during one year
(2,106 tonnes km. × 24 days × 12 months) = 6,06,528 tonne-km

2. Fixed and variable component of maintenance cost:

$$\text{Variable maintenance cost per km} = \frac{\text{Difference in maintenanc e cost}}{\text{Difference in distance travelled}}$$

$$= \frac{46,050 - 45,175}{1,60,200 \text{ kms} - 1,56,700 \text{ kms}} = 0.25$$

Fixed maintenance cost = Total maintenance cost–Variable maintenance cost
= ₹ 46,050 – 1,60,200 kms × ₹ 0.25= ₹ 6,000

Q.7 Charging Overtime | MTP Nov 20

In a factory, the basic wage rate is ₹ 300 per hour and overtime rates are as follows:

Before and after normal working hours	180% of basic wage rate
Sundays and holidays	230% of basic wage rate
During the previous year, the following hours were worked	
- Normal time	1,00,000 hours
- Overtime before and after working hours	20,000 hours
Overtime on Sundays and holidays	5,000 hours
Total	1,25,000 hours

The following hours have been worked on job 'A'

Normal	1,000 hours
Overtime before and after working hrs.	100 hours.
Sundays and holidays	25 hours.
Total	1,125 hours

You are required to CALCULATE the labour cost chargeable to job 'A' and overhead in each of the following instances:

(i) Where overtime is worked regularly throughout the year as a policy due to the workers' shortage.
(ii) Where overtime is worked irregularly to meet the requirements of production.
(iii) Where overtime is worked at the request of the customer to expedite the job.

Ans. (i)

Process- A Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Inputs	40,000	3,60,000	By Normal wastage (2,000 units × Rs.15)	2,000	30,000
To Material	---	2,42,000	By Abnormal loss A/c (1,000 units × Rs.27)	1,000	27,000
To Direct wages	---	2,58,000	By Process- B (29,600 units × Rs.27)	29,600	7,99,200
To Manufacturing Exp.	---	1,96,000	By Profit & Loss A/c (7,400 units × Rs.27)	7,400	1,99,800
	40,000	10,56,000		40,000	10,56,000

Cost per unit = $\frac{\text{Rs.10,56,000} - \text{Rs.30,000}}{40{,}000\text{units} - 2{,}000\text{units}}$ = Rs. 27 per unit

Normal wastage = 40,000 units × 5% = 2,000 units
Abnormal loss = 40,000 units – (37,000 units + 2,000 units) = 1,000 units
Transfer to Process- B = 37,000 units × 80% = 29,600 units
Sale = 37,000 units × 20% = 7,400 units

Process- B Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)

To Process- A A/c	29,600	7,99,200	By Normal wastage (2,960 units × Rs. 20) By Profit & Loss A/c (27,000 units × Rs. 48)	2,960	59,200
To Material	---	2,25,000		27,000	12,96,000
To Direct Wages	---	1,90,000			
To Manufacturing Exp.	---	1,23,720			
To Abnormal Gain A/c (360 units × Rs. 48)	360	17,280			
	29,960	13,55,200		29,960	13,55,200

Cost per unit = $= \frac{Rs.13,37,920 - Rs.59,200}{29,600units - 2,960units} =$ Rs. 48 perunit

Normal wastage = 29,600 units × 10% = 2,960 units

Abnormal gain = (27,000 units + 2,960 units) – 29,600 units = 360 units

(ii) Costing Profit & Loss Account

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Process- A A/c	1,99,800	By Sales:	
To Process- B A/c	12,96,000	- Process-A (7,400 units × Rs. 37)	2,73,800
To Abnormal loss A/c	12,000	- Process- B (27,000 units × Rs. 61)	16,47,000
To Indirect Expenses	4,48,080	By Abnormal gain	10,080
		By Net loss	25,000
	19,55,880		19,55,880

Working Notes:

Normal wastage (Loss) Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process- A A/c	2,000	30,000	By Abnormal Gain A/c (360 units × Rs. 20)	360	7,200
To Process- B A/c	2,960	59,200	By Bank (Sales)	4,600	82,000
	4,960	89,200		4,960	89,200

Abnormal Loss Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process- A A/c	1,000	27,000	By Bank A/c (1,000 units × Rs. 15)	1,000	15,000
			By Profit & Loss A/c	---	12,000
	1,000	27,000		1,000	27,000

Abnormal Gain Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Normal loss A/c (360 units × Rs. 20)	360	7,200	By Process- B A/c	360	17,280
To Profit & Loss A/c		10,080			
	360	17,280		360	17,280

Q.8 Employee Cost & Idle Time | PY Nov 18

Following data have been extracted from the books of M/s. ABC Private Limited:

(i)	*Salary (each employee, per month)*	*₹ 30,000*
(ii)	*Bonus*	*25% of salary*
(iii)	*Employer's contribution to PF, ESI etc.*	*15% of salary*
(iv)	*Total cost at employees' welfare activities*	*₹ 6,61,500 per annum*
(v)	*Total leave permitted during the year*	*30 days*
(v)	*No. of employees*	*175*
(vii)	*Normal idle time*	*70 hours per annum*
(viii)	*Abnormal idle time (due to failure of power supply)*	*50 hours*
(ix)	*Working days per annum*	*310 days of 8 hours*

You are required to calculate:

1. Annual cost of each employee
2. Employee cost per hour
3. Cost of abnormal idle time, per employee

Ans.

1.

	Annual cost of each employee	₹.
1.	Salary (30,000×12)	3,60,000
2.	Bonus (25% of Salary)	90,000
3.	Employees Contribution to PF (15% of Salary)	54,000
4.	Employers welfare (661500/175)	3,780
	Total Annual Cost	**5,07,780**

2.

Effective Working hours (310 days × 8 hours)	2480 hours
Less: Leave days (30 days × 8 hours)	240 hours*
Available Working hours	2240 hours
Less: Normal Loss @	70 hours
	2170 hours

Employee Cost per hour $= \frac{507780}{2170} = 234$

*It is assumed 310 working days are without taking leave permitted into consideration

3. Cost of abnormal idle time per employee = 234× 50 hours= 11700

Alternative solution for Part (2) and (3)

Calculation of Employee cost per hour:

Working hours per annum	2,480 *
Less: Normal Idle time hours	70
Effective hours	2,410
Employee cost	5,07,780
Employee cost per hour	210.70

***It is assumed 310 working days are after adjusting leave permitted during the year.**

Cost of Abnormal idle time per employee:

Abnormal Idle time hours	50
Employee cost per hour	210.70

Cost of Abnormal idle time (210.70 ×50) 10,534.85

Q.9 Gurenteed/Rowan/Piece Rate | RTP May 19

A Company is undecided as to what kind of wage scheme should be introduced. The following particulars have been compiled in respect of three workers. Which are under consideration of the management.

	I	II	III
Actual hours worked	380	100	540
Hourly rate of wages (in ₹)	40	50	60
Productions in units:			
- Product A	210	-	600
- Product B	360	-	1350
- Product C	460	250	-
Standard time allowed per unit of each product is:			
	A	B	C
Minutes	15	20	30

For the purpose of piece rate, each minute is valued at 1/-

You are required to CALCULATE the wages of each worker under:

(i) Guaranteed hourly rate basis

(ii) Piece work earning basis, but guaranteed at 75% of basic pay (Guaranteed hourly rate if his earnings are less than 50% of basic pay.)

(iii) Premium bonus basis where the worker received bonus based on Rowan scheme.

Ans.

(i) Computation of wages of each worker under guaranteed hourly rate basis

Worker	Actual hours worked (Hours)	Hourly wage rate (₹)	Wages (₹)
I	380	40	15,200
II	100	50	5,000
III	540	60	32,400

(ii) Computation of Wages of each worker under piece work earning basis

Product	Piece rate per unit (₹)	Worker-I		Worker-II		Worker-III	
		Units	Wages (₹)	Units	Wages (₹)	Units	Wages (₹)
A	15	210	3,150	-	-	600	9,000
B	20	360	7,200	-	-	1,350	27,000
C	30	460	13,800	250	7,500	-	-
Total			24,150		7,500		36,000

Since each worker's earnings are more than 50% of basic pay. Therefore, worker-I, II and III will be paid the wages as computed i.e. ₹ 24,150, ₹ 7,500 and ₹ 36,000 respectively.

Working Notes:

1. **Piece rate per unit**

Product	Standard time per unit in minute	Piece rate each minute (₹)	Piece rate per unit (₹)
A	15	1	15
B	20	1	20
C	30	1	30

2. **Time allowed to each worker**

Worker	Product-A	Product-B	Product-C	Total Time (Hours)
I	210 units × 15 = 3,150	360 units × 20 = 7,200	460 units × 30 = 13,800	24,150/60 = 402.50
II	-	-	250 units × 30 = 7,500	7,500/60 = 125
III	600 units × 15 = 9,000	1, 350 units × 20 = 27,000	-	36,000/60 = 600

(iii) Computation of wages of each worker under Premium bonus basis (where each worker receives bonus based on Rowan Scheme)

Worker	Time Allowed (Hr.)	Time Taken (Hr.)	Time saved (Hr.)	Wage Rate per hour (₹)	Earnings (₹)	Bonus (₹)*	Total Earning (₹)
I	402.5	380	22.5	40	15,200	850	16,050
II	125	100	25	50	5,000	1,000	6,000
III	600	540	60	60	32,400	3,240	35,640

$$* \frac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Wage Rate}$$

$$\text{Worker} - \text{I} = \frac{380}{402.5} = 22.5 \times 40 = 850$$

$$\text{Worker} - \text{II} = \frac{100}{125} = 25 \times 50 = 1000$$

$$\text{Worker} - \text{III} = \frac{540}{600} = 60 \times 60 = 3240$$

Q.10 Halsey & Normal | PY Nov 19

X Ltd. distributes' its goods to a regional dealer using single lorry. The dealer premises are 40 kms away by road. The capacity of the lorry is 10 tonnes. The lorry makes the journey twice a day fully loaded on the outward journey and empty on return journey.

The following information is available:

Diesel Consumption	8 km per litre
Diesel Cost	60 per litre
Engine Oil	200 per week
Driver's Wages (fixed)	2,500 per
week Repairs	600 per
week Garage Rent	800 per week
Cost of Lorry (excluding cost of tyres)	9,50,000
Life of Lorry	1,60,000 kms
Insurance	18,200 per annum
Cost of Tyres	52,500
Life of Tyres	25,000 kms
Estimated sale value of the lorry at end of its life is	1,50,000
Vehicle License Cost	7,800 per annum
Other Overhead Cost	41,600 per annum

The lorry operates on a 5 day week.

Required:

(i) A statement to show the total cost of operating the vehicle for the four week period analysed into Running cost and Fixed cost.

(ii) Calculate the vehicle operating cost per km and per tonne km. (Assume 52 weeks in a year)

Ans. **Working Notes:**

Particulars	For 4 weeks	For 1 week (by dividing by 4)
Total distance travelled (40 k.m × 2 × 2 trips × 5 days × 4 weeks)	3,200 km	800 km
Total tonne km (40 k.m × 10 tonnes × 2 × 5 days × 4 weeks)	16,000 tonne km	4,000 tonne km

(i) Statement showing Operating Cost

	Particulars	For 4 weeks	For 1 week (by dividing by 4)
A.	**Fixed Charges:**		
	Drivers' wages (₹2,500x4 weeks)	10,000	2,500
	Garage rent (₹800 × 4 weeks)	3,200	800
	Insurance {(₹18,200 ÷ 52 weeks) × 4 weeks}	1,400	350
	Vehicle license {(₹7,800 ÷ 52 weeks) × 4 weeks}	600	150
	Other overheads cost {(₹41,600 ÷ 52 weeks) × 4 weeks}	3,200	800
	Total (A)	**18,400**	**4,600**
B.	**Running Cost:**		
	Cost of diesel {(3,200 ÷ 8 kms) × ₹60}	24,000	6,000
	Engine Oil (₹200 × 4 weeks)*	800	200
	Repairs (₹600 × 4 weeks)*	2,400	600
	Depreciation on vehicle $\left(\frac{9,50,000-1,50,000}{1,60,000km} x 3,200km\right)$	16,000	4,000
	Depreciation on tyres $\frac{5,200}{25,000km} x 3,200km$	6,720	1,680
	Total (B)	**49,920**	**12,480**
C.	**Total Cost (A + B)**	**68,320**	**17,080**

*Cost of engine oil & repairs may also be treated as fixed cost, as the question relates these with time i.e. in weeks instead of running of vehicle.

(ii) Calculation of vehicle operating cost:

Operating cost per k.m. $= \frac{68,320}{3,200 \text{ kms}}$ OR $= \frac{17,080}{800 \text{ Kms}} = 21.35$

Operating cost per Tonne-k.m. $= \frac{68,320}{16,000}$ OR $= \frac{17,080}{4,000} = 4.27$

Q.11 Halsey & Rowan | PY Jan 21

Z Ltd is working by employing 50 skilled workers. It is considering the introduction of an incentive scheme - either Halsey Scheme (with 50% Bonus) or Rowan Scheme - of wage payment for increasing the labour productivity to adjust with the increasing demand for its products by 40%. The company feels that if the proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers, it could act as sufficient incentive for them to produce more and the company has accordingly given assurance to the workers.

Because of this assurance, an increase in productivity has been observed as revealed by the figures for the month of April, 2020:

Hourly rate of wages (guaranteed)	*₹ 50*
Average time for producing one unit by one worker at the previous performance (this may be taken as time allowed)	*1.975 hours*
Number of working days in a month	*24*
Number of working hours per day of each worker	*8*
Actual production during the month	*6,120 units*

Required:

(i) Calculate the effective increase in earnings of workers in percentage terms under Halsey and Rowan scheme.

(ii) Calculate the savings to Z Ltd in terms of direct labour cost per unit under both the schemes.

(iii) Advise Z Ltd about the selection of the scheme that would fulfil its assurance of incentivising workers and also to adjust with the increase in demand.

Ans.

Working Notes:

1. Total time wages of 50 workers per month:
   = No. of working days in the month × No. of working hours per day of each worker × Hourly rate of wages × No. of workers
   = 24 days × 8 hrs. × ₹ 50 × 50 workers = 4,80,000

2. Time saved per month:

Time allowed per unit to a worker	1.975 hours
No. of units produced during the month by 50 workers	6,120
units Total time allowed to produce 6,120 units (6,120 × 1.975 hrs)	12,087 hours
Actual time taken to produce 6,120 units (24 days × 8 hrs. × 50 workers)	9,600 hours
Time saved (12,087 hours – 9,600 hours)	2,487 hours

3. Bonus under Halsey scheme to be paid to 50 workers:
   Bonus = (50% of time saved) × hourly rate of wages
   = 50/100 × 2,487 hours × 50 = 62,175
   Total wages to be paid to 50 workers are (₹ 4,80,000 + ₹ 62,175) ₹ 5,42,175, if Z Ltd. considers the introduction of Halsey Incentive Scheme to increase the worker productivity.

4. Bonus under Rowan Scheme to be paid to 50 workers:

$$\text{Bonus} = \frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{hourly rate}$$

$$= \frac{9,600 \text{ hours}}{12,087 \text{ hours}} \times 2,487 \text{hours} \times 50 = 98,764$$

Total wages to be paid to 50 workers are (₹ 4,80,000 + ₹ 98,764) ₹ 5,78,764, if Z Ltd. considers the introduction of Rowan Incentive Scheme to increase the worker productivity.

(i) (a) Effective hourly rate of earnings under Halsey scheme:
(Refer to Working Notes 1, 2 and 3)

$$= \frac{\text{Total time wages of 50 workers} + \text{Total bonus under Halsey scheme}}{\text{Total hours worked}}$$

$$= \frac{4,80,000 + 62,175}{9,600 \text{ hours}} = 56.48$$

Effective increase in earnings of worker (in %) = $\frac{56.48 - 50}{50} \times 100 = \mathbf{2.96\%}$

(b) Effective hourly rate of earnings under Rowan scheme:
(Refer to Working Notes 1, 2 and 4)

$$\frac{\text{Total time wages of 50 workers} + \text{Total bonus under Rowan scheme}}{\text{Total hours worked}}$$

$$\frac{4,80,000 + 96,875}{9,600 \text{ hours}} = 60.29$$

Effective increase in earnings of worker (in %)= $\frac{60.29 - 50}{50} \times 100 = \mathbf{20.58\%}$

(ii) (a) Saving in terms of direct labour cost per unit under Halsey scheme: (Refer to Working Note 3)
Labour cost per unit (under time wage scheme)
= 1.975 hours × ₹ 50 = ₹ 98.75

$$= \frac{\text{Total wages paid under the schem}}{\text{Total number of units produced}} = \frac{5,\ 42,175}{6,120} = 88.60$$

Saving per unit = ₹ 98.75 – ₹ 88.60 = ₹ 10.15

(b) Saving in terms of direct worker cost per unit under Rowan Scheme: (Refer to Working Note 4)
Labour cost per unit under Rowan scheme = 5,78,764/6,120 units = 94.57
Saving per unit = 98.75 – 94.57 = 4.18

(iii) Calculation of Productivity:

Normal Production Hours worked/Unit per Hour (9,600/1.975)	4,861
Actual Production Units	6,120
Increase in labour productivity	1,259
% Productivity i.e. increase in production/Normal production	**25.9%**

Advice: Rowan plan fulfils the company's assurance of 20% increase over the present earnings of workers. This would increase productivity by 25.9% only. It will not adjust with the increase in demand by 40%.

Q.12 Halsey & Rowan | PY Dec 21

A skilled worker is paid a guaranteed wage rate of ₹ 150 per hour. The standard time allowed for a job is 10 hours. He took 8 hours to complete the job. He has been paid the wages under Rowan Incentive Plan.
You are required to:
(i) Calculate an effective hourly rate of earnings under Rowan Incentive Plan.
(ii) Calculate the time in which he should complete the job, if the worker is placed under Halsey Incentive Scheme (50%) and he wants to maintain the same effective hourly rate of earnings.

Ans. (i) Calculation of Effective hourly rate of earnings under Rowan Incentive Plan:
Standard time allowed = 10 hours
Time taken = 8 hours; Time saved = 2 hours

	Particulars	Amount (₹)
A	Basic guaranteed wages (₹150×8 hours)	1,200
B	Add: Bonus for time saved (2 × 8 × ₹150) 10	240
C	Total earnings (A+B)	1,440
D	Hours worked	8 hours
E	Effective hourly rate (C÷D)	180

(ii) Let the time taken to complete the job is "T" and the time saved is 10-T Effective hourly rate under the Halsey Incentive scheme

(Rate × Hours Worked) + (Rate × 50% of Time Saved)

$$= \frac{(\text{Rate} \times \text{Hours Worked}) + (\text{Rate} \times 50\% \text{ of Time Saved})}{\text{Hours Worked}} = 180$$

$$= \frac{(150 \times T) + 150 \times 50\%(10 - T)}{T} = 180$$

150T + 750 -75T = 180T

180T-75T = 750

$$T = \frac{750}{105} = 7.14$$

Q.13 Halsey & Rowan | PY May 23

SMC Company Limited is producing a particular design of toys under the following existing incentive system:

Normal working hours in the week	48 hours
Late shift hours in the week	12 hours
Rate of payment	Normal working: 150 per hour Late shift: 300 per hour

Average output per operator for 60 hours per week (including late shift hours): 80 toys.

The company's management has now decided to implement a system of labour cost payment with either the Rowan Premium Plan or the Halsey Premium Plan in order to increase output, eliminate late shift overtime, and reduce the labour cost.

The following information is obtained:

The standard time allotted for ten toys is seven and half hours. Time rate: ₹ 150 per hour (as usual).

Assuming that the operator works for 48-hours in a week and produces 100 toys, you are required to calculate the weekly earnings for one operator under-

(i) The existing Time Rate,

(ii) Rowan Premium Plan and,

(iii) Halsey Premium Plan (50%).

Ans. **Working Notes:**

(1) Effective rate per hour:

Incentive for 60 hours = (₹ 150 × 48 hours + ₹ 300 × 12 hours)

= 7,200 + 3,600 = ₹ 10,800

= ₹ 10,800 ÷ 60 hours = ₹ 180 per hour

(2) Time taken/ Allowed to produce 100 toys:

= (60 hours ÷ 80 toys) × 100 toys = 75 hours

(3) Time saved = Time Allowed – Time Taken

= 75 hours – 48 hours = 27 hours

(i) Calculation of weekly earnings for one operator under the existing time rate:

= (48 hours x 150) + (12 hours x 300) = **10,800**

Alternative solution

= Effective rate per hour (WN-1) × Time required for 100 toys (WN-2)

= 180 × 75 hours = **13,500**

(ii) Calculation of weekly earnings for one operator under Rowan Premium plan:

(Time taken × Rate per hour) + (Time Saved/ Time Allowed × Time taken × Rate per hour)

= (48 hours × 150) + [(27 ÷ 75) × 48 × 150]

= 7,200 + 2,592 = **9,792**

(iii) Calculation of weekly earnings for one operator under Halsey Premium plan:

(Time taken × Rate per hour) + (50% of Time Saved × Rate per hour)

= (48 hours × 150) + (50% of 27 hours ×150)

= 7,200 + 2,025 = **9,225**

Q.14 Halsey & Rowan | RTP Nov 18

A job can be executed either through workman A or B. A takes 32 hours to complete the job while B finishes it in 30 hours. The standard time to finish the job is 40 hours.

The hourly wage rate is same for both the workers. In addition workman A is entitled to receive bonus according to Halsey plan (50%) sharing while B is paid bonus as per Rowan plan. The works overheads are absorbed on the job at ₹ 7.50 per labour hour worked. The factory cost of the job comes to ₹ 2,600 irrespective of the workman engaged.

INTERPRET the hourly wage rate and cost of raw materials input. Also show cost against each element of cost included in factory cost.

Ans.

1. Time saved and wages:

Workmen	A	B
Standard time (hrs.)	40	40
Actual time taken (hrs.)	32	30
Time saved (hrs.)	8	10
Wages paid @ ₹ x per hr. (₹)	32x	30x

2. Bonus Plan:

	Halsey	Rowan
Time saved (hrs.)	8	10
Bonus (₹)	4x $\left[\frac{8hrs \times X}{2}\right]$	7.5x $\left[\frac{10hrs}{40hrs} \times 30hrs \times x\right]$

3. Total wages:

Workman A: 32x + 4x = 36x

Workman B: 30x + 7.5x = 37.5x

Statement of factory cost of the job

Workmen	A (₹)	B (₹)
Material cost (assumed)	y	y
Wages (shown above)	36x	37.5x
Works overhead	240	225
Factory cost (given)	2,600	2,600

The above relations can be written as follows:

36x + y + 240 = 2,600 (i)

37.5x+ y+ 225 = 2,600 (ii)

Subtracting (i) from (ii) we get

1.5x – 15 = 0

Or, 1.5 x = 15
Or, x = 10 per hour
On substituting the value of x in (i) we get y = 2,000
Hence the wage rate per hour is ₹ 10 and the cost of raw material is ₹ 2,000 on the job.

Q.15 Halsey & Rowan | RTP Nov 23

A skilled worker is paid a guaranteed wage rate of ₹ 120 per hour. The standard time allowed for a job is 6 hour. He took 5 hours to complete the job. He is paid wages under Rowan Incentive Plan.

(i) Calculate his effective hourly rate of earnings under Rowan Incentive Plan.

(ii) If the worker is placed under Halsey Incentive Scheme (50%) and he wants to maintain the same effective hourly rate of earnings, calculate the time in which he should complete the job.

Ans.

(i) Effective hourly rate of earnings under Rowan Incentive Plan

Earnings under Rowan Incentive plan =

$$(\text{Actual time taken} \times \text{wage rate}) + \frac{\text{Time Saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Wage rate}$$

$$= (5 \text{ hours} \times 120) + \left(\frac{1 hour}{5 hour} \times 5 hours \times 120A\right)$$

= 600 +100 = 700

Effective hourly rate = 700/5 hours = 140 /hour

(ii) Let time taken = X

$$\therefore \text{Effective hourly rate} = \frac{\text{Earnings under Halsay Scheme}}{\text{Time Taken}}$$

Or, Effective hourly rate under Halsey Incentive plan =

$$\frac{(\text{Time taken}'\text{Rate}) + 50\% \text{ of Rate}'(\text{Time allowed} - \text{Timetaken})}{\text{Time Taken}}$$

$$\text{Or, } ₹140 = \frac{(X\ '120) + 50\% \text{ of } 120'(6 - X)}{X}$$

Or, 140X = 120X + 360 – 60X Or, 80X = 360

$$\text{Or, } X\frac{360}{80} = 4.5 hours$$

Therefore, to earn effective hourly rate of ₹140 under Halsey Incentive Scheme worker has to complete the work in 4.5 hours.

Q.16 Halsey & Rowan | MTP May 18

Two workers 'A' and 'B' produce the same product using the same material. Their normal wage rate is also the same. 'A' is paid bonus according to Rowan scheme while 'B' is paid bonus according to Halsey scheme. The time allowed to make the product is 120 hours. 'A' takes 90 hours while 'B' takes 100 hours to complete the product. The factory overhead rate is ₹ 50 per hour actually worked. The factory cost of product manufactured by 'A' is ₹ 80,200 and for product manufactured by 'B' is ₹ 79,400.

Required:

(i) COMPUTE the normal rate of wages.

(ii) CALCULATE the material cost.

(iii) PREPARE a statement comparing the factory cost of the product as made by two workers.

Ans. Let x be the cost of material and y be the normal rate of wage/hour

	Worker A (₹)	Worker B (₹)
Material cost	x	x
Labour wages	90 y	100 y
Bonus	Rowan system	Halsey system
	Time saved × hour worked× rate Time allowed	Hours saved × 50% × rate
	$\frac{30}{120} \times 90 \times y = 22.5y$	$20 \times \frac{1}{2} \times y = 10y$
Overheads	90x50 = 4,500	100x50 = 5,000
Factory cost	x + 112.5y + 4,500 = 80,200 ∴ x + 112.5y = 75,700... (1)	x + 110y + 5,000 = 79,400 ∴ x + 110y = 74,400.... (2)

Solving (1) and (2) we get x = 17,200 and y = 520

(i) Normal rate of wages is 520 per hour.

(ii) Cost of materials = ₹ 17,200.

(iii) Comparative Statement of factory cost

	Worker A (₹)	Worker B (₹)
Material cost	17,200	17,200
Wages	46,800 (90 × 520)	52,000 (100 × 520)
Bonus	11,700 $\left(\frac{30}{120} \times 90 \times 520\right)$	5,200 $\left(20 \times \frac{1}{2} \times 520\right)$
Overheads	4,500 (90 × 50)	5,000 (100 ×50)
Factory cost	80,200	79,400

Q.17 Halsey & Rowan | RTP Nov 19

ADV Pvt. Ltd. manufactures a product which requires skill and precision in work to get quality products. The company has been experiencing high labour cost due to slow speed of work. The management of the company wants to reduce the labour cost but without compromising with the quality of work. It wants to introduce a bonus scheme but is indifferent between the Halsey and Rowan scheme of bonus.

For the month of November 2019, the company budgeted for 24,960 hours of work. The workers are paid ₹80 per hour.

Required:

(i) CALCULATE and suggest the bonus scheme where the time taken (in %) to time allowed to complete the works is (a) 100% (b) 75% (c) 50% & (d) 25% of budgeted hours.

Ans. **The Cost of labour under the bonus schemes are tabulated as below:**

Time Allowed	Time taken	Wages (₹)	Bonus (₹)		Total Wages (₹)		Earning per hour (₹)	
			Halsey*	Rowan**	Halsey	Rowan	Halsey	Rowan
(1)	(2)	(3) = (2) ×₹ 80	(4)	(5)	(6) = (3) + (4)	(7) = (3) + (5)	(8) = (6)/(2)	(9) = (7)/(2)
24,960	24,960	19,96,800	-	-	19,96,800	19,96,800	80.00	80.00
24,960	18,720	14,97,600	2,49,600	3,74,400	17,47,200	18,72,000	93.33	100.00
24,960	12,480	9,98,400	4,99,200	4,99,200	14,97,600	14,97,600	120.00	120.00

24,960	6,240	4,99,200	7,48,800	3,74,400	12,48,000	8,73,600	200.00	140.00

* Bonus under Halsey Plan = 50% of (Time Allowed – Time Taken) × Rate per hour

** Bonus under Rowan Plan = $\frac{Time\ Allowed}{Time\ Taken}$ X Time saved X Rateper hour

Rowan scheme of bonus keeps checks on speed of work as the rate of incentive increases only upto 50% of time taken to time allowed but the rate decreases as the time taken to time allowed comes below 50%. It provides incentives for efficient workers for saving in time but also puts check on careless speed. On implementation of Rowan scheme, the management of ADV Pvt. Ltd. would resolve issue of the slow speed work while maintaining the skill and precision required maintaining the quality of product.

Q.18 Halsey & Rowan (Important) | RTP July 21

JBL Sisters operates a boutique which works for various fashion houses and retail stores. It has employed 26 workers and pays them on time rate basis. On an average an employee is allowed 8 hours for boutique work on a piece of garment. In the month of December 2020, two workers M and J were given 15 pieces and 21 pieces of garments respectively for boutique work. The following are the details of their work:

	M	J
Work assigned	15 pcs.	21 pcs.
Time taken	100 hours	140 hours

Workers are paid bonus as per Halsey System. The existing rate of wages is 60 per hour. As per the new wages agreement the workers will be paid 72 per hour w.e.f. 1stJanuary 2021. At the end of the month December 2020, the accountant of the company has wrongly calculated wages to these two workers taking 72 per hour.

Required:

(i) CALCULATE the loss incurred due to incorrect rate selection.

(ii) CALCULATE the loss incurred due to incorrect rate selection, had Rowan scheme of bonus payment followed.

(iii) CALCULATE the loss/ savings if Rowan scheme of bonus payment had followed.

(iv) DISCUSS the suitability of Rowan scheme of bonus payment for JBL Sisters?

Ans.

Workings Notes:

Calculation of Total hours saved:

	M	J
No. of garments assigned (Pieces.)	15	21
Hour allowed per piece (Hours)	8	8
Total hours allowed (Hours)	120	168
Hours Taken (Hours)	100	140
Hours Saved (Hours)	20	28

(i) Calculation of loss incurred due to incorrect rate selection:

(While calculating loss only excess rate per hour has been taken)

	M(₹)	J(₹)	Total (₹)
Basic Wages	1,200 (100 Hrs. × ₹12)	1,680 (140 Hrs. × ₹12)	2,880
Bonus (as per Halsey Scheme) (50% of Time Saved × ExcessRate)	120 (50% of 20 Hrs. × ₹12)	168 (50% of 28 Hrs. × ₹12)	288
Excess Wages Paid	1,320	1,848	3,168

(ii) Calculation of loss incurred due to incorrect rate selection had Rowan scheme of bonus payment

followed:

	M (₹)	J (₹)	Total (₹)
Basic Wages	1,200 (100 Hrs. × 12)	1,680 (140 Hrs. × 12)	2,880
$\left(\frac{Time\ taken}{Time\ allowed} \times \text{Time saved} \times \text{Wage rate}\right)$	200 $\left(\frac{100}{120} \times 20 \times 12\right)$	280 $\left(\frac{140}{168} \times 28 \times 12\right)$	480
Excess Wages Paid	1,400	1,960	3,360

(iii) Calculation of amount that could have been saved if Rowan Scheme were Followed

	M (₹)	J (₹)	Total (₹)
Wages paid under Halsey Scheme	1,320	1,848	3,168
Wages paid under Rowan Scheme	1,400	1,960	3,360
Difference (loss)	(80)	(112)	(192)

(iv) Rowan Scheme of incentive payment has the following benefits, which is suitable with the nature of business in which JBL Sisters operates:

(a) Under Rowan Scheme of bonus payment, workers cannot increase their earnings or bonus by merely increasing its work speed. Bonus under Rowan Scheme is maximum when the time taken by a worker on a job is half of the time allowed. As this fact is known to the workers, therefore, they work at such a speed which helps them to maintain the quality of output too.

(b) If the rate setting department commits any mistake in setting standards for time to be taken to complete the works, the loss incurred will be relatively low.

Q.19 Halsey,Rowan,Time,Piece Rate | PY May 19

M/s Zeba Private Limited allotted a standard time of 40 hours for a job and the rate per hour is ₹ 75. The actual time taken by a worker is 30 hours.

You are required to calculate the total earnings under the following plans:

(i) Halsey Premium Plan (Rate 50%)
(ii) Rowan Plan
(iii) Time Wage System
(iv) Piece Rate System
(v) Emerson Plan

Ans. **(i) Halsey Premium plan:**

=(Time taken×Rateper hour) + ($\frac{1}{2}$ ×Time saved×Rate per hour)

=(30hours×Rs.75)+ ($\frac{1}{2}$ ×10hours×Rs.75)

= 2,250 + 375 = 2,625

(ii) Rowan Premium plan:

$$=(\text{Time Taken}\times\text{Rateper hour})+\left(\frac{Timesaved}{\text{Time allowed}}\times\ \text{Time taken}\times\ \text{rate per hour}\right)$$

$$=(30\text{hours}\times\ 75)+\left(\frac{10}{40}\times\ 30\times\ 75\right)$$

= 2,250 + 375 = 2,812.5 or 2,813

(iii) Time wage system:

= Time taken × Rate per hour

= 30 × 75 = 2,250

(iv) Piece Rate System:

= Std. Time × Rate per hour

= 40 × 75 = 3,000

(iv) Emerson plan:

Efficiency level = 40/30 = 133.33%

Time taken × (120% + 33.33%) of Rate

= 30 hours × 153.33% of 75

= 3,450

Q.20 Halsey,Rowan,Time,Piece Rate | PY Nov 22

A skilled worker, in PK Ltd., is paid a guaranteed wage rate of ₹15.00 per hour in a 48- hour week. The standard time to produce a unit is 18 minutes. During a week, a skilled worker Mr. 'A' has produced 200 units of the product. The Company has taken a drive for cost reduction and wants to reduce its labour cost. You are required to:

(i) Calculate wages of Mr. 'A' under each of the following methods:
- (A) Time rate,
- (B) Piece -rete with a guaranteed weekly wage,
- (C) Halsey Premium Plan
- (D) Rowan Premium Plan

(ii) Suggest which bonus plan i.e. Halsey Premium Plan or Rowan Premium Plan, the company should follow.

Ans. **(i) Calculation of wages of Mr. 'A' under different wage schemes:**

A. Time rate

Wages = Time Worked × Rate for the time
= 48 hours x 15
= 720

B. Piece rate with a guaranteed weekly wage

Wages = Number of units produced × Rate per unit
= 200 units x 4.50*
= 900

*(₹ 15 / 60 minutes) x 18 minutes = 4.50

C. Halsey Premium Plan

Wages = Time taken × Time rate + 50% of time saved × Time rate

Wages = Time taken × Time rate + 50% (Standard time – Actual time) × Time rate
= (48 hours x 15) + 50% of (60 hours# – 48 hours) x 15
= 720 + 90
= 810

#(200 units x 18 minutes) / 60 minutes = 60 hours

D. Rowan Premium Plan

$$\text{Wages} = \text{Time taken} \times \text{Rate per hour} + \frac{\text{Time saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Rate per hour}$$

$$= (48 \text{ hours} \times ₹ 15) + \left(\frac{60 - 48 \text{ hours}}{60 \text{ hours}} \times 48 \text{ hours} \times 15 \right)$$

$$= 720 + 144$$

$$= 864$$

(ii) The company may follow Halsey Premium Plan over Rowan Premium Bonus Plan as the total wages paid is lower than that of Rowan Premium Bonus Plan.

Q.21 Hourly & Piece Rate | MTP Dec 21

The following particulars have been compiled in respect of three workers:

	M	N	O
Actual hours worked	380	100	540
Hourly rate of wages (in ₹)	90	100	110
Productions in units:			
- Product A	210	-	600
- Product B	360	-	1350
- Product C	460	250	-
Standard time allowed per unit of each product is:			
	A	**B**	**C**
Minutes	15	20	30

For the purpose of piece rate, each minute is valued at ₹ 1.50.

You are required to CALCULATE the wages of each worker under:

(i) Guaranteed hourly rate basis.

(ii) Piece work earning basis but guaranteed at 75% of basic pay (Guaranteed hourly rate if his earnings are less than 50% of basic pay.)

Ans. **(i) Computation of wages of each worker under guaranteed hourly rate basis**

Worker	Actual hours worked (Hours)	Hourly wage rate (₹)	Wages (₹)
M	380	90	34,200
N	100	100	10,000
O	540	110	59,400

(ii) Computation of Wages of each worker under piece work earning basis

Product	Piece rate per unit	Worker-M		Worker-N		Worker-O	
	(₹)	Units	Wages (₹)	Units	Wages (₹)	Units	Wages (₹)
A	22.50	210	4,725	-	-	600	13,500
B	30.00	360	10,800	-	-	1,350	40,500
C	45.00	460	20,700	250	11,250	-	-
Total			36,225		11,250		54,000

Since each worker's earnings are more than 50% of basic pay. Therefore, worker-M, N and O will be paid the wages as computed i.e. ₹ 36,225, ₹ 11,250 and ₹ 54,000 respectively.

Working Notes:

Piece rate per unit

Product	Standard time per unit (in minutes)	Piece rate each minute (₹)	Piece rate per unit (₹)
A	15	1.5	22.50
B	20	1.5	30.00
C	30	1.5	45.00

Q.22 Labour T/O, Flux Rate | RTP May 23

Following information are available from the cost records of BMR Limited, CALCULATE Labour turnover rate and Labour flux rate:

No. of Employees as on 01.04.2021 = 9,400

No. of Employees as on 31.03.2022 = 10,600

During the year, 160 Employees left while 640 Employees were discharged and 1,500 Employees were recruited during the year; of these, 400 Employees were recruited because of exits and the rest were recruited in accordance with expansion plans.

Ans.

Employee turnover rate:

It comprises of computation of Employee turnover by using following methods:

$$\text{(i) Separate Method} := \frac{\text{Number of employees seperated during the period}}{\text{Average number of employees during the period on roll}} \times 100$$

$$\text{OR,} = \frac{\text{Number of employees left} + \text{Number of employees discharged}}{\text{Average number of employees during the period on roll}} \times 100$$

$$= \frac{(160 + 640)}{(9,400 + 10,600)} \times 100$$

$$= \frac{800}{1000} \times 100 = 8\%$$

$$\text{(ii) Replacement Method} = \frac{\text{Number of employees replaced during the period}}{\text{Average number of employees during the period on roll}} \times 100$$

$$= \frac{400}{10,000} \times 100 = 4\%$$

$$\text{(iii) New Recruitment} = \frac{\text{Number of employees joining in a period (excluding replacement)}}{\text{Average number of employees during the period on roll}} \times 100$$

$$= \frac{15,00 - 400}{10,000} \times 100$$

$$= \frac{1100}{10,00} \times 100 = 11\%$$

$$\text{Flux Method} = \frac{\text{Number of separation} + \text{Number of replacement} + \text{Number of new joining}}{\text{Average number of employees during the period on roll}} \times 100$$

$$= \frac{(800 + 400 + 1,100)}{(9,400 + 10,600) \div 2} \times 100$$

$$= \frac{23,00}{10,000} \times 100 = 23\%$$

Q.23 Labour T/O, Replacement & Flux | MTP May 18

SV chemicals Limited processes 9,00,000 kgs. of raw material in a month purchased at ₹ 95 per kg in department X. The input output ratio of department X is 100 : 90. Processing of the material results in two joint products being produced 'P1' and 'P2' in the ratio of 60 : 40. Product 'P1' can be sold at split off stage or can be further processed in department Y and sold as a new product 'YP1'. The input output ratio of department Y is 100 : 95. Department Y is utilized only for further processing of product 'P1' to product 'YP1'. Individual departmental expenses are as follows:

	Dept. X (₹ lakhs)	Dept. Y (₹ lakhs)
Direct Materials	95.00	14.00
Direct Wages	80.00	27.00
Variable Overheads	100.00	35.00
Fixed Overheads	75.00	52.00
Total	350.00	128.00

Further, selling expenses to be incurred on three products are:

Particulars	Amount (₹ in lakhs)
Product 'P1'	28.38
Product 'P2'	25.00
Product 'YP1'	19.00

Selling price of the products 'P1' and 'P2' at split off point is ₹ 110 per kg and ₹ 325 per kg respectively. Selling price of new product 'YP1' is ₹ 150 per kg.

You are required to:

(i) PREPARE a statement showing apportionment of joint costs, in the ratio of value of sales, net of selling expenses.

(ii) PREPARE a Statement showing profitability at split off point.

(iii) PREPARE a Statement of profitability of 'YP1'.

(iv) DETERMINE that would you recommend further processing of P1?

Ans.

Working Notes:

(i) Calculation of no. of employees at the beginning and end of the year

	At the Beginning of the year	At the end of the year
Data Processors	540	1,560
Payroll Processors [Left- 60 + Closing- 40 – Joined- 20]	80	40
Supervisors*	30	90
Voice Agents*	30	30
Assistant Managers*	20	30
Senior Voice Agents	4	12
Senior Data Processors	8	34
Team Leaders	60	0
Total	**772**	**1,796**

(*) At the beginning of the year:

Strength of Supervisors, Voice Agents and Asst. Managers =

[772 – {540 + 80 + 4 + 8 + 60} employees] or [772 – 692 = 80 employees]

[{Supervisors- $80\frac{3}{8}$ =30, Voice Agents- $80\frac{3}{8}$ =30 & Asst. Managers- $80\frac{2}{8}$ = 20} employees]

At the end of the year:

[Supervisor-(Opening- 30 + 60 Joining) = 90; Voice Agents- (Opening- 30 + 20 Joined – 20 Left) = 30]

(ii) No. of Employees Separated, Replaced and newly recruited during the year

Particulars	Separations	New Recruitment	Replacement	Total Joining
Data Processors	60	1,020	60	1,080
Payroll Processors	60	--	20	20
Supervisors	--	60	--	60
Voice Agents	20	--	20	20
Assistant Managers	10	10	10	20
Sr. Voice Agents	--	8	--	8
Sr. Data Processors	--	26	--	26
Team Leaders	60	--	--	--
Total	**210**	**1,124**	**110**	**1,234**

(Since, Corrs Consultancy Ltd. and its subsidiary are maintaining separate Personnel Department, so transfer-in and transfer-out are treated as recruitment and separation respectively.)

(a) Calculation of Labour Turnover:

$$\text{Replacement Method} = \frac{\text{No.of employees replaced during the year}}{\text{Average no.of employees on roll}} \times 100$$

$$= \frac{110}{1284} \times 100 = 8.57\%$$

$$\text{Separation Method} = \frac{\text{No.of employees separated during the year}}{\text{Average no.of employees on roll}} \times 100$$

$$= \frac{210}{1284} \times 100 = 16.36\%$$

(b) Labour Turnover under Flux Method

$$= \frac{\text{No.of employees(Joined + Separated) during the year}}{\text{Average no.of employees on roll}} \times 10$$

$$= \frac{\text{No.of employees(Re placed + Newrecruited + Separated) during the year}'}{\text{Average no.of employees on roll}} \times 100$$

$$= \frac{1,234 + 210}{1,284} \times 10 = 112.46\%$$

Labour Turnover calculated by the executive trainee of the Personnel department is incorrect as it has not taken the No. of new recruitment while calculating the labour turnover under Flux method.

Q.24 Labour Tournover | PY May 18

The information regarding number of employees on roll in a shopping mall for the month of December 2017 are given below:

Number of employees as on 01-12-2017	900
Number of employees as on 31-12-2017	1100

During December, 2017, 40 employees resigned and 60 employees were discharged.

300 employees were recruited during the month. Out of these 300 employees, 225 employees were recruited for an expansion project of the mall and rest were recruited due to exit of employees.

Assuming 365 days in a year, calculate Employee Turnover Rate and Equivalent Annual' Employee Turnover Rate by applying the following:

(i) Replacement Method

(ii) Separation Method
(iii) Flux Method

Ans. **Labour turnover rate:**

It comprises of computation of labour turnover by using following methods:

(i) Replacement Method:

$$\text{Labour turnover rate} = \frac{\text{No. of workers replaced}}{\text{Average number of workers}} \times 100$$

$$= \frac{75}{100} \times 100 = 7.5\%$$

$$\text{Equivalent Annual Turnover Rate} = \frac{7.5 \times 365}{31} = 88.31\%$$

(ii) Separation Method:

$$\text{Labour turnover rate} \quad \frac{\text{No. of workers left} + \text{No. of workers discharged}}{\text{Average number of workers}} \times 100$$

$$= \frac{(40 + 60)}{(900 + 1100) \div 2} \times 100 = \frac{100}{1000} \times 100 = 10\%$$

$$\text{Equivalent Annual Turnover Rate} = \frac{10 \times 365}{31} 117.74\%$$

(iii) Flux Method:

$$\text{Labour turnover rate} = \frac{\text{No. of separations} + \text{No. of accessions}}{\text{Average number of workers}} \times 100$$

$$= \frac{(100 + 300)}{(900 + 1{,}100) \div 2} \times 100 = \frac{400}{1000} \times 100 = 40\%$$

$$\text{Equivalent Annual Turnover Rate} = \frac{40 \times 365}{31} = 470.97\%$$

Or

(iii) Flux Method:

$$\text{Labour turnover rate} = \frac{\text{No. of separation} + \text{No. of replaced}}{\text{Average number of workers}} \times 100$$

$$= \frac{100 + 75}{1000} \times 100 = 17.5\%$$

$$\text{Equivalent Annual Turnover Rate} = \frac{17.5 \times 365}{31} = 206.05\%$$

Q.25 Labour Turnover | RTP May20

From the following information, CALCULATE employee turnover rate using –

(i) Separation Method,
(ii) Replacement Method,
(iii) New Recruitment Method, and
(iv) Flux Method:

No. of workers as on 01.01.2019 = 3,600 No. of workers as on 31.12.2019 = 3,790

During the year, 40 workers left while 120 workers were discharged. 350 workers were recruited during the year, of these 150 workers were recruited because of exits and the rest were recruited in accordance with expansion plans.

Ans. **Employee turnover rate using:**

(i) Separation Method:

$$\frac{\text{No. ofworkers left} + \text{No.of workersdischarged}}{\text{Average number of workers}} \times 100$$

$$= \frac{(40 + 120)}{(3,600 + 3,790) / 2} x100 = \frac{160}{3,695} x100 = 4.33\%$$

(ii) Replacement Method:

$$= \frac{\text{No. of workersreplaced}}{\text{Average number of workers}} x100 = \frac{150}{3,695} x100 = 4.06\%$$

(iii) New Recruitment Method:

$$= \frac{\text{No. of workersnewly recruited}}{\text{Average numberof workers}} x100$$

$$= \frac{\text{No.Recruitments} - \text{No. ofReplacements}}{\text{Average numberof workers}} x100$$

$$= \frac{350 - 150}{3,695} x100 = \frac{200}{3,695} x100 = 5.41\%$$

(iv) Flux Method:

$$= \frac{\text{No.of separations} + \text{No. of accessions}}{\text{Average numberof workers}} x100$$

$$= \frac{(160 + 350)}{(3,600 + 3,790) / 2} x100 = \frac{510}{3,695} x100 = 13.80\%$$

Q.26 Labour Turnover | PY Jul 21

Following information is given of a newly setup organization for the year ended on 31st March, 2021.

Number of workers replaced during the period	50
Number of workers left and discharged during the period	25
Average number of workers on the roll during the period	500

You are required to:

(i) Compute the Employee Turnover Rates using Separation Method and Flux Method.

(ii) Equivalent Employee Turnover Rates for (i) above, given that the organization was setup on 31st January, 2021.

Ans. **(i) Employee Turnover rate Using Separation method:**

$$= \frac{\text{Number ofemployees Separatedduring the period}}{\text{Average number of employees during the period on roll}} x100$$

$$= \frac{25}{500} x100 = 5\%$$

Using Flux method:

$$= \frac{\text{Number of employees Separated} + \text{Number of employees Replaced during the period}}{\text{Average number of employeesduring the period on roll}} x100$$

$$= \frac{50 + 25}{500} x100 = 15\%$$

(ii) Equivalent Employee Turnover rate:

$$= \frac{\text{Employee Turnover rate for the period}}{\text{Number of days in the period}} x365$$

Using Separation method $= \frac{5}{60} x365 = 30.42\%$

Or, $= \frac{5}{60} x360 = 30\%$

Or, $= \frac{5}{2} x12 = 30\%$

Using Flux method $= \frac{15}{60} x365 = 91.25\%$

Or, $= \frac{15}{60} x360 = 90\%$

Or, $= \frac{15}{2} x12\ 90\%$

Q.27 Objective of time keeping | PY Nov20

Discuss any four objectives of 'Time keeping' in relation to attendance and payroll procedures.

Ans. **The objectives of time-keeping in relation to attendance and payroll procedures are as follows:**

(i) For the preparation of payrolls.
(ii) For calculating overtime.
(iii) For ascertaining and controlling employee cost.
(iv) For ascertaining idle time.
(v) For disciplinary purposes.
(vi) For overhead distribution

Q.28 Piece Rete System | MTP May 22

The standard time allowed for a certain piece of work is 240 hours. Normal wage rate is ₹ 75 per hour. The bonus system applicable to the work is as follows:

Percentage of time saved to time allowed (slab rate)	Bonus
(i) Up to the first 20% of time allowed	25% of the corresponding saving in time.
(ii) For and within the next 30% of time allowed	40% of the corresponding saving in time.
(iii) For and within the next 30% of time allowed	30% of the corresponding saving in time.
(iv) For and within the next 20% of time allowed	10% of the corresponding saving in time.

CALCULATE the total earnings of a worker over the piece of work and his earnings per hour when he takes-

(a) 256 hours,
(b) 120 hours, and
(c) 24 hours respectively.

Ans. **Calculation of total earnings and earnings per hour:**

	Particulars	(a) Time taken is 256 hours	(b) Time taken is 120 hours	(c) Time taken is 24 hours
A.	Time Allowed	240 hours	240 hours	240 hours
B.	Time taken	256 hours	120 hours	24 hours
C.	Time Saved (A-B)	Nil	120 hours	216 hours
D.	Bonus hours (Refer workings)	Nil	40.80 hours	64.80 hours
E.	Hours to be paid (B+D)	256 hours	160.80 hours	88.80 hours
F.	Wages rate per hour	₹ 75	₹ 75	₹ 75
G.	**Total earnings (E×F)**	**₹ 19,200**	**₹ 12,060**	**₹ 6,660**
H.	**Earnings per hour (G÷B)**	**₹ 75**	**₹ 100.50**	**₹ 277.50**

Working Notes:

Calculation of bonus hours:

	Time saved 120 hours	Time saved 216 hours
For first 20% of time allowed i.e. 48 hours	12 (25% of 48 hours)	12 (25% of 48 hours)
For next 30% of time allowed i..e. 72 hours	28.80 (40% of 72 hours)	28.80 (40% of 72 hours)
For next 30% of time allowed i..e. 72 hours	-	21.60 (30% of 72 hours)
For next 20% of time allowed i..e. 48 hours	-	2.40 (10% of 24 hours)
Bonus hours	**40.80**	**64.80**

Q.29 Profit lost due to Labout T/o | RTP May 18

Jyoti Ltd. wants to ascertain the profit lost during the year 2017-18 due to increased labour turnover. For this purpose, it has given you the following information:

(1) Training period of the new recruits is 50,000 hours. During this period their productivity is 60% of the experienced workers. Time required by an experienced worker is 10 hours per unit.

(2) 20% of the output during training period was defective. Cost of rectification of a defective unit was ₹ 25.

(3) Potential productive hours lost due to delay in recruitment were 1,00,000 hours.

(4) Selling price per unit is ₹ 180 and P/V ratio is 20%.

(5) Settlement cost of the workers leaving the organization was ₹ 1,83,480.

(6) Recruitment cost was ₹ 1,56,340

(7) Training cost was ₹ 1,13,180

Required:

CALCULATE the profit lost by the company due to increased labour turnover during the year 2017-18.

Ans. Output by experienced workers in 50,000 hours = $\frac{50,000}{10}$ = 5,000 units

∴ Output by new recruits = 60% of 5,000 = 3,000

units Loss of output = 5,000 – 3,000 = 2,000 units

Total loss of output = Due to delay recruitment + Due to inexperience

= 10,000 + 2,000 = 12,000 units

Contribution per unit = 20% of ₹180 = ₹ 36

Total contribution lost = ₹36 × 12,000 units = ₹ 4,32,000

Cost of repairing defective units = 3,000 units × 0.2 × ₹ 25 = ₹ 15,000

Profit forgone due to labour turnover

	( ) (₹)
Loss of Contribution	4,32,000
Cost of repairing defective units	15,000
Recruitment cost	1,56,340
Training cost	1,13,180
Settlement cost of workers leaving	1,83,480

Profit forgone in 2017-18	9,00,000

Q.30 Profit lost due to Labour T/o | MTP May 19

Anirban Ltd. wants to ascertain the profit lost during the year 20X8-X9 due to increased labour turnover. For this purpose, they have given you the following information:

(1) Training period of the new recruits is 50,000 hours. During this period their productivity is 60% of the experienced workers. Time required by an experienced worker is 10 hours per unit.
(2) 20% of the output during training period was defective. Cost of rectification of a defective unit was Rs. 25.
(3) Potential productive hours lost due to delay in recruitment were 1,00,000 hours.
(4) Selling price per unit is Rs.180 and P/V ratio is 20%.
(5) Settlement cost of the workers leaving the organization was Rs.1,83,480.
(6) Recruitment cost was Rs.1,56,340
(7) Training cost was Rs.1,13,180.

You are required to CALCULATE the profit lost by the company due to increased labour turnover during the year 20X8-X9.

Ans.

Output by experienced workers in 50,000 hours = $\frac{50,000}{10}$ = 5,000 units

∴ Output by new recruits = 60% of 5,000 = 3,000
units Loss of output = 5,000 – 3,000 = 2,000 units
Total loss of output = Due to delay recruitment + Due to inexperience
= 10,000 + 2,000 = 12,000 units

Contribution per unit = 20% of 180 = Rs. 36
Total contribution cost = 36 × 12,000 = Rs. 4,32,000
Cost of repairing defective units = 3,000 × 0.2 × 25 = Rs. 15,000

Profit forgone due to labour turnover

	( ) (₹)
Loss of Contribution	4,32,000
Cost of repairing defective units	15,000
Recruitment cost	1,56,340
Training cost	1,13,180
Settlement cost of workers leaving	1,83,480
Profit forgone in 2017-18	9,00,000

Q.31 Profit lost due to Labout T/o | MTP May22

R Ltd. is facing increasing employee turnover in the factory and before analyzing the causes and taking remedial steps; the management wants to have an idea of the profit foregone as a result of employee turnover in the last year.

Last year sales amounted to ₹ 99,63,960 and P/V ratio was 20%.

The total number of actual hours worked by the direct employee force was 5.34 lakhs. The actual direct employee hours included 36,000 hours attributable to training new recruits, out of which half of the hours were unproductive. As a result of the delays by the Personnel Department in filling vacancies due to employee turnover, 1,20,000 potentially productive hours (excluding unproductive training hours) were lost.

The costs incurred consequent on employee turnover revealed, on analysis, the following:

Settlement cost due to leaving	₹ 52,584
Recruitment costs	₹ 32,088
Selection costs	₹ 15,300
Training costs	₹ 36,588

Assuming that the potential production lost as a consequence of employee turnover could have been sold at prevailing prices, FIND the profit foregone last year on account of employee turnover.

Ans.

Workings:

(i) Computation of productive hours

Actual hours worked	5,34,000
Less: Unproductive training hours	18,000
Actual productive hours	5,16,000

(ii) Productive hours lost:

Loss of potential productive hours + Unproductive training hours

= 1,20,000 + 18,000 = 1,38,000 hours

(iv) Loss of contribution due to unproductive hours:

$$\frac{\text{Sales value}}{\text{Actual productive hours}} \times \text{Total unproductive hours}$$

$$= \frac{99,63,960}{5,16,000 \text{ hrs}} \times 1,38,000 \text{ hours} = ₹\ 26,64,780$$

$$\text{Contribution lost for 1,38,000 hours} = \frac{26,64,780}{100} \times 20 = 5,32,956$$

Computation of profit forgone on account of employee turnover

	(₹)
Contribution foregone (as calculated above)	5,32,956
Settlement cost due to leaving	52,584
Recruitment cost	32,088
Selection cost	15,300
Training costs	36,588
Profit foregone	**6,69,516**

Q.32 Rowan & Halsey | PY May 18

A worker takes 15 hours to complete a piece of work for which time allowed is 20 hours.
His wage rate is ₹ 5 per hour. Following additional information are also available:

Material cost of work	₹ 50
Factory overheads	100% of wages

Calculate the factory cost of work under the following methods of wage payments:

(i) Rowan Plan

(ii) Halsey Plan

Ans.

When Quantity Discount is accepted

	(₹)
Purchase Cost 12,000 units x ₹ 608)	72,96,000
Ordering Cost $\left[\frac{A}{C} \times C(12,000 \text{ units} / 3,000 \text{ units}) \times 1800\right]$	7,200
Carrying Cost $\left[\frac{Q}{2} \times C \times i(3,000 \text{ units} \text{ ´ } \text{`} 608 \text{ ´ } \frac{1}{2} \text{ ´ } 18.75 / 100)\right]$	1,71,000
Total Cost	74,74,200

Advise – The total cost of inventory is higher if EOQ is adopted. If M/s. X Private Limited gets a discount of 5% on the purchases of "SKY BLUE" (if order size is 3,000 components at a time), there will be financial benefit of ₹ 2,77,800 (77,52,000 -74,74,200). However, order size of big quantity will increase volume of average inventory to 5 times. There may be risk of shrinkage, pilferage and obsolescence etc., of inventory due to increase in the average volume of inventory holding. This aspect also has to be taken into consideration before opting the discount offer and taking final decision.

Q.33 Rowan & Piece Rate | MTP May 20

A company is undecided as to what kind of wage scheme should be introduced. The following particulars have been compiled in respect of three workers, which are under consideration of the management.

	I	II	III
Actual hours worked	380	100	540
Hourly rate of wages (in Rs.)	40	50	60
Productions in units:			
- Product A	210	-	600
- Product B	360	-	1350
- Product C	460	250	-
- Standard time allowed per unit of each			
	A	B	C
Minutes	15	20	30

For the purpose of piece rate, each minute is valued at Rs. 1/- You are required to COMPUTE the wages of each worker under:

(i) Guaranteed hourly rate basis.

(ii) Piece work earning basis, but guaranteed at 75% of basic pay (Guaranteed hourly rate if his earnings are less than 50% of basic pay.)

(iii) Premium bonus basis where the worker received bonus based on Rowan scheme.

Ans.

(i) Computation of wages of each worker under guaranteed hourly rate basis

Worker	Actual hours worked (Hours)	Hourly wage rate (Rs.)	Wages (Rs.)
I	380	40	15,200
II	100	50	5,000
III	540	60	32,400

(ii) Computation of Wages of each worker under piece work earning basis

Product	Piece rate per unit (Rs.)	Worker-I		Worker-II		Worker-III	
		Units	Wages (Rs.)	Units	Wages (Rs.)	Units	Wages (Rs.)
A	15	210	3,150	-	-	600	9,000
B	20	360	7,200	-	-	1,350	27,000
C	30	460	13,800	250	7,500	-	-
Total		**24150**			**7,500**		**36,000**

Since each worker's earnings are more than 50% of basic pay. Therefore, worker-I, II and III will be paid the wages as computed i.e. Rs. 24,150, Rs. 7,500 and Rs. 36,000 respectively.

Working Note:

Piece rate per unit

Product	Standard time per unit in minute	Piece rate each minute(Rs.)	Piece rate per unit(Rs.)
A	15	1	15

B	20	1	20
C	30	1	30

(iii) Computation of wages of each worker under Premium bonus basis (where each worker receives bonus based on Rowan Scheme)

Worker	Time Allowed (Hr.)	Time Taken (Hr.)	Time saved (Hr.)	Wage Rate per hour (Rs.)	Earnings (Rs.)	Bonus (Rs.)*	Total Earning (Rs.)
I	402.5	380	22.5	40	15,200	850	16,050
II	125	100	25	50	5,000	1,000	6,000
III	600	540	60	60	32,400	3,240	35,640

Working Note:

1. Time allowed to each worker

Worker	Product-A	Product-B	Product-C	Total Time (Hours)
I	210 units × 15 = 3,150	360 units × 20 = 7,200	460 units × 30 = 13,800	24,150/60 = 402.50
II	-	-	250 units × 30 = 7,500	7,500/60 = 125
III	600 units × 15 = 9,000	1, 350 units × 20 = 27,000	-	36,000/60 = 600

* $\frac{Time taken}{Time allowed} \times Time saved \times wage Rate$

Worker-I $= \frac{380}{402.5} \times 22.5 \times 40 = 850$

Worker-II $= \frac{100}{125} \times 25 \times 50 = 1000$

Worker-III $= \frac{540}{600} \times 60 \times 60 = 32,40$

Q.34 Rowam System | MTP Dec 21 (2)

ABC Ltd. has its factory at two locations viz Noida and Patparganj. Rowan plan is used at Noida factory and Halsey plan at Patparganj factory.

Standard time and basic rate of wages are same for a job which is similar and is carried out on similar machinery. Normal working hours is 9 hours per day in a 5 day week.

Job at Noida factory is completed in 36 hours while at Patparganj factory it has taken 33 hours 45 minutes. Conversion costs at Noida and Patparganj are ₹ 6,084 and ₹ 5,569 respectively. Overheads account for ₹ 25 per hour.

REQUIRED:

(i) To find out the normal wage; and

(ii) To compare the respective conversion costs.

Ans.

Particulars	Noida	Patparganj
Hours worked	36 hr.	33.75 hr.
Conversion Costs	₹ 6,084	₹ 5,569

Less: Overheads	₹ 900(₹25 ×36 hr.)	₹ 844(₹ 25 × 33.75 hr.)
Labour Cost	₹ 5,184	₹ 4,725

(i) Finding of Normal wage rate:

Let Wage rate be ₹ R per hour, this is same for both the Noida and Patparganj factory.

Normal wage rate can be found out taking total cost of either factory.

Noida: Rowan Plan

Total Labour Cost = Wages for hours worked + Bonus as per Rowan plan

$$₹\ 5{,}184 = \text{Hours worked} \times \text{Rate per hour} + \left(\frac{Time saved}{Time allowed} \times Hours worked \times Rate per hour\right)$$

$$\text{Or, } ₹\ 5{,}184 = 36 \text{ hr.} \times R + \left(\frac{45 - 36}{45} \times 36 \times R\right)$$

Or, ₹ 5,184 = 36R + 7.2R

R = ₹ 120

Normal wage = 36 hrs × ₹ 120 = ₹ 4,320

OR

Patparganj: Halsey Plan

Total Labour Cost = Wages for hours worked + Bonus as per Halsey plan

₹ 4,725 = Hours worked × Rate per hour + (50% ×Hours saved×Rate per hour)

₹ 4,725 = 33.75 hr. × R + 50% × (45 hr. – 33.75 hr.) × R

₹ 4,725 = 39.375 R

R = ₹ 120

Normal Wage = 33.75 hrs × ₹ 120 = ₹ 4,050

(ii) Comparison of conversion costs:

Particulars	Noida (₹)	Patparganj (₹)
Normal Wages (36 x 120)	4,320	
(33.75 x 120)		4,050
Bonus (7.2 x 120)	864	
(5.625 x 120)		675
Overhead	900	844
	6,084	5,569

Q.35 Theory Ques | PY May 23

How does the high employee turnover increase the cost of production? Explain.

Ans.

High Employee Turnover increases the cost of production

Replacement costs are the costs which arise due to employee turnover. If employees leave soon after they acquire the **necessary training and experience** of good work, additional costs will have to be incurred on new workers, i.e., **cost of recruitment, training and induction, abnormal breakage and scrap and extra wages and overheads due to the inefficiency** of new workers.

It is obvious that a company will incur very high replacement costs if the rate of employee turnover is high. Similarly, only adequate preventive costs can keep Employee turnover at a low level. Each company must, therefore, work out the optimum level of Employee turnover keeping in view its personnel policies and the behaviour of replacement cost and preventive costs at various levels of Employee turnover rates.

Q.36 Workers left, joined & average | PY May 22

PQR Limited has replaced 72 workers during the quarter ended 31st March 2022. The labour rates for the quarter are as follows:

Flux method	*16%*
Replacement method	*8%*
Separation method	*5%*

You are required to ascertain:

(i) Average number of workers on roll (for the quarter),
(ii) Number of workers left and discharged during the quarter,
(iii) Number of workers recruited and joined during the quarter,
(v) Equivalent employee turnover rates for the year.

Ans.

Working Note:

(i) Average number of workers on roll (for the quarter):

Employee Turnover rate using Replacement method

$$= \frac{\text{No. of replacements}}{\text{Average number of workers on roll}} \times 100$$

$$or, \frac{8}{100} = \frac{72}{\text{Average number of workers on roll}}$$

$$\text{Or, Average number of workers on roll} = \frac{72 \times 100}{8} = 900$$

(ii) Number of workers left and discharged:

Employee turnover rate (Separation method)

$$= \frac{\text{No. of Separations}(S)}{\text{Average number of workers on roll}} \times 100 \quad \frac{5}{100} = \frac{S}{900} \text{ Or, } S = 45$$

Hence, number of workers left and discharged comes to 45

(iii) Number of workers recruited and joined:

Employee turnover rate (Flux method)

$$= \frac{\text{No. of Separations}(S)}{\text{Average number of workers on roll}} \times 100$$

$$\text{Or, } \frac{16}{100} - \frac{45 + A}{900} \quad \text{Or, } A = \left[\frac{1440}{100} - 45\right] = 99$$

No. of workers recruited and joined 99

(iv) Calculation of Equivalent employee turnover rates:

$$= \frac{\text{Employee Turnove rate for the quarter}(s)}{\text{Number of quarter}(s)} \times 4 quarters$$

Using Flux method $= \frac{16}{1} \times 4 = 64\%$

Using Replacement method $= \frac{8\%}{1} \times 4 = 32\%$

Using Separation method $= \frac{5\%}{1} \times 4 = 20\%$

Q.37 Workers left, joined & average | RTP Nov 22

HR Ltd. is progressing in its legal industry. One of its trainee executives, Mr. H, in the Personnel department has calculated labour turnover rate 24.92% for the last year using Flux method.

Following is the data provided by the Personnel department for the last year:

Employees	At the beginning	Joined	Left	At the end
Records clerk	810	1,620	90	2,340
Human Resource Manager	?	30	90	60
Legal Secretary	?	90	---	?
Staff Attorney	?	30	30	?
Associate Attorney	?	30	---	45
Senior Staff Attorney	6	---	---	18
Senior Records clerk	12	---	---	51
Litigation attorney	?	---	---	?
Employees transferred from the Subsidiary Company				
Senior Staff Attorney	---	12	---	---
Senior Records clerk	---	39	---	---
Employees transferred to the Subsidiary Company				
Litigation attorney	---	---	90	---
Associate Attorney	---	---	15	---

At the beginning of the year there were total 1,158 employees on the payroll of the company. The opening strength of the Legal Secretary, Staff Attorney and Associate Attorney were in the ratio of 3 : 3 : 2.

The company has decided to abandon the post of Litigation attorney and consequently all the Litigation attorneys were transferred to the subsidiary company.

The company and its subsidiary are maintaining separate set of books of account and separate Personnel Department.

You are required to:

(a) CALCULATE Labour Turnover rate using Replacement method and Separation method.

(b) VERIFY the Labour turnover rate calculated under Flux method by Mr. H

Ans.

(i) **Working Notes:**

Calculation of no. of employees at the beginning and end of the year

	At the Beginning of the year	At the end of the year
Records clerk	810	2,340
Human Resource Manager [Left- 90 +Closing- 60 – Joined- 30]	120	60
Legal Secretary*	45	135
Staff Attorney*	45	45
Associate Attorney*	30	45
Senior Staff Attorney	6	18
Senior Records clerk	12	51
Litigation attorney	90	0
Total	1,158	2,694

(*) At the beginning of the year:

Strength of Legal Secretary, Staff Attorney and Associate Attorney =

[1158 – {810 + 120 + 6 + 12 + 90} employees] or [1158 – 1038 = 120 employees]

[{Legal Secretary - 120 × $\frac{3}{8}$ = 45, Staff Attorney - 120 × $\frac{3}{8}$ = 45 & Associate Attorney - 120 × $\frac{2}{8}$ = 30} employees]

At the end of the year:

[Legal Secretary -(Opening 45 + 90 Joining) = 135; Staff Attorney - (Opening 45 + 30 Joined – 30 Left) = 45]

(ii) **No. of Employees Separated, Replaced and newly recruited during the year**

Particulars	Separations	New Recruitment	Replacement	Total Joining
Records clerk	90	1,530	90	1,620
Human Resource Manager	90	--	30	30
Legal Secretary	--	90	--	**90**
Staff Attorney	**30**	--	**30**	**30**
Associate Attorney	**15**	15	**15**	**30**
Senior Staff Attorney	--	12	--	**12**
Senior Records clerk	--	39	--	**39**
Litigation attorney	**90**	--	--	--
Total	**315**	1,686	**165**	**1,851**

(Since, HR Ltd. and its subsidiary are maintaining separate Personnel Department, so transfer-in and transfer-out are treated as recruitment and separation respectively.)

(a) Calculation of Labour Turnover rate:

$$\text{Replacement Method} = \frac{\text{No.of employees replaced during the year}}{\text{Average no.of employees on roll}} \times 100$$

$$= \frac{165}{(1{,}158 + 2{,}694)/2} \times 100 = \frac{165}{1{,}926} \times 100 = 8.57\%$$

$$\text{Separation Method} = \frac{\text{No.of employees separated during the year}}{\text{Average no.of employees on roll}} \times 100$$

$$= \frac{315}{1{,}926} \times 100 = 16.36\%$$

(b) Labour Turnover rate under Flux Method:

$$\frac{\text{No.of employees (Joined + Separated) during the year}}{\text{Average no.of employees on roll}} \times 10$$

$$= \frac{\text{No. of employees (Replaced + New recruited + Separated) during the year}}{\text{Average no. of employees on roll}} \times 100$$

$$\frac{1{,}851 + 315}{1{,}926} \times 100 = 112.46\%$$

Labour Turnover rate calculated by Mr. H is incorrect as it seems he has not taken the No. of new recruitment while calculating the labour turnover rate under Flux method.

Q.38 Workers left, joined & average | MTP Nov18(2)

RST Company Ltd. has computed labour turnover rates for the quarter ended 31 st March, 2017 as 20%, 10% and 5% under flux method, replacement method and separation method respectively. If the number of workers replaced during that quarter is 50,

CALCULATE

(i) Workers recruited and joined

(ii) Workers left and discharged and

(iii) Average number of workers on roll.

Ans. Labour Turnover Rate (Replacement method) = $\frac{\text{No. of workers replaced}}{\text{Average no. of workers}} x100$

Or, $= \frac{10}{100} = \frac{50}{\text{Average no.ofwor kers}}$

Thus, Average No. of workers = 500

Labour Turnover Rate (Separation method) $\frac{\text{No. of workers separated}}{\text{Average no.ofwor kers}} x100$

Or, $\frac{5}{100} = \frac{\text{No. of workers separated}}{500}$

Thus, No. of workers separated = 25

Labour Turnover Rate (Flux Method)

$$\frac{\text{No. ofSeparations} + \text{No. ofAccession (Joinings)}}{\text{Average no.of workers}} x100$$

Or, $\frac{20}{100} = \frac{25 + \text{No. ofAccession (Joinings)}}{\text{Average no.of workers}}$

Or, 100 (25 + No. of Accessions) = 10,000

Or, 25 + No. of Accessions =100

Thus, No. of Accessions = 100 - 25 =75

Accordingly,

(i) Workers recruited and Joined = 75

(ii) Workers left and discharged = 25

(iii) Average number of workers on roll = 500

Q.39 Workers left, joined & average | MTP May 21(1)

The labour turnover rates for the quarter ended 30th September, 20 20 are computed as 14%, 8% and 6% under Flux method, Replacement method and Separation method respectively. If the number of workers replaced during 2nd quarter of the financial year 2020-21 is 36, COMPUTE the following:

(i) The number of workers recruited and joined; and

(ii) The number of workers left and discharged.

Ans. Labour Turnover Rate (Replacement method) = $\frac{\text{No. of workersreplaced}}{\text{Average No. of worker}}$

Or, $\frac{8}{100} = \frac{36}{\text{Average No. of wor ker s}}$

Or, Average No. of workers = 450

Labour Turnover Rate (Separation method) = $\frac{\text{No.ofwor ker sseperated}}{\text{Average No. of workers}}$

Or, $\frac{6}{100} \quad \frac{\text{No.ofwor ker sseperated}}{450}$ Or, No. of workers separated = 27

Labour Turnover Rate (Flux Method) = $\frac{\text{No. of Separations + No. of accession (Joinings)}}{\text{Average No. of workers}}$

Or, $\frac{14}{100} \quad \frac{27 + \text{No. of accessions (Joinings)}}{450}$ Or, 100 (27 + No. of Accessions) = 6,300

Or, No. of Accessions = 36

(i) The No. of workers recruited and Joined = 36

(ii) The No. of workers left and discharged = 27

Q.40 Workers left, joined & average | MTP Nov22(2)

R Ltd. has computed labour turnover rates for the quarter ended 31 st March, 2022 as 20%, 10% and 5% under flux method, replacement method and separation method respectively. If the number of workers replaced during that quarter is 50,

FIND OUT

(i) Workers recruited and joined

(ii) Workers left and discharged and

(iii) Average number of workers on roll.

Ans.

Labour Turnover Rate (Replacement method) = $\frac{No.of\,workers\,replaced}{Average\,number\,of\,workers} \times 100$

Or, $= \frac{10}{100} = \frac{50}{Average\,number\,of\,workers}$

Thus, Average No. of workers = 500

Labour Turnover Rate (Separation method) = $\frac{No.of\,workers\,separated}{Average\,number\,of\,workers} \times 100$

Or, $= \frac{50}{100} = \frac{No.of\,workers\,separated}{500}$

Thus, No. of workers separated = 25

Labour Turnover Rate (Flux Method)

$\frac{No.of\,separations\,no\,of\,accession(joining)}{Average\,number\,of\,workers} \times 100$

Or, $\frac{20}{100} = \frac{25 + no.of\,accession(joining)}{500}$

Or, 100 (25 + No. of Accessions) = 10,000

Or, 25 + No. of Accessions =100

Thus, No. of Accessions = 100 - 25 =75

Accordingly,

(i) Workers recruited and joined = 75

(ii) Workers left and discharged = 25

(iii) Average number of workers on roll = 500

Q.41 Effectively Hour Rate | ICAI MAT

'X' an employee of ABC Co. gets the following emoluments and benefits:

(a)	Basic pay	₹ 10,000 p.m.
(b)	Dearness allowance	₹ 2,000 p.m.
(c)	Bonus	20% of salary and D.A.
(d)	Other allowances	₹ 2,500 p.m.
(e)	Employer's contribution to P.F.	10% of salary and D.A.

'X' works for 2,400 hours per annum, out of which 400 hours are non-productive and treated as normal idle time. You are required to COMPUTE the effective hourly cost of employee 'X'.

Ans.

Statement showing computation of effective hourly cost of employee 'X'

	Per month (₹)	Per annum (₹)
(A) Earning of Employee 'X':		
Basic pay	10,000	1,20,000
Dearness Allowance	2,000	24,000
Bonus	2,400	28,800

	Employer's contribution to provident fund	1,200	14,400
	Other allowances	2,500	30,000
		18,100	2,17,200
(B)	Effective working hours (refer workings)		2,000 hours
(C)	**Effective hourly cost {(A) ÷ (B)}**		**₹108.60**

Workings:

Calculation of effective working hours:

Annual working hours less Normal idle time = 2,400 hours – 400 hours = 2,000 hours.

Q.42 Allocate Cost | ICAI MAT

In a factory working six days in a week and eight hours each day, a worker is paid at the rate of ₹ 100 per day basic plus D.A. @ 120% of basic. He is allowed to take 30 minutes off during his hours shift for meals-break and a 10 minutes recess for rest. During a week, his card showed that his time was chargeable to :

Job X 15 hrs.
Job Y 12 hrs.
Job Z 13 hrs.

The time not booked was wasted while waiting for a job. In Cost Accounting, STATE how would you allocate the wages of the workers for the week?

Ans.

Working notes:

(i) Total effective hours in a week:
[(8 hrs. – (30 mts. + 10 mts.)] × 6 days = 44 hours

(ii) Total wages for a week:
(₹ 100 + 120% of ₹ 100) × 6 days = ₹ 1,320

(iii) Wage rate per hour = 1320 ÷ 44 hours = ₹ 30

(iv) Time wasted waiting for job (Abnormal idle time):
= 44 hrs. – (15 hrs. + 12 hrs. + 13 hrs.) = 4 hrs.

Allocation of wages in Cost Accounting

		(₹)
Allocated to Job X	: 15 hours × ₹ 30	450
Allocated to Job Y	: 12 hours × ₹ 30	360
Allocated to Job Z	: 13 hours × ₹ 30	390
Charged to Costing Profit & Loss A/c	: 4 hours × ₹ 30	120
Total		**1,320**

Q.43 Calculate Earnings | ICAI MAT

CALCULATE the earnings of A and B from the following particulars for a month and allocate the employee cost to each job X, Y and Z:

	A	*B*
(i) Basic Wages (₹)	*10,000*	*16,000*
(ii) Dearness Allowance	*50%*	*50%*
(iii) Contribution to provident Fund (on basic wages)	*8%*	*8%*
(iv) Contribution to Employee's State Insurance (on basic wages)	*2%*	*2%*
(v) Overtime (Hours)	*10*	*--*

The normal working hours for the month are 200. Overtime is paid at double the total of normal wages and

dearness allowance. Employer's contribution to state Insurance and Provident Fund are at equal rates with employees' contributions. The two workers were employed on jobs X, Y and Z in the following proportions:

Jobs	X	Y	Z
Worker A	40%	30%	30%
Worker B	50%	20%	30%

Overtime was done on job Y.

Ans.

Statement showing Earnings of Workers A and B

	A (₹)	B (₹)
Basic wages	10,000	16,000
Dearness Allowance (50% of Basic Wages)	5,000	8,000
Overtime wages (Refer to Working Note 1)	1,500	--
Gross wages earned	16,500	24,000
Less: Contribution to Provident fund	(800)	(1,280)
Less: Contribution to ESI	(200)	(320)
Net wages earned	**15,500**	**22,400**

Statement of Employee Cost:

	A (₹)	B (₹)
Gross Wages (excluding overtime)	15,000	24,000
Add: Employer's contribution to PF	800	1,280
Add: Employer's contribution to ESI	200	320
Gross wages earned	16,000	25,600
Normal working hours	200	200
Ordinary wages rate per hour	**80**	**128**

Statement Showing Allocation of Wages to Jobs

	Total Wages (₹)	Jobs		
		X (₹)	Y (₹)	Z (₹)
Worker A:				
- Ordinary Wages (4: 3 : 3)	16,000	6,400	4,800	4,800
- Overtime	1,500	--	1,500	--
Worker B:				
- Ordinary Wages (5 : 2 : 3)	25,600	12,800	5,120	7,680
	43,100	**19,200**	**11,420**	**12,480**

Working Notes

1. Normal Wages are considered as basic wages

Over time $= \frac{2 \times (\text{Basic wage} + DA) \times 10 \text{ hours}}{100}$

$2 \times \left(\frac{15,000}{200}\right) \times 10 hours$ 150 × 10 hours = ₹1,500

Q.44 Calculate wages payable | ICAI MAT

It is seen from the job card for repair of the customer's equipment that a total of 154 labour hours have been put in as detailed below:

	Worker 'A' paid at ₹ 200 per day of 8 hours	*Worker 'B' paid at ₹ 100 per day of 8 hours*	*Worker 'C' paid at ₹ 300 per day of 8 hours*
Monday (hours)	*10.5*	*8.0*	*10.5*
Tuesday (hours)	*8.0*	*8.0*	*8.0*
Wednesday (hours)	*10.5*	*8.0*	*10.5*
Thursday (hours)	*9.5*	*8.0*	*9.5*
Friday (hours)	*10.5*	*8.0*	*10.5*
Saturday (hours)	*--*	*8.0*	*8.0*
Total (hours)	*49.0*	*48.0*	*57.0*

In terms of an award in employee conciliation, the workers are to be paid dearness allowance on the basis of cost of living index figures relating to each month which works out @ ₹ 968 for the relevant month. The dearness allowance is payable to all workers irrespective of wages rate if they are present or are on leave with wages on all working days.

Each worker has to work for 8 hours on weekdays. Saturday and Sunday will be weekly holiday, however workers may work on Saturdays due to exigency of work for 4 hours, though full payment of 8 hours will be made with no other payments.

Overtime is paid twice of ordinary wage rate if a worker works for more than nine hours in a day. Excluding holidays, the total number of hours works out to 176 in the relevant month. The company's contribution to Provident Fund and Employees State Insurance Premium are absorbed into overheads.

CALCULATE the wages payable to each worker.

Ans.

Calculation of hours to be paid for worker A:

	Normal hours	Extra hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours
Monday	8	1	$1\frac{1}{2}$	3	12
Tuesday	8	--	--	--	8
Wednesday	8	1	$1\frac{1}{2}$	3	12
Thursday	8	1	$\frac{1}{2}$	1	10
Friday	8	1	$1\frac{1}{2}$	3	12
Saturday	--	--	--	--	--
Total	40	4	5	10	54

Calculation of hours to be paid for worker B:

	Normal hours	Extra hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours
Monday	8	---	---	---	8
Tuesday	8	---	---	---	8
Wednesday	8	---	---	---	8
Thursday	8	---	---	---	8
Friday	8	---	---	---	8
Saturday	4	4*	---	---	8
Total	**44**	**4**	**---**	**---**	**4 8**

(*Worker-B has not worked more than 9 hours in any day)

Calculation of hours to be paid for worker C:

	Normal hours	Extra hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours
Monday	8	1	$1\frac{1}{2}$	3	12
Tuesday	8	---	---	---	8
Wednesday	8	1	$1\frac{1}{2}$	3	12
Thursday	8	1	$\frac{1}{2}$	1	10
Friday	8	1	$1\frac{1}{2}$	3	12
Saturday	8*	---	---	---	8
Total	**48**	**4**	**5**	**10**	**62**

(*Worker-C will be paid for equivalent 8 hours, though 4 hours of working is required on Saturday. Further, no overtime will be paid for working beyond 4 hours since it is paid for working beyond 9 hours.)

Wages payable:

	A	B	C
Basic Wages per hour (₹)	25.00	12.50	37.50
Dearness allowance per hour (₹)	5.50	5.50	5.50
Hourly rate (₹)	30.50	18.00	43.00
Total normal hours	54.00	48.00	62.00
Total Wages payable (₹)	**1,647.00**	**864.00**	**2,666.00**

Q.45 Calculate Labour Cost | ICAI MAT

In a factory, the basic wage rate is ₹100 per hour and overtime rates are as follows:

Before and after normal working hours	*175% of basic wage rate*
Sundays and holidays	*225% of basic wage rate*
During the previous year, the following hours were worked	
- Normal time	*1,00,000 hours*
- Overtime before and after working hours	*20,000 hours*
Overtime on Sundays and holidays	*5,000 hours*
Total	*1,25,000 hours*

The following hours have been worked on job 'Z'

Normal	*1,000 hours*
Overtime before and after working hrs.	*100 hours.*
Sundays and holidays	*25 hours.*
Total	*1,125 hours*

You are required to CALCULATE the labour cost chargeable to job 'Z' and overhead in each of the following instances:

(a) Where overtime is worked regularly throughout the year as a policy due to the workers' shortage.
(b) Where overtime is worked irregularly to meet the requirements of production.
(c) Where overtime is worked at the request of the customer to expedite the job.

Ans.

Workings

Basic wage rate : ₹ 100 per hour
Overtime wage rate before and after working hours : ₹ 100 × 175%
= ₹ 175 per hour

Overtime wage rate for Sundays and holidays : ₹ 100 × 225%
= ₹ 225 per hour

Computation of average inflated wage rate (including overtime premium):

Particulars	(₹)
Annual wages for the previous year for normal time (1,00,000 hrs. × ₹100)	1,00,00,000
Wages for overtime before and after working hours (20,000 hrs. × ₹175)	35,00,000
Wages for overtime on Sundays and holidays (5,000 hrs. × ₹225)	11,25,000
Total wages for 1,25,000 hrs.	**1,46,25,000**

Average inflated wage rate = $\frac{`1,46,25,000}{1,25,000 \text{ hours}}$ = = ₹117

(a) Where overtime is worked regularly as a policy due to workers' shortage:
The overtime premium is treated as a part of employee cost and job is charged at an inflated wage rate.
Hence, employee cost chargeable to job Z
= Total hours × Inflated wage rate = 1,125 hrs. × ₹ 117 = ₹ 1,31,625

(b) Where overtime is worked irregularly to meet the requirements of production:
Basic wage rate is charged to the job and overtime premium is charged to factory overheads as under:
Employee cost chargeable to Job Z: 1,125 hours @ ₹100 per hour =

₹ 1,12,500
Factory overhead: {100 hrs. × ₹ (175 – 100)} + {25 hrs. × ₹ (225 – 100)} =
{₹7,500 + ₹3,125} = **₹10,625**

(c) Where overtime is worked at the request of the customer, overtime premium is also charged to the job as under:

			(₹)
Job Z Employee cost	1,125 hrs. @ ₹ 100	=	1,12,500
Overtime premium	100 hrs. @ ₹ (175 – 100)	=	7,500
	25 hrs. @ ₹ (225 – 100)	=	3,125
	Total		**1,23,125**

Q.46 Halsey System | ICAI MAT

CALCULATE the earnings of a worker under Halsey System. The relevant data is as below:

Time Rate (per hour)	₹ 60
Time allowed	8 hours
Time taken	6 hours
Time saved	2 hours

Ans.

Calculation of total earnings:
= Time taken × Time rate + 50% (Time Allowed – Time Taken) × Time rate
= 6 hrs. × ₹60 + 1/2 × (2 hrs. × ₹60) or ₹360 + ₹60 = ₹420
Of his total earnings, ₹360 is on account of the time worked and ₹60 is on account of his share of the premium bonus.

Rowan Premium Plan: According to this system a standard time allowance is fixed for the performance of a job and bonus is paid if time is saved.
Under Rowan System the bonus is that proportion of the time wages as time saved bears to the standard time.

$$\text{Time taken} \times \text{Rate per hour} + \frac{\text{Time Saved}}{\text{Time Allowed}} \times \text{Time taken} \times \text{Rate per hour}$$

Advantages and Disadvantages of Rowan Premium Plan

Advantages	Disadvantages
1. It is claimed to be a fool-proof system in as much as a worker can never double his earnings even if there is bad rate setting.	1. The system is a bit complicated.
2. It is admirably suitable for encouraging moderately efficient workers as it provides a better return for moderate efficiency than under the Halsey Plan.	2. The incentive is weak at a high production level where the time saved is more than 50% of the time allowed.
3. The sharing principle appeals to the employer as being equitable.	3. The sharing principle is not generally welcomed by employees.

Q.47 Rowan System | ICAI MAT

CALCULATE the earnings of a worker under Rowan System. The relevant data is given as below:

Time rate (per Hour)	₹ 60
Time allowed	8 hours.
Time taken	6 hours.
Time saved	2 hours.

Ans.

Calculation of total earnings:

$$= \text{Time taken} \times \text{Rate per hour} + \frac{\text{Time Saved}}{\text{Time Allowed}} \times \text{Time taken} \times \text{Rate per hour}$$

$$= 6 \text{ hours} \times ₹60 + \frac{2 Hours}{8 Hours} \times 6 \text{ hours} \times 60 = 360 + 90 = 450$$

Q.48 Rate of wages | ICAI MAT

Two workmen, 'A' and 'B', produce the same product using the same material. Their normal wage rate is also the same. 'A' is paid bonus according to the Rowan system, while 'B' is paid bonus according to the Halsey system. The time allowed to make the product is 50 hours. 'A' takes 30 hours while 'B' takes 40 hours to complete the product. The factory overhead rate is ₹ 5 per man-hour actually worked. The factory cost for the product for 'A' is ₹ 3,490 and for 'B' it is ₹ 3,600.

Required:

(a) COMPUTE the normal rate of wages;

(b) COMPUTE the cost of materials cost;

(c) PREPARE a statement comparing the factory cost of the products as made by the two workmen.

Ans.

Step 1 : Let X be the cost of material and Y be the normal rate of wages per hour.

Step 2 : Factory Cost of Workman 'A'

	(₹)
A. Material Cost	X
B. Wages (Rowan Plan)	30 Y
C. Bonus = $\frac{30}{50} \times (50 - 30) \times Y$	12 Y
D. Overheads (30 × ₹5)	150
E. Factory Cost	3,490
Or, X + 42 Y = ₹3,490 (Given) – ₹150 = ₹3,340 .....equation (i)	

Step 3 : Factory Cost of Workman 'B'

	(₹)
terial Cost	X
B. Wages (Halsey Plan)	40 Y
C. Bonus = 50% of (SH - AH) × R	5 Y
= 50% of (50 - 40) × R	
D. Overheads (40 × ₹5)	200
E. Factory Cost	3,600
Or, X + 45 Y = ₹3,600 (Given) – ₹200 = ₹3,400..... equation (ii)	

Step 4 : Subtracting equation (i) from equation (ii)

3Y = ₹60

Y = ₹60/3 = ₹20 per hour.

(a) The normal rate of wages: ₹20 per hour

(b) The cost of material: X + 45 ×₹ 20 = ₹ 3,400 or, X = ₹ 3,400 – ₹ 900 = ₹ 2,500

(c) **Comparative Statement of the Factory Cost of the product made by the two workmen.**

	'A' (₹)	'B' (₹)
Material cost	2,500	2,500
Direct Wages	600 (30 ×₹20)	800 (40 ×₹20)
Bonus	240 (12 ×₹20)	100 (5 ×₹20)
Factory Overhead	150	200
Factory Cost	**3,490**	**3,600**

Q.49 Halsey System | ICAI MAT

(a) Bonus paid under the Halsey Plan with bonus at 50% for the time saved equals the bonus paid under the Rowan System. When will this statement hold good? (Your answer should contain the proof).

(b) The time allowed for a job is 8 hours. The hourly rate is ₹ 8. PREPARE a statement showing:

(i) The bonus earned

(ii) The total earnings of employee and

(iii) Hourly earnings.

Under the Halsey System with 50% bonus for time saved and Rowan System for each hour saved progressively.

Ans. (a) Bonus under Halsey Plan = $\frac{50}{100} \times (SH - AH) \times R$ (i)

Bonus under Rowan Plan : = $\frac{AH}{SH} \times (SH - AH) \times R$ (ii)

Bonus under Halsey Plan will be equal to the bonus under Rowan Plan when the following condition holds good:

$$\frac{50}{100} \times (SH - AH) \times R = \frac{AH}{SH} \times (SH - AH) \times R$$

$$\frac{50}{100} = \frac{AH}{SH}$$

Hence, when the actual time taken (AH) is 50% of the time allowed (SH), the bonus under Halsey and Rowan Plans is equal.

(b) **Statement of Bonus, total earnings of Employee and hourly earnings under Halsey and Rowan Systems.**

SH	AH	Time saved	Basic wages (AH x₹8) (B x ₹8)	Bonus under Halsey System $\left[\frac{50}{100} \times C \times 8\right]$	Bonus under Rowan system $\left[\frac{B}{A} \times C \times 8\right]$	Total Earnings under Halsey System D+E	Total Earnings under Rowan System D+F	Hourly Earnings under Halsey System G/B	Hourly Earnings under Rowan System H/B
A	B	C =	D	E	F	G	H	I	J

Hours	Hours	(A-B) Hours	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)
8	8	-	64	-	-	64	64	8.00	8.00
8	7	1	56	4	7	60	63	8.57	9.00
8	6	2	48	8	12	56	60	9.33	10.00
8	5	3	40	12	15	52	55	10.40	11.00
8	4	4	32	16	16	48	48	12.00	12.00
8	3	5	24	20	15	44	39	14.67	13.00
8	2	6	16	24	12	40	28	20.00	14.00
8	1	7	8	28	7	36	15	36.00	15.00

Q.50 Halsey System | ICAI MAT

A skilled worker in XYZ Ltd. is paid a guaranteed wage rate of ₹ 30 per hour. The standard time per unit for a particular product is 4 hours. Mr. P, a machine man, has been paid wages under the Rowan Incentive Plan and he had earned an effective hourly rate of ₹ 37.50 on the manufacture of that particular product.
STATE what could have been his total earnings and effective hourly rate, had he been put on Halsey Incentive Scheme (50%)?

Ans.

Total earnings (under 50% Halsey Scheme) = Hours worked ×Rate per hour + $\frac{1}{2}$ × time saved × Rate per hour
= 3 hours ×₹ 30 + $\frac{1}{2}$ × 1 hour ×₹30 = ₹105

Effective hourly rate $= \frac{Total earnings}{Hours taken} = \frac{105}{3 Hours}$ 35

Working Note:
Let T hours be the total time worked in hours by the skilled workers (machine man P), ₹30 is the rate per hour; standard time is 4 hours per unit and effective hourly earnings rate is ₹37.50 then

Earning (under Rowan plan) = Hours worked × Rate per hr + $\frac{Time saved}{Time allowed}$ × Time taken × Rate per hr

₹37.5 T	= T ×₹30 + $\frac{(4-T)}{4}$ × T ×₹30
(both sides are divided by T)	
₹ 37.5	= ₹ 30 + (4 – T) × ₹ 7.5
₹ 37.5	= ₹ 30 + ₹30 - 7.5T
or, ₹ 7.5 T	= ₹60-₹37.5
or, ₹ 7.5 T	= ₹ 22.5
or, T	= 3 hours.

Q.51 Incentive Scheme | ICAI MAT

A factory having the latest sophisticated machines wants to introduce an incentive scheme for its workers, keeping in view the following:

(i) The entire gains of improved production should not go to the workers.
(ii) In the name of speed, quality should not suffer.
(iii) The rate setting department being newly established are liable to commit mistakes.

You are required to PREPARE a suitable incentive scheme and DEMONSTRATE by an illustrative numerical example how your scheme answers to all the requirements of the management.

Ans. Rowan Scheme of premium bonus (variable sharing plan) is a suitable incentive scheme for the workers of the factory. If this scheme is adopted, the entire gains due to time saved by a worker will not pass to him.

Another feature of this scheme is that a worker cannot increase his earnings or bonus by merely increasing its work speed. The reason for this is that the bonus under Rowan Scheme is maximum when the time taken by a worker on a job is half of the time allowed. As this fact is known to the workers, therefore, they work at such a speed which helps them to maintain the quality of output too.

Lastly, Rowan System provides a safeguard in the case of any loose fixation of the standards by the rate-setting department. It may be observed from the following illustration that in the Rowan Scheme the bonus paid will be low due to any loose fixation of standards. Workers cannot take undue advantage of such a situation. The above three features of Rowan Plan can be discussed with the help of the following illustration:

(i) Time allowed = 4 hours

Time taken = 3 hours

Time saved = 1 hour

Rate = ₹5 per hour

$$\text{Bonus} = \frac{Time taken}{Time allowed} \times Time saved \times Rate$$

$$= \frac{3 Hours}{4 Hours} \times 1 Hours \times 5 = ₹3.75$$

In the above illustration time saved is 1 hour and, therefore, total gain is ₹ 5. Out of ₹5 according to Rowan Plan only ₹ 3.75 is given to the worker in the form of bonus and the remaining ₹ 1.25 remains with the management. In other words, a worker is entitled for 75 percent of the time saved in the form of bonus.

(ii) The figures of bonus in the above illustration when the time taken is 2 hours and 1 hour respectively are as below:

$$\text{Bonus} = \frac{Time taken}{Time allowed} \times Time saved \times Rate$$

$$= \frac{2 Hours}{4 Hours} \times 2 \text{ hours} \times ₹5 = ₹5$$

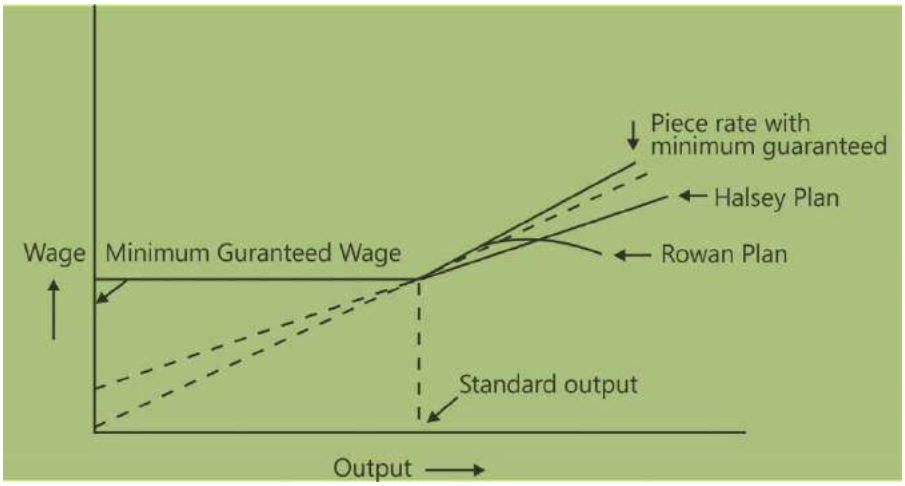
$$= \frac{1 Hours}{4 Hours} \times 3 \text{ hours} \times ₹5 = ₹3.75$$

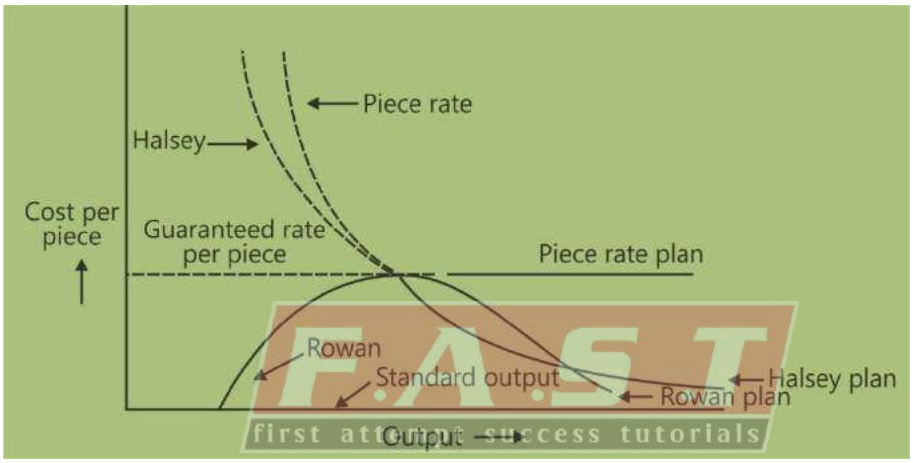
The above figures of bonus clearly show that when time taken is half of the time allowed, the bonus is maximum. When the time taken is reduced from 2 to 1 hour, the bonus figure fell by ₹1.25. Hence, it is quite apparent to workers that it is of no use to increase speed of work. This feature of Rowan Plan thus protects the quality of output.

(iii) If the rate-setting department erroneously sets the time allowed as 10 hours instead of 4 hours, in the above illustration; then the bonus paid will be as follows:

$$\text{Bonus} = \frac{3 Hours}{10 Hours} \times 7 \text{ hours} \times ₹5 = ₹10.50$$

The bonus paid for saving 7 hours thus is ₹10.50 which is approximately equal to the wages of 2 hours. In other words, the bonus paid to the workers is low. Hence workers cannot take undue advantage of any mistake committed by the time setting department of the concern.





Q.52 Calculate Wage Rate | ICAI MAT

A worker is paid ₹10,000 per month and a dearness allowance of ₹2,000 p.m. Worker contribution to provident fund is @ 10% and employer also contributes the same amount as the employee. The Employees State Insurance Corporation premium is 6.5% of wages of which 1.75% is paid by the employees. It is the firm's practice to pay 2 months' wages as bonus each year.

The number of working days in a year are 300 of 8 hours each. Out of these the worker is entitled to 15 days leave on full pay. CALCULATE the wage rate per hour for costing purposes.

Ans.

	(₹)
Wages paid to worker during the year {(₹ 10,000 +2,000) × 12}	1,44,000
Add: Employer Contribution to:	
Provident Fund @ 10%	14,400
E.S.I. Premium @ 4.75% (6.5 – 1.75)	6,840
Bonus at 2 months' wages (Basic + DA)	24,000
Total	1,89,240

Effective hours per year: 285 days × 8 hours = 2,280 hours

Wage-rate per hour (for costing purpose): ₹1,89,240/2,280 hours = ₹83

Q.53 Employee Hour Rate | ICAI MAT

CALCULATE the Employee hour rate of a worker X from the following data:

Basic pay	₹ 10,000 p.m.
D.A.	₹ 3,000 p.m.
Fringe benefits	₹ 1,000 p.m.

Number of working days in a year 300. 20 days are availed off as holidays on full pay in a year. Assume a day of 8 hours.

Ans.

(i)	Effective working days in a year	300
	Less: Leave days on full pay	20
	Effective working days	280 days
	Total effective working hours (280 days × 8 hours)	2,240

		(₹)
(ii)	Total wages paid in a year	
	Basic pay	1,20,000
	D.A.	36,000
	Fringe benefits	12,000
	Total wages	1,68,000
(iii)	Hourly rate : ₹1,68,000/2,240 hours	₹75.00

Q.54 Workers left, joined, average | ICAI MAT

The Accountant of Y Ltd. has computed employee turnover rates for the quarter ended 31st March, 2023 as 10%, 5% and 3% respectively under 'Flux method', 'Replacement method' and 'Separation method' respectively. If the number of workers replaced during that quarter is 30, FIND OUT the number of workers for the quarter (i) recruited and joined and (ii) left and discharged and (iii) Equivalent employee turnover rates for the year.

Ans.

Working Note:

Average number of workers on roll (for the quarter):

Employee Turnover rate using Replacement method

$$= \frac{\text{No. of replacements}}{\text{Average numberof workers on roll}} \times 100$$

$$\text{Or, } \frac{5}{100} = \frac{30}{\text{Average numberof workers on roll}}$$

$$\text{Or, Average number of workers on roll} = \frac{30 \times 100}{5} = 600$$

(i) Number of workers recruited and joined:

Employee turnover rate (Flux method)

$$= \frac{\text{No. ofSeparations } *(S) + \text{No. of Accessions}(A)}{\text{Average number of workers on roll}}$$

$$\text{Or, } \frac{10}{100} \quad \frac{*18 + A}{600} \quad \text{or, } A = \left[\frac{600}{100} - 80\right] = 42$$

No. of workers recruited and joined 42.

(ii) Number of workers left and discharged:

Employee turnover rate (Separation method)

$$= \frac{\text{No. ofSeparations } (S)}{\text{Average number of workers on roll}} \times 100 = \frac{3}{100} = \frac{S}{600} \quad \text{or, } S^* = 18$$

Hence, number of workers left and discharged comes to 18

(iii) Calculation of Equivalent employee turnover rates:

$$= \frac{\text{Employee Turnover rate for the quarter}(s)}{\text{Number of quarter}(s)} \times 4 quarters$$

Using Flux method = $\frac{10\%}{1} \times 4 = 40\%$

Using Replacement method = $\frac{5\%}{1} \times 4 = 20\%$

Using Separation method = $\frac{3\%}{1} \times 4 = 12\%$

Q.55 Profit Forgone | ICAI MAT

The management of B.R Ltd. is worried about their increasing employee turnover in the factory and before analyzing the causes and taking remedial steps; it wants to have an idea of the profit foregone as a result of employee turnover in the last year.

Last year sales amounted to ₹ 83,03,300 and P/V ratio was 20 per cent. The total number of actual hours worked by the direct employee force was 4.45 lakhs. The actual direct employee hours included 30,000 hours attributable to training new recruits, out of which half of the hours were unproductive. As a result of the delays by the Personnel Department in filling vacancies due to employee turnover, 1,00,000 potentially productive hours (excluding unproductive training hours) were lost.

The costs incurred consequent on employee turnover revealed, on analysis, the following:

Settlement cost due to leaving	₹ 43,820
Recruitment costs	₹ 26,740
Selection costs	₹ 12,750
Training costs	₹ 30,490

Assuming that the potential production lost as a consequence of employee turnover could have been sold at prevailing prices, FIND the profit foregone last year on account of employee turnover.

Ans. **Workings:**

(i) Computation of productive hours

Actual hours worked (given)	4,45,000
Less: Unproductive training hours	15,000
Actual productive hours	4,30,000

(ii) Productive hours lost:

Loss of potential productive hours + Unproductive training hours

= 1,00,000 + 15,000 = 1,15,000 hours

(iii) Loss of contribution due to unproductive hours:

$$= \frac{\text{Sales value}}{\text{Actual productive hours}} \times \text{Total unproductive hours}$$

$$= \frac{83,03,300}{4,30,000 \text{ hrs}} \times 1,15,000 \text{ hours} = 22,20,650$$

Contribution lost for 1,15,000 hours = $\frac{22,20,650}{100} \times 20 = 4,44,130$

Computation of profit forgone on account of employee turnover

	(₹)
Contribution foregone (as calculated above)	4,44,130
Settlement cost due to leaving	43,820
Recruitment cost	26,740
Selection cost	12,750
Training costs	30,490
Profit foregone	**5,57,930**

Q.56 Expenses directly attributable | ICAI MAT

Aditya Ltd. is an engineering manufacturing company producing job order on the basis of specification given by the customers. During the last the month it has completed three job works namely A, B and C. The following are the items of expenditures which are incurred apart from direct materials and direct employee cost:

(i) Office and administration cost- ₹ 3,00,000.

(ii) Product blueprint cost for job A – ₹ 1,40,000

(iii) Hire charges paid for machinery used for job work B- ₹ 40,000

(iv) Salary to office attendants- ₹ 50,000

(v) One time license fee paid for software used to make computerised graphics for job C- ₹ 50,000.

(vi) Salary paid to marketing manager- ₹ 1,20,000.

Required:

CALCULATE direct expenses attributable to each job

Ans. **Calculation of Direct expenses**

Particulars	Job A (₹)	Job B (₹)	Job C (₹)
Product blueprint cost	1,40,000	--	--
Hire charges paid for machinery	--	40,000	--
license fee paid for software	--	--	50,000
Total Direct expenses	1,40,000	40,000	50,000

Note:

(i) Office and administration cost is classified as overheads.

(ii) Salary paid to office attendants is classified under office and administration cost.

(iii) Salary paid to marketing manager is classified under selling overheads

4 CHAPTER OVERHEADS

Q.1 Calculate Cost & SP | MTP May 23(1)

Arnav Confectioners (AC) owns a bakery which is used to make bakery items like pastries, cakes and muffins. AC use to bake atleast 50 units of any item at a time. A customer has given an order for 600 cakes. To process a batch of 50 cakes, the following cost would be incurred:

Direct materials - Rs. 5,000
Direct wages - Rs. 500
Oven set-up cost -Rs. 750

AC absorbs production overheads at a rate of 20% of direct wages cost. 10% is added to the total production cost of each batch to allow for selling, distribution and administration overheads.

AC requires a profit margin of 25% of sales value.

Required:

(i) DETERMINE the price to be charged for 600 cakes.
(ii) CALCULATE cost and selling price per cake.
(iii) DETERMINE what would be selling price per unit If the order is for 605 cakes.

Ans.

Statement of cost per batch and per order

No. of batch = 600 units ÷ 50 units = 12 batches

	Particulars	Cost per batch (Rs.)	Total Cost (Rs.)
	Direct Material Cost	5,000.00	60,000
	Direct Wages	500.00	6,000
	Oven set-up cost	750.00	9,000
	Add: Production Overheads (20% of Direct wages)	100.00	1,200
	Total Production cost	6,350.00	76,200
	Add: S&D and Administration overheads (10% of Total production cost)	635.00	7,620
	Total Cost	6,985.00	83,820
	Add: Profit (1/3rd of total cost)	2,328.33	27,940
(i)	**Sales price**	**9,313.33**	**1,11,760**
	No. of units in batch	50 units	
(ii)	**Cost per unit** (Rs.6,985 ÷ 50 units)	**139.70**	
	Selling price per unit (9,313.33 ÷ 50 units)	**186.27**	

If the order is for 605 cakes, then selling price per cake would be as below:

Particulars	Total Cost (Rs.)
Direct Material Cost	60,500
Direct Wages	6,050
Oven set-up cost	9,750
Add: Production Overheads (20% of Direct wages)	1,210
Total Production cost	77,510
Add: S&D and Administration overheads	7,751

(10% of Total production cost)	
Total Cost	85,261
Add: Profit (1/3rd of total cost)	28,420
Sales price	**1,13,681**
No. of units	605 units
Selling price per unit (Rs.1,13,681 ÷ 605 units)	**187.90**

Q.2 Calculate Cost & SP | MTP May 23(1)

Mithi Treat (MT) owns a confectionary store which sells items like sweets, cake, chocolates. MT use to produce at most 40 units of any item at a time. It has received an order for 800 chocolates from a customer. To process a batch of 40 chocolates, the following cost would be incurred:

Direct materials - ₹ 600
Direct wages - ₹ 55
Oven set- up cost - ₹ 175

MT absorbs production overheads at a rate of 25% of direct wages cost. 15% is added to the total production cost of each batch to allow for selling, distribution and administration overheads.

MT requires a profit margin of 25% of cost. DETERMINE the selling price for 800 Chocolates.

Ans.

Statement of cost per batch and per order

No. of batch = 800 units ÷ 40 units = 20 batches

Particulars	*Cost per batch (₹)*	*Total Cost (₹)*
Direct Material Cost	600	12,000
Direct Wages	55	1100
Oven set-up cost	175	3500
Add: Production Overheads (25% of Direct wages)	13.75	275
Total Production cost	843.75	16875
Add: S&D and Administration overheads	126.56	2531.25
Total Cost	970.31	19406.25
Add: Profit (25% of total cost)	242.58	4851.56
Selling price	1,212.89	24,257.81
Selling Price per unit = 1,212.89÷40[Or 24,257.81÷800]	30.32	30.32

Q.3 Machine Hour Rate | PY Jan 21

A machine shop has 8 identical machines manned by 6 operators. The machine cannot work without an operator wholly engaged on it. The original cost of all the 8 machines works out to ₹ 32,00,000. The following particulars are furnished for a six months period:

Normal available hours per month per operator	208
Absenteeism (without pay) hours per operator	18
Leave (with pay) hours per operator	20
Normal unavoidable idle time-hours per operator	10
Average rate of wages per day of 8 hours per operator	₹ 100
Production bonus estimated	10% on wages
Power consumed	₹ 40,250
Supervision and Indirect Labour	₹ 16,500
Lighting and Electricity	₹ 6,000

The following particulars are given for a year:

Insurance	₹ 3,60,000
Sundry work Expenses	₹ 50,000
Management Expenses allocated	₹ 5,00,000
Depreciation	10% on the original cost

Repairs and Maintenance (including consumables): 5% of the value of all the machines.

Prepare a statement showing the comprehensive machine hour rate for the machine shop.

Ans.

Workings:

Particulars	Six months 6 operators (Hours)
Normal available hours per month (208 x 6 months x 6 operators)	7,488
Less: Absenteeism hours (18 x 6 operators)	(108)
Paid hours (A)	7,380
Less: Leave hours (20 x 6 operators)	(120)
Less: Normal idle time (10 x 6 operators)	(60)
Effective working hours	**7,200**

Computation of Comprehensive Machine Hour Rate

Particulars	Amount for sixmonths (₹)
Operators' wages (7,380/8 x100)	92,250
Production bonus (10% on wages)	9,225
Power consumed	40,250
Supervision and indirect labour	16,500
Lighting and Electricity	6,000
Repair and maintenance {(5% × ₹ 32,00,000)/2}	80,000
Insurance (₹ 3,60,000/2)	1,80,000
Depreciation {(₹ 32,00,000 × 10%)/2}	1,60,000
Sundry Work expenses (₹ 50,000/2)	25,000
Management expenses (₹ 5,00,000/2)	2,50,000
Total Overheads for 6 months	**8,59,225**
Comprehensive Machine Hour Rate = ₹ 8,59,225/7,200 hours	**₹ 119.33**

(Note: Machine hour rate may be calculated alternatively. Further, presentation of figures may also be done on monthly or annual basis.)

Q.4 Machine Hour Rate | PY Nov 22

USP Ltd. is the manufacturer of 'double grip motorcycle tyres'. In the manufacturing process, it undertakes three different jobs namely, Vulcanising, Brushing and Striping. All of these jobs require the use of a special machine and also the aid of a robot when necessary. The robot is hired from outside and the hire charges paid for every six months is₹ 2,70,000. An estimate of overhead expenses relating to the special machine is given below:

- Rent for a quarter is ₹ 18,000.
- The cost of the special machine is ₹ 19,20,000 and depreciation is charged @10% per annum on straight linebasis.
- Other indirect expenses are recovered at 20% of direct wages.

The factory manager has informed that in the coming year, the total direct wages will be ₹ 12,00,000 which will be incurred evenly throughout the year.

During the first month of operation, the following details are available from the job book:

Number of hours the special machine was used

Jobs	Without the aid of the robot	With the of the robot
Vulcanising	500	400
Brushing	1000	400
Striping	-	1200

You are required to :

(i) Compute the Machine Hour Rate for the company as a whole for a month (A) when the robot is used and (B) when the robot is not used.

(ii) Compute the Machine Hour Rate for the individual jobs i.e. Vulcanising, Brushing and Striping.

Ans.

Working notes:

(I) Total machine hours use (500 + 1,000 + 400 + 400 + 1,200) — 3,500

(II) Total machine hours without the use of robot (500 + 1,000) — 1,500

(III) Total machine hours with the use of robot (400 + 400 + 1,200) — 2,000

(IV) Total overheads of the machine per month

Rent (₹ 18,000 ÷ 3 months)	6,000
Depreciation [(₹ 19,20,000 x 10%) ÷ 12 months]	16,000
Indirect expenses [(₹ 12,00,000 x 20%) ÷ 12 months]	20,000
Total	42,000

(V) Robot hire charges for a month (₹ 2,70,000 ÷ 6 months) — ₹ 45,000

(VI) Overheads for using machines without robot

$$-\frac{42,000}{3,500 Hours} \times 1,500 hrs. = 18,000$$

(VII) Overheads for using machines with robot

$$-\frac{42,000}{3,500 Hours} \times 2,000 hrs. + 45,000 = 69,000$$

(i) Computation of Machine hour rate for the firm as a whole for a month.

(A) When the robot was used: $\frac{69,000}{2,000} = 34.50$ Per Hour

(B) When the robot was not used: $\frac{18,000}{15,000} = 12$ Per Hour

(ii) Computation of Machine hour rate for the individual job

	Rate per hour	Job					
		Vulcanising		Brushing		Striping	
	(₹)	Hrs.	(₹)	Hrs.	(₹)	Hrs.	(₹)
Overheads							
Without robot	12.00	500	6,000	1,000	12,000	-	-
With robot	34.50	400	13,800	400	13,800	1,200	41,400
Total		900	19,800	1,400	25,800	1,200	41,400
Machine hour rate			22		18.43		34.50

Q.5 Machine Hour Rate | RTP Jul 21

A manufacturing unit has purchased and installed a new machine at a cost of ₹ 24,90,000 to its fleet of 5 existing machines. The new machine has an estimated life of 12 years and is expected to realise ₹ 90,000 as scrap value

at the end of its working life.

Other relevant data are as follows:

(i) Budgeted working hours are 2,496 based on 8 hours per day for 312 days. Plant maintenance work is carried out on weekends when production is totally halted. The estimated maintenance hours are 416. During the production hours machine set -up and change over works are carried out. During the set-up hours no production is done. A total 312 hours are required for machine set-ups and change overs.

(ii) An estimated cost of maintenance of the machine is ₹ 2,40,000 p.a.

(iii) The machine requires a component to be replaced every week at a cost of ₹ 2,400.

(iv) There are three operators to control the operations of all the 6 machines. Each operator is paid ₹ 30,000 per month plus 20% fringe benefits.

(v) Electricity: During the production hours including set-up hours, the machine consumes 60 units per hour. During the maintenance the machine consumes only 10 units per hour. Rate of electricity per unit of consumption is ₹ 6.

(vi) Departmental and general works overhead allocated to the operation during last year was ₹ 5,00,000. During the current year it is estimated to increase by 10%.

Required: COMPUTE the machine hour rate.

Ans.

1. Effective machine hour:
   = Budgeted working hours – Machine Set-up time
   = 2,496 hours – 312 hours = 2,184 hours.

2. Operators' salary per annum:

Salary (3 operators × ₹30,000 × 12 months)	₹ 10,80,000
Add: Fringe benefits (20% of ₹10,80,000)	₹ 2,16,000
	₹ 12,96,000

3. Depreciation per annum
$$\frac{24,90,000 - 90,000}{12 \text{ years}} = 2,00,000$$

Computation of Machine hour Rate

	Amount p.a. (₹)	Amountperhour (₹)
Standing charges		
Operators' Salary $\left(\frac{12,96,000}{6\text{machines}} \times \frac{1}{2,184\text{hours}}\right)$	12,96,000	98.90
Departmental and general overheads: (₹ 5,00,000 × 110%) $\left(\frac{5,50,000}{6\text{machines}} \times \frac{1}{2,184\text{hours}}\right)$	5,50,000	41.97
(A)	18,46,000	140.87
Machine Expenses		
Depreciation $\left(\frac{2,00,000}{2,184\text{hours}}\right)$	2,00,000	91.58
Electricity:		
During working hours (2,496 hours × 60 units ×₹6)	8,98,560	411.43
During maintenance hours (416 hours × 10 units ×₹6)	24,960	11.43
Component replacement cost (2,400 × 52 weeks)	1,24,800	57.14
Machine maintenance cost	2,40,000	109.89
(B)	14,88,320	681.47
Machine Hour Rate (A + B)		822.34

Q.6 Machine Hour Rate | RTP Nov 23

The following particulars refer to process used in the treatment of material subsequently incorporated in a component forming part of an electrical appliance:

(i) The original cost of the machine used (Purchased in June 2018) was ₹ 10,00,000. Its estimated life is 10 years, the estimated scrap value at the end of its life is ₹ 10,000, and the estimated working time per year (50 weeks of 44 hours) is 2,200 hours. Out of which machine maintenance etc., is estimated to take up 200 hours.
No other loss of working time expected, setting up time, estimated at 100 hours, is regarded as productive time. (Holiday to be ignored).

(ii) Electricity used by the machine during production is 16 units per hour at cost of a ₹ 7 per unit. No power is consumed during maintenance or setting up.

(iii) The machine required a chemical solution which is replaced at the end of week at a cost of ₹ 2,000 each time.

(iv) The estimated cost of maintenance per year is ₹ 1,20,000.

(v) Two attendants control the operation of machine together with five other identical machines. Their combined weekly wages, insurance and the employer's contribution to holiday pay amount is ₹ 9,000.

(vi) Departmental and general works overhead allocated to this machine for the current year amount to ₹ 20,000.

You are required to calculate the machine hour rate of operating the machine.

Ans.

(i) Total Productive hours = Estimated Working hours – Machine Maintenance hours
= 2,200 hours – 200 hours = 2,000 hours

(ii) Depreciation per annum = $\frac{10,00,000 - 10,000}{10} = 99,000$

(iii) Chemical solution cost per annum = ₹ 2,000 × 50 weeks = ₹ 1,00,000

(iv) Wages of attendants (per annum) =

$$\frac{9,000 \times 50 \text{ weeks}}{6 \text{ machines}} = ₹\ 75,000$$

Calculation of Machine hour rate

Particulars	Amount (perannum)	Amount (perhour)
A. Standing Charge		
(i) Wages of attendants	75,000	
(ii) Departmental and general works overheads	20,000	
Total Standing Charge	95,000	
Standing Charges per hour		47.50
B. Machine Expense		
(iii) Depreciation	99,000	49.50
(iv) Electricity (7 × 1,900 × 16 units) ÷ 2,000	-	106.40
(v) Chemical solution	1,00,000	50.00
(vi) Maintenance cost	1,20,000	60.00
Machine operating cost per hour (A + B)		313.40

Q.7 Machine Hour Rate | MTP May 18

A machine shop cost centre contains three machines of equal capacities. To operate these three machines nine operators are required i.e. three operators on each machine. Operators are paid ₹ 20 per hour. The factory works for fourty eight hours in a week which includes 4 hours set up time. The work is jointly done by operators. The operators are paid fully for the fourty eight hours. In additions they are paid a bonus of 10 per cent of productive time. Costs are reported for this company on the basis of thirteen four-weekly period.

The company for the purpose of computing machine hour rate includes the direct wages of the operator and also recoups the factory overheads allocated to the machines. The following details of factory overheads applicable to the cost centre are available:

- Depreciation 10% per annum on original cost of the machine. Original cost of the each machine is ₹ 52,000.
- Maintenance and repairs per week per machine is ₹ 60.
- Consumable stores per week per machine are ₹ 75.
- Power : 20 units per hour per machine at the rate of 80 paise per unit.
- Apportionment to the cost centre : Rent per annum ₹ 5,400, Heat and Light per annum ₹9,720, foreman'ssalary per annum ₹12,960 and other miscellaneous expenditure per annum ₹ 18,000.

Required:

(i) CALCULATE the cost of running one machine for a four-week period.

(ii) CALCULATE machine hour rate.

Ans.

Effective Machine hour for four-week period

= Total working hours – unproductive set-up time

= {(48 hours × 4 weeks) – {(4 hours × 4 weeks)}

= (192 – 16) hours) = 176 hours.

(i) Computation of cost of running one machine for a four week period

		(₹)	(₹)
(A)	**Standing charges (per annum)**		
	Rent	5,400.00	
	Heat and light	9,720.00	
	Forman's salary	12,960.00	
	Other miscellaneous expenditure	18,000.00	
	Standing charges (per annum)	46,080.00	
	Total expenses for one machine for four week period $\left(\frac{46,080}{3 machines \times 13 Four-Week Period}\right)$		1,181.54
	Wages (48 hours × 4 weeks × ₹ 20 × 3 operators)		11,520.00
	Bonus {(176 hours × ₹ 20 × 3 operators) 10%}		1,056.00
	Total standing charges		13,757.54
(B)	Machine Expenses		
	Depreciation = $\left(52,000 \times 10\% \times \frac{1}{13 \text{ four} - \text{weekperiod}}\right)$		400.00

	Repairs and maintenance (₹ 60 × 4 weeks)		240.00
	Consumable stores (₹ 75 × 4 weeks)		300.00
	Power (176 hours × 20 units × ₹ 0 .80)		2,816.00
	Total machine expenses		3,756.00
(C)	Total expenses (A) + (B)		17,513.54

(ii) Machine hour rate = $\frac{17,513.54}{176 hours} = 99.51$

Q.8 Machine Hour Rate | MTP Dec 21(2)

A machine costing ₹ 10 lakhs, was purchased on 01-04-2021. The expected life of the machine is 10 years. At the end of this period its scrap value is likely to be ₹ 10,000. The total cost of all the machines including new one was ₹ 90 lakhs.

The other information is given as follows:

(i) Working hours of the machine for the year was 4,200 including 200 non-productive hours.

(ii) Repairs and maintenance for the new machine during the year was ₹ 6,000.

(iii) Insurance Premium was paid for all the machine ₹ 9,000.

(iv) New machine consumes 8 units of electricity per hour, the rate per unit being ₹ 3.75

(v) The new machine occupies 1/10th area of the department. Rent of the department is ₹ 2,400 per month.

(v) Depreciation is charged on straight line basis. COMPUTE machine hour rate for the new machine.

Ans

Computation of machine hour rate of new Machine

	Total (₹)	Per hour (₹)
A. Standing Charges		
I. Insurance Premium $9,000 \times \frac{1}{9}$	1,000	
II. Rent $\frac{1}{10} \times$ ₹2,400 ×12 months	2,880	
B. Machine expenses	3,880	0.97*
I. Repairs and Maintenance (₹ 6,000 ÷ 4,000 hours)		1.50
II. Depreciation $\frac{10,00,000 - 10,000}{10 years \times 4,000 hours}$		24.75
III. Electricity (8 units x ₹ 3.75)		30.00
Machine hour rate		57.22

Working Note

Calculation of productive Machine hour rate

Total hours	4,200
Less: Non-Productive hours	200
Effective machine hours	4,000

* ₹ 3,880 ÷ 4,000 hours = ₹ 0.97

Q.9 Comprehensive Mac. Hour Rate | PY May 19

M/s Zaina Private Limited has purchased a machine costing ₹ 29,14,800 and it is expected to have a salvage value of ₹ 1,50,000 at the end of its effective life of 15 years. Ordinarily the machine is expected to run for 4,500 hours per annum but it is estimated that 300 hours per annum will be lost for normal repair & maintenance. The other details in respect of the machine are as follows:

(i) Repair & Maintenance during the whole life of the machine are expected to be ₹ 5,40,000.
(ii) Insurance premium (per annum) 2% of the cost of the machine.
(iii) Oil and Lubricants required for operating the machine (per annum) ₹ 87,384.
(iv) Power consumptions: 10 units per hour @ ₹ 7 per unit. No power consumption during repair and maintenance.
(v) Salary to operator per month ₹ 24,000. The operator devotes one third of his time to the machine.

You are required to calculate comprehensive machine hour rate.

Ans.

Effective machine hour = 4,500 – 300 = 4,200 hours

Calculationof Comprehensive machine hour rate

Elements of Cost and Revenue	Amount (₹) Per Annum
Repair and Maintenance (₹5,40,000 ÷15 years)	36,000
Power (4,200 hours × 10 units × ₹7)	2,94,000
Depreciation $\left(\frac{29,14,800 - 1,50,000}{15 \text{ years}}\right)$	1,84,320
Insurance (₹29,14,800 × 2%)	58,296
Oil and Lubricant	87,384
Salary to Operator {(₹24,000×12)/3}	96,000
Total Cost	7,56,000
Effective machine hour	4,200
Total Machine Rate Per Hour	**180**

Q.10 Comprehensive Mac. Hour Rate | RTP Nov 18

Sree Ajeet Ltd. having fifteen different types of automatic machines furnishes information as under for 20X8-20X9

(i) Overhead expenses: Factory rent ₹ 1,80,000 (Floor area 1,00,000 sq. ft.), Heat and gas ₹ 60,000 and supervision ₹ 1,50,000.
(ii) Wages of the operator are ₹ 200 per day of 8 hours. Operator attends to one machine when it is under set up and two machines while they are under operation.

In respect of machine B (one of the above machines) the following particulars are furnished:

(i) Cost of machine ₹1,80,000, Life of machine- 10 years and scrap value at the end of its life ₹ 10,000
(ii) Annual expenses on special equipment attached to the machine are estimated as₹12,000
(iii) Estimated operation time of the machine is 3,600 hours while set up time is 400 hours per annum
(iv) The machine occupies 5,000 sq. ft. of floor area.
(v) Power costs ₹ 5 per hour while machine is in operation.

ESTIMATE the comprehensive machine hour rate of machine B. Also find out machine costs to be absorbed in respect of use of machine B on the following two work orders

	Work order- 1	Work order-2
Machine set up time (Hours)	15	30
Machine operation time (Hours)	100	190

Ans.

Sree Ajeet Ltd.

Statement showing comprehensive machine hour rate of Machine B

	(₹)
Standing Charges:	
Factory rent {(₹ 1,80,000/1,00,000 sq. ft.) × 5,000 Sq. ft.}	9,000
Heat and Gas (₹ 60,000/15 machines)	4,000
Supervision (₹ 1,50,000/ 15 machines)	10,000
Depreciation [(₹ 1,80,000 – ₹ 10,000)/ 10 years]	17,000
Annual expenses on special equipment	12,000
	52,000
Fixed cost per hour (₹ 52,000/ 4,000 hrs.)	13/-

	Set up rate Per hour (₹)	Operational rate Per hour (₹)
Fixed cost	13.00	13.00
Power	--	5.00
Wages	25.00	12.50
Comprehensive machine hour rate per hr.	38.00	30.50

Statement of 'B' machine costs to be absorbed on the two work orders

	Work order-1			Work order-2		
	Hours	Rate	Amount	Hours	Rate	Amount
		₹	₹	₹	₹	₹
Set up time cost	15	38	570	30	38	1,140
Operation time cost	100	30.5	3,050	190	30.5	5,795
Total cost			3,620			6,935

Q.11 Comprehensive Mac. Hour Rate | MTP May 19(1)

From the details furnished below you are required to COMPUTE a comprehensive machine-hour rate:

Original purchase price of the machine (subject to depreciation at 10% per annum on original cost)	Rs. 6,48,000
Normal working hours for the month (The machine works for only 75% of normal capacity)	200 hours
Wages to Machine-man	Rs. 400 per day (of 8 hours)
Wages to Helper (machine attendant)	Rs. 275 per day (of 8 hours)
Power cost for the month for the time worked	Rs. 65,000
Supervision charges apportioned for the machine centre for the month	Rs. 18,000
Electricity& Lighting for the month	Rs. 9,500
Repairs & maintenance (machine) including Consumable stores per month	Rs. 17,500
Insurance of Plant & Building (apportioned) for the year	Rs. 18,250
Other general expense per annum	Rs. 17,500

The workers are paid a fixed Dearness allowance of Rs. 4,575 per month. Production bonus payable to workers in terms of an award is equal to 33.33% of basic wages and dearness allowance. Add 10% of the basic wage and dearness allowance against leave wages and holidays with pay to arrive at a comprehensive labour-wage for debit to production.

Ans.

Effective machine hours = 200 hours × 75% = 150 hours

Computation of Comprehensive Machine Hour Rate

	Per month (Rs.)	Per hour (Rs.)
Fixed cost		
Supervision charges	18,000.00	
Electricity and lighting	9,500.00	
Insurance of Plant and building (Rs.18,250 ÷12)	1,520.83	
Other General Expenses (Rs.17,500÷12)	1,458.33	
Depreciation (Rs.64,800÷12)	5,400.00	
	35,879.16	239.19
Direct Cost		
Repairs and maintenance	17,500.00	116.67
Power	65,000.00	433.33
Wages of machine man		139.27
Wages of Helper		109.41
Machine Hour rate (Comprehensive)		1,037.87

Wages per machine hour

	Machine man	Helper
Wages for 200 hours		
Machine-man (Rs.400 × 25)	Rs.10,000.00	---
Helper (Rs.275 × 25)	---	Rs.6,875.00
Dearness Allowance (DA)	Rs.4,575.00	Rs.4,575.00
	Rs.14,575.00	Rs.11,450.00
Production bonus (1/3 of Basic and DA)	4,858.33	3,816.67
Leave wages (10% of Basic and DA)	1,457.50	1,145.00
	20,890.83	16,411.67
Effective wage rate per machine hour	Rs.139.27	Rs.109.41

Q.12 Comprehensive Mac. Hour Rate | MTP May 22(2)

M/s Avyukt Automobile Parts has four identical machines in its factory. Cost of each machine is ₹ 5,00,000 with expected scrap value of 10% at the end of its effective life (9 years). The expected annual running hours of machine is expected to run for 2,200 hours. The other details in respect of the machine shop are:

(I)	Factory Rent	₹ 5,000 per month
(II)	Lighting of Factory	₹ 3,000 per month
(III)	Operator Wages (Two operators and each operator is in charge of two machines)	₹10,000 per month (per Operator)
(IV)	Fixed repairs and maintenance charges per machine	₹ 2,000 per quarter
(V)	Insurance premium for the machine (Annual)	3% of cost
(VI)	Forman's salary (Devoted 1/6th of his time to this factory)	₹ 2,500 per month

(VII) Other factory overhead (Annual)	₹40,000
(VIII)Power Consumption per machine per hour	80 units
(IX) Rate of Power	₹ 150 for 100 units
(X) Unproductive Hours lost during repairs	50 per annum
(XI) Unproductive Hours Lost while Job Setting	650 per annum

You are required to COMPUTE a comprehensive machine hour rate assuming power is used during operating time only.

Ans.

Computation of Comprehensive Machine Hour Rate per Machine

Particulars	Per Annum (₹)	Per Hour (₹)
Standing Charges:		
Depreciation (Working Note 2)	50,000	
Factory Rent (₹ 5,000 x 12 months / 4)	15,000	
Lighting of Factory (₹ 3,000 x 12 months / 4)	9,000	
Operator Wages (₹ 10,000 x 12 months / 2)	60,000	
Repairs and maintenance (₹ 2,000 x 4)	8,000	
Insurance premium (₹ 5,00,000 x 3%)	15,000	
Forman's salary (₹ 2,500 x 12 x ⅙ / 4)	1,250	
Other factory overhead (₹ 40,000 / 4)	10,000	
	1,68,250	
Standing Charges per hour (₹ 1,68,250 / 1,500 hours)		112.17
Running Charges:		
Power (80 units x ₹ 150 / 100)		120.00
Comprehensive Machine Hour Rate		232.17

Working Notes:

1. Computation of Total Operative Hours

Total Running Hours:	2,200
Less: Unproductive hours lost during repairs	50
Less: Unproductive hours Lost while Job Setting	650
Total Operative Hours	1,500 per annum

2. Calculation of Annual Depreciation

$$\text{Annual Depreciation} = \frac{\text{Purchase Cost - Estimated Scrap Value}}{\text{Effective Life in Years}}$$

$$= \frac{5,00,000 - 50,000}{9 \text{ Years}}$$

$$= ₹\ 50,000$$

Q.13 Comprehensive Mac. Hour Rate | MTP Nov 22(1)

MG Ltd. manufactures three types of products namely A, B and C. The data relating to a period are as under:

Particulars	A	B	C
Machine hours per unit	10	18	14
Direct Labour hours per unit	4	12	8
Direct Material per unit (₹)	1,350	1,200	1,800
Production (units)	3,000	5,000	20,000

Currently the company uses traditional costing method and absorbs all production overheads on the basis of machine hours. The machine hour rate of overheads is ₹ 90 per hour. Direct labour hour rate is ₹ 300 per hour.

The company proposes to use activity based costing system and the activity analysis is as under:

Particulars	A	B	C
Batch size (units)	150	500	1,000
Number of purchase orders per batch	3	10	8
Number of inspections per batch	5	4	3

The total production overheads are analysed as under:

Machine set up costs	20%
Machine operation costs	30%
Inspection costs	40%
Material procurement related costs	10%

Required:

(i) CALCULATE the cost per unit of each product using traditional method of absorbing all production overheads on the basis of machine hours.

(ii) CALCULATE the cost per unit of each product using activity based costing principles.

Ans.

(i) Statement Showing "Cost per unit - Traditional Method"

Particulars of Costs	A (₹)	B (₹)	C (₹)
Direct Materials	1,350	1,200	1,800
Direct Labour [(4, 12, 8 hours) × ₹ 300]	1,200	3,600	2,400
Production Overheads [(10, 18, 14 hours) × ₹ 90]	900	1,620	1,260
Cost per unit	**3,450**	**6,420**	**5,460**

(ii) Statement Showing "Cost per unit - Activity Based Costing"

Products	A	B	C
Production (units)	**3,000**	**5,000**	**20,000**
	(₹)	(₹)	(₹)
Direct Materials (1350, 1200, 1800)	40,50,000	60,00,000	3,60,00,000
Direct Labour (1200, 3600, 2400)	36,00,000	1,80,00,000	4,80,00,000
Machine Related Costs @ ₹ 27 per hour (30,000, 90,000, 2,80,000)	8,10,000	24,30,000	75,60,000
Setup Costs @ ₹ 1,44,000 per setup (20, 10, 20)	28,80,000	14,40,000	28,80,000
Inspection Costs @ ₹ 72,000 per inspection (100, 40, 60)	72,00,000	28,80,000	43,20,000
Purchase Related Costs @ ₹ 11,250 per purchase (60, 100, 160)	6,75,000	11,25,000	18,00,000
Total Costs	**1,92,15,000**	**3,18,75,000**	**10,05,60,000**
Cost per unit (Total Cost ÷ Units)	**6,405**	**6,375**	**5,028**

Working Notes:

1.Number of Batches, Purchase Orders, and Inspections-

	Particulars	A	B	C	Total
A.	Production (units)	3,000	5,000	20,000	
B.	Batch Size (units)	150	500	1,000	
C.	Number of Batches [A. ÷ B.]	20	10	20	50
D.	Number of Purchase Order per batch	3	10	8	
E.	Total Purchase Orders [C. × D.]	60	100	160	320
F.	Number of Inspections per batch	5	4	3	
G.	Total Inspections [C. × F.]	100	40	60	200

2.Total Machine Hours-

	Particulars	A	B	C
A.	Machine Hours per unit	10	18	14
B.	Production (units)	3,000	5,000	20,000
C.	Total Machine Hours [A. × B.]	30,000	90,000	2,80,000

Total Machine Hours = 4,00,000

Total Production Overheads-

= 4,00,000 hrs. × ₹ 90 = ₹ 3,60,00,000

3.Cost Driver Rates-

Cost Pool	%	Overheads(₹)	Cost Driver Basis	Cost Driver (Units)	Cost Driver Rate (₹)
Setup	20%	72,00,000	Number of batches	50	1,44,000 per Setup
Inspection	40%	1,44,00,000	Number of inspections	200	72,000 per Inspection
Purchases	10%	36,00,000	Number of purchases	320	11,250 per Purchase
Machine Operation	30%	1,08,00,000	Machine Hours	4,00,000	27 per Machine Hour

Q.14 Reapportionment | PY Nov 20

TEE Ltd. is a manufacturing company having three production departments 'P', 'Q' and 'R' and two service departments 'X' and 'Y' details pertaining to which are as under :

	P	Q	R	X	Y
Direct wages (₹)	*5,000*	*1,500*	*4,500*	*2,000*	*800*
Working hours	*13,191*	*7,598*	*14,995*	-	-
Value of machine (₹)	*1,00,000*	*80,000*	*1,00,000*	*20,000*	*50,000*
H.P. of machines	*100*	*80*	*100*	*20*	*50*
Light points (Nos.)	*20*	*10*	*15*	*5*	*10*
Floor space (sq. ft.)	*2,000*	*2,500*	*3,500*	*1,000*	*1,000*

The expenses are as follows:

	(₹)
Rent and Rates	*10,000*
General Lighting	*600*
Indirect Wages	*3,450*

Power	3,500
Depreciation on Machines	70,000
Sundries (apportionment on the basis of direct wages)	13,800

The expenses of Service Departments are allocated as under :

	P	Q	R	X	Y
X	45%	15%	30%	-	10%
Y	35%	25%	30%	10%	-

Product 'A' is processed for manufacture in Departments P, Q and R for 6, 5 and 2 hours respectively.
Direct Costs of Product A are :
Direct material cost is ₹ 65 per unit and Direct labour cost is ₹ 40 per unit. You are Required to:

(i) Prepare a statement showing distribution of overheads among the production and service departments.
(ii) Calculate recovery rate per hour of each production department after redistributing the service departments costs.
(iii) Find out the Total Cost of a 'Product A'.

Ans.

Statement showing distribution of Overheads
Primary Distribution Summary

Item of cost	Basis of apportionment	Total (`)	P (`)	Q (`)	R (`)	X (`)	Y (`)
Direct wages	Actual	2,800	--	--	--	2,000	800
Rent and Rates	Floor area (4:5:7:2:2)	10,000	2,000	2,500	3,500	1,000	1,000
General lighting	Light points (4:2:3:1:2)	600	200	100	150	50	100
Indirect wages	Direct wages (50:15:45:20:8)	3,450	1,250	375	1,125	500	200
Power	Horse Power of machinesused (10:8:10:2:5)	3,500	1,000	800	1,000	200	500
Depreciation of machinery	Value of machinery (10:8:10:2:5)	70,000	20,000	16,000	20,000	4,000	10,000
Sundries	Direct wages (50:15:45:20:8)	13,800	5,000	1,500	4,500	2,000	800
Total		**1,04,150**	**29,450**	**21,275**	**30,275**	**9,750**	**13,400**

Secondary Distribution using simultaneous equation method: Overheads of service cost centres

Let, X be the overhead of service cost centre X
Y be the overhead of service cost centre Y

X = 9,750 + 0.10 Y
Y = 13,400 + 0.10 X

Substituting the value of Y in X we get

X = 9,750 + 0.10 (13,400 + 0.10 X)
X = 9,750 + 1,340 + 0.01 X
0.99 X = 11,090
∴ X = ₹ 11,202
∴ Y = 13,400 + 0.10 □ 11,202
= ₹ 14,520.20

Secondary Distribution Summary

Particulars	Total (₹)	P (₹)	Q (₹)	R (₹)
Allocated and Apportioned over-heads as per primary distribution		29,450.00	21,275.00	30,275.00
X	11,202.00	5,040.90	1,680.30	3,360.60
Y	14,520.20	5,082.07	3,630.05	4,356.06
Total		39,572.97	26,585.35	37,991.66

(ii) Calculation of Overhead recovery rate per hour

	P (₹)	Q (₹)	R (₹)
Total overheads cost	**39,572.97**	**26,585.35**	**37,991.66**
Working hours	13,191	7,598	14,995
Rate per hour (₹)	**3**	**3.50**	**2.53**

(iii) Cost of Product A

	(₹)
Direct material	65.00
Direct labour	40.00
Prime cost	105.00
Production on overheads	
P 6 hours × ₹ 3 = ₹ 18	
Q 5 hours × ₹ 3.50 = ₹ 17.50	
R 2 hours × ₹ 2.53 = ₹ 5.06	40.56
Total cost	**145.56**

Note: Secondary Distribution can also be done using repeated distribution Method

Q.15 Reapportionment | RTP May 19

The Union Ltd. has the following account balances and distribution of direct charges on 31st March, 2019.

	Total	Production Depts.		Service Depts.	
		Machine Shop	Packing	General Plant	Stores
Allocated Overheads:	(₹)	(₹)	(₹)	(₹)	(₹)
Indirect labour	29,000	8,000	6,000	4,000	11,000
Maintenance Material	9,900	3,400	1,600	2,100	2,800
Misc. supplies	5,900	1,500	2,900	900	600
Supervisor's salary	16,000	--	--	16,000	--
Cost & payroll salary	80,000	--	--	80,000	--

Overheads to be apportioned:	
Power	78,000
Rent	72,000
Fuel and Heat	60,000
Insurance	12,000
Taxes	8,400
Depreciation	1,20,000

The following data were compiled by means of the factory survey made in the previous year:

	Floor Space	Radiato Section	No. of employees	Investment	H.P. hours
Machine Shop	2,000 Sq. ft.	45	20	8,00,000	3,500
Packing	800 Sq. ft.	90	12	2,40,000	500
General Plant	400 Sq. ft.	30	4	80,000	-
Stores & maintenance	1,600 Sq. ft.	60	8	1,60,000	1,000

Expenses charged to the stores departments are to be distributed to the other departments by the following percentages:
Machine shop 50%; Packing 20%; General Plant 30%;
General Plant overheads is distributed on the basis of number of employees.

(a) PREPARE an overhead distribution statement with supporting schedules to show computations and basis of distribution.

(b) DETERMINE the service department distribution by simultaneous equation method.

Ans.

Overhead Distribution Statement

	Production Departments		Service Departments	
	Machine Shops	Packing	General Plant	Stores
Allocated Overheads:	(₹)	(₹)	(₹)	(₹)
Indirect labour	8,000	6,000	4,000	11,000
Maintenance Material	3,400	1,600	2,100	2,800
Misc. supplies	1,500	2,900	900	600
Supervisor's salary	--	--	16,000	--
Cost & payroll salary	--	--	80,000	--
Total allocated overheads	12,900	10,500	1,03,000	14,400
Add: Apportioned Overheads (As per Schedule below)	1,84,350	70,125	22,775	73,150
	1,97,250	80,625	1,25,775	87,550

Schedule of Apportionment of Overheads

Item of Cost	Basis	Production Departments		Service Departments	
		Machine Shops (₹)	Packing (₹)	General Plant (₹)	Stores (₹)
Power	HP hours (7 : 1 : - : 2)	54,600	7,800	--	15,600
Rent	Floor space (5 : 2 : 1 : 4)	30,000	12,000	6,000	24,000
Fuel & Heat	Radiator sec. (3 : 6 : 2 : 4)	12,000	24,000	8,000	16,000
Insurance	Investment (10 : 3 : 1 : 2)	7,500	2,250	750	1,500
Taxes	Investment (10 : 3 : 1 : 2)	5,250	1,575	525	1,050
Depreciation	Investment (10 : 3 : 1 : 2)	75,000	22,500	7,500	15,000
		1,84,350	70,125	22,775	73,150

Re-distribution of Overheads of Service Departments to Production Departments:

Let, the total overheads of General Plant = 'a' and the total overheads of Stores = 'b'

a = 1,25,775 + 0.3b (i)

b = 87,550 + 0.2a (ii)

Putting the value of 'b' in equation no. (i)

a = 1,25,775 + 0.3 (87,550 + 0.2a)

Or a = 1,25,775 + 26,265 + 0.06a

Or 0.94a = 1,52,040 Or a = 1,61,745 (appx.)

Putting the value of a = 1,61,745 in equation no. (ii) to get the value of 'b'

b = 87,550 + 0.2 × 1,61,745 = 1,19,899

Secondary Distribution Summary

Particulars	Total (₹)	Machine Shops (₹)	Packing (₹)
Allocated and Apportioned overheads as per Primary distribution	2,77,875	1,97,250.00	80,625.00
- General Plant	1,61,745	80,872.50 $\left(1,61,745 \times \frac{5}{10}\right)$	48,523.50 $\left(1,61,745 \times \frac{3}{10}\right)$
- Stores	1,19,899	59,949.50 (1,19,899 × 50%)	23,979.80 (1,19,899 ×20%)
		3,38,072.00	1,53,128.30

Q.16 Reapportionment | RTP May 22

Pretz Ltd. is a manufacturing company having two production departments, 'A' & 'B' and two service departments 'X' & 'Y'. The following is the budget for March, 2022:

	Total (₹)	A (₹)	B (₹)	X (₹)	Y (₹)
Direct material		2,00,000	4,00,000	4,00,000	2,00,000
Direct wages		10,00,000	4,00,000	2,00,000	4,00,000
Factory rent	9,00,000				
Power (Machine)	5,10,000				
Depreciation	2,00,000				
General Lighting	3,00,000				
Perquisites	4,00,000				
Additional information:					
Area (Sq. ft.)		500	250	250	500
Capital value of assets (₹ lakhs)		40	80	20	20
Light Points		10	20	10	10
Machine hours		1,000	2,000	1,000	1,000
Horse power of machines		50	40	15	25

A technical assessment of the apportionment of expenses of service departments is as under:

	A	B	X	Y
Service Dept. 'X' (%)	55	25	-	20
Service Dept. 'Y' (%)	60	35	5	-

You are required to:

(a) PREPARE a statement showing distribution of overheads to various departments.

(b) PREPARE a statement showing re-distribution of service departments expenses to production departments using-

(i) Simultaneous equation method

(ii) Trial and error method

(iii) Repeated Distribution Method.

Ans. **Primary Distribution of Overheads**

	Basis	Total (₹)	A (₹)	B (₹)	X (₹)	Y (₹)
Direct materials	Direct	6,00,000	-	-	4,00,000	2,00,000

Direct wages	Direct	6,00,000	-	-	2,00,000	4,00,000
Factory rent (2:1:1:2)	Area	9,00,000	3,00,000	1,50,000	1,50,000	3,00,000
Power (Machine) (10:16:3:5)*	H.P. × Machine Hrs.	5,10,000	1,50,000	2,40,000	45,000	75,000
Depreciation (2:4:1:1)	Capital value	2,00,000	50,000	1,00,000	25,000	25,000
General Lighting (1:2:1:1)	Light Points	3,00,000	60,000	1,20,000	60,000	60,000
Perquisites (5:2:1:2)	Direct Wages	4,00,000	2,00,000	80,000	40,000	80,000
		35,10,000	**7,60,000**	**6,90,000**	**9,20,000**	**11,40,000**

*{(1000×50) : (2000×40) : (1000×15) : (1000×25)}
(50000 : 80000 : 15000 : 25000)
(10 : 16 : 3 : 5)

(i) Redistribution of Service Department's expenses using 'Simultaneous equation method'

X = 9,20,000 + 0.05 Y

Y = 11,40,000 + 0.20 X

Substituting the value of X,

Y = 11,40,000 + 0.20 (9,20,000 + 0.05 Y)
= 13,24,000 + 0.01 Y
Y - 0.01Y = 13,24,000
Y = 13,24,000
0.99
Y = ₹ 13,37,374

The total expense of Y is ₹ 13,37,374 and that of X is ₹ 9,86,869 i.e., ₹ 9,20,000 + (0.05 × ₹ 13,37,374).

Distribution of Service departments' overheads to Production departments

	Production Departments	
	A (₹)	B (₹)
Overhead as per primary distribution	7,60,000	6,90,000
Dept- X (55% and 25% of ₹ 9,86,869)	5,42,778	2,46,717
Dept- Y (60% and 35% of ₹ 13,37,374)	8,02,424	4,68,081
	21,05,202	**14,04,798**

(iii) Redistribution of Service Department's expenses using 'Trial and Error Method':

	Service Departments	
	X (₹)	Y (₹)
Overheads as per primary distribution	9,20,000	11,40,000
(i) Apportionment of Dept-X expenses to Dept-Y (20% of ₹ 9,20,000)	---	1,84,000
	---	13,24,000
(ii) Apportionment of Dept-Y expenses to Dept-X (5% of ₹ 13,24,000)	66,200	---
(i) Apportionment of Dept-X expenses to Dept-Y (20% of ₹ 66,200)	---	13,240
(ii) Apportionment of Dept-Y expenses to Dept-X (5% of ₹ 13,240)	662	---
(i) Apportionment of Dept-X expenses to Dept-Y (20% of ₹ 662)		132
(ii) Apportionment of Dept-Y expenses to Dept-X (5% of ₹ 132)	7	

Total	**9,86,869**	**13,37,372**

Distribution of Service departments' overheads to Production departments

	Production Departments	
	A (₹)	**B (₹)**
Overhead as per primary distribution	7,60,000	6,90,000
Dept- X (55% and 25% of ₹ 9,86,869)	5,42,778	2,46,717
Dept- Y (60% and 35% of ₹ 13,37,372)	8,02,423	4,68,080
	21,05,201	**14,04,797**

(iii) Redistribution of Service Department's expenses using 'repeated distribution method':

	A (₹)	**B (₹)**	**X (₹)**	**Y (₹)**
Overhead as per primary distribution	7,60,000	6,90,000	9,20,000	11,40,000
Dept. X overhead apportioned in the ratio (55:25:—:20)	5,06,000	2,30,000	(9,20,000)	1,84,000
Dept. Y overhead apportioned in the ratio (60:35:5: —)	7,94,400	4,63,400	66,200	(13,24,000)
Dept. X overhead apportioned in the ratio (55:25:—:20)	36,410	16,550	(66,200)	13,240
Dept. Y overhead apportioned in the ratio (60:35:5: —)	7,944	4,634	662	(13,240)
Dept. X overhead apportioned in the ratio (55:25:—:20)	364	166	(662)	132
Dept. Y overhead apportioned in the ratio (60:35:5: —)	79	46	7	(132)
Dept. X overhead apportioned in the ratio (55:25:—:20)	4	3	(7)	-
	21,05,201	**14,04,799**	▯	▯

Q.17 Reapportionment | RTP May 23

SANDY Ltd. is a manufacturing company having three production departments, 'A', 'B' and 'C' and two service departments 'X' and 'Y'. The following is the budget for December 2022:

	Total (₹)	**A (₹)**	**B (₹)**	**C (₹)**	**X (₹)**	**Y (₹)**
Direct material		1,60,000	3,20,000	6,40,000	3,20,000	1,60,000
Direct wages		8,00,000	3,20,000	12,80,000	1,60,000	3,20,000
Factory rent	6,40,000					
Power	4,00,000					
Depreciation	1,60,000					
Other overheads	14,40,000					
Additional information:						
Area (Sq. ft.)		800	400	800	400	800
Capital value of assets (₹) lakhs)		32	64	32	16	16

Machine hours		1,600	3,200	6,400	1,600	1,600
Horsepower of machines		80	64	32	24	40

Apportionment of expenses of service departments is as under:

	A	B	C	X	Y
Service Dept. 'X'	72	24	48	-	16
Service Dept. 'Y'	96	56	-	8	-

Required:

(i) PREPARE a statement showing distribution of overheads to various departments.

(ii) PREPARE a statement showing re-distribution of service departments expenses to production departments using Repeated Distribution method. Also CALCULATE machine hour rate of the production departments 'A', 'B', 'C'.

Ans.

(i) Overhead Distribution Summary

	Basis	Total (₹)	A (₹)	B (₹)	C (₹)	X (₹)	Y (₹)
Direct materials	Direct	-	-	-	-	3,20,000	1,60,000
Direct wages	Direct	-	-	-	-	1,60,000	3,20,000
Factory rent (2:1:2:1:2)	Area	6,40,000	1,60,000	80,000	1,60,000	80,000	1,60,000
Power (10:16:16:3:5)*	H.P. × Machine Hrs.	4,00,000	80,000	1,28,000	1,28,000	24,000	40,000
Depreciation (2:4:2:1:1)	Capital value of assets	1,60,000	32,000	64,000	32,000	16,000	16,000
Other overheads (1:2:4:1:1)	Machine hrs.	14,40,000	1,60,000	3,20,000	6,40,000	1,60,000	1,60,000
Total		26,40,000	4,32,000	5,92,000	9,60,000	7,60,000	8,56,000

*{(1600×80) : (3200×64) : (6400×32) : (1600×24) : (1600×40)}

(1,28,000 : 2,04,800 : 2,04,800 : 38,400 : 64,000)

(10:16:16:3:5)

(ii) Redistribution of service department's expense using repeated distribution Method:

	A (₹)	B (₹)	C (₹)	X (₹)	Y (₹)
Total overheads	4,32,000	5,92,000	9,60,000	7,60,000	8,56,000
Dept. X overhead apportioned in the ratio (72:24:48: —:16)	3,42,000	1,14,000	2,28,000	-7,60,000	76,000
Dept. Y overhead apportioned in the ratio (96:56: —:8: —)	5,59,200	3,26,200	-	46,600	-9,32,000
Dept. X overhead apportioned in the ratio	20,970	6,990	13,980	-46,600	4,660

(72:24:48: —:16)					
Dept. Y overhead apportioned in the ratio (96:56: —:8: —)	2,796	1,631	-	233	-4,660
Dept. X overhead apportioned in the ratio (72:24:48: —:16)	105	35	70	-233	23
Dept. Y overhead apportioned in the ratio (96:56: —:8: —)	15	8	-	-	-23
	13,57,086	10,40,864	12,02,050	-	-

Calculation of machine hour rate

		A	B	C
A	Total overheads (₹)	13,57,086	10,40,864	12,02,050
B	Machine hours	1,600	3,200	6,400
C	**Machine hour rate (₹) [A ÷ B]**	**848.18**	**325.27**	**187.82**

Q.18 Reapportionment | MTP Nov 19

V Ltd. manufactures luggage trolleys for airports. The factory, in which the company undertakes all of its production, has two production departments- 'Fabrication' and 'Assembly', and two service departments- 'Stores' and 'Maintenance'.

The following information have been extracted from the company's budget for the financial year ended 31st March, 2019:

Particulars	Rs.
Allocated Overhead Costs	
Fabrication Department	15,52,000
Assembly Department	7,44,000
Stores Department	2,36,000
Maintenance Department	1,96,000
Other Overheads	
Factory rent	15,28,000
Factory building insurance	1,72,000
Plant & machinery insurance	1,96,000
Plant & Machinery Depreciation	2,65,000
Subsidy for staffs' canteen	4,48,000

Direct Costs	Rs.	Rs.
Fabrication Department:		
Material	63,26,000	
Labour	8,62,000	71,88,000
Assembly Department:		
Material	1,42,000	
Labour	13,06,000	14,48,000

The following additional information is also provided:

	Fabrication Department	Assembly Department	Stores Department	Maintenance Department
Floor area (square meters)	24,000	10,000	2,500	3,500
Value of plant & machinery (Rs.)	16,50,000	7,50,000	75,000	1,75,000
No. of stores requisitions	3,600	1,400	---	---
Maintenance hours required	2,800	2,300	400	---
No. of employees	120	80	38	12
Machine hours	30,00,000	60,000		
Labour hours	70,000	26,00,000		

Required:

(i) PREPARE a table showing the distribution of overhead costs of the two service departments to the two production departments using step method; and

(ii) CALCULATE the most appropriate overhead recovery rate for each department.

(iii) Using the rates calculated in part (ii) above, CALCULATE the full production costs of the following job order:

Job number IGI2019

Direct Materials	Rs. 2,30,400
Direct Labour:	
Fabrication Department	240 hourse@ Rs.50 per hour
Assembly Department	180 hourse @Rs.50 per hour
Machine hours required:	
Febrication Department	210 hours
Assembly Department	180 hours

Ans

(i) Table of Primary Distribution of Overheads

Particulars	Basis of Apportionment	Total Amount	Production Department		Service Departments	
			Fabrication	Assembly	Stores	Maintenance
Overheads Allocated		27,28,000	15,52,000	7,44,000	2,36,000	1,96,000
Direct Costs	Actual	86,36,000	71,88,000	14,48,000	---	---
Other Overheads:						
Factory rent	Floor Area (48:20:5:7)	15,28,000	9,16,800	3,82,000	95,500	1,33,700
Factory building insurance	Floor Area (48:20:5:7)	1,72,000	1,03,200	43,000	10,750	15,050
Plant & Machinery insurance	Value of Plant & Machinery (66:30:3:7)	1,96,000	1,22,038	55,472	5,547	12,943
Plant &	Value of Plant &	2,65,000	1,65,000	75,000	7,500	17,500

Machinery Depreciation	Machinery (66:30:3:7)	4,48,000	2,15,040	1,43,360	68,096	21,504
Canteen Subsidy	No. of employees (60:40:19:6)					
		1,39,73,000	1,02,62,078	28,90,832	4,23,393	3,96,697

Re-distribution of Service Departments' Expenses:

Particulars	Basis of Apportionment	Production Department		Service Departments	
		Fabrication	Assembly	Stores	Maintenance
Overheads as per Primary distribution	As per Primary distribution	1,02,62,078	28,90,832	4,23,393	3,96,697
Maintenance Department Cost	Maintenance Hours (28:23:4:-)	2,01,955	1,65,891	28,851	(3,96,697)
		1,04,64,033	30,56,723	4,52,244	---
Stores Department	No. of Stores Requisition (18:7:-:-)	3,25,616	1,26,628	(4,52,244)	
		1,07,89,649	31,83,351	---	---

(ii) Overhead Recovery Rate

Department	Apportioned Overhead (Rs.) (I)	Basis of Recovery Rate (II)	Overhead Recovery Rate (Rs.) [(I) ÷ (II)]
Fabrication	1,07,89,649	30,00,000 Machine Hours	3.60 per Machine Hour
Assembly	31,83,351	26,00,000 Labour Hours	1.22 per Labour Hour

(iv) Calculation of full production costs of Job no. IGI2019.

Particulars	Amount (Rs.)
Direct Materials	2,30,400
Direct Labour:	
Fabrication Deptt. (240 hours × Rs.50)	12,000
Assembly Deptt. (180 hours × Rs.50)	9,000
Production Overheads:	
Fabrication Deptt. (210 hours × Rs. 3.60)	756
Assembly Deptt. (180 hours × Rs. 1.22)	220
Total Production Cost	2,52,376

Q.19 Reapportionment | MTP May 21(1)

The following account balances and distribution of indirect charges are taken from the accounts of a manufacturing concern for the year ending on 31st March 2021:

Item	Total Amount	Production Departments			Service Departments	
	(Rs.)	X (Rs.)	Y (Rs.)	Z (Rs.)	A (Rs.)	B (Rs.)
Indirect Material	2,50,000	40,000	60,000	90,000	50,000	10,000
Indirect Labour	5,20,000	90,000	1,00,000	1,40,000	1,20,000	70,000
Supervisor's Salary	1,92,000	-	-	1,92,000	-	-
Fuel & Heat	30,000					
Power	3,60,000					
Rent & Rates	3,00,000					
Insurance	36,000					
Canteen Charges	1,20,000					
Depreciation	5,40,000					

The following departmental data are also available:

	Production Departments			Service Departments	
	X	Y	Z	A	B
Area (Sq. ft.)	4,400	4,000	3,000	2,400	1,200
Capital Value of Assets (Rs.)	40,00,000	60,00,000	50,00,000	10,00,000	20,00,000
Kilowatt Hours	3,500	4,000	3,000	1,500	-
Radiator Sections	20	40	60	50	30
No. of Employees	60	70	120	30	20

Expenses charged to the service departments are to be distributed to other departments by the following percentages:

	X	Y	Z	A	B
Department A (%)	30	30	20	-	20
Department B (%)	25	40	25	10	-

PREPARE an overhead distribution statement to show the total overheads of production departments after re-apportioning service departments' overhead by using simultaneous equation method. Show all the calculations to the nearest rupee.

Ans

Primary Distribution of Overheads

Item	Basis	Total Amount (Rs.)	Production Departments			Service Departments	
			X (Rs.)	Y (Rs.)	Z (Rs.)	A (Rs.)	B (Rs.)
Indirect Material	Actual	2,50,000	40,000	60,000	90,000	50,000	10,000
Indirect Labour	Actual	5,20,000	90,000	1,00,000	1,40,000	1,20,000	70,000
Supervisor's Salary	Actual	1,92,000	-	-	1,92,000	-	-

Fuel & Heat	Radiator Sections {2:4:6:5:3}	30,000	3,000	6,000	9,000	7,500	4,500
Power	Kilowatt Hours {7:8:6:3:-}	3,60,000	1,05,000	1,20,000	90,000	45,000	-
Rent & Rates	Area (Sq. ft.)	3,00,000	88,000	80,000	60,000	48,000	24,000
Insurance	Capital Value of Assets {4:6:5:1:2}	36,000	8,000	12,000	10,000	2,000	4,000
Canteen Charges	No. of Employees {6:7:12:3:2}	1,20,000	24,000	28,000	48,000	12,000	8,000
Depreciation	Capital Value of Assets {4:6:5:1:2}	5,40,000	1,20,000	1,80,000	1,50,000	30,000	60,000
Total overheads		23,48,000	4,78,000	5,86,000	7,89,000	3,14,500	1,80,500

Re-distribution of Overheads of Service Department A and B

Total overheads of Service Departments may be distributed by simultaneous equation. Let, the total overheads of A = a and the total overheads of B = b

a = 3,14,500 + 0.10 b (i)

or, 10a - b = 31,45,000 [(i) x10]

b = 1,80,500 + 0.20 a (ii)

or, -0.20a + b = 1,80,500

Solving equation (i) & (ii)

10a - b = 31,45,000

-0.20a + b = 1,80,500

9.8a = 33,25,500

a = Rs. 3,39,337

Putting the value of 'a' in equation (ii), we get

b = 1,80,500 + 0.20 × 3,39,337

b = Rs. 2,48,367

Secondary Distribution of Overheads

	Production Departments		
	X (Rs.)	Y (Rs.)	Z (Rs.)
Total overhead as per primary distribution	4,78,000	5,86,000	7,89,000
Service Department A (80% of Rs.3,39,337)	1,01,801	1,01,801	67,867
Service Department B (90% of Rs.2,48,367)	62,092	99,347	62,092
Total	6,41,893	7,87,148	9,18,959

Q.20 Reapportionment | MTP Dec 21(1)

The following account balances and distribution of indirect charges are taken from the accounts of a manufacturing concern for the year ending on 31st March, 2021:

Item	Total Amount	Production Departments			Service Departments	
	(₹)	X (₹)	Y (₹)	Z (₹)	A (₹)	B (₹)
Indirect Material	5,00,000	80,000	1,20,000	1,80,000	1,00,000	20,000
Indirect Labour	10,40,000	1,80,000	2,00,000	2,80,000	2,40,000	1,40,000
Supervisor's Salary	3,84,000	-	-	3,84,000	-	
Fuel & Heat	60,000					
Power	7,20,000					
Rent & Rates	6,00,000					
Insurance of Assets	72,000					
Canteen Charges	2,40,000					
Depreciation	10,80,000					

The following departmental data are also available:

	Production Departments			Service Departments	
	X	Y	Z	A	B
Area (Sq. ft.)	4,400	4,000	3,000	2,400	1,200
Capital Value of Assets (₹)	40,00,000	60,00,000	50,00,000	10,00,000	20,00,000
Kilowatt Hours	3,500	4,000	3,000	1,500	-
Radiator Sections	20	40	60	50	30
No. of Employees	60	70	120	30	20

Expenses charged to the service departments are to be distributed to other departments by the following percentages:

	X	Y	Z	A	B
Department A (%)	30	30	20	-	20
Department B (%)	25	40	25	10	-

PREPARE an overhead distribution statement to show the total overheads of production departments after re-apportioning service departments' overhead by using simultaneous equation method. Show all the calculations to the nearest rupee.

Ans

Primary Distribution of Overheads

Item	Basis	Total Amount (₹)	Production Departments			Service Departments	
			X (₹)	Y (₹)	Z (₹)	A (₹)	B (₹)
Indirect Material	Actual	5,00,000	80,000	1,20,000	1,80,000	1,00,000	20,000
Indirect Labour	Actual	10,40,000	1,80,000	2,00,000	2,80,000	2,40,000	1,40,000
Supervisor's Salary	Actual	3,84,000	-	-	3,84,000	-	-

Fuel & Heat	Radiator Sections {2:4:6:5:3}	60,000	6,000	12,000	18,000	15,000	9,000
Power	Kilowatt Hours {7:8:6:3:-}	7,20,000	2,10,000	2,40,000	1,80,000	90,000	-
Rent & Rates	Area (Sq. ft.) {22:20:15:12:6}	6,00,000	1,76,000	1,60,000	1,20,000	96,000	48,000
Insurance	Capital Value of Assets {4:6:5:1:2}	72,000	16,000	24,000	20,000	4,000	8,000
Canteen Charges	No. of Employees {6:7:12:3:2}	2,40,000	48,000	56,000	96,000	24,000	16,000
Depreciation	Capital Value of Assets {4:6:5:1:2}	10,80,000	2,40,000	3,60,000	3,00,000	60,000	1,20,000
Total overheads		46,96,000	9,56,000	11,72,000	15,78,000	6,29,000	3,61,000

Re-distribution of Overheads of Service Department A and B

Total overheads of Service Departments may be distributed using simultaneous equation method

Let, the total overheads of A = 'a' and the total overheads of B = 'b'

$a = 6,29,000 + 0.10\ b$ (i)

or, $10a - b = 62,90,000$ [(i) ×10]

$b = 3,61,000 + 0.20\ a$ (ii)

or, $-0.20a + b = 3,61,000$

Solving equation (i) & (ii)

$$\begin{array}{r} 10a - b = 62,90,000 \\ -0.20a + b = 3,61,000 \\ \hline 9.8a \quad = 3,61,000 \end{array}$$

$a = 66,51,000$

Putting the value of 'a' in equation (ii), we get

$b = 3,61,000 + 0.20 \times 6,78,673$

$b = 4,96,735$

Secondary Distribution of Overheads

	Production Departments		
	X (₹)	Y (₹)	Z (₹)
Total overhead as per primary distribution	9,56,000	11,72,000	15,78,000
Service Department A (80% of 6,78,673) (3:3:2)	2,03,602	2,03,602	1,35,734
Service Department B (90% of 4,96,735) (5:8:5)	1,24,184	1,98,694	1,24,184
Total	**12,83,786**	**15,74,296**	**18,37,918**

Q.21 Reapportionment | MTP May 22(1)

PM Ltd. has three Production Departments P1, P2, P3 and two Service Departments S1 and S2 details pertaining to which are as under:

	P1	P2	P3	S1	S2
Direct wages (₹)	60,000	40,000	60,000	30,000	3,900
Working hours	3,070	4,475	2,419	-	-
Value of machines (₹)	12,00,000	16,00,000	20,00,000	1,00,000	1,00,000
H.P. of machines	60	30	50	10	-
Light points	10	15	20	10	5
Floor space (sq. ft.)	2,000	2,500	3,000	2,000	500

The following figures extracted from the accounting records are relevant:

	(₹)
Rent and Rates	1,00,000
General Lighting	12,000
Indirect Wages	38,780
Power	30,000
Depreciation on Machines	2,00,000
Sundries	1,93,900

The expenses of the service departments are allocated as under:

	P1	P2	P3	S1	S2
S1	20%	30%	40%	-	10%
S2	40%	20%	30%	10%	-

DETERMINE the total cost of product X which is processed for manufacture in Departments P_1, P_2 and P_3 for 4, 5 and 3 hours respectively, given that its Direct Material Cost is ₹ 1,000 and Direct Labour Cost is ₹ 600.

Ans

Statement Showing Distribution of Overheads of PM Ltd.

Particulars	Basis	Total	Production Departments			Service Departments	
			P1	P2	P3	S1	S2
		(₹)	(₹)	(₹)	(₹)	(₹)	(₹)
Direct wages	Actual	33,900	-	-	-	30,000	3,900
Rent & rates	Area	1,00,000	20,000	25,000	30,000	20,000	5,000
General lighting	Light points	12,000	2,000	3,000	4,000	2,000	1,000
Indirect wages	Direct wages	38,780	12,000	8,000	12,000	6,000	780
Power	H.P.	30,000	12,000	6,000	10,000	2,000	-
Depreciation of machines	Value of machines	2,00,000	48,000	64,000	80,000	4,000	4,000
Sundries	Direct wages	1,93,900	60,000	40,000	60,000	30,000	3,900
		6,08,580	**1,54,000**	**1,46,000**	**1,96,000**	**94,000**	**18,580**

Redistribution of Service Department's Expenses over Production Departments

	P1 (₹)	P2 (₹)	P3 (₹)	S1 (₹)	S2 (₹)
Total overhead distributed as above	1,54,000	1,46,000	1,96,000	94,000	18,580
Dept. S1 Overheads apportioned (20:30:40:—:10)	18,800	28,200	37,600	(94,000)	9,400
Dept. S 2 overheads apportioned	11,192	5,596	8,394	2,798	(27,980)
(40:20:30:10:—)					
Dept. S 1 Overheads apportioned (20:30:40:—:10)	560	839	1,119	(2,798)	280
Dept. S3 overheads apportioned (40:20:30:10:—)	124	63	93	-	(280)
	1,84,676	**1,80,698**	**2,43,206**	**-**	**-**
Working hours	3,070	4,475	2,419		
Rate per hour	**60.16**	**40.38**	**100.54**		

Determination of total cost of Product 'X'

	(₹)
Direct material cost	1,000.00
Direct labour cost	600.00
Overhead cost (See working note)	744.14
	2,344.14

Working Note:
Overhead cost

= (₹ 60.16 × 4 hrs.) + (₹ 40.38 × 5 hrs.) + (₹ 100.54 × 3 hrs.)
= ₹ 240.62 + ₹ 201.90 + ₹ 301.62 = ₹ 744.14

Q.22 Overhead Recovery Rate | PY May 22

SNS Trading Company has three Main Departments and two Service Departments. The data for each department is given below:

Departments	Expenses (in ₹)	Area in (Sq. Mtr)	Number of Employees
Main Department:			
Purchase Department	5,00,000	12	800
Packing Department	8,00,000	15	1700
Distribution Department	3,50,000	7	700
Service Departments:			
Maintenance Department	6,40,000	4	200
Personnel Department	3,20,000	6	250

The cost of Maintenance Department and Personnel Department is distributed on the basis of 'Area in Square Metres' and 'Number of Employees' respectively.
You are required to:
(i) Prepare a Statement showing the distribution of expenses of Service Departments to the Main Departments using the "Step Ladder method" of Overhead Distribution.
(ii) Compute the Rate per hour of each Main Department, given that, the Purchase Department, Packing Department and Distribution Department works for 12 hours a day, 24 hours a day and 8 hours a day respectively. Assume that there are 365 days in a year and there are no holidays.

Ans **(i) Schedule Showing the Distribution of Expenses of Service Departments using Step ladder method.**

	Main Department			Service Department	
	Purchase (₹)	Packing (₹)	Distribution (₹)	Maintenance (₹)	Personnel (₹)
Expenses	5,00,000	8,00,000	3,50,000	6,40,000	3,20,000
Distribution of Maintenance Department (12:15:7:-:6)	1,92,000	2,40,000	1,12,000	(6,40,000)	96,000
Distribution of Personnel Department (800:1700:700:-:-)	1,04,000	2,21,000	91,000	-	(4,16,000)
Total	7,96,000	12,61,000	5,53,000	-	-

(ii) Calculation of Expenses rate per hour of Main Department

	Purchase	Packing	Distribution
Total apportioned expenses (₹)	7,96,000	12,61,000	5,53,000
Total Hours worked	4,380 (12 x 365)	8,760 (24 x 365)	2,920 (8 x 365)
Expenses rate per hour (₹)	**181.74**	**143.95**	**189.38**

Q.23 Overhead Recovery Rate | RTP May 20

In a manufacturing company, the overhead is recovered as follows: Factory Overheads: a fixed percentage basis on direct wages and administrative overheads: a fixed percentage basis on factory cost.
The company has furnished the following data relating to two jobs undertaken by it in a period.

	Job 1(₹)	Job 2(₹)
Direct materials	1,08,000	75,000
Direct wages	84,000	60,000
Selling price	3,33,312	2,52,000
Profit percentage on total cost	12%	20%

You are required to:
(i) Compute the percentage recovery rates of factory overheads and administrative overheads.
(ii) Calculate the amount of factory overheads, administrative overheads and profit for each of the two jobs.
(iii) Using the above recovery rates, determine the selling price to be quoted for job 3.
Additional data pertaining to Job 3 is as follows

Direct materials	₹ 68,750
Direct wages	₹ 22,500
Profit percentage on selling price	15%

Ans **(i) Computation of percentage recovery rates of factory overheads and administrative overheads.**
Let the factory overhead recovery rate as percentage of direct wages be F and administrative overheads recovery rate as percentage of factory cost be A.
Factory Cost of Jobs:
Direct materials + Direct wages + Factory overhead For Job 1 = ₹ 1,08,000 +₹ 84,000 + ₹ 84,000F
For Job 2 = ₹ 75,000 +₹ 60,000 + ₹ 60,000F
Total Cost of Jobs:

Factory cost + Administrative overhead

For Job 1 = (₹ 1,92,000 + ₹ 84,000F) + (₹ 1,92,000 + ₹ 84,000F) A = ₹ 2,97,600* For Job-2 = (₹ 1,35,000 + ₹ 60,000F) + (₹1,35,000+ ₹ 60,000F) A = ₹ 2,10,000**

The value of F & A can be found using following equations

1,92,000 + 84,000F + 1,92,000A + 84,000AF = ₹ 2,97,600 .....eqn (i)

1,35,000 + 60,000F + 1,35,000A + 60,000AF = ₹ 2,10,000 .....eqn (ii)

Multiply equation (i) by 5 and equation (ii) by 7

9,60,000 + 4,20,000F + 9,60,000A + 4,20,000AF = ₹14,88,000 ...eqn (iii)

9,45,000 + 4,20,000F + 9,45,000A + 4,20,000AF = ₹ 14,70,000 ...eqn (iv)

\- - - - -

15,000 + 15,000A = ₹18,000

15,000 A = 18,000 – 15,000

A = 0.20

Now putting the value of A in equation (i) to find the value of F

1,92,000 + 84,000F + (1,92,000 × 0.20) + (84,000 F × 0.20)= ₹ 2,97,600

Or

1,92,000 + 84,000F+38,400+16,800 F = ₹2,97,600

1,00,800 F = 67,200

F = 0.667

On solving the above relations: F = 0.667 and A = 0.20

Hence, percentage recovery rates of:

Factory overheads = 66.7% or 2/3rd of wages and Administrative overheads = 20% of factory cost.

Working note:

$$\text{Total Cost} = \frac{\text{Selling price}}{(100\% + \text{Percentage of profit})}$$

$$\text{*For Job 1} = \frac{3,33,312}{(100\% + 12\%)} = ₹\ 2,97,600$$

$$\text{**For Job 2} = \frac{2,52,000}{(100\% + 20\%)} = ₹\ 2,10,000$$

(ii) Statement of jobs, showing amount of factory overheads, administrative overheads and profit:

	Job 1	Job 2
	(₹)	(₹)
Direct materials	1,08,000	75,000
Direct wages	84,000	60,000
Prime cost	1,92,000	1,35,000
Factory overheads		
2/3rd of direct wages	56,000	40,000
Factory cost	2,48,000	1,75,000
Administrative overheads		
20% of factory cost	49,600	35,000
Total cost	2,97,600	2,10,000
Profit (12% & 20% respectively)	35,712	42,000
Selling price	3,33,312	2,52,000

(iii) Selling price of Job 3

	(₹)
Direct materials	68,750
Direct wages	22,500
rime cost	91,250
Factory overheads (2/3rd of Direct Wages)	15,000
Factory cost	1,06,250
Administrative overheads (20% of factory cost)	21,250
Total cost	1,27,500
Profit margin (balancing figure)	22,500
Selling price Total Cost $\left\lfloor \frac{\text{Totalcost}}{85\%} \right\rfloor$	1,50,000

Q.24 Overhead Recovery Rate | RTP Dec 21

ABC Ltd. has three production departments P1, P2 and P3 and two service departments S1 and S2. The following data are extracted from the records of the company for the month of January, 2020:

	(₹)
Rent and rates	6,25,000
General lighting	7,50,000
Indirect wages	1,87,500
Power	25,00,000
Depreciation on machinery	5,00,000
Insurance of machinery	2,00,000

Other Information:

	P1	P2	P3	S1	S2
Direct wages (₹)	3,75,000	2,50,000	3,75,000	1,87,500	62,500
Horse Power of Machines used	60	30	50	10	-
Cost of machinery (₹)	30,00,000	40,00,000	50,00,000	2,50,000	2,50,000
Floor space (Sq. ft)	2,000	2,500	3,000	2,000	500
Number of light points	10	15	20	10	5
Production hours worked	6,225	4,050	4,100	-	-

Expenses of the service departments S1 and S2 are reapportioned as below:

	P1	P2	P3	S1	S2
S1	20%	30%	40%	-	10%
S2	40%	20%	30%	10%	-

Required:

(i) COMPUTE overhead absorption rate per production hour for each production department.

(ii) DETERMINE the total cost of product X which is processed for manufacture in department P1, P2 and P3 for 5 hours, 3 hours and 4 hours respectively, given that its direct material cost is ₹6,250 and direct labour cost is ₹3,750.

Ans **Primary Distribution Summary**

Item of cost	Basis of apportionment	Total (₹)	P1 (₹)	P2 (₹)	P3 (₹)	S1 (₹)	S2 (₹)
Direct wages	Actual	2,50,000	--	--	--	1,87,500	62,500
Rent and rates	Floor area (4 : 5 : 6 : 4 : 1)	6,25,000	1,25,000	1,56,250	1,87,500	1,25,000	31,250
General lighting	Light points (2 : 3 : 4 : 2 : 1)	7,50,000	1,25,000	1,87,500	2,50,000	1,25,000	62,500
Indirect wages	Direct wages (6 : 4 : 6 : 3 : 1)	1,87,500	56,250	37,500	56,250	28,125	9,375
Power	Horse Power of machines used (6 : 3 : 5 : 1)	25,00,000	10,00,000	5,00,000	8,33,333	1,66,667	-
Depreciati on of machinery	Value of machinery (12:16:20:1:1)	5,00,000	1,20,000	1,60,000	2,00,000	10,000	10,000
Insurance of machinery	Value of machinery (12:16:20:1:1)	2,00,000	48,000	64,000	80,000	4,000	4,000
		50,12,500	14,74,250	11,05,250	16,07,083	6,46,292	1,79,625

Overheads of service cost centres:

Let S1 be the overhead of service cost centre S1 and S2 be the overhead of service cost centre S2.

S1 = 6,46,292 + 0.10 S2

S2 = 1,79,625 + 0.10 S1

Substituting the value of S2 in S1 we get S1 = 6,46,292 + 0.10 (1,79,625 + 0.10 S1)

S1 = 6,46,292 + 17,962.5 + 0.01 S1

0.99 S1 = 6,64,254.5

S1 = ₹6,70,964

S2 = 1,79,625 + 0.10 x 6,70,964

= ₹2,46,721.4

Secondary Distribution Summary

Particulars	Total (₹)	P1 (₹)	P2 (₹)	P3 (₹)
Allocated and Apportioned overheads as per primary distribution	41,86,583	14,74,250	11,05,250	16,07,083
S1	6,70,964	1,34,192.8	2,01,289.2	2,68,385.6
S2	2,46,721.4	98,688.6	49,344.3	74,016.5
		17,07,131.4	13,55,883.5	19,49,485.1

(i) Overhead rate per hour

	P1	P2	P3
Total overheads cost (₹)	17,07,131.4	13,55,883.5	19,49,485.1
Production hours worked	6,225	4,050	4,100
Rate per hour (₹)	274.24	334.79	475.48

(ii) Cost of Product X

	(₹)
Direct material	6,250.00

Direct labour	3,750.00
Prime cost	10,000.00
Production on overheads	
P1 5 hours x₹ 274.24 = 1,371.20	
P2 3 hours x ₹ 334.79 = 1,004.37	
P3 4 hours x ₹ 475.48 = 1,901.92	4,277.49
Factory cost	14,277.49

Q.25 Overhead Recovery Rate | MTP Nov 22(2)

Madhu Ltd has calculated a predetermined overhead rate of ₹22 per machine hour for its Quality Check (QC) department. This rate has been calculated for the budgeted level of activity and is considered as appropriate for absorbing overheads. The following overhead expenditures at various activity levels had been estimated.

Total overheads	Number of machine hours
₹3,38,875	14,500
₹3,47,625	15,500
₹3,56,375	16,500

You are required to:

(i) COMPUTE the variable overhead absorption rate per machine hour.

(ii) COMPUTE the estimated total fixed overheads.

(iii) CALCULATE the budgeted level of activity in machine hours.

(iv) CALCULATE the amount of under/over absorption of overheads if the actual machine hours were 14,970 and actual overheads were ₹3,22,000.

Ans

(i) Computation of variable overhead absorption rate:

$$\text{Variable overhead absorption rate} = \frac{\text{Difference in Total overheads}}{\text{Difference in levels in terms of machine hours}}$$

$$= \frac{3,47,625-3,38,875}{15,500\text{hours}-14,500\text{hours}} = \text{Rs.8.75 per machine}$$

(ii) Computation of Total fixed overheads:

	(₹)
Total overheads at 14,500 hours	3,38,875
Less: Variable overheads (Rs. 8.75 × 14,500)	(1,26,875)
Total fixed overheads	2,12,000

(iii) Calculation of Budgeted level of activity in machine hours:

Let budgeted level of activity = X

Then, $\frac{8.75 + 2,12,000}{x}$ = ₹32

8.75X + Rs.2,12,000 = 22X

13.25X = 2,12,000

X =16,000

Thus, budgeted level of activity = 16,000 machine hours.

(iv) Calculation of Under / Over absorption of overheads:

	(Rs.)
Actual overheads	3,22,000
Absorbed overheads (14,970 hours × Rs. 22 per hour)	3,29,340
Over-absorption (3,29,340 – 3,22,000)	7,340

Q.26 Overhead Distribution | PY Nov 18

M/s. NOP Limited has its own power plant and generates its own power. Information regarding power requirements and power used are as follows:

	Production Dept.		Service Dept.	
	A	B	X	Y
	(Horse power hours)			
Needed capacity production	20,000	25,000	15,000	10,000
Used during the quarter ended September 2018	16,000	20,000	12,000	8,000

During the quarter ended September 2018, costs for generating power amounted to ₹ 12.60 lakhs out of which ₹ 4.20 lakhs was considered as fixed cost.

Service department X renders services to departments A, B, and Y in the ratio of 6:4:2 whereas department Y renders services to department A and B in the ratio of 4: 1. The direct labour hours of department A and B are 67500 hours and 48750 hours respectively.

Required:

1 Prepare overheads distribution sheet.

2 Calculate factory overhead per labour hour for the dept. A and dept. B.

Ans

(1) Overheads distribution Sheet

Item	Basis	Total Amount (₹)	Production Departments		Service Departments	
			A (₹)	B (₹)	X (₹)	Y (₹)
Variable overheads (₹12.6 Lakh - ₹4.2 Lakh)	Horse Power hours used	8,40,000	2,40,000	3,00,000	1,80,000	1,20,000
Fixed Overheads	Horse power for Capacity production	4,20,000	1,20,000	1,50,000	90,000	60,000
Total Overheads		12,60,000	3,60,000	4,50,000	2,70,000	1,80,000
Service dept X allocated to A, B & Y	As per the ratio given6:4:2	(2,70,000)	1,35,000	90,000		45,000
Service dept Y allocated to A & B in ratio of 4:1		(1,80,000 + 45,000) = (2,25,000)	1,80,000	45,000		

Total Overheads of Production departments			6,75,000	5,85,000		

(2) Calculation of Factory overhead per labour hour

Item	Production Departments	
	A (₹)	B (₹)
Total overheads	6,75,000	5, 85,000
Direct labour hours	67,500	48,750
Factory overheads per hour	10	12

Q.27 Predetermined Machine Hour | RTP Nov 20

You are given the following information of the three machines of a manufacturing department of X Ltd.:

	Preliminary estimates of expenses (per annum)			
		Machines		
	Total (₹)	A (₹)	B (₹)	C (₹)
Depreciation	2,00,000	75,000	75,000	50,000
Spare parts	1,00,000	40,000	40,000	20,000
Power	4,00,000			
Consumable stores	80,000	30,000	25,000	25,000
Insurance of machinery	80,000			
Indirect labour	2,00,000			
Building maintenance expenses	2,00,000			
Annual interest on capital outlay	1,00,000	40,000	40,000	20,000
Monthly charge for rent and rates	20,000			
Salary of foreman (per month)	42,000			
Salary of Attendant (per month)	12,000			

(The foreman and the attendant control all the three machines and spend equal time on them.)

The following additional information is also available:

	Machines		
	A	B	C
Estimated Direct Labour Hours	1,00,000	1,50,000	1,50,000
Ratio of K.W. Rating	3	2	3
Floor space (sq. ft.)	40,000	40,000	20,000

There are 12 holidays besides Sundays in the year, of which two were on Saturdays. The manufacturing department works 8 hours in a day but Saturdays are half days. All machines work at 90% capacity throughout the year and 2% is reasonable for breakdown.

You are required to :

CALCULATE predetermined machine hour rates for the above machines after taking into consideration the following factors:

- An increase of 15% in the price of spare parts.
- An increase of 25% in the consumption of spare parts for machine 'B' & 'C' only.
- 20% general increase in wages rates.

Ans

Computation of Machine Hour Rate

	Basis of apportionment	Total (₹)	Machines A (₹)	B (₹)	C (₹)
(A) Standing Charges					
Insurance	Depreciation Basis (3:3:2)	80,000	30,000	30,000	20,000
Indirect Labour	Direct Labour (2:3:3)	2,40,000	60,000	90,000	90,000
Building maintenance expenses	Floor Space (2:2:1)	2,00,000	80,000	80,000	40,000
Rent and Rates	Floor Space (2:2:1)	2,40,000	96,000	96,000	48,000
Salary of foreman	Equal	5,04,000	1,68,000	1,68,000	1,68,000
Salary of attendant	Equal	1,44,000	48,000	48,000	48,000
Total standing charges		14,08,000	4,82,000	5,12,000	4,14,000
Hourly rate for standing charges			247.43	262.83	212.53
(B) Machine Expenses:					
Depreciation	Direct	2,00,000	75,000	75,000	50,000
Spare parts	Final estimates	1,32,250	46,000	57,500	28,750
Power	K.W. rating (3:2:3)	4,00,000	1,50,000	1,00,000	1,50,000
Consumable Stores	Direct	80,000	30,000	25,000	25,000
Total Machine expenses		8,12,250	3,01,000	2,57,500	2,53,750
Hourly Rate for Machine expenses			154.52	132.19	130.26
Total (A + B)		22,20,250	7,83,000	7,69,500	6,67,750
Machine Hour rate			401.95	395.02	342.79

Working Notes:

(i) Calculation of effective working hours:

No. of full off-days = No. of Sunday + No. of holidays

= 52 + 12 = 64 days

No. of half working days = 52 days – 2 holidays = 50 days

No. of full working days = 365 days – 64 days – 50 days = 251 days

Total working Hours = {(251 days × 8 hours) + (50 days × 4 hours)}

= 2,008 hours + 200 = 2,208 hours.

Total effective hours = Total working hours × 90% - 2% for break-down

= 2,208 hours × 90% - 2% (2,208 hours × 90%)

= 1,987.2 hours – 39.74 hours

= 1947.46 or Rounded up to 1948 hours.

(ii) Amount of spare parts is calculated as under:

	A (₹)	B (₹)	C (₹)
Preliminary estimates	40,000	40,000	20,000
Add: Increase in price @ 15%	6,000	6,000	3,000
	46,000	46,000	23,000
Add: Increase in consumption @ 25%	-	11,500	5,750
Estimated cost	46,000	57,500	28,750

(iii) Amount of Indirect Labour is calculated as under:

	(₹)
Preliminary estimates	2,00,000
Add: Increase in wages @ 20%	40,000
	2,40,000

(iv) Interest on capital outlay is a finance cost, therefore it has been excluded from the cost accounts.

Q.28 Predetermined OH Rate | RTP Nov 22

SE Limited manufactures two products- A and B. The company had budgeted factory overheads amounting to ₹ 36,72,000 and budgeted direct labour hour of 1,80,000 hours. The company uses pre-determined overhead recovery rate for product costing purposes.

The department-wise break-up of the overheads and direct labour hours were as follows:

Particulars	Budgeted overheads	Budgeted direct labour hours	Rate per direct labour hour
Department Pie	₹ 25,92,000	90,000 hours	₹ 28.80
Department Qui	₹ 10,80,000	90,000 hours	₹ 12.00
Total	₹ 36,72,000	1,80,000 hours	

Additional Information:

Each unit of product A requires 4 hours in department Pie and 1 hour in department Qui. Also, each unit of product B requires 1 hour in department Pie and 4 hours in department Qui.

This was the first year of the company's operation. There was no WIP at the end of the year. However, 1,800 and 5,400 units of Products A and B were on hand at the end of the year.

The budgeted activity has been attained by the company. You are required to:

(i) DETERMINE the production and sales quantities of both products 'A' and 'B' for the above year.

(ii) ASCERTAIN the effect of using a pre-determined overhead rate instead of department-wise overhead rates on the company's income due to its effect on stock value.

(iii) CALCULATE the difference in the selling price due to the use of pre-determined overhead rate instead of using department-wise overhead rates. Assume that the direct costs (material and labour costs) per unit of products A and B were ₹ 25 and ₹ 40 respectively and the selling price is fixed by adding 40% over and above these costs to cover profit and selling and administration overhead.

Ans

(i) Computation of production and sales quantities:

The products processing times are as under –

Product	A	B	Total
Department Pie	4 hours	1 hour	90,000 hours
Department Qui	1 hour	4 hours	90,000 hours

Let X and Y be the number of units (production quantities) of the two products. Converting these into equations, we have –

$4X + Y = 90,000$ & $X + 4Y = 90,000$

Solving the above, we get X = 18,000; Y = 18,000

Hence, the Production and Sales Quantities are determined as under –

Product	Production Quantity	Closing Stock (Given)	Sales Quantity (Balancing Figure)
A	18,000 units	1,800 units	16,200 units
B	18,000 units	5,400 units	12,600 units

(iii) Effect of using pre-determined rate of overheads on the company's profit

Product	Closing Stock Quantity	Overhead included using pre- determined rate	Overhead included using department rate	Difference in overhead in closing stock value / Effect on closing stock value
A	1,800 units	1,800 x 5 hours x ₹ 20.40 = ₹ 1,83,600	Pie = 1,800 units x 4 hours x ₹ 28.80 = ₹ 2,07,360 Qui = 1,800 units x 1 hour x ₹ 12 = ₹ 21,600	(-) ₹ 45,360
B	5,400 units	5,400 x 5 hours x ₹ 20.40 = ₹ 5,50,800	Pie = 5,400 units x 1 hour x ₹ 28.80 = ₹ 1,55,520	(+) ₹ 1,36,080
			Qui = 5,400 units x 4 hours x ₹12 = ₹ 2,59,200	
Total		₹ 7,34,400	₹ 6,43,680	(+) ₹ 90,720

Use of pre-determined overhead rate has resulted in over valuation of stock by ₹ 90,720 due to which the company's income would be affected (increase) by ₹ 90,720. Profit would be affected only to the extent of Overhead contained in closing finished goods and closing WIP, if any.

(iv) Effect of using pre-determined on the products' selling prices

Particulars	Product A	Product B
Selling Price per unit if pre-determined overhead rate is used	₹177.80	₹ 198.80
Selling Price per unit if department wise rate is used	₹ 213.08	₹163.52
Difference	₹ 35.28 Under-Priced	₹ 35.28 Over-Priced

Workings:

(1) Pre-determined overhead recovery rate = $\frac{36,72,000}{1,80,000 \text{ hours}}$ = 20.40 per direct labour

(2) If pre-determined recovery rate is used

Particulars	Product A in ₹	Product B in ₹
Materials & Labour	25.00	40.00
Add: Production Overhead A = 5 hours x ₹ 20.40 per hour B = 5 hours x ₹ 20.40 per hour	102.00	102.00
Cost of production	127.00	142.00
Add: 40% of margin	50.80	56.80
	177.80	198.50

(3) If department-wise recovery rate is used

Particulars	Product A in ₹	Product B in ₹
Materials & Labour	25.00	40.00
Add: Production Overhead	127.20	76.80
A = Pie = 4 hours x ₹ 28.80		
Qui = 1 hour x ₹ 12		
B =Pie = 1 hour x ₹ 28.80		
Qui = 4 hours x ₹ 12		
Cost of production	152.20	116.80
Add: 40% of margin	60.88	46.72
Selling Price per unit	213.08	163.52

Q.29 Predetermined Mach. Hour Rate | MTP Nov 18(2)

You are given the following information of the three machines of a manufacturing department of X Ltd.:

	Preliminary estimates of expenses (per annum)			
		Machines		
	Total (Rs.)	A (Rs.)	B (Rs.)	C (Rs.)
Depreciation	20,000	7,500	7,500	5,000
Spare parts	10,000	4,000	4,000	2,000
Power	40,000			
Consumable stores	8,000	3,000	2,500	2,500
Insurance of machinery	8,000			
Indirect employee cost	20,000			
Building maintenance expenses	20,000			
Annual interest on capital outlay	50,000	20,000	20,000	10,000
Monthly charge for rent and rates	10,000			
Salary of foreman (per month)	20,000			
Salary of Attendant (per month)	5,000			

(The foreman and attendant control all the three machines and spend equal time on each of them.) The following additional information is also available:

	Machines		
	A	B	C
Estimated Direct Labour Hours	1,00,000	1,50,000	1,50,000
Ratio of K.W. Rating	3	2	3
Floor space (sq. ft.)	40,000	40,000	20,000

There are 12 holidays besides Sundays in the year, of which two were on Saturdays. The manufacturing department works 8 hours in a day but Saturdays are half days. All machines work at 90% capacity throughout the year and 2% is reasonable for breakdown.

You are required to:

CALCULATE predetermined machine hour rates for the above machines after taking into consideration the following factors:

- An increase of 15% in the price of spare parts.
- An increase of 25% in the consumption of spare parts for machine 'B' & 'C' only.
- 20% general increase in wages rates.

Ans

	Basis of apportionment	Total (Rs)	Machines		
			A (Rs.)	B (Rs.)	C (Rs.)
(A) Standing Charges					
Insurance	Depreciation Basis (3:3:2)	8,000	3,000	3,000	2,000
Indirect employee cost	Direct Labour hours (2:3:3)	24,000	6,000	9,000	9,000
Building maintenance expenses	Floor Space (2:2:1)	20,000	8,000	8,000	4,000
Rent and Rates	Floor Space (2:2:1)	1,20,000	48,000	48,000	24,000
Salary of foreman	Equal	2,40,000	80,000	80,000	80,000
Salary of attendant	Equal	60,000	20,000	20,000	20,000
Total standing charges		4,72,000	1,65,000	1,68,000	1,39,000
Hourly rate for standing charges			84.70	86.24	71.36
(B) Machine Expenses:					
Depreciation	Direct	20,000	7,500	7,500	5,000
Spare parts	Final estimates	13,225	4,600	5,750	2,875
Power	K.W. rating (3:2:3)	40,000	15,000	10,000	15,000
Consumable Stores	Direct	8,000	3,000	2,500	2,500
Total Machine expenses		81,225	30,100	25,750	25,375
Hourly Rate for Machine expenses			15.45	13.22	13.03
Total (A + B)		553,225	1,95,100	1,93,750	1,64,375
Machine Hour rate			100.15	99.46	84.38

Working Notes:

(i) Calculation of effective working hours:

No. of full off-days = No. of Sunday + No. of holidays
= 52 + 12 = 64 days

No. of half working days = 52 days – 2 holidays = 50 days

No. of full working days = 365 days – 64 days – 50 days = 251 days

Total working Hours = {(251 days × 8 hours) + (50 days × 4 hours)}
= 2,008 hours + 200 = 2,208 hours.

Total effective hours = Total working hours × 90% - 2% for break-down
= 2,208 hours × 90% - 2% (2,208 hours × 90%)
= 1,987.2 hours – 39.74 hours
= 1947.46 or Rounded up to 1948 hours

(ii) Amount of spare parts is calculated as under:

	A (Rs.)	B (Rs.)	C (Rs.)
Preliminary estimates	4,000	4,000	2,000
Add: Increase in price @ 15%	600	600	300
	4,600	4,600	2,300
Add: Increase in consumption @ 25%	-	1,150	575
Estimated cost	4,600	5,750	2,875

(iii) Amount of Indirect employee cost is calculated as under:

	(Rs.)
Preliminary estimates	20,000
Add: Increase in wages @ 20%	4,000
	24,000

(iv) Interest on capital outlay is a finance cost, therefore it has been excluded from the cost accounts.

Q.30 Predetermined Mach. Hour Rate | MTP Nov 20

A Ltd. manufactures two products- A and B. The manufacturing division consists of two production departments P1 and P2 and two service departments S1 and S2.

Budgeted overhead rates are used in the production departments to absorb factory overheads to the products. The rate of Department P1 is based on direct machine hours, while the rate of Department P2 is based on direct labour hours. In applying overheads, the pre-determined rates are multiplied by actual hours.

For allocating the service department costs to production departments, the basis adopted is as follows:

(i) Cost of Department S1 to Department P1 and P2 equally, and

(ii) Cost of Department S2 to Department P1 and P2 in the ratio of 2 : 1 respectively.

The following budgeted and actual data are available:

Annual profit plan data:

Factory overheads budgeted for the year:

Departments	P1	27,51,000	S1	8,00,000
	P2	24,50,000	S2	6,00,000

Budgeted output in units: Product A50,000; B 30,000.

Budgeted raw-material cost per unit:

Product A ₹ 120; Product B ₹ 150.

Budgeted time required for production per unit:

Department P_1 : Product A : 1.5 machine hours

Product B : 1.0 machine hour

Department P_2 : Product A : 2 Direct labour hours Product B : 2.5 Direct labour hours

Average wage rates budgeted in Department P_2 are:

Product A - ₹ 72 per hour and Product B – ₹ 75 per hour.

All materials are used in Department P_1 only.

Actual data (for the month of Jan, 2020):

Units actually produced: Product A : 4,000 units

Product B : 3,000 units

Actual direct machine hours worked in Department P_1:

On Product A 6,100 hours, Product B 4,150 hours.

Actual direct labour hours worked in Department P_2:

On Product A 8,200 hours, Product B 7,400 hours.

Costs actually incurred:		Product A		Product B
		₹		₹
Raw materials		4,89,000		4,56,000
Wages		5,91,900		5,52,000
Overheads: Department	P_1	2,50,000	S_1	80,000
	P_2	2,25,000	S_2	60,000

You are required to:

(i) COMPUTE the pre-determined overhead rate for each production department.

(ii) PREPARE a performance report for Jan, 2020 that will reflect the budgeted costs and actual costs.

Ans. **(i) Computation of pre-determined overhead rate for each production department from budgeted data**

	Production Department		Service Department	
	P1	P2	S1	S2
Budgeted factory overheads for the year (₹)	27,51,000	24,50,000	8,00,000	6,00,000
Allocation of service department S1's costs to production departments P1 and P2 equally (₹)	4,00,000	4,00,000	(8,00,000)	--
Allocation of service department S2's costs to production departments P1 and P2 in the ratio of 2:1 (₹)	4,00,000	2,00,000	-	(6,00,000)
Total	35,51,000	30,50,000	--	--
Budgeted machine hours in department P1 (working note-1)	1,05,000	--		
Budgeted labour hours in department P2 (working note-1)	--	1,75,000		
Budgeted machine/ labour hour rate (₹)	33.82	17.43		

(ii) Performance report for Jan, 2020

(When 4,000 and 3,000 units of Products A and B respectively were actually produced)

	Budgeted (₹)	Actual (₹)
Raw materials used in Dept. P1:		
A : 4,000 units × ₹ 120	4,80,000	4,89,000
B : 3,000 units × ₹ 150	4,50,000	4,56,000
Direct labour cost (on the basis of labour hours worked in department P2)		
A : 4,000 units × 2 hrs. × ₹ 72	5,76,000	5,91,900

B : 3,000 units × 2.5 hrs. × ₹ 75	5,62,500	5,52,000
Overhead absorbed on machine hour basis in Dept. P1:		
A : 4,000 units × 1.5 hrs. × ₹ 33.82	2,02,920	1,96,420*
B : 3,000 units × 1 hr. × ₹ 33.82	1,01,460	1,33,630*
Overhead absorbed on labour hour basis in Dept. P2:		
A : 4,000 units × 2 hrs. × ₹ 17.43	1,39,440	1,49,814**
B : 3,000 units × 2.5 hrs. × ₹ 17.43	1,30,725	1,35,198**
	26,43,045	27,03,962

Working notes:

1.

	Product A	Product B	Total
Budgeted output (units)	50,000	30,000	
Budgeted machine hours in Dept. P1	75,000	30,000	1,05,000
	(50,000×1.5 hrs.)	(30,000×1 hr.)	
Budgeted labour hours in Dept. P2	1,00,000	75,000	1,75,000
	(50,000×2 hrs.)	(30,000×2.5 hrs.)	

2.

	Product A	Product B	Total
Actual output (units)	4,000	3,000	
Actual machine hours utilized in Dept. P_1	6,100	4,150	10,250
Actual labour hours utilised in Dept. P_2	8,200	7,400	15,600

3. **Computation of actual overhead rates for each production department from actual data**

	Production Department		Service Department	
	P1	P2	S1	S2
Actual factory overheads for the month of Jan, 2020 (₹)	2,50,000	2,25,000	80,000	60,000
Allocation of service Dept. S_1's costs to production Dept. P_1 and P_2 equally (₹)	40,000	40,000	(80,000)	-
Allocation of service Dept. S_2's costs to production Dept. P_1 and P_2 in the ratio of 2:1 (₹)	40,000	20,000	-	(60,000)
Total	3,30,000	2,85,000	--	--
Actual machine hours in Dept. P_1 (working note 2)	10,250	--		
Actual labour hours in Dept. P_2 (working note 2)	--	15,600		
Actual machine/ labour hour rate (₹)	32.20	18.27		

4. Actual overheads absorbed (based on machine hours)

A : 6,100 hrs × ₹ 32.20 = ₹ 1,96,420

B : 4,150 hrs × ₹ 32.20 = ₹ 1,33,630

5. Actual overheads absorbed (based on labour hours)

A : 8,200 hrs × ₹ 18.27 = ₹ 1,49,814

B : 7,400hrs × ₹ 18.27 = 1,35,198

Q.31 Two tier machine hour rate | MTP Nov 18(1)

In a factory, a machine is considered to work for 208 hours in a month. It includes maintenance time of 8 hours and set up time of 20 hours.

The expense data relating to the machine are as under:

Cost of the machine is Rs. 5,00,000. Life 10 years. Estimated scrap value at the end of life is Rs. 20,000.

	(Rs.)
- Repairs and maintenance per annum	60,480
- Consumable stores per annum	47,520
- Rent of building per annum (The machine under reference occupies 1/6 of the area)	72,000
- Supervisor's salary per month (Common to three machines)	6,000
- Wages of operator per month per machine	2,500
- General lighting charges per month allocated to the machine	1,000
- Power 25 units per hour at Rs. 2 per unit	

Power is required for productive purposes only. Set up time, though productive, does not require power.

The Supervisor and Operator are permanent. Repairs and maintenance and consumable stores vary with the running of the machine.

Required

COMPUTE a two-tier machine hour rate for (a) set up time, and (b) running time

Ans

1. (i) Effective hours for standing charges (208 hours – 8 hours) = 200 hours
   (ii) Effective hours for variable costs (208 hours – 28 hours) = 180 hours
2. Standing Charges per hour

	Cost per month (Rs.)	Cost per hour (Rs.) (Cost per month ÷ 200 hours)
Supervisor's salary $\left(\frac{6,000}{3 \text{machines}}\right)$	2,000	10.00
Rent of building $\left(\frac{1}{6} \times \frac{72,000}{12 \text{months}}\right)$	1,000	5.00
General lighting	1,000	5.00
Total Standing Charges	4,000	20.00

3. Machine running expenses per hour

	Cost per month (Rs.)	Cost per hour (Rs.)
Depreciation	4,000	20.00

$\left(\frac{5,00,000-20,000}{10Years} \times \frac{1}{12months}\right)$		$\left(\frac{4,000}{200hours}\right)$
Wages	2,500	12.50 $\left(\frac{2,500}{200hours}\right)$
Repairs & Maintenance $\left(\frac{60.480}{12months}\right)$	5,040	28.00 $\left(\frac{5,040}{180hours}\right)$
Consumable stores $\left(\frac{47,520}{12months}\right)$	3,960	22.00 $\left(\frac{3,960}{180hours}\right)$
Power (25 units × Rs.2 × 180 hours)	9,000	50.00
Total Machine Expenses	24,500	132.50

Computation of Two – tier machine hour rate

	Set up time rate per machine hour (Rs.)	Running time rate per machine hour (Rs.)
Standing Charges	20.00	20.00
Machine expenses :		
Depreciation	20.00	20.00
Repair and maintenance	-	28.00
Consumable stores	-	22.00
Power	-	50.00
Machine hour rate of overheads	40.00	140.00
Wages	12.50	12.50
Comprehensive machine hour rate	52.50	152.50

Q.32 Unabsorbed OH | PY Dec 21

XYZ Ltd. manufactures a single product. It recovers factory overheads at a pre - determined rate of ₹ 20 per man-day.

During the year 2020-21, 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 stick period and ₹ 1.00 lakh was in respect of expenses of previous year booked in this current year. During the period, 50,000 units were sold. At the end of the period, 12,000 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 20,000 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. You are required to:

(i) Calculate the amount of unabsorbed overheads during the year 2020 -21.

(ii) Show the accounting treatment of unabsorbed overheads in cost accounts and pass journal entry.

Ans **(i) Amount of under-absorption of overheads during the year 2020-21**

		(₹)
Total production overheads actually incurred during the year2020-21		35,50,000
Less: Wages paid during strike period	₹2,00,000	
Wages of previous year booked in current year	₹ 1,00,000	3,00,000
Net production overheads actually incurred: (A)		32,50,000
Production overheads absorbed by 1.50 lakh man-days @ ₹ 20 per man-day: (B)		30,00,000
Amount of under-absorption of production overheads: [(A)-(B)]		2,50,000

(ii) Accounting treatment of under absorption of production overheads: It is given in the statement of the question that 62,000 units (50,000 sold + 12,000 closing stock – 0 opening stock) were completely finished and 20,000 units were 65% complete, 40% of the under-absorbed overheads were due to factory inefficiency and the rest were attributable to increase in cost of indirect materials and indirect labour.

	(₹)
1. (40% of ₹2,50,000) i.e. ₹ 1,00,000 of under – absorbed overheads were due to factory inefficiency. This being abnormal, should be debited to the Costing Profit and Loss A/c	1,00,000
2. Balance (60% of ₹ 2,50,000) i.e. ₹ 1,50,000 of under – absorbed overheads should be distributed over work-in- progress, finished goods and cost of sales by using supplementary rate	1,50,000
Total under-absorbed overheads	2,50,000

Apportionment of unabsorbed overheads of ₹1,50,000 over work-in-progress, finished goods and cost of sales.

	Equivalent Completed units	(₹)
Work-in-progress (13,000 units × ₹ 2) (Refer to Working Note)	20000 * 65% = 13,000	26,000
Finished goods (12,000 units × ₹ 2)	12,000	24,000
Cost of sales (50,000 units × ₹ 2)	50,000	1,00,000
	75,000	1,50,000

Journal entry:

Work-in-progress control A/c	Dr.	₹26,000	
Finished goods control A/c	Dr.	₹24,000	
Cost of Sales A/c	Dr.	₹ 1,00,000	
Costing Profit & Loss A/c	Dr.	₹ 1,00,000	
To Overhead control A/c			₹ 2,50,000

Working Note:

Supplementary overhead absorption rate= $\frac{1,50,000}{75,000 units}$ ₹ 2 per unit

Q.33 Unabsorbed OH | PY Nov 19

ABS Enterprises produces a product and adopts the policy to recover factory overheads applying blanket rate based on machine hours. The cost records of the concern reveal the following information:

Budgeted production overheads	₹	10,35,000
Budgeted machine hours	₹	90,000
Actual machine hours worked	₹	45,000
Actual production overheads	₹	8,80,000
Production overheads (actual) include-		
Paid to worker as per court's award	₹	50,000
Wages paid for strike period	₹	38,000
Stores written off	₹	22,000
Expenses of previous year booked in current year	₹	18,500
Production -		
Finished goods		30,000 units
Sale of finished goods		27,000 units

The analysis of cost information reveals that 1/3 of the under absorption of overheads was due to defective production planning and the balance was attributable to increase in costs.

You are required:

(i) To find out the amount of under absorbed production overheads.

(ii) To give the ways of treating it in Cost Accounts.

(iii) To apportion the under absorbed overheads over the items.

Ans

(i) Amount of under absorption of production overheads:

Particular	Amount (₹)	Amount(₹)
Total production overheads actually incurred		8,80,000
Less: Amount paid to worker as per court order	50,000	
Wages paid for the strike period under an award	38,000	
Stores written off	22,000	
Expenses of previous year booked in the current year	18,500	1,28,500
		7,51,500
Less: Production overheads absorbed as per machine hour rate (45,000 hours × ₹11.50*)		5,17,500
Amount of under- absorbed production overheads		2,34,000

***Budgeted Machine hour rate (Blanket rate)** = $\frac{10,35,000}{90,000}$ = ₹ 11.50 per hour

(ii) Accounting treatment of under absorbed production overheads:

(a) As 1/3rd of the under absorbed overheads were due to defective production planning, this being abnormal, hence should be debited to Costing Profit and Loss Account.

Amount to be debited to Costing Profit and Loss Account

= ₹ 2,34,000 × 1/3 = ₹ 78,000.

(b) Balance of under absorbed production overheads should be distributed over Finished goods and Cost of sales by applying supplementary rate*.

Amount to be distributed = ₹ 2,34,000 × 2/3 = ₹1,56,000

*Supplementary rate = $\frac{1,56,000}{30,000 \text{ units}}$ = ₹ 5.20 per unit

(iii) Apportionment of under absorbed production overheads over Finished goods and Cost of sales:

Particular	Units	Amount (₹)
Finished goods (3,000 units × ₹5.20)	3,000	15,600
Cost of sales (27,000 units × ₹5.20)	27,000	1,40,400
Total	30,000	1,56,000

Q.34 Unabsorbed / Over Abs. OH | PY May 23

The following information has been obtained from financial accounting and cost accounting records.

	Financial Accounting	Cost Accounting
	₹	₹
(i) Factory Overhead	94,750	90,000
(ii) Administrative Overhead	60,000	57,000
(iii) Selling Overhead	55,000	61,000
(iv) Opening Stock	17,500	22,500
(v) Closing Stock	12,500	15,000

Required:

Indicate under-recovery and over-recovery and their effects on cost accounting profit. [Note: You are not required to prepare reconciliation statement.]

Ans

	Financial Accounting ₹	Cost Accounting ₹	Difference ₹	Under/Over-recovery	Effect on Cost Accounting Profit	Net Effect* on Cost Accounting Profit
(i) Factory Overhead	94,750	90,000	4,750	Under-recovery	Increased	To be reduced/ deducted
(ii) Administrative Overhead	60,000	57,000	3,000	Under-recovery	Increased	To be reduced/ deducted
(iii) Selling Overhead	55,000	61,500	-6,500	Over-recovery	Decreased	To be added
(iv) Opening Stock	17,500	22,500	-5,000	Over valuation	Decreased	To be added
(v) Closing Stock	12,500	15,000	-2,500	Over valuation	Increased	To be reduced/ deducted

Taking Cost Accounting Profit as base

(Under recovery and over recovery with effect are answered by the candidate, or if under recovery and over recovery with treatment (net effect) are answered, due credit shall be given in both cases)

Q.35 Under / Over Absorbed OH | RTP May 18

PQR manufacturers – a small scale enterprise, produces a single product and has adopted a policy to recover the

production overheads of the factory by adopting a single blanket rate based on machine hours. The annual budgeted production overheads for the year 2017-18 are ₹ 44,00,000 and budgeted annual machine hours are 2,20,000. For a period of first six months of the financial year 2017-18, following information were extracted from the books:

Actual production overheads	₹ 24,88,200
Amount included in the production overheads:	
Paid as per court's order	₹ 1,28,000
Expenses of previous year booked in current year	₹ 1,200
Paid to workers for strike period under an award	₹ 44,000
Obsolete stores written off	₹ 6,700

Production and sales data of the concern for the first six months are as under:

Production:	
Finished goods	24,000 units
Works-in-progress	
(50% complete in every respect)	18,000 units
Sale:	
Finished goods	21,600 units

The actual machine hours worked during the period were 1,16,000 hours. It is revealed from the analysis of information that $\frac{1}{4}$ of the under/ over absorption was due to defective production policies and the balance was attributable to increase/decrease in costs.

Required:

(i) DETERMINE the amount of under/over absorption of production overheads for the six-month period of 2017-18.

(ii) EXAMINE the accounting treatment of under/ over absorption of production overheads, and

(iii) CALCULATE the apportionment of the under/ over absorbed overheads over the items.

Ans

(i) Amount of under/ over absorption of production overheads during the period of first six months of the year 2017-2018:

	Amount (₹)	Amount (₹)
Total production overheads actually incurred during the period		24,88,200
Less: Amount paid to worker as per court order	1,28,000	
Expenses of previous year booked in the current year	1,200	
Wages paid for the strike period under an award	44,000	
Obsolete stores written off	6,700	(1,79,900)
		23,08,300
Less: Production overheads absorbed as per machine hour rate (1,16,000 hours × ₹20*)		23,20,000
Amount of over absorbed production overheads		11,700

*Budgeted Machine hour rate (Blanket rate) = $\frac{44,00,000}{2,20,000 \text{hours}}$ = ₹ 20 per hour

(ii) Accounting treatment of over absorbed production overheads: As, one fourth of the over absorbed overheads were due to defective production policies, this being abnormal, hence should be transferred to Costing Profit and Loss Account.

Amount to be transferred to Costing Profit and Loss Account = (11,700 × $\frac{1}{4}$) = ₹ 2,925
Balance of over absorbed production overheads should be distributed over Works in progress, finished goods and Cost of sales by applying supplementary rate*.
Amount to be distributed = (11,700 × $\frac{3}{4}$) =₹ 8,775

$$\text{Supplementary rate} = \frac{8,775}{33,000\text{Unites}} = ₹\ 0.2659 \text{ per unit}$$

(iii) Apportionment of under absorbed production overheads over WIP, Finished goods and Cost of sales:

	Equivalent completed units	Amount (₹)
Work-in-Progress (18,000 units × 50% × ₹ 0.2659)	9,000	2,393
Finished goods (2,400 units × ₹ 0.2659)	2,400	638
Cost of sales (21,600 units × ₹ 0.2659)	21,600	5,744
Total	33,000	8,775

Q.36 Under & Over Absorbed OH | RTP Nov 19

PLR Ltd. manufacturers a single product and recovers the overheads by adopting a single blanket rate based on machine hours. The budgeted production overheads of the factory for the FY 2019-20 are ₹50,40,000 and budgeted machine hours are 6,000.

For a period of first six months of the financial year 2019□20, following information were extracted from the books:

Actual production overheads	₹34,08,000
Amount included in the production overheads:	
Paid as per court's order	₹4,50,000
Expenses of previous year booked in current year	₹1,00,000
Paid to workers for strike period under an award	₹4,20,000
Obsolete stores written off	₹36,000

Production and sales data of the concern for the first six months are as under:

Production:	
Finished goods	1,10,000 units
Works-in-progress	
(50% complete in every respect)	80,000 units
Sale:	
Finished goods	90,000 units

The actual machine hours worked during the period were 3,000 hours. It is revealed from the analysis of information that 40% of the over/under-absorption was due to defective production policies and the balance was attributable to increase in costs.

You are required:

(i) to determine the amount of over/ under absorption of production overheads for the period,
(ii) to show the accounting treatment of over/ under-absorption of production overheads, and
(iii) to apportion the over/ under-absorbed overheads over the items.

Ans (i) **Amount of over/ under absorption of production overheads during the period of first six months of the year 2019-20:**

	Amount (₹)	Amount (₹)
Total production overheads actually incurred during the period		34,08,000
Less: Amount paid to worker as per court order	4,50,000	
Expenses of previous year booked in the current year	1,00,000	
Wages paid for the strike period under an award	4,20,000	
Obsolete stores written off	36,000	10,06,000
		24,02,000
Less: Production overheads absorbed as per machine hour rate (3,000 hours × ₹840*)		25,20,000
Amount of over absorbed production overheads		1,18,000

*Budgeted Machine hour rate (Blanket rate) = $\frac{50,40,000}{6,000 \text{ hours}}$ =₹840 per hour

(ii) Accounting treatment of over absorbed production overheads: As, 40% of the over absorbed overheads were due to defective production policies, this being abnormal, hence should be credited to Costing Profit and Loss Account.

Amount to be credited to Costing Profit and Loss Account

= ₹1,18,000 × 40% = ₹47,200.

Balance of over absorbed production overheads should be distributed over Works in progress, Finished goods and Cost of sales by applying supplementary rate*.

Amount to be distributed = ₹1,18,000× 60% = ₹70,800

Supplementary rate = $\frac{70,800}{150,000 \text{ units}}$ = ₹ 0.472 per unit

(iii) Apportionment of over absorbed production overheads over WIP, Finished goods and Cost of sales:

	Equivalent completed units	Amount (₹)
Work-in-Progress (80,000 units × 50% ×0.472)	40,000	18,880
Finished goods (20,000 units × 0.472)	20,000	9,440
Cost of sales (90,000 units × 0.472)	90,000	42,480
Total	1,50,000	70,800

Q.37 Under & Over Absorbed OH | MTP May 19 (2)

Madhu Ltd. has calculated a predetermined overhead rate of Rs.22 per machine hour for its Quality Check (QC) department. This rate has been calculated for the budgeted level of activity and is considered as appropriate for absorbing overheads. The following overhead expenditures at various activity levels had been estimated.

Total overheads	Number of machine hours
Rs.3,38,875	14,500
Rs.3,47,625	15,500
Rs.3,56,375	16,500

You are required to:

(i) CALCULATE the variable overhead absorption rate per machine hour.

(ii) CALCULATE the estimated total fixed overheads.

(iii) CALCULATE the budgeted level of activity in machine hours.

(iv) CALCULATE the amount of under/over absorption of overheads if the actual machine hours were 14,970 and actual overheads were Rs.3,22,000.

(v) ANALYSE the arguments for and against using departmental absorption rates vs blanket factory wide rate.

Ans

(i) Variable overhead absorption rate = $\frac{\text{Difference in Total Overheads}}{\text{Difference in levels in terms of machine hours}}$

$= \frac{3,47,625 - 3,38,875}{15,500 \text{ hours} - 14,500 \text{ hours}}$ = Rs.8.75 per machine hour.

(ii) Calculation of Total fixed overheads:

	(Rs.)
Total overheads at 14,500 hours	3,38,875
Less: Variable overheads (Rs. 8.75 × 14,500)	(1,26,875)
Total fixed overheads	2,12,000

(iii) Calculation of Budgeted level of activity in machine hours:

Let budgeted level of activity = X

Then, $\frac{(\text{Rs. } 8.75\text{ X} + \text{Rs. } 2,12,000)}{\text{X}}$ = Rs. 22

8.75X + Rs.2,12,000 = 22X

13.25X = 2,12,000

X =16,000

Thus, budgeted level of activity = 16,000 machine hours.

(iv) Calculation of Under / Over absorption of overheads:

	(Rs.)
Actual overheads	3,22,000
Absorbed overheads (14,970 hours × Rs. 22 per hour)	3,29,340
Over-absorption (3,29,340 – 3,22,000)	7,340

(v) Departmental absorption rates provide costs which are more precise than those provided by the use of blanket absorption rates. Departmental absorption rates facilitate variance analysis and cost control. The application of these rates make the task of stock and work- in-process (WIP) valuation easier and more precise. However, the setting up and monitoring of these rates can be time consuming and expensive.

Q.38 Under & Over Absorbed OH | MTP May 20

A Ltd has calculated a predetermined overhead rate of Rs.22 per machine hour for its Quality Check (QC) department. This rate has been calculated for the budgeted level of activity and is considered as appropriate for absorbing overheads. The following overhead expenditures at various activity levels had been estimated.

Total overheads	Number of machine hours
Rs.3,38,875	14,500
Rs.3,47,625	15,500
Rs.3,56,375	16,500

You are required to:

(i) CALCULATE the variable overhead absorption rate per machine hour.

(ii) CALCULATE the estimated total fixed overheads.

(iii) CALCULATE the budgeted level of activity in machine hours.

(iv) CALCULATE the amount of under/over absorption of overheads if the actual machine hours were 14,970 and actual overheads were Rs.3,22,000.

(iv) ANALYSE the arguments for and against using departmental absorption rates as opposed to a single or blanket factory wide rate.

Ans (i) Variable overhead absorption rate

Difference in levels in terms of machine hours = $\frac{3,47,625-3,38,875}{15,500\text{hours} - 14,500 \text{ hours}}$ = Rs.8.75 per machine hour.

(ii) Calculation of Total fixed overheads:

	(Rs.)
Total overheads at 14,500 hours	3,38,875
Less: Variable overheads (Rs. 8.75 × 14,500)	(1,26,875)
Total fixed overheads	2,12,000

(iii) Calculation of Budgeted level of activity in machine hours:

Let budgeted level of activity = X

Then, $\frac{(\text{Rs. } 8.75\ X\ +\ \text{Rs.}2,12,000)}{X}$ = Rs.22

8.75X + Rs.2,12,000 = 22X

13.25X = 2,12,000

X =16,000

Thus, budgeted level of activity = 16,000 machine hours.

(iv) Calculation of Under / Over absorption of overheads:

	(Rs.)
Actual overheads	3,22,000
Absorbed overheads (14,970 hours × Rs. 22 per hour)	3,29,340
Over-absorption (3,29,340 – 3,22,000)	7,340

Q.39 Overhead Recovery Rate | ICAI MAT

Deccan Manufacturing Ltd., have three departments which are regarded as production departments. Service departments' costs are distributed to these production departments using the "Step Ladder Method" of distribution. Estimates of factory overhead costs to be incurred by each department in the forthcoming year are as follows. Data required for distribution is also shown against each department:

Department	Factory overhead (₹)	Direct labour hours	No. of employees	Area in sq.m.
Production:				
X	1,93,000	4,000	100	3,000
Y	64,000	3,000	125	1,500
Z	83,000	4,000	85	1,500
Service:				
P	45,000	1,000	10	500
Q	75,000	5,000	50	1,500
R	1,05,000	6,000	40	1,000
S	30,000	3,000	50	1,000

The overhead costs of the four service departments are distributed in the same order, viz. P, Q, R and S respectively on the following basis.

Department	Basis
P	Number of employees
Q	Direct labour hours
R	Area in square metres
S	Direct labour hours

You are required to:

(a) PREPARE a schedule showing the distribution of overhead costs of the four service departments to the three production departments; and

(b) CALCULATE the overhead recovery rate per direct labour hour for each of the three production departments.

Ans

(a) Deccan Manufacturing Limited

Schedule Showing the Distribution of Overhead Costs among Departments

	Production			Service			
	X(₹)	Y (₹)	Z (₹)	P (₹)	Q (₹)	R (₹)	S(₹)
Overhead cost	1,93,000	64,000	83,000	45,000	75,000	1,05,000	30,000
Distribution of Dept.P (100:125:85:-:50:40:50)	10,000	12,500	8,500	-45,000	5,000	4,000	5,000
Distribution of Dept.Q (4:3:4:-:-:6:3)	16,000	12,000	16,000	-	-80,000	24,000	12,000
Distribution of Dept.R (6:3:3:-:-:-:-:2)	57,000	28,500	28,500	-	-	-1,33,000	19,000
Distribution of Dept.S (4:3:4:-:-:-:-)	24,000	18,000	24,000	-	-	-	-66,000
Total	3,00,000	1,35,000	1,60,000				

(b) Calculation of overhead recovery rate

	Dept-X	Dept-Y	Dept-Z
Total apportioned overheads	₹3,00,000	₹1,35,000	₹1,60,000
Direct labour hours	4,000	3,000	4,000
Overhead recovery rate per labour hour	₹75	₹45	₹40

Q.40 Machine Hour Rate | ICAI MAT

Gemini Enterprises undertakes three different jobs A, B and C. All of them require the use of a special machine and also the use of a computer. The computer is hired and the hire charges work out to ₹ 4,20,000 per annum. The expenses regarding the machine are estimated as follows:

	(₹)
Rent for a quarter	17,500
Depreciation per annum	2,00,000
Indirect charges per annum	1,50,000

During the first month of operation the following details were taken from the job register:

	Job		
	A	B	C
Number of hours the machine was used:			
(a) Without the use of the computer	600	900	—
(b) With the use of the computer	400	600	1,000

You are required to COMPUTE the machine hour rate:

(a) For the firm as a whole for the month when the computer was used and when the computer was not used.

(b) For the individual jobs A, B and C.

Ans

Working notes:

(i) Total machine hours used — 3,500

(600 + 900 + 400 + 600 + 1,000)

(ii) Total machine hours without the use of computers — 1,500

(600 + 900)

(iii) Total machine hours with the use of computer — 2,000

(400 + 600 + 1,000)

(iv) Total overheads of the machine per month

Rent (₹ 17,500 ÷ 3 months)	₹ 5,833.33
Depreciation (₹ 2,00,000 ÷ 12 months)	₹ 16,666.67
Indirect Charges (₹ 1,50,000 ÷ 12 months)	₹ 12,500.00
Total	₹ 35,000.00

(v) Computer hire charges for a month = ₹ 35,000

(₹ 4,20,000 ÷ 12 months)

(vi) Overheads for using machines without computer

$= \frac{35,000}{3,500 \text{ hrs.}} \times 1,500 \text{ hrs.} = ₹ 15,000$

(vii) Overheads for using machines with computer

$= \frac{35,000}{3,500 \text{ hrs.}} 2,000 \text{ hrs.} + ₹ 35,000 = ₹ 55,000$

(a) Computation of Machine hour rate for the firm as a whole for a month.

(1) When the Computer was used: $\frac{55,000}{2,000 \text{ hours}}$ = ₹ 27.50 per hour

(2) When the computer was not used: $\frac{15,000}{1,500 \text{ hrs.}}$ =₹ 10 per hour

(b) Computation of Machine hour rate for the individual job

	Rate per hour	Job					
		A		B		C	
	(₹)	Hrs.	(₹)	Hrs.	(₹)	Hrs.	(₹)
Overheads							
Without Computer	10.0	600	6,000	900	9,000	-	-
With computer	27.5	400	11,000	600	16,500	1,000	27,500
Total		1,000	17,000	1,500	25,500	1,000	27,500
Machine hour rate			17		17		27.5

Q.41 Works Cost | ICAI MAT

Job No. 198 was commenced on October 10, 2022 and completed on November 1, 2022. Materials used were ₹ 6,000 and labour charged directly to the job was ₹ 4,000. Other information is as follows:

Machine No. 215 used for 40 hours, the machine hour rate being ₹ 35.

Machine No. 160 used for 30 hours, the machine hour rate being ₹ 40. Six welders worked on the job for five days of 8 hours each: the Direct labour hour per welder is ₹ 20.

General expenses related to production not included for calculating either the machine hour or direct labour hour rate totaled ₹20,000, total direct wages for the period being ₹2,00,000. COMPUTE the works costs for job No. 198.

Ans

Computation for works costs for job No. 198

	(₹)	(₹)
Materials		6,000
Direct labour		4,000
		10,000
Factory overheads:		
Machine No. 215 : 40 hours @ ₹35	1,400	
Machine No. 160 : 30 hours @ ₹40	1,200	
*240 hours of welders @ ₹ 20 per hr.	4,800	
**General expenses 10% of wages	400	7,800
Work cost		**17,800**

* 6 welders × 5 days × 8 hours = 240 hours

** Un- apportioned expenses ₹ 20,000 which works out at 10% of direct wages.

Q.42 Under / Over Absorbed | ICAI MAT

In a factory, overheads of a particular department are recovered on the basis of ₹ 5 per machine hour. The total expenses incurred and the actual machine hours for the department for the month of August were ₹ 80,000 and 10,000 hours respectively. Of the amount of ₹ 80,000, ₹ 15,000 became payable due to an award of the Labour Court and ₹ 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 analysing 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. SHOW the treatment of over/under-absorbed overhead in the cost accounts?

Ans

Computation of Over/Under-absorbed overhead expenses during the month of August

	(₹)	(₹)
Total expenses incurred in the month of August:		80,000
Less: The amount paid according to labour court award (Assumed to be non-recurring)	15,000	
Expenses of previous year	5000	(20,000)
Net overhead expenses incurred for the month		60,000
Overhead recovered for 10,000 hours @ ₹ 5 per hour		(50,000)
Under-absorbed overheads		10,000

60% of under-absorbed overhead was due to defective planning, it will be charged to costing profit & loss account.

40% of under-absorbed overhead i.e. ₹4,000 may be distributed over Finished Goods and Cost of Sales using supplementary overhead rate:

$$\text{Supplementary rate} = \frac{\text{Under – absorbed OH}}{\text{Units produced}}$$

$$= \frac{4{,}000}{4{,}0000 \text{ Unitys}} = ₹0.10$$

Amount of under-absorbed overheads charged to finished goods
= 10,000 units × ₹0.10 = ₹1,000
Amount of under-absorbed overheads charged to cost of sales
= 30,000 units × ₹0.10 = ₹3,000

Q.43 Under / Over Absorbed | ICAI MAT

In a manufacturing unit, factory overhead was recovered at a pre-determined rate of ₹ 25 per man-day. The total factory overhead expenses incurred and the man-days actually worked were ₹ 41.50 lakhs and 1.5 lakh man-days respectively. Out of the 40,000 units produced during a period, 30,000 were sold.

On analysing the reasons, it was found that 60% of the unabsorbed overheads were due to defective planning and the rest were attributable to increase in overhead costs.

EXPLAIN how would unabsorbed overheads be treated in Cost Accounts?

Ans

Computation of unabsorbed overheads

Man-days worked		1,50,000
		(₹)
Overhead actually incurred		41,50,000
Less: Overhead absorbed @ ₹ 25 per man-day (₹ 25 × 1,50,000)		37,50,000
Unabsorbed overheads		4,00,000
Unabsorbed overheads due to defective planning (i.e. 60% of ₹ 4,00,000)		2,40,000
Balance of unabsorbed overhead		1,60,000

Treatment of unabsorbed overheads in Cost Accounts

(i) The unabsorbed overheads of ₹ 2,40,000 due to defective planning to be treated as abnormal and therefore be charged to Costing Profit and Loss Account.

(ii) The balance unabsorbed overheads of ₹1,60,000 be charged to production i.e., 40,000 units at the supplementary overhead absorption rate i.e., ₹ 4 per unit (Refer to Working Note)

	(₹)
Charge to Costing Profit and Loss Account as part of the cost of unit sold (30,000 units @ ₹ 4 p.u.)	1,20,000
Add: To closing stock of finished goods (10,000 units @ ₹ 4 p.u.)	40,000
Total	1,60,000

Working Note:

Supplementary overhead absorption rate = $\frac{1,60,000}{40,000 \text{ units}}$ = ₹ 4 p.u.

Q.44 Under / Over Absorbed OH | ICAI MAT

A factory has three production departments. The policy of the factory is to recover the production overheads of the entire factory by adopting a single blanket rate based on the percentage of total factory overheads to total factory wages. The relevant data for a month are given below:

Department	Direct Materials (₹)	Direct Wages (₹)	Factory Overheads (₹)	Direct Labour hours	Machine hours
Budget:					
Machining	6,50,000	80,000	3,60,000	20,000	80,000
Assembly	1,70,000	3,50,000	1,40,000	1,00,000	10,000
Packing	1,00,000	70,000	1,25,000	50, 000	-
Actual:					
Machining	7,80,000	96,000	3,90,000	24,000	96,000
Assembly	1,36,000	2,70,000	84,000	90,000	11,000
Packing	1,20,000	90,000	1,35,000	60,000	-

The details of one of the representative jobs produced during the month are as under:

Job No. CW 7083 :

Department	Direct Materials	Direct Wages (₹)	Direct Labour hours	Machine hours
Machining	1,200	240	60	180
Assembly	600	360	120	30
Packing	300	60	40	-

The factory adds 30% on the factory cost to cover administration and selling overheads and profit.

Required:

(i) COMPUTE the overhead absorption rate as per the current policy of the company and determine the selling price of the Job No. CW 7083.

(ii) Suggest any suitable alternative method(s) of absorption of the factory overheads and CALCULATE the overhead recovery rates based on the method(s) so recommended by you.

(iii) DETERMINE the selling price of Job CW 7083 based on the overhead application rates calculated in (ii) above.

(iv) CALCULATE the department-wise and total under or over recovery of overheads based on the company's current policy and the method(s) recommended by you.

Ans **(i)** **Computation of overhead absorption rate (as per the current policy of the company)**

Department	Budgeted factory Overheads	Budgeted direct wages
	(₹)	(₹)
Machinery	3,60,000	80,000
Assembly	1,40,000	3,50,000
Packing	1,25,000	70,000
Total	6,25,000	5,00,000

$$\text{Overhead absorption rate} = \frac{\text{Budgeted factory overheads}}{\text{Budgeted direct wages}} \times 100$$

$$= \frac{6,25,000}{5,00,000} \times 100 = 125\% \text{ of Direct wages}$$

	(₹)
Direct materials (₹ 1,200 + ₹ 600 + ₹ 300)	2,100.00
Direct wages (₹ 240 + ₹ 360 + ₹ 60)	660.00
Overheads (125% × ₹ 660)	825.00
Total factory cost	3,585.00
Add: Mark-up (30% × ₹ 3,585)	1,075.50
Selling price	4,660.50

(ii) Methods available for absorbing factory overheads and their overhead recovery rates in different departments

1. Machining Department
   In the machining department, the use of machine time is the predominant factor of production. Hence machine hour rate should be used to recover overheads in this department. The overhead recovery rate based on machine hours has been calculated as under:

   $$\text{Machine hour rate} = \frac{\text{Budgeted factory overheads}}{\text{Budgeted machine hours}}$$

   $$= \frac{3,60,000}{80,000 \text{ hours}} = ₹ 4.50 \text{ per hour}$$

2. Assembly Department
   In this department direct labour hours is the main factor of production. Hence direct labour hour rate method should be used to recover overheads in this department. The overheads recovery rate in this case is:

   $$\text{Direct labour hour rate} = \frac{\text{Budgeted factory overheads}}{\text{Budgeted direct labourhours}}$$

   $$= \frac{1,40,000}{1,00,000 \text{ hours}} = ₹ 1.40 \text{ per hour}$$

3. Packing Department
   Labour is the most important factor of production in this depart- ment. Hence direct labour hour rate method should be used to recover overheads in this department.
   The overhead recovery rate in this case comes to:
   Budgeted factory overhead

   $$\text{Direct labour hour rate} = \frac{\text{Budgeted factory overheads}}{\text{Direct labour hours}}$$

   $$= \frac{1,25,000}{50,000 \text{ hours}} = ₹ 2.50 \text{ per hour}$$

(iii) Selling Price of Job CW-7083 [based on the overhead application rates calculated in (ii) above]

	(₹)
Direct materials	2,100.00

Direct wages	660.00
Overheads (Refer to Working note)	1,078.00
Factory cost	3,838.00
Add: Mark up (30% of ₹ 3,838)	1,151.40
Selling price	4,989.40

Working note:

Overhead Summary Statement

Dept.	Basis	Hours	Rate(₹)	Overheads (₹)
Machining	Machine hour	180	4.50	810
Assembly	Direct labour hour	120	1.40	168
Packing	Direct labour hour	40	2.50	100
			Total	1,078

(v) Department-wise statement of total under or over recovery of overheads

(a) Under current policy

Departments

	Machining (₹)	Assembly (₹)	Packing (₹)	Total (₹)
Direct wages (Actual)	96,000	2,70,000	90,000	
Overheads recovered @ 125% of Direct wages: (A)	1,20,000	3,37,500	1,12,500	5,70,000
Actual overheads: (B)	3,90,000	84,000	1,35,000	6,09,000
(Under)/Over recovery of overheads : (A-B)	(2,70,000)	2,53,500	(22,500)	(39,000)

(b) As per methods suggested

Basis of overhead recovery

	Machine hours	Direct labour hours (Assembly)	Direct labour hours (Packing)	Total (₹)
Hours worked	96,000	90,000	60,000	
Rate/hour (₹)	4.50	1.40	2.50	
Overhead recovered (₹): (A)	4,32,000	1,26,000	1,50,000	7,08,000
Actual overheads (₹): (B)	3,90,000	84,000	1,35,000	6,09,000
(Under)/Over recovery: (A-B)	42,000	42,000	15,000	99,000

Q.45 Cost Sheet | ICAI MAT

A light engineering factory fabricates machine parts for customers. The factory commenced fabrication of 12 nos. machine parts as per customers' specifications, the expenditure incurred on the job for the week ending 21st August is as tabulated below:

	(₹)	(₹)
Direct materials (all items)		780.00
Direct labour (manual) 20 hours @₹ 15 per hour		300.00

Machine facilities :		
Machine No. I : 4 hours @ ₹ 45	180.00	
Machine No. II : 6 hours @ ₹ 65	390.00	570.00
Total		1,650.00
Overheads @ ₹ 8 per hour on 20 manual hours		160.00
Total cost		1,810.00

The overhead rate of ₹ 8 per hour is based on 3,000 man hours per week; similarly, the machine hour rates are based on the normal working of Machine Nos. I and II for 40 hours out of 45 hours per week.

After the close of each week, the factory levies a supplementary rate for the recovery of full overhead expenses on the basis of actual hours worked during the week. During the week ending 21st August, the total labour hours worked was 2,400 and Machine Nos. I and II had worked for 30 hours and 32.5 hours respectively.

PREPARE a Cost Sheet for the job for the fabrication of 12 nos. machine parts duly levying the supplementary rates.

Ans

Fabrication of 12 nos. machine parts (job No)

Date of commencement: 16th August Date of Completion:

Cost sheet for the week ending, August 21st:

	(₹)	(₹)
Direct materials (all items)		780.00
Direct labour (manual) 20 hours @₹ 15 per hour		300.00
Machine facilities:		
Machine No. I : 4 hours @ ₹ 45	180.00	
Machine No. II : 6 hours @ ₹ 65	390.00	570.00
Total		1,650.00
Overheads @ ₹ 8 per hour on 20 manual hours		160.00
Total cost		1,810.00
Supplementary Rates		
Overheads 20 hours @ ₹ 2 per hour (Refer WN-1)	40.00	
Machine facilities: (Refer WN-2)		
Machine No. I - 4 hours @ ₹ 15	60.00	
Machine No. II - 6 hours @ ₹ 15	90.00	190.00
Cost		2,000.00

Working notes (WN):

1. Overheads budgeted: 3,000 man-hours × ₹8 =₹24,000
   Actual hours: 2,400 man-hours
   Actual rate per hour ₹24,000 ÷ 2,400 hours = ₹10
   Supplementary charge ₹ 2 (₹10 – ₹ 8) per hour

2. Machine facilities:

	Machine No. I	Machine No. II
Budgeted	₹1,800 (40 × ₹45)	₹2,600 (40 × ₹65)
Actual number of hours	30	32.5
Actual rate per hour	₹60.00	₹80.00
Supplementary rate per hour	₹ 15.00 (₹60.00 – ₹45.00)	₹ 15.00 (₹80.00 – ₹65.00)

Q.46 Under / Over Absorbtion | ICAI MAT

ABC Ltd. manufactures a single product and absorbs the production overheads at a pre-determined rate of ₹ 10 per machine hour.

At the end of current financial year, it has been found that actual production overheads incurred were ₹ 6,00,000. It included ₹ 45,000 on account of 'written off' obsolete stores and ₹ 30,000 being the wages paid for the strike period under an award.

The production and sales data for the current year is as under:

Production :	
Finished goods	20,000 units
Work-in-progres	8,000 units
(50% complete in all respects)	
Sales :	
Finished goods	8,000 units

The actual machine hours worked during the period were 48,000. It has been found that one-third of the under-absorption of production overheads was due to lack of production planning and the rest was attributable to normal increase in costs.

(i) CALCULATE the amount of under-absorption of production overheads during the current year; and

(ii) SHOW the accounting treatment of under-absorption of production overheads.

Ans

(i) Amount of under-absorption of production overheads during the current year

Total production overheads actually incurred during the current year	6,00,000	
Less : 'Written off' obsolete stores	₹ 45,000	
Wages paid for strike period	₹ 30,000	75,000
Net production overheads actually incurred : (A)	5,25,000	
Production overheads absorbed by 48,000 machine hours @ ₹ 10 per hour : (B)	4,80,000	
Amount of under – absorption of production overheads : [(A) – (B)]	45,000	

(ii) Accounting treatment of under absorption of production overheads

It is given in the statement of the question that 20,000 units were completely finished and 8,000 units were 50% complete, one third of the under-absorbed overheads were due to lack of production planning and the rest were attributable to normal increase in costs.

		(₹)
1.	(33 – 1/3% of ₹ 45,000) i.e., ₹ 15,000 of under-absorbed overheads were due to lack of production planning. This being abnormal, should be debited to the Costing Profit and Loss A/c.	15,000
2.	Balance (66-2/3% of ₹ 45,000) i.e., ₹ 30,000 of under-absorbed overheads should be distributed over work-in-progress, finished goods and cost of sales by using supplementary rate.	30,000
	Total under-absorbed overheads	45,000

Apportionment of unabsorbed overheads of ₹ 30,000 over, work-in progress, finished goods and cost of sales

	Equivalent Completed Units	(₹)

Work-in-Progress		
(4,000 units × ₹ 1.25)	4,000	5,000
(Refer to working note)		
Finished goods		
(2,000 units × ₹ 1.25)	2,000	2,500
Cost of sales		
(18,000 units × ₹ 1.25)	18,000	22,500
	24,000	30,000

Working Note

Supplementary rate per unit = $\frac{30,000}{24,000}$ = ₹ 1.25

Q.47 Overhead Rate | ICAI MAT

A Ltd., manufactures two products A and B. The manufacturing division consists of two production departments P1 and P2 and two service departments S1 and S2. Budgeted overhead rates are used in the production departments to absorb factory overheads to the products. The rate of Department P1 is based on direct machine hours, while the rate of Department P2 is based on direct labour hours. In applying overheads, the pre-determined rates are multiplied by actual hours.

For allocating the service department costs to production departments, the basis adopted is as follows:

(i) Cost of Department S1 to Department P1 and P2 equally, and

(ii) Cost of Department S2 to Department P1 and P2 in the ratio of 2 : 1 respectively.

The following budgeted and actual data are available:

Annual profit plan data:

Factory overheads budgeted for the year:

Production Departments		Service Departments	
P1	P2	S1	S2
₹ 25,50,000	₹ 21,75,000	₹ 6,00,000	₹ 4,50,000

Budgeted output in units:

Product A 50,000; B 30,000.

Budgeted raw-material cost per unit:

Product A ₹ 120; Product B ₹ 150.

Budgeted time required for production per unit:

Department P1 : Product A : 1.5 machine hours
Product B : 1.0 machine hour

Department P2 : Product A : 2 Direct labour hours
Product B : 2.5 Direct labour hours

Average wage rates budgeted in Department P2 are:

Product A - ₹ 72 per hour and Product B – ₹ 75 per hour. All materials are used in Department P1 only.

Actual data: (for the month of July, 2022)

Units actually produced: Product A: 4,000 units

Product B: 3,000 units Actual direct machine hours worked in Department P1:

On product A- 6,100 hours, Product B- 4,150 hours. Actual direct labour hours worked in Department P2:

on product A- 8,200 hours, Product B- 7,400 hours.

Costs actually incurred:	Product A	Product B
Raw materials	₹ 4,89,000	₹ 4,56,000
Wages	₹ 5,91,900	₹ 5,52,000

Overheads: Department P1	₹ 2,31,000	S1	₹ 60,000
P2	₹ 2,04,000	S2	₹ 48,000

You are required to:
(i) COMPUTE the pre-determined overhead rate for each production department.
(ii) PREPARE a performance report for July, 2022 that will reflect the budgeted costs and actual costs.

Ans **(i) Computation of predetermined overhead rate for each production departments from budgeted data**

	Production Department		Service Department	
	P1	P2	S1	S2
Budgeted factory overheads for the year in (₹)	25,50,000	21,75,000	6,00,000	4,50,000
Allocation of service department S1's costs to production departments P1 and P2 equally in (₹)	3,00,000	3,00,000	(6,00,000)	—
Allocation of service department S2's costs to production departments P1 and P2 in the ratio of 2:1 in (₹)	3,00,000	1,50,000	—	(4,50,000)
Total	31,50,000	26,25,000	—	—
Budgeted machine hours in department P1 (working note 1)	1,05,000	—		
Budgeted labour hours in department P2 (working note 1)	—	1,75,000		
Budgeted machine/ labour hour rate (₹)	30.00	15.00		

(ii) Performance report for July, 2022
(When 4,000 and 3,000 units of products A and B respectively were actually produced)

	Budgeted (₹)	Actual (₹)
Raw materials used in Dept. P1:		
A : 4,000 units × ₹ 120	4,80,000	4,89,000
B : 3,000 units × ₹ 150	4,50,000	4,56,000
Direct labour cost (on the basis of labour hours worked in department P2)		
A : 4,000 units × 2 hrs. × ₹ 72	5,76,000	5,91,900
B : 3,000 units × 2.5 hrs. × ₹ 75	5,62,500	5,52,000
Overhead absorbed on machine hour basis in Dept. P1:		
A : 4,000 units × 1.5 hrs. × ₹30	1,80,000	1,74,400*
B : 3,000 units × 1 hr. × ₹30	90,000	1,18,649*
Overhead absorbed on labour hour basis in Dept. P2:		
A : 4,000 units × 2 hrs. × ₹ 15	1,20,000	1,31,364**
B : 3,000 units × 2.5 hrs. × ₹ 15	1,12,500	1,18,548**
	25,71,000	26,31,861

* (Refer to working note 4) **(Refer to working note 5)
Working notes:

1.

	Product A	Product B	Total
Budgeted output (in units)	50,000	30,000	
Budgeted machine hours in Dept. P1	75,000	30,000	1,05,000

	(50,000×1.5 hrs.)	(30,000×1 hr.)	
Budgeted labour hours in Dept. P2	1,00,000 (50,000×2 hrs.)	75,000 (30,000×2.5 hrs.)	1,75,000

2.

	Product A	Product B	Total
Actual output (in units)	4,000	3,000	
Actual machine hours utilized in Dept. P1	6,100	4,150	10,250
Actual labour hours utilised in Dept. P2	8,200	7,400	15,600

3. **Computation of actual overhead rates for each production department from actual data**

	Production Department		Service Department	
	P1	P2	S1	S2
Actual factory overheads for the month of July, 2022 in (₹)	2,31,000	2,04,000	60,000	48,000
Allocation of service Dept. S1's costs to production Dept. P1 and P2 equally in (₹)	30,000	30,000	(60,000)	-
Allocation of service Dept. S2's costs to production Dept. P1 and P2 in the ratio of 2:1 in (₹)	32,000	16,000	-	(48,000)
Total	2,93,000	2,50,000	--	--
Actual machine hours in Dept. P1 (working note 2)	10,250	--		
Actual labour hours in Dept. P2 (working note 2)	--	15,600		
Actual machine/ labour hour rate (₹)	28.59	16.02		

4. Actual overheads absorbed (based on machine hours)
   A : 6,100 hrs × ₹ 28.59 = ₹ 1,74,400
   B : 4,150 hrs × ₹ 28.59 = ₹ 1,18,649
5. Actual overheads absorbed (based on labour hours)
   A : 8,200 hrs × ₹ 16.02 = ₹ 1,31,364
   B : 7,400 hrs × ₹ 16.02 = ₹ 1,18,548

5 CHAPTER
ACTIVITY BASED COSTING

Q.1 ABC v/s Absorption | PY May 18

PQR Pens Ltd. manufactures two products - 'Gel Pen' and 'Ball Pen'. It furnishes the following data for the year 2017:

Product	Annual Output	Total Machine	Total number of Purchase orders	Total number of set-ups
Gel Pen	5,500	24,000	240	30
Ball Pen	24,000	54,000	448	56

The annual overheads are as under:

Particulars	₹
Volume related activity costs	4,75,020
Set up related costs	5,79,988
Purchase related costs	5,04,992

Calculate the overhead cost per unit of each Product - Gel Pen and Ball Pen on the basis of:

(i) Traditional method of charging overheads
(ii) Activity based costing method and
(iii) Find out the difference in cost per unit between both the methods.

Ans **(i) Statement Showing Overhead Cost per unit "Traditional Method"**

	Gel Pen (₹)	Ball Pen (₹)
Units	5,500	24,000
Overheads (₹) (Refer to W.N.)	4,80,000 (20 x 24,000 hrs.)	10,80,000 (20 x 54,000 hrs.)
Overhead Rate per unit (₹)	87.27 (₹ 4,80,000 / 5,500 units)	45 (₹ 10,80,000 /24,000 units)

Working Notes:

Overhead Rate per Machine Hour

$$= \frac{\text{Total Overhead incurred by the Company}}{\text{Total Machine Hours}}$$

$$= \frac{4,75,020 + 5,79,988 + 5,04,992}{24,000 \text{ hours} + 54,000 \text{ hours}} = \frac{15,60,000}{78,000 \text{ hours}}$$

= 20 per machine hour

(ii) Statement Showing "Activity Based Overhead Cost"

'Activity Cost Pool	Cost Driver	Ratio	Total Amount (₹)	Gel Pen (₹)	Ball Pen (₹)
Volume Related Activity	Machine hours	24:54	4,75,020	1,46,160	3,28,860
Setup Related Costs	No. of Setups	30:56	5,79,988	2,02,321	3,77,667
Purchase Related Costs	No. of Purchase Orders	240:448	5,04,992	1,76,160	3,28,832
Total Cost				5,24,641	10,35,359
Output (units)				5,500	24,000
Unit Cost (Overheads)				95.39	43.13

(iii)

	Gel Pen (₹)	Ball Pen (₹)
Overheads Cost per unit (₹) (Traditional Method)	87.27	45
Overheads Cost per unit (₹) (ABC)	95.39	43.13
Difference per unit	-8.12	+1.87

(Volume related activity cost, set up related costs and purchase related cost can also be calculated under Activity Base Costing using Cost driver rate. However, there will be no changes in the final answer.)

Q.2 ABC v/s Absorption | PY Nov 18

M/s. HMB Limited is producing a product in 10 batches each of 15000 units in a year and incurring following overheads their on:

	Amount (₹)
Material procurement	22,50,000
Maintenance	17,30,000
Set-up	6,84,500
Quality control	5,14,800

The prime costs for the year amounted to ₹ 3,01,39,000.
The company is using currently the method of absorbing overheads on the basis of prime cost. Now it wants to shift to activity-based costing. Information relevant to Activity drivers for a year are as under:

Activity Driver	Activity Volume
No. of purchase orders	1500
Maintenance hours	9080

No. of set-ups	2250
No. of inspections	2710

The company has produced a batch of 15000 units and has incurred ₹ 26,38,700 and ₹ 3,75,200 on materials and wages respectively.

The usage of activities of the said batch are as follows:

Materials orders	48 orders
Maintenance hours	810 hours
No. of set-ups	40
No. of inspections	25

You are required to:

(i) find out cost of product per unit on absorption costing basis for the said batch.
(ii) determine cost driver rate, total cost and cost per unit of output of the said batch on the basis of activity based costing.

Ans

Working Note:

Overhead Absorption Rate $= \frac{51,79,300}{3,01,39,000} x100 = 17.18\%$

(i) Cost of Product Under Absorption Costing

Item of Cost	Amount (₹)
Material	26,38,700
Wages	3,75,200
Prime Cost	30,13,900
Overheads: $\frac{51,79,300}{3,01,39,000} \times 30,13,900$	5,17,930
Total Cost	35,31,830
Units	15,000
Cost per unit	**235.46**

(ii) Cost driver rate, total cost and cost per unit on the basis of activity-based costing method
Absorption Costing

Calculation of Cost Driver rate:

Activity	₹.	Activity Volume	Cost Driver Rate
Material Procurement	22,50,000	1500	1500
Maintenance	17,30,000	9080	190.5
Setup	6,84,500	2250	304.2
Quality Control	5,14,800	2710	189.9

Calculation of total Cost and cost per unit:

Item of Cost	Amount (₹)
Material	26,38,700
Wages	3,75,200
Prime Cost	30,13,900
Material Purchas $= \left(\frac{22,50,000}{1,500} x 48\right)$	72,000
Maintenance $= \left(\frac{17,30,000}{9,080} x 810\right)$	1,54,328
Setup $= \left(\frac{6,84,500}{2,250} x 40\right)$	12,169
Quality Control $= \left(\frac{5,14,800}{2,710} x 25\right)$	4,749
Total Cost	32,57,146
Unit	15,000
Cost per unit	**217.14**

Q.3 ABC v/s Absorption | PY May 19

MNO Ltd. manufactures two types of equipment A and B and absorbs overheads on the basis of direct labour hours. The budgeted overheads and direct labour hours for the month of March 2019 are ₹ 15,00,000 and 25,000 hours respectively. The information about the company's products is as follows:

	Equipment	
	A	B
Budgeted Production Volume	3,200 units	3,850 units
Direct Material Cost	₹ 350 per unit	₹ 400 per unit
Direct Labour Cost		
A: 3 hours @ ₹ 120 per hour	₹ 360	
B: 4 hours @ ₹ 120 per hour		₹ 480

Overheads of ₹ 15,00,000 can be identified with the following three major activities:

Order Processing: ₹ 3,00,000

Machine Processing: ₹ 10,00,000

Product Inspection: ₹ 2,00,000

These activities are driven by the number of orders processed, machine hours worked and inspection hours respectively. The data relevant to these activities is as follows:

	Orders processed	Machine hours worked	Inspection hours
A	400	22,500	5,000
B	200	27,500	15,000
Total	600	50,000	20,000

Required:

(i) Prepare a statement showing the manufacturing cost per unit of each product using the absorption costing method assuming the budgeted manufacturing volume is attained.

(ii) Determine cost driver rates and prepare a statement showing the manufacturing cost per unit of each product using activity based costing, assuming the budgeted manufacturing volume is attained.

(iii) MNO Ltd.'s selling prices are based heavily on cost. By using direct labour hours as an application base, calculate the amount of cost distortion (under costed or over costed) for each equipment.

Ans **(i) Overheads application base: Direct labour hours**

	Equipment	Equipment
	A (₹)	B (₹)
Direct material cost	350	400
Direct labour cost	360	480
Overheads*	**180**	**240**
	890	**1120**

$$\text{*Pre-determined rate} = \left(\frac{\text{Budgeted overheads}}{\text{Budgeted direct labour hours}}\right) = \frac{15,00,000}{25,000 \text{ hours}} = 60$$

(ii) Estimation of Cost-Driver rate

Activity	Overhead cost	Cost-driver level	Cost driver rate
	(₹)		(₹)
Order processing	3,00,000	600 Orders processed	500
Machine processing	10,00,000	50,000 Machine hours	20
Inspection	2,00,000	15,000 Inspection hours	10
		Equipment	Equipment
		A (₹)	B (₹)
Direct material cost		350	400
Direct labour cost		360	480
Prime Cost(A)		710	880
Overhead Cost			
Order processing 400: 200		2,00,000	1,00,000
Machine processing 22,500: 27,500		4,50,000	5,50,000
Inspection 5,000: 15,000		50,000	1,50,000
Total overhead cost		7,00,000	8,00,000

(iii) Calculation of Cost Distortion

	Equipment	Equipment
	A (₹)	B (₹)
Unit manufacturing cost-using direct labour hours as an application base	890.00	1,120.00
Unit manufacturing cost-using activity based costing	928.75	1,087.79
Cost distortion	-38.75	32.21

Q.4 ABC v/s Absorption | PY Jan 21

ABC Ltd. manufactures three products X, Y and Z using the same plant and resources. It has given the following information for the year ended on 31st March, 2020:

	X	Y	Z
Production Quantity (units)	1200	1440	1968
Cost per unit:			
Direct Material (₹)	90	84	176
Direct Labour (₹)	18	20	30

Budgeted direct labour rate was ₹ 4 per hour and the production overheads, shown in table below, were absorbed to products using direct labour hour rate. Company followed Absorption Costing Method. However, the company is now considering adopting Activity Based Costing Method.

	Budgeted Overheads (₹)	Cost Driver	Remarks
Material Procurement	50,000	No. of orders	No. of orders was 25 units for each product.
Set-up	40,000	No. of production Runs	All the three products are produced in production runs of 48 units.
Quality Control	28,240	No. of Inspections	Done for each production run.
Maintenance	1,28,000	Maintenance hours	Total maintenance hours were 6,400 and was allocated in the ratio of 1:1:2 between X, Y & Z.

Required:

1. Calculate the total cost per unit of each product using the Absorption Costing Method.
2. Calculate the total cost per unit of each product using the Activity Based Costing Method.

Ans **1. Traditional Absorption Costing**

		X	Y	Z	Total
(a)	Quantity (units)	1,200	1,440	1,968	4608
(b)	Direct labour per unit (₹)	18	20	30	-
(c)	Direct labour hours (a × b)/₹ 4	5,400	7,200	14,760	27,360

Overhead rate per direct labour hour:

= Budgeted overheads ÷ Budgeted labour hours

= (50,000 + 40,000 + 28,240 + 1,28,000) ÷ 27,360 hours

= 2,46,240 ÷ 27,360 hours = 9 per direct labour hour

Unit Costs:

	X	Y	Z
Direct Costs:			
- Direct Labour (₹)	18.00	20.00	30.00
- Direct Material (₹)	90.00	84.00	176.00
Production Overhead: (₹)	40.50	45.00	67.50
	$\left(\frac{9x18}{4}\right)$	$\left(\frac{9x20}{4}\right)$	$\left(\frac{9x30}{4}\right)$
Total cost per unit (₹)	148.50	149.00	273.50

2. Calculation of Cost-Driver level under Activity Based Costing

	X	Y	Z	Total
Quantity (units)	1,200	1,440	1,968	-
No. of orders (to be rounded off for fraction)	48 (1200 / 25)	58 (1440 / 25)	79 (1968 / 25)	185
No. of production runs	25 (1200 / 48)	30 (1440 / 48)	41 (1968 / 48)	96
No. of Inspections (done for each production run)	25	30	41	96
Maintenance hours	1,600	1,600	3,200	6400

Calculation of Cost-Driver rate

Activity	Budgeted Cost (₹) (a)	Cost-driver level (b)	Cost Driver rate (₹) (c) = (a) / (b)
Material procurement	50,000	185	270.27
Set-up	40,000	96	416.67
Quality control	28,240	96	294.17
Maintenance	1,28,000	6,400	20.00

Calculation of total cost of products using Activity Based Costing

Particulars	Product		
	X (₹)	Y (₹)	Z (₹)
Direct Labour	18.00	20.00	30.00
Direct Material	90.00	84.00	176.00
Prime Cost per unit (A)	108.00	104.00	206.00
Material procurement	10.81 [(48 x270.27)/1200]	10.89 [(58 x 270.27)/1440]	10.85 [(79 x270.27)/1968]
Set-up	8.68 [(25 x 416.67)/1200]	8.68 [(30 x 416.67)/ 1440]	8.68 [(41 x 416.67)/ 1968]
Quality control	6.13 [(25 x 294.17)/1200]	6.13 [(30 x 294.17)/ 1440]	6.13 [(41 x 294.17)/ 1968]
Maintenance	26.67 [(1,600 x 20)/1200]	22.22 [(1,600 x 20)/ 1440]	32.52 [(3,200 x 20)/ 1968]
Overhead Cost per unit (B)	52.29	47.92	58.18
Total Cost per unit (A + B)	**160.29**	**151.92**	**264.18**

Note: Question may also be solved assuming no. of orders for material procurement to be 25 for each product

Q.5 ABC v/s Absorption | PY Dec 21

A Drug Store is presently selling three types of drugs namely 'Drug A', 'Drug B' and 'Drug C'. Due to some constraints, it has decided to go for only one product line of drugs. It has provided the following data for year 2020-21 for each product line:

	Drugs Types		
	A	B	C
Revenues (in ₹)	74,50,000	1,11,75,000	1,86,25,000
Cost of goods sold (in ₹)	41,44,500	68,16,750	1,20,63,750
Number of purchase orders placed (in nos.)	560	810	630
Number of deliveries received	950	1,000	850
Hours of shelf-stocking time	900	1,250	2,350
Units sold (in Nos.)	1,75,200	1,50,300	1,44,500

Following additional information is also provided:

Activity	Description of activity	Total Cost (₹)	Cost-allocation base
Drug Licence fee	Drug Licence fee	5,00,000	To be distributed in ratio 2:3:5 between A, B and C

Ordering	Placing of orders for purchases	8,30,000	2,000 purchase orders
Delivery	Physical delivery and receipt of foods	18,20,000	2,800 deliveries
Shelf stocking	Stocking of goods	32,40,000	4,500 hours of shelf-stocking time
Customer Support	Assistance provided to customers	28,20,000	4,70,000 units sold

You are required to:

(i) Calculate the operating income and operating income as a percentage (%) of revenue of each product line if:

(a) All the support costs (Other than cost of goods sold) are allocated in the ratio of cost of goods sold.

(b) All the support costs (Other than cost of goods sold) are allocated using activity-based costing system.

(ii) Give your opinion about choosing the product line on the basis of operating income as a percentage (%) of revenue of each product line under both the situations as above.

Ans **(i) (a)** Statement of Operating income and Operating income as a percentage of revenues for each product line
(When support costs are allocated to product lines on the basis of cost of goods sold of each product)

	Drug A (₹)	Drug B (₹)	Drug C (₹)	Total (₹)
Revenues: (A)	74,50,000	1,11,75,000	1,86,25,000	3,72,50,000
Cost of Goods sold (COGS): (B)	41,44,500	68,16,750	1,20,63,750	2,30,25,000
Support cost (40% of COGS): (C) (Refer working notes)	16,57,800	27,26,700	48,25,500	92,10,000
Total cost: (D) = {(B) + (C)}	58,02,300	95,43,450	1,68,89,250	3,22,35,000
Operating income: E = {(A)-(D)}	16,47,700	16,31,550	17,35,750	50,15,000
Operating income as a % of revenues: (E/A) × 100)	22.12%	14.60%	9.32%	13.46%

Working notes:

1. Total support cost

	(₹)
Drug Licence Fee	5,00,000
Ordering	8,30,000
Delivery	18,20,000
Shelf stocking	32,40,000
Customer support	28,20,000
Total support cost	92,10,000

2. Percentage of support cost to cost of goods sold (COGS):

$$= \frac{\text{Total Support Cost}}{\text{Total cost of goods sold}} x100$$

$$= \frac{92,10,000}{2,30,25,000} x100 = 40\%$$

3. Cost for each activity cost driver:

Activity (1)	Total cost(₹) (2)	Cost allocation base (3)	Cost driver rate (4) = [(2) ÷ (3)]
Ordering	8,30,000	2,000 purchase orders	₹ 415 per purchase order
Delivery	18,20,000	2,800 deliveries	₹ 650 per delivery
Shelf-stocking	32,40,000	4,500 hours	₹ 720 per stocking hour
Customer support	28,20,000	4,70,000 units sold	₹ 6 per unit sold

(b) Statement of Operating income and Operating income as a percentage of revenues for each product line

(When support costs are allocated to product lines using an activity-based costing system)

	Drug A (₹)	Drug B (₹)	Drug C (₹)	Total (₹)
Revenues: (A)	74,50,000	1,11,75,000	1,86,25,000	3,72,50,000
Cost & Goods sold	41,44,500	68,16,750	1,20,63,750	2,30,25,000
Drug Licence Fee	1,00,000	1,50,000	2,50,000	5,00,000
Ordering cost* (560:810:630)	2,32,400	3,36,150	2,61,450	8,30,000
Delivery cost* (950:1000:850)	6,17,500	6,50,000	5,52,500	18,20,000
Shelf stocking cost* (900:1250:2350)	6,48,000	9,00,000	16,92,000	32,40,000
Customer Support cost* (175200:150300:144500)	10,51,200	9,01,800	8,67,000	28,20,000
Total cost: (B)	67,93,600	97,54,700	1,56,86,700	3,22,35,000
Operating income C: {(A) - (B)}	6,56,400	14,20,300	29,38,300	50,15,000
Operating income as a % of revenues	8.81%	12.71%	15.78%	13.46%

(ii) **Comparison on the basis of operating income as per the percentage (%) of revenue:**

When support costs are allocated to product lines on the basis of cost of goods sold of each product

	Drug A (₹)	Drug B (₹)	Drug C (₹)	Total (₹)
Operating income as a % of revenues	22.12%	14.60%	9.32%	13.46%

On comparing the operating income as a % of revenue of each product, Drug A is the most profitable product line, though its revenue is least but with highest units sold

Q.6 ABC v/s Absorption | PY May 22

Star Limited manufacture three products using the same production methods. A conventional product costing system is being used currently. Details of the three products for a typical period are:

Product	Labour Hrs. per unit	Machine Hrs. per unit	Materials per Unit1	Volume in Units
AX	1.00	2.00	35	7,500
BX	0.90	1.50	25	12,500
CX	1.50	2.50	45	25,000

Direct Labour costs ₹ 20 per hour and production overheads are absorbed on a machine hour basis. The overhead absorption rate for the period is ₹ 30 per machine hour.

Management is considering using Activity Based Costing system to ascertain the cost of the products. Further analysis shows that the total production overheads can be divided as follows:

Particulars	%
Cost relating to set-ups	40
Cost relating to machinery	10
Cost relating to material handling	30
Costs relating to inspection	20
Total production overhead	100

The following activity volumes are associated with the product line for the period as a whole. Total activities for the period:

Product	No. of set-ups	No. of movements of Materials	No. of inspections
AX	350	200	200
BX	450	280	400
CX	740	675	900
Total	1,540	1,155	1,500

Required:

(i) Calculate the cost per unit for each product using the conventional method.
(ii) Calculate the cost per unit for each product using activity based costing method.

Ans (i) Statement showing "Cost per unit" using "conventional method"

Particulars of Costs	AX (₹)	BX (₹)	CX (₹)
Direct Materials	35	25	45

Direct Labour	20	18	30
Production Overheads	60	45	75
Cost *per* unit	**115**	**88**	**150**

(ii) Statement Showing "Cost *per unit* using "Activity Based Costing"

Products	AX	BX	CX
Production (units)	7,500	12,500	25,000
	(₹)	(₹)	(₹)
Direct Materials	2,62,500	3,12,500	11,25,000
Direct Labour	1,50,000	2,25,000	7,50,000
Machine Related Costs	**45,000**	**56,250**	**1,87,500**

Products	AX	BX	CX
Setup Costs	2,62,500	3,37,500	5,55,000
Material handling Cost	1,50,000	2,10,000	5,06,250
Inspection Costs	77,000	1,54,000	3,46,500
Total Costs	9,47,000	12,95,250	34,70,250
Cost *per unit* (Total Cost x Units)	126.267	103.62	138.81

Working Notes:

Calculation of Total Machine hours

Particulars	AX	BX	CX
(A) Machine hours per unit	2	1.5	2.5
(B) Production (units)	7,500	12,500	25,000
(C) Total Machine hours (A× B)	15,000	18,750	62,500

Total Machine hours = 96,250
Total Production overheads = 96,250 × 30 = ₹ 28,87,500
Calculation of Cost Driver Rate

Cost Pool	%	Overheads (₹)	Cost Driver (Basis)	Cost Driver (Units)	Cost Driver Rate (₹)
Set up	40	11,55,000	No of set ups	1,540	750 per set up
Machine Operation	10	2,88,750	Machine hours	96,250	3 per machine hour
Material Handling	30	8,66,250	No of material movement	1,155	750 per material movement
Inspection	20	5,77,500	No of inspection	1,500	385 per inspection

Q.7 ABC v/s Absorption | PY May 23

Beta Limited produces 50,000 Units, 45,000 Units and 62,000 Units of product 'A', 'B' and 'C' respectively. At present the company follows absorption costing method and absorbs overhead on the basis of direct labour hours. Now, the company wants to adopt Activity Based Costing

The information provided by Beta Limited is follows:

	Product A	Product B	Product C
Floor Space Occupied	5,000 Sq.Ft.	4,500 Sq.Ft.	6,200 Sq.Ft.
Direct Labour Hours	7,500 Hours	7,200 Hours	7,800 Hours
Direct Machine Hours	6,000 Hours	4,500 Hours	4,650 Hours
Power consumption	32%	28%	40%

Overhead for year are as follows:	
Rent & Taxes	8,63,500
Electricity Expenses	10,66,475
Indirect labour	13,16,250
Repair & Maintenance	1,28,775
	33,75,000

Required:

(i) Calculate the overhead rate per labour hour under Absorption Costing.

(ii) Prepare a cost statement showing overhead cost per unit for each product - 'A', 'B' and 'C' as per Activity based Costing.

Ans

(i) Calculation of Overhead rate per hour

Total Overheads / Total hours

$$\frac{33,75,000}{22,500} = ₹\ 150 \text{ per hour}$$

(ii) Statement showing overhead cost per unit as per Activity Based Costing

			Product		
Overheads	**Cost Driver**	**Total**	**A**	**B**	**C**
		₹	₹	₹	₹
Rent & Taxes	Floor space (50:45:62)	8,63,500	2,75,000	2,47,500	3,41,000
Electricity	Power Consumption (32:28:40)	10,66,475	3,41,272	2,98,613	4,26,590
Indirect labour	Labour hours (75:72:78)	13,16,250	4,38,750	4,21,200	4,56,300
Repair & Maintenance	Machine hours (600:450:465)	1,28,775	51,000	38,250	39,525
Total Cost		33,75,000	11,06,022	10,05,563	12,63,415

Units			50,000	45,000	62,000
Cost per Unit			**22.12**	**22.35**	**20.38**

Q.8 ABC v/s Absorption | RTP Nov 18

Family Store wants information about the profitability of individual product lines: Soft drinks, Fresh produce and Packaged food. Family store provides the following data for the year 20X7-X8 for each product line:

	Soft drinks	Fresh produce	Packaged food
Revenues	₹ 39,67,500	₹ 1,05,03,000	₹ 60,49,500
Cost of goods sold	₹ 30,00,000	₹ 75,00,000	₹ 45,00,000
Cost of bottles returned	₹ 60,000	₹ 0	₹ 0
Number of purchase orders placed	360	840	360
Number of deliveries received	300	2,190	660
Hours of shelf-stocking time	540	5,400	2,700
Items sold	1,26,000	11,04,000	3,06,000

Family store also provides the following information for the year 20X7-X8:

Activity	Description of activity	Total Cost	Cost-allocation base
Bottles returns	Returning of empty bottles	₹ 60,000	Direct tracing to soft drink line
Ordering	Placing of orders for purchases	₹ 7,80,000	1,560 purchase orders
Delivery	Physical delivery and receipt of goods	₹ 12,60,000	3,150 deliveries
Shelf stocking	Stocking of goods on store shelves and on-going restocking	₹ 8,64,000	8,640 hours of shelf-stocking time
Customer Support	Assistance provided to customers including check-out	₹ 15,36,000	15,36,000 items sold

Required:

(i) Family store currently allocates support cost (all cost other than cost of goods sold) to product lines on the basis of cost of goods sold of each product line. CALCULATE the operating income and operating income as a % of revenues for each product line.

(ii) If Family Store allocates support costs (all costs other than cost of goods sold) to product lines using and activity based costing system, CALCULATE the operating income and operating income as a % of revenues for each product line.

Ans

(i) Statement of Operating income and Operating income as a percentage of revenues for each product line (When support costs are allocated to product lines on the basis of cost of goods sold of each product)

	Soft Drinks(₹)	Fresh Produce (₹)	Packaged Foods (₹)	Total (₹)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000

Cost of Goods sold (COGS): (B)	30,00,000	75,00,000	45,00,000	1,50,00,000
Support cost (30% of COGS): (C) (Refer working notes)	9,00,000	22,50,000	13,50,000	45,00,000
Total cost: (D) = {(B) + (C)}	39,00,000	97,50,000	58,50,000	1,95,00,000
Operating income: E= {(A)-(D)}	67,500	7,53,000	1,99,500	10,20,000
Operating income as a percentage of revenues: (E/A) × 100)	1.70%	7.17%	3.30%	4.97%

Working notes:

1. Total support cost:

	(₹)
Bottles returns	60,000
Ordering	7,80,000
Delivery	12,60,000
Shelf stocking	8,64,000
Customer support	15,36,000
Total support cost	45,00,000

2. Percentage of support cost to cost of goods sold (COGS):

$$= \frac{\text{Total support cost}}{\text{Total cost of goods sold}} x100$$

$$= \frac{45,00,000}{1,50,00,000} x100 = 30\%$$

3 Cost for each activity cost driver:

Activity(1)	Total cost (₹) (2)	Cost allocation base (3)	Cost driver rate (4) = [(2) ÷ (3)]
Ordering	7,80,000	1,560 purchase orders	₹500 per purchase order
Delivery	12,60,000	3,150 deliveries	₹400 per delivery
Shelf-stocking	8,64,000	8,640 hours	₹100 per stocking hour
Customer support	15,36,000	15,36,000 items sold	₹1 per item sold

(ii) Statement of Operating income and Operating income as a percentage of revenues for each product line

(When support costs are allocated to product lines using an activity -based costing system)

	Soft drinks (₹)	Fresh Produce (₹)	Packaged Food (₹)	Total (₹)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost & Goods sold	30,00,000	75,00,000	45,00,000	1,50,00,000
Bottle return costs	60,000	0	0	60,000
Ordering cost* (360:840:360)	1,80,000	4,20,000	1,80,000	7,80,000
Delivery cost* (300:2190:660)	1,20,000	8,76,000	2,64,000	12,60,000
Shelf stocking cost*	54,000	5,40,000	2,70,000	8,64,000

(540:5400:2700)				
Customer Support cost* (1,26,000:11,04,000:3,06,000)	1,26,000	11,04,000	3,06,000	15,36,000
Total cost: (B)	35,40,000	1,04,40,000	55,20,000	1,95,00,000
Operating income C: {(A)- (B)}	4,27,500	63,000	5,29,500	10,20,000
Operating income as a % of revenues	10.78%	0.60%	8.75%	4.97%

Q.9 ABC v/s Absorption | RTP July 21

The following budgeted information relates to N Ltd. for the year 2021:

	Products		
	X	Y	Z
Production and Sales (units)	1,00,000	80,000	60,000
	(₹)	(₹)	(₹)
Selling price per unit	90	180	140
Direct cost per unit	50	90	95
	Hours	Hours	Hours
Machine department (machine hours per unit)	3	4	5
Assembly department (direct labour hours per unit)	6	4	3

The estimated overhead expenses for the year 2021 will be as below: Machine Department ₹ 73,60,000 Assembly Department ₹ 55,00,000Overhead expenses are apportioned to the products on the following basis: Machine Department On the basis of machine hours Assembly Department On the basis of labour hours
After a detailed study of the activities the following cost pools and their respective cost drivers are found:

Cost Pool	Amount (₹)	Cost Driver	Quantity
Machining services	64,40,000	Machine hours	9,20,000 hours
Assembly services	44,00,000	Direct labour hours	11,00,000 hours
Set-up costs	9,00,000	Machine set-ups	9,000 set-ups
Order processing	7,20,000	Customer orders	7,200 orders
Purchasing	4,00,000	Purchase orders	800 orders

As per an estimate the activities will be used by the three products:

	Products		
	X	Y	Z
Machine set-ups	4,500	3,000	1,500
Customer orders	2,200	2,400	2,600
Purchase orders	300	350	150

You are required to PREPARE a product-wise profit statement using:
(i) Absorption costing method;
(ii) Activity-based method.

Ans **(i)** Profit Statement using Absorption costing method:

	Particulars	Product			Total
		X	Y	Z	
A.	Sales Quantity	1,00,000	80,000	60,000	2,40,000
B.	Selling price per unit (₹)	90	180	140	
C.	Sales Value (₹) [A×B]	90,00,000	1,44,00,000	84,00,000	3,18,00,000
D.	Direct cost per unit (₹)	50	90	95	
E.	Direct Cost (₹) [A×D]	50,00,000	72,00,000	57,00,000	1,79,00,000
F.	Overheads:				
(i)	Machine department (₹) (Working note-1)	24,00,000	25,60,000	24,00,000	73,60,000
(ii)	Assembly department (₹) (Working note-1)	30,00,000	16,00,000	9,00,000	55,00,000
G.	Total Cost (₹) [E+F]	1,04,00,000	1,13,60,000	90,00,000	3,07,60,000
H.	Profit (C-G)	(14,00,000)	30,40,000	(6,00,000)	10,40,000

(ii) Profit Statement using Activity based costing (ABC) method:

	Particulars	Product			Total
		X	Y	Z	
A.	Sales Quantity	1,00,000	80,000	60,000	
B.	Selling price per unit (₹)	90	180	140	
C.	Sales Value (₹) [A×B]	90,00,000	1,44,00,000	84,00,000	3,18,00,000
D.	Direct cost per unit (₹)	50	90	95	
E.	Direct Cost (₹) [A×D]	50,00,000	72,00,000	57,00,000	1,79,00,000
F.	Overheads: (Refer working note-3)				
(i)	Machining services (₹)	21,00,000	22,40,000	21,00,000	64,40,000
(ii)	Assembly services (₹)	24,00,000	12,80,000	7,20,000	44,00,000
(iii)	Set-up costs (₹)	4,50,000	3,00,000	1,50,000	9,00,000
(iv)	Order processing (₹)	2,20,000	2,40,000	2,60,000	7,20,000
(v)	Purchasing (₹)	1,50,000	1,75,000	75,000	4,00,000
G.	Total Cost (₹) [E+F]	1,03,20,000	1,14,35,000	90,05,000	3,07,60,000
H.	Profit (₹) (C-G)	(13,20,000)	29,65,000	(6,05,000)	10,40,000

Working Notes: 1.

		Products			
		X	Y	Z	Total
A.	Production (units)	1,00,000	80,000	60,000	
B.	Machine hours per unit	3	4	5	
C.	Total Machine hours [A×B]	3,00,000	3,20,000	3,00,000	9,20,000
D.	Rate per hour (₹)	8	8	8	
E.	**Machine Dept. cost**	**24,00,000**	**25,60,000**	**24,00,000**	**73,60,000**

	[C×D]				
F.	Labour hours per unit	6	4	3	
G.	Total labour hours [A×F]	6,00,000	3,20,000	1,80,000	11,00,000
H.	Rate per hour (₹)	5	5	5	
I	**Assembly Dept. cost [G×H]**	**30,00,000**	**16,00,000**	**9,00,000**	**55,00,000**

$$\text{Machine hour rate} = \frac{73,60,000}{9,20,000 \text{hours}} = 8$$

$$\text{Labour hour rate} = \frac{55,00,000}{11,00,000 \text{hours}} = 5$$

2. Calculation of cost driver rate

Cost Pool	Amount (₹)	Cost Driver	Quantity	Driver rate (₹)
Machining services	64,40,000	Machine hours	9,20,000 hours	7.00
Assembly services	44,00,000	Direct labour hours	11,00,000 hours	4.00
Set-up costs	9,00,000	Machine set-ups	9,000 set-ups	100.00
Order processing	7,20,000	Customer orders	7,200 orders	100.00
Purchasing	4,00,000	Purchase orders	800 orders	500.00

3. Calculation of activity-wise cost

		Products			
		X	Y	Z	Total
A.	Machining hours (Refer Working note-1)	3,00,000	3,20,000	3,00,000	9,20,000
B.	Machine hour rate (₹) (Refer Working note-2)	7	7	7	
C.	Machining services cost (₹) [A×B]	21,00,000	22,40,000	21,00,000	64,40,000
D.	Labour hours (Refer Working note-1)	6,00,000	3,20,000	1,80,000	11,00,000
E.	Labour hour rate (₹) (Refer Working note-2)	4	4	4	
F.	Assembly services cost (₹) [D×E]	24,00,000	12,80,000	7,20,000	44,00,000
G.	Machine set-ups	4,500	3,000	1,500	9,000
H.	Rate per set-up (₹) (Refer Working note-2)	100	100	100	
I.	Set-up cost (₹) [G×H]	4,50,000	3,00,000	1,50,000	9,00,000

J	Customer orders	2,200	2,400	2,600	7,200
K.	Rate per order (₹) (Refer Working note-2)	100	100	100	
L.	Order processing cost (₹) [J×K]	2,20,000	2,40,000	2,60,000	7,20,000
M.	Purchase orders	300	350	150	800
N.	Rate per order (₹) (Refer Working note-2)	500	500	500	
O.	Purchasing cost (₹) [M×N]	1,50,000	1,75,000	75,000	4,00,000

Q.10 ABC v/s Absorption | RTP Dec 21

Family Store wants information about the profitability of individual product lines: Soft drinks, Fresh produce and Packaged food. Family store provides the following data for the year 2020-21 for each product line:

	Soft drinks	Fresh produce	Packaged food
Revenues	₹ 39,67,500	₹ 1,05,03,000	₹ 60,49,500
Cost of goods sold	₹ 30,00,000	₹ 75,00,000	₹ 45,00,000
Cost of bottles returned	₹ 60,000	₹ 0	₹ 0
Number of purchase orders placed	360	840	360
Number of deliveries received	300	2,190	660
Hours of shelf-stocking time	540	5,400	2,700
Items sold	1,26,000	11,04,000	3,06,000

Family store also provides the following information for the year 2020-21:

Activity	Description of activity	Total Cost (₹)	Cost-allocation base
Bottles returns	Returning of empty bottles	60,000	Direct tracing to soft drink line
Ordering	Placing of orders for purchases	7,80,000	1,560 purchase orders
Delivery	Physical delivery and receipt of goods	12,60,000	3,150 deliveries
Shelf stocking	Stocking of goods on store shelves and on- going restocking	8,64,000	8,640 hours of shelf-stocking time
Customer Support	Assistance provided to customers including check-out	15,36,000	15,36,000 items sold

Required:

(i) Family store currently allocates support cost (all cost other than cost of goods sold) to product lines on the basis of cost of goods sold of each product line. CALCULATE the operating income and operating income as a % of revenues for each product line.

(ii) If Family Store allocates support costs (all costs other than cost of goods sold) to product lines using and activity-based costing system, CALCULATE the operating income and operating income as a % of revenues for each product line.

Ans

1. Total support cost:

	(₹)
Bottles returns	60,000
Ordering	7,80,000
Delivery	12,60,000
Shelf stocking	8,64,000
Customer support	15,36,000
Total support cost	45,00,000

2. Percentage of support cost to cost of goods sold (COGS):

$$= \frac{\text{Total support cost}}{\text{Total cost of goods sold}} \times 100$$

$$= \frac{45,00,000}{1,50,00,000} \times 100 = 30\%$$

3 Cost for each activity cost driver:

Activity (1)	Total cost (₹) (2)	Cost allocation base (3)	Cost driver rate (4) = [(2) ÷ (3)]
Ordering	7,80,000	1,560 purchase orders	₹ 500 per purchase order
Delivery	12,60,000	3,150 deliveries	₹ 400 per delivery
Shelf-stocking	8,64,000	8,640 hours	₹ 100 per stocking hour
Customer support	15,36,000	15,36,000 items sold	₹ 1 per item sold

(i) Statement of Operating income and Operating income as a percentage of revenues for each product line
(When support costs are allocated to product lines on the basis of cost of goods sold of each product)

	Soft Drinks (₹)	Fresh Produce (₹)	Packaged Foods (₹)	Total (₹)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost of Goods sold (COGS): (B)	30,00,000	75,00,000	45,00,000	1,50,00,000
Support cost (30% of COGS): (C) (Refer working notes)	9,00,000	22,50,000	13,50,000	45,00,000

Total cost: (D) = {(B) + (C)}	39,00,000	97,50,000	58,50,000	1,95,00,000
Operating income: (E) = {(A)-(D)}	67,500	7,53,000	1,99,500	10,20,000
Operating income as a percentage of revenues: (F)= {(E)/(A) × 100}	1.70%	7.17%	3.30%	4.97%

(ii) Statement of Operating income and Operating income as a percentage of revenues for each product line
(When support costs are allocated to product lines using an activity -based costing system)

	Soft drinks (₹)	Fresh Produce (₹)	Packaged Food(₹)	Total (₹)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost & Goods sold	30,00,000	75,00,000	45,00,000	1,50,00,000
Bottle return costs	60,000	0	0	60,000
Ordering cost* (360:840:360)	1,80,000	4,20,000	1,80,000	7,80,000
Delivery cost* (300:2,190:660)	1,20,000	8,76,000	2,64,000	12,60,000
Shelf stocking cost* (540:5,400:2,700)	54,000	5,40,000	2,70,000	8,64,000
Customer Support cost* (1,26,000:11,04,000:3,06,000)	1,26,000	11,04,000	3,06,000	15,36,000
Total cost: (B)	35,40,000	1,04,40,000	55,20,000	1,95,00,000
Operating income: (C) = {(A)-(B)}	4,27,500	63,000	5,29,500	10,20,000
Operating income as a % of revenues: (D) = {(C)/(A) × 100}	10.78%	0.60%	8.75%	4.97%

Q.11 ABC v/s Absorption | RTP Nov 22

The profit margin of BABY Hairclips Company were over 20% of sales producing BROWN and BLACK hairclips. During the last year, GREEN hairclips had been introduced at 10% premium in selling price after the introduction of YELLOW hairclips earlier five years back at 10/3% premium. However, the manager of the company is disheartened with the sales figure for the current financial year as follows:

During the last year, GREEN hairclips had been introduced at 10% premium in selling price after the introduction of YELLOW hairclips earlier five years back at 10/3% premium. However, the manager of the company is disheartened with the sales figure for the current financial year as follows:

Traditional Income Statement

	Brown	Black	Yellow	Green	Total
Sales	1,50,00,000	1,20,00,000	27,90,000	3,30,000	3,01,20,000
Material Costs	50,00,000	40,00,000	9,36,000	1,10,000	1,00,46,000
Direct Labour	20,00,000	16,00,000	3,60,000	40,000	40,00,000
Overhead (3 times of direct labour)	60,00,000	48,00,000	10,80,000	1,20,000	1,20,00,000
Total Operating Income	20,00,000	16,00,000	4,14,000	60,000	40,74,000
Return on Sales (in %)	13.3%	13.3%	14.8%	18.2%	13.5%

It is a known fact that customers are ready to pay premium amount for YELLOW and GREEN hairclips for their attractiveness; and the percentage returns are also high on new products.

At present, all of the Plant's indirect expenses are allocated to the products at 3 times of the direct labour expenses. However, the manager is interested in allocating indirect expenses on the basis of activity cost to reveal real earner.

He provides support expenses category-wise as follows:

At present, all of the Plant's indirect expenses are allocated to the products at 3 times of the direct labour expenses. However, the manager is interested in allocating indirect expenses on the basis of activity cost to reveal real earner.

He provides support expenses category-wise as follows:

Support Expenses	(₹)
Indirect Labour	40,00,000
Labour Incentives	32,00,000
Computer Systems	20,00,000
Machinery depreciation	16,00,000
Machine maintenance	8,00,000
Energy for machinery	4,00,000
Total	1,20,00,000

He provides following additional information for accomplishment of his interest: Incentives to be allocated @ 40% of labour expenses (both direct and indirect).

Indirect labours are involved mainly in three activities. About half of indirect labour is involved in handling production runs. Another 40% is required just for the physical changeover from one color hairclip to another because YELLOW hairclips require substantial labour for preparing the machine as compared to other colour hairclips. Remaining 10% of the time is spend for maintaining records of the products in four parts.

Another amount spent on computer system of ₹ 20,00,000 is for maintenance of documents relating to production runs and record keeping of the four products. In aggregate, approx.. 80% of the amount expend is involved in the production run activity and approx.. 20% is used to keep records of the products in four parts.

Other overhead expenses i.e. machinery depreciation, machine maintenance and energy for machinery are incurred to supply machine capacity to produce all the hairclips (practical capability of 20,000 hours).

Activity Cost Drivers:

Particulars	Brown	Black	Yellow	Green	Total
Sales Volume (units)	1,00,000	80,000	18,000	2,000	2,00,000
Selling Price (₹)	150	150	155	165	
Material cost (₹)	50	50	52	55	
Machine hours per unit (Hrs)	0.10	0.10	0.10	0.10	20,000
Production runs	100	100	76	24	300
Setup time per run (Hrs)	4	1	6	4	

You are required to –

(i) CALCULATE operating income and operating income as per percentage of sales using activity-based costing system.

(ii) STATE the reasons for different operating income under traditional income system and activity-based costing system.

Ans

(i) Calculation of operating income using Activity Based Costing

Activity	Overhead cost	Allocation	Overhead cost	Cost-driver level	Cost driver rate
	(₹)		(₹)		(₹)
Indirect labour + 40% for incentives	56,00,000	50%	28,00,000	300 Production runs	9,333.33
		40%	22,40,000	1052* Setup hours	2,129.28
		10%	5,60,000	4 Number of parts	1,40,000
Computer Systems	20,00,000	80%	16,00,000	300 Production runs	5,333.33
		20%	4,00,000	4 Number of parts	1,00,000
Machinery depreciation	16,00,000	100%	16,00,000	20,000 Machine hours	80
Machine Maintenance	8,00,000	100%	8,00,000	20,000 Machine hours	40
Energy for Machinery	4,00,000	100%	4,00,000	20,000 Machine hours	20

* (100 x 4) + (100 x 1) + (76 x 6) + (24 x 4)
= (400 + 100 + 456 + 96)
= 1052 setup hours

Activity Based Costing

	Brown	Black	Red	Green	Total
Quantity (units)	1,00,000	80,000	18,000	2,000	2,00,000
	(₹)	**(₹)**	**(₹)**	**(₹)**	**(₹)**
Sales	1,50,00,000	1,20,00,000	27,90,000	3,30,000	3,01,20,000
Less: Material Costs	50,00,000	40,00,000	9,36,000	1,10,000	1,00,46,000
Less: Direct labour	20,00,000	16,00,000	3,60,000	40,000	40,00,000
Less: 40% incentives on direct labour	8,00,000	6,40,000	1,44,000	16,000	16,00,000
(A)	**72,00,000**	**57,60,000**	**13,50,000**	**1,64,000**	**1,44,74,000**
Overheads					
Indirect labour + incentives					
- 50% based on Production runs	9,33,333 (9,333.33 x 100)	9,33,333 (9,333.33 x 100)	7,09,334 (9,333.33 x 76)	2,24,000 (9,333.33 x 24)	28,00,000
- 40% based On Setp hours	8,51,711 (2,129.28 x 400)	2,12,928 (2,129.28 x 100)	9,70,951 (2,129.28 x456)	2,04,410 (2,129.28 x 96)	22,40,000
- 10% based on number of parts	1,40,000 (1,40,000 x 1)	1,40,000	1,40,000	1,40,000	5,60,000
Computer Systems					
- 80% based on Production runs	5,33,333 (5,333.33 x 100)	5,33,333 (5,333.33 x 100)	4,05,334 (5,333.33 x76)	1,28,000 (5,333.33 x 24)	16,00,000
- 20% based on number of parts	1,00,000 (1,00,000 x 1)	1,00,000	1,00,000	1,00,000	4,00,000
Machinery depreciation	8,00,000 (80 x 0.1 x 1,00,000)	6,40,000 (80 x 0.1 x 80,000)	1,44,000 (80x0.1x18,000)	16,000 (80 x 0.1 x 2,000)	16,00,000
Machine Maintenance	4,00,000 (40 x 0.1 x 1,00,000)	3,20,000 (40 x 0.1 x 80,000)	72,000 (40x0.1x18,000)	8,000 (40 x 0.1 x 2,000)	8,00,000
Energy for Machinery	2,00,000 (20x0.1x1,00,000)	1,60,000 (20x0.1x80,000)	36,000 (20x0.1x18,000)	4,000 (20x0.1x2,000)	4,00,000
Total Overheads (B)	**39,58,377**	**30,39,594**	**25,77,619**	**8,24,410**	**1,04,00,000**
Operating Income (A-B)	**32,41,623**	**27,20,406**	**(12,27,619)**	**(6,60,410)**	**40,74,000**

Return on Sales (%)	**21.61**	**22.67**	**(44.00)**	**(200.12)**	**13.53**

(ii) The difference in the operating income under the two systems is due to the differences in the overheads borne by each of the products. The Activity Based Costs appear to be more accurate.

Q.12 ABC v/s Absorption | MTP Nov 18(2)

Woolmark Ltd. manufactures three types of products namely P, Q and R. The data relating to a period are as under:

Particulars	**P**	**Q**	**R**
Machine hours per unit	10	18	14
Direct Labour hours per unit @ Rs. 20	4	12	8
Direct Material per unit (Rs.)	90	80	120
Production (units)	3,000	5,000	20,000

Currently the company uses traditional costing method and absorbs all production overheads on the basis of machine hours. The machine hour rate of overheads is Rs. 6 per hour.
The company proposes to use activity based costing system and the activity analysis is as under:

Particulars	**P**	**Q**	**R**
Batch size (units)	150	500	1,000
Number of purchase orders per batch	3	10	8
Number of inspections per batch	5	4	3

The total production overheads are analysed as under:

Machine set up costs	20%
Machine operation costs	30%
Inspection costs	40%
Material procurement related costs	10%

Required:

(i) CALCULATE the cost per unit of each product using traditional method of absorbing all production overheads on the basis of machine hours.

(ii) CALCULATE the cost per unit of each product using activity based costing principles.

Ans (i) Statement Showing "Cost per unit - Traditional Method"

Particulars of Costs	**P (Rs.)**	**Q (Rs.)**	**R (Rs.)**
Direct Materials	90	80	120
Direct Labour [(4, 12, 8 hours) × Rs.20]	80	240	160
Production Overheads [(10, 18, 14 hours) × Rs.6]	60	108	84
Cost per unit	230	428	364

(ii) Statement Showing "Cost per unit - Activity Based Costing"

Products	P	Q	R
Production (units)	3,000	5,000	20,000
	(Rs.)	(Rs.)	(Rs.)
Direct Materials (90, 80, 120)	2,70,000	4,00,000	24,00,000
Direct Labour (80, 240, 160)	2,40,000	12,00,000	32,00,000
Machine Related Costs @ Rs.1.80 *per hour* (30,000, 90,000, 2,80,000)	54,000	1,62,000	5,04,000
Setup Costs @ Rs.9,600 per setup (20, 10, 20)	1,92,000	96,000	1,92,000
Inspection Costs @ Rs.4,800 *per inspection* (100, 40, 60)	4,80,000	1,92,000	2,88,000
Purchase Related Costs @ Rs.750 *per purchase* (60, 100, 160)	45,000	75,000	1,20,000
Total Costs	12,81,000	21,25,000	67,04,000
Cost per unit(Total Cost x Units)	427.00	425.00	335.20

Workings

Number of Batches, Purchase Orders, and Inspections-

	Particulars	P	Q	R	Total
A.	Production (units)	3,000	5,000	20,000	
B.	Batch Size (units)	150	500	1,000	
C.	Number of Batches [A x B]	20	10	20	50
D.	Number of Purchase Order per batch	3	10	8	
E.	Total Purchase Orders [C × D]	60	100	160	320
F.	Number of Inspections per batch	5	4	3	
G.	Total Inspections [C × F]	100	40	60	200

Total Machine Hours-

	Particulars	P	Q	R
A.	Machine Hours per unit	10	18	14
B.	Production (units)	3,000	5,000	20,000
C.	Total Machine Hours [A × B]	30,000	90,000	2,80,000

Total Machine Hours = 4,00,000

Total Production Overheads-

= 4,00,000 hrs. × Rs. 6

= Rs. 24,00,000

Cost Driver Rates-

Cost Pool	%	Overheads (Rs.)	Cost Driver (Units)	Cost Driver Rate (Rs.)
Setup	20%	4,80,000	50	9,600 per Setup
Inspection	40%	9,60,000	200	4,800 per Inspection
Purchases	10%	2,40,000	320	750 per Purchase
Machine Hours	30%	7,20,000	4,00,000	1.80 per Machine Hour

Q.13 ABC v/s Absorption | MTP Nov 19

Asian Mfg. Co. has decided to increase the size of the store. It wants the information about the probability of the individual product lines : Lemon, Grapes and Papaya. It provides the following data for the 2018 for each product line:

Particulars	Lemon	Grapes	Papaya
Revenues (Rs.)	79,350	2,10,060	1,20,990
Cost of goods sold (Rs.)	60,000	1,50,000	90,000
Cost of bottles returned (Rs.)	1,200	0	0
Number of purchase orders placed	36	84	36
Number of deliveries received	30	219	66
Hours of shelf stocking time	54	540	270
Items sold	12,600	1,10,400	30,600

Asian Mfg. Co. also provides the following information for the year 2018:

Activity	Description of Activity	Total Costs (Rs.)	Cost Allocation Basis
Bottle returns	Returning of empty bottles to the store	1,200	Direct tracing to product line
Ordering	Placing of orders of purchases	15,600	156 purchase orders
Delivery	Physical delivery and the receipts of merchandise	25,200	315 deliveries
Self- stocking	Stocking of merchandise on store shelves and ongoing restocking	17,280	864 hours of time
Customer support	Assistance provided to customers including bagging	30,720	1,53,600 items sold

Required

(i) Asian Mfg. Co. currently allocates store support costs (all costs other than the cost of goods sold) to the product line on the basis of the cost of goods sold of each product line. CALCULATE the operating income and operating income as the percentage of revenue of each product line.

(ii) If Asian Mfg. Co. allocates store support costs (all costs other than the cost of goods sold) to the product lines on the basis of ABC system, CALCULATE the operating income and operating income as the percentage of revenue of each product line.

(iii) SHOW a comparison statement.

Ans (i) Absorption Costing System

Operating Income-

Particulars	Lemon	Grapes	Papaya	Total
Revenue	79,350	2,10,060	1,20,990	4,10,400
Less: Cost of Goods Sold	60,000	1,50,000	90,000	3,00,000
Less: Store Support Cost	18,000	45,000	27,000	90,000
Operating Income	1,350	15,060	3,990	20,400
Operating Income (%)	1.70	7.17	3.30	4.97

(ii) ABC System

Overhead Allocation Rate-

Activity	Total Costs (Rs.)	Quantity of Cost Allocation Base	Overhead Allocation Rate (Rs.)
Ordering	15,600	156 Purchase Orders	100.00
Delivery	25,200	315 Delivering Orders	80.00
Shelf Stocking	17,280	864 Self Stocking Hours	20.00
Customer Support	30,720	1,53,600 Items Sold	0.20

Store Support Cost-

Particulars	Cost Driver	Lemon	Grapes	Papaya	Total
Bottle Returns	Direct	1,200	0	0	1,200
Ordering	Purchase	3,600	8,400	3,600	15,600
Delivery	Deliveries	2,400	17,520	5,280	25,200
Self -Stocking	Hours of time	1,080	10,800	5,400	17,280
Customer Support	Items Sold	2,520	22,080	6,120	30,720
Grand Total		10,800	58,800	20,400	90,000

Operating Income-

	Lemon	Grapes	Papaya	Total
Revenue	79,350	2,10,060	1,20,990	410,400
Less: Cost of Goods Sold	60,000	1,50,000	90,000	300,000
Less: Store Support Cost	10,800	58,800	20,400	90,000
Operating Income	8,550	1,260	10,590	20,400
Operating Income (%)	10.78	0.60	8.75	4.97

(iii) Comparison

Particula	Lemon	Grapes	Papaya	Total
Under Traditional Costing System	1.70%	7.17%	3.30%	4.97%
Under ABC System	10.78%	0.60%	8.75%	4.97%

Q.14 ABC v/s Absorption | MTP Nov 20

BABYSOFT is a global brand created by Bio-organic Ltd. The company manufactures three range of beauty soaps i.e. BABYSOFT- Gold, BABYSOFT- Pearl, and BABYSOFT- Diamond. The budgeted costs and production for the month of December, 2019 are as follows:

	BABYSOFT- Gold		BABYSOFT- Pearl		BABYSOFT- Diamond	
Production of soaps (Units)	4,000		3,000		2,000	
Resources per Unit:	**Qty**	**Rate**	**Qty**	**Rate**	**Qty**	**Rate**
- Essential Oils	60 ml	₹ 200 / 100 ml	55 ml	₹ 300 / 100 ml	65 ml	₹ 300 / 100 ml
- Cocoa Butter	20 g	₹ 200 / 100 g	20 g	₹ 200 / 100 g	20 g	₹ 200 / 100 g
- Filtered Water	30 ml	₹ 15 / 100 ml	30 ml	₹ 15 / 100 ml	30 ml	₹ 15 / 100 ml
- Chemicals	10 g	₹ 30 / 100 g	12 g	₹ 50 / 100 g	15 g	₹ 60 / 100 g
- Direct Labour	30 minutes	₹ 10 / hour	40 minutes	₹ 10 / hour	60 minutes	₹ 10 / hour

Bio-organic Ltd. followed an Absorption Costing System and absorbed its production overheads, to its products using direct labour hour rate, which were budgeted at ₹ 1,98,000.

Now, Bio-organic Ltd. is considering adopting an Activity Based Costing system. For this, additional information regarding budgeted overheads and their cost drivers is provided below:

Particulars	(₹)	Cost drivers
Forklifting cost	58,000	Weight of material lifted
Supervising cost	60,000	Direct labour hours
Utilities	80,000	Number of Machine operations

The number of machine operators per unit of production are 5, 5, and 6 for BABYSOFT - Gold, BABYSOFT- Pearl, and BABYSOFT- Diamond respectively.

(Consider (i) Mass of 1 litre of Essential Oils and Filtered Water equivalent to 0.8 kg and 1 kg respectively (ii) Mass of output produced is equivalent to the mass of input materials taken together.)

You are requested to:

(i) PREPARE a statement showing the unit costs and total costs of each product using the absorption costing method.

(ii) PREPARE a statement showing the product costs of each product using the ABC approach. (iii) STATE what are the reasons for the different product costs under the two approaches?

Ans

(i) Traditional Absorption Costing

	BABY SO - Gold	BABYSOFT- Pearl	BABYSOFT- Diamond	Total
(a) Produciton of soaps (units)	4,000	3,000	2,000	9,000
(b) Direct labour (minutes)	30	40	60	-
(c) Direct labour hours (cxb)/60 minutes	2,000	2,000	2,000	6,000

Overhead rate per direct labour hour:

= Budgeted overheads ÷ Budgeted labour hours

= 1,98,000 ÷ 6,000 hours

= 33 per direct labour hour

Unit Costs:

	BABYSOFT- Gold (₹)	BABYSOFT- Pearl (₹)	BABYSOFT- Diamond (₹)
Direct Costs:			
- Direct Labour	5.00	6.67	10.00
	$\left(\frac{10x30}{60}\right)$	$\left(\frac{10x40}{60}\right)$	$\left(\frac{10x60}{60}\right)$
- Direct Material (Refer working note1)	167.50	215.50	248.50
Production Overhead:	16.50	22.00	33.00
	$\left(\frac{33x30}{60}\right)$	$\left(\frac{33x40}{60}\right)$	$\left(\frac{33x60}{60}\right)$
Total unit costs	189.00	244.17	291.50
Number of units	4,000	3,000	2,000
Total costs	**7,56,000**	**7,32,510**	**5,83,000**

Working note-1
Calculation of Direct material cost

	BABYSOFT- Gold (₹)	BABYSOFT- Pearl (₹)	BABYSOFT- Diamond (₹)
Essential oils	120.00	165.00	195.00
	$\left(\frac{200x60}{100}\right)$	$\left(\frac{300x55}{100}\right)$	$\left(\frac{300x65}{100}\right)$
Cocoa Butter	40.00	40.00	40.00
	$\left(\frac{200x20}{100}\right)$	$\left(\frac{200x20}{100}\right)$	$\left(\frac{200x20}{100}\right)$
Filtered water	4.50	4.50	4.50
	$\left(\frac{15x30}{100}\right)$	$\left(\frac{15x30}{100}\right)$	$\left(\frac{15x30}{100}\right)$
Chemicals	3.00	6.00	9.00
	$\left(\frac{30x10}{100}\right)$	$\left(\frac{50x12}{100}\right)$	$\left(\frac{60x15}{100}\right)$
Total costs	**167.50**	**215.50**	**248.50**

(ii) Activity Based Costing

	BABYSOFT- Gold	BABYSOFT- Pearl	BABYSOFT- Diamond	Total
Quantity(units)	4,000	3,000	2,000	-
Weight per unit (grams)	108 {(60×0.8)+20+30+10}	106 {(55×0.8)+20+30+12}	117 {(65×0.8)+20+30+15}	-

Total weight(gm)	4,32,000	3,18,000	2,34,000	9,84,000
Direct labour (minutes)	30	40	60	-
Direct labour hours	2,000 $\left(\frac{4,000x30}{60}\right)$	2,000 $\left(\frac{3,000x40}{60}\right)$	2,000 $\left(\frac{2,000x60}{60}\right)$	6,000
Machine operations per unit	5	5	6	-
Total Operations	20,000	15,000	12,000	47,000

Forklifting rate per gram = 58,000 ÷ 9,84,000 grams
= 0.06 per gram

Supervising rate per direct labour hour = 60,000 ÷ 6,000 hours = 10 per labour hour
Utilities rate per machine operations = 80,000 ÷ 47,000 machine operations
= 1.70 per machine operations

Unit Costs under ABC:

	BABYSOFT- Gold (₹)	BABYSOFT- Pearl (₹)	BABYSOFT- Diamond (₹)
Direct Costs: - Direct Labour - Direct material	5.00 167.50	6.67 215.50	10.00 248.50
Production Overheads: Forklifting cost	6.48 (0.06x108)	6.36 (0.06 × 106)	7.02 (0.06 × 117)
Supervising cost	5.00 $\left(\frac{10x30}{60}\right)$	6.67 $\left(\frac{10x40}{60}\right)$	10.00 $\left(\frac{10x60}{60}\right)$
Utilities	8.50	8.50	10.20
	(1.70 x5)	(1.70 x 5)	(1.70 x 6)
Total unit costs	192.48	243.70	285.72
Number of units	4,000	3,000	2,000
Total costs	**7,69,920**	**7,31,100**	**5,71,440**

(iii) Comments: The difference in the total costs under the two systems is due to the differences in the overheads borne by each of the products. The Activity Based Costs appear to be more precise.

Q.15 ABC v/s Absorption | MTP May 21(1)

ABY Ltd. manufactures four products, namely A, B, C and D using the same plant and proce ss.
The following information relates to production period December, 2020:

Product	A	B	C	D

Output in units	1,440	1,200	960	1,008
Cost per unit:				
Direct Materials	Rs. 84	Rs. 90	Rs. 80	Rs. 96
Direct Labour	Rs. 20	Rs. 18	Rs. 14	Rs. 16
Machine hours per unit	4	3	2	1

The four products are similar and are usually produced in production runs of 48 units per batch and are sold in batches of 24 units. Currently, the production overheads are absorbed using machine hour rate. The production overheads incurred by the company for the period December, 2020 are as follows:

	(Rs.)
Machine department costs:	
Rent, deprecation and supervision	2,52,00
Set-up Costs	80,00
Store receiving costs	60,00
Inspection	40,00
Material handling and dispatch	10,36

During the period December, 2020, the following cost drivers are to be used for allocation of overheads cost:

Cost	Cost driver
Set-up Costs	Number of production runs
Stores receiving	(batches) Requisition raised
Inspection	Number of production runs (batches)
Material handling and dispatch	Orders executed

It is also determined that:

(i) Machine department costs should be apportioned among set-up, stores receiving and inspection activities in proportion of 4 : 3 : 2.

(ii) The number of requisitions raised on stores is 50 for each product. The total number of material handling and dispatch orders executed during the period are 192 and each order being for a batch size of 24 units of product.

Required:

(i) CALCULATE the total cost of each product, if all overhead costs are absorbed on machine - hour rate basis.

(ii) CALCULATE the total cost of each product using activity-based costing.

Ans

(i) Total Overhead = Rs. (2,52,000 + 80,000 + 60,000 + 40,000 + 10,368) = Rs. 4,42,368

Total machine hours = 1,440 x 4 + 1,200 x 3 + 960 x 2 + 1,008 x 1

= 5,760 + 3,600 + 1,920 + 1,008 = 12,288 M. Hrs.

∴ Overhead recovery rate / M.H. = Rs. 4,42,368 = Rs. 36

Cost Statement when overheads are absorbed on machine hours rate basis

Product	A	B	C	D
Output in units	1,440	1,200	960	1,008

	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Cost per unit:				
Direct material	84	90	80	96
Direct labour	20	18	14	16
Overhead (@ Rs. 36)	144	108	72	36
	(4 x Rs.36)	(3 x Rs.36)	(2 x Rs.36)	(1x Rs.36)
Total cost per unit	248	216	166	148
Total cost	3,57,120	2,59,200	1,59,360	1,49,184

(iii) (1) Machine department costs of Rs. 2,52,000 to be apportioned to set-up cost, store receiving and inspection in 4 : 3 : 2 i.e. Rs. 1,12,000, Rs. 84,000 and Rs. 56,000

(2) respectively. One production run = 48 units. Hence, the number of production runs of different products:

$A = \frac{1,440}{24} = 60$ $B = \frac{1,200}{24} = 50$ $C = \frac{960}{24} = 40$ $D = \frac{1,008}{24} = 42$ or total 192 batches

(3) Computation of Cost driver rates

Activity	Activity Cost (Rs.)	Cost driver	Quantity	Cost driver rate
Set-up	80,000 + 1,12,000 = 1,92,000	No. of production run	96	Rs. 2,000 per production run
Store-receiving	60,000 + 84,000 = 1,44,000	Requisition raised	50 × 4 = 200	Rs. 720 per requisition
Inspection	40,000 + 56,000 = 96,000	No. of production run	96	Rs. 1,000 per production run
Material handling	10,368	Orders executed (No. of batches)	192	Rs. 54 per batch

(5) Cost statement under Activity Based Costing:

Product	A	B	C	D
Output in units	1,440	1,200	960	1,008
	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Material	1,440 x 84 = 1,20,960	1,200 x90 = 1,08,000	960 x80 =76,800	1,008x96 = 96,768
Labour	1,440 x 20 = 28,800	1,200 x 18 = 21,600	960 x14 = 13,440	1,008x16 = 16,128
	1,49,760	1,29,600	90,240	1,12,896
Overhead cost:	2,000 x 30	2,000 x 25	2,000 x 20	2,000 x 21
Set up	= 60,000	= 50,000	= 40,000	= 42,000
Store receiving	720 x 50	720 x 50	720 x 50	720 x 50
	= 36,000	= 36,000	= 36,000	= 36,000
Inspection	1,000 x 30	1,000 x 25	1,000 x 20	1,000 x 21
	= 30,000	= 25,000	= 20,000	= 21,000

Material handling	54 x 60	54 x 50	54 x 40	54 x 42
	= 3,240	= 2,700	= 2,160	= 2,268
Total overhead cost	1,29,240	1,13,700	98,160	1,01,268
Total cost	2,79,000	2,43,300	1,88,400	2,14,164
Total cost per unit (Total cost / Output)	193.75	202.75	196.25	212.46

Q.16 ABC v/s Absorption | MTP Dec 21(1)

The following budgeted information relates to B Ltd. for the year 2021:

	Products		
	X	Y	Z
Production and Sales (units)	1,00,000	80,000	60,000
	(₹)	(₹)	(₹)
Selling price per unit	45	90	70
Direct cost per unit	25	45	50
	Hours	Hours	Hours
Machine department (machine hours per unit)	3	4	5
Assembly department (direct labour hours per unit)	6	4	3

The estimated overhead expenses for the year 2021 will be as below:
Machine Department 36,80,000
Assembly Department 27,50,000
Overhead expenses are apportioned to the products on the following basis:
Machine Department On the basis of machine hours
Assembly Department On the basis of labour hours
After a detailed study of the activities the following cost pools and their respective cost drivers are found:

Cost Pool	Amount (₹)	Cost Driver	Quantity
Machining services	32,20,000	Machine hours	9,20,000 hours
Assembly services	22,00,000	Direct labour hours	11,00,000 hours
Set-up costs	4,50,000	Machine set-ups	9,000 set-ups
Order processing	3,60,000	Customer orders	7,200 orders
Purchasing	2,00,000	Purchase orders	800 orders

As per an estimate the activities will be used by the three products:

	Products		
	X	Y	Z
Machine set-ups	4,500	3,000	1,500

Customer orders	2,200	2,400	2,600
Purchase orders	300	350	150

You are required to PREPARE a product-wise profit statement using:
(i) Absorption costing method;
(ii) Activity-based method.

Ans (i) Profit Statement using Absorption costing method:

	Particulars	Product			Total
		X	Y	Z	
A.	Sales Quantity	1,00,000	80,000	60,000	2,40,000
B.	Selling price per unit (₹)	45	90	70	
C.	Sales Value (₹) [A×B]	**45,00,000**	**72,00,000**	**42,00,000**	**1,59,00,000**
D.	Direct cost per unit (₹)	25	45	50	
E.	Direct Cost (₹) [A×D]	25,00,000	36,00,000	30,00,000	91,00,000
F.	Overheads:				
(i)	Machine department (₹) (Working note-1)	12,00,000	12,80,000	12,00,000	36,80,000
(ii)	Assembly department (₹) (Working note-1)	15,00,000	8,00,000	4,50,000	27,50,000
G.	Total Cost (₹) [E+F]	52,00,000	56,80,000	**46,50,000**	**1,55,30,000**
H.	**Profit (C-G)**	**(7,00,000)**	**15,20,000**	**(4,50,000)**	**3,70,000**

Working Notes:
1

		Products			
		X	Y	Z	Total
A.	Production (units)	1,00,000	80,000	60,000	
B.	Machine hours per unit	3	4	5	
C.	Total Machine hours [A×B]	3,00,000	3,20,000	3,00,000	9,20,000
D.	Rate per hour (₹)	4	4	4	36,80,000 11,00,000 **27,50,000**
E.	Machine Dept. cost [C×D]	12,00,000	12,80,000	12,00,000	**36,80,000**
F.	Labour hours per unit	6	4	3	
G.	Total labour hours	6,00,000	3,20,000	1,80,000	11,00,000

	[A×F]				
H.	Rate per hour (₹)	2.5	2.5	2.5	
I	Assembly Dept. cost [G×H]	15,00,000	8,00,000	4,50,000	**27,50,000**

$$\text{Machine hour rate} = \frac{36,80,000}{9,20,000 \text{ hours}} = 4$$

$$\text{Labour hour rate} = \frac{27,50,000}{11,00,000 \text{ hours}} = 2.5$$

2. Calculation of cost driver rate

Cost Pool	Amount (₹)	Cost Driver	Quantity	Driver rate (₹)
Machining services	32,20,000	Machine hours	9,20,000 hours	3.50
Assembly services	22,00,000	Direct labour hours	11,00,000 hours	2.00
Set-up costs	4,50,000	Machine set-ups	9,000 set-ups	50.00
Order processing	3,60,000	Customer orders	7,200 orders	50.00
Purchasing	2,00,000	Purchase orders	800 orders	250.00

3. Calculation of activity-wise cost

		Products			
		X	Y	Z	Total
A.	Machining hours (Refer Working note-1)	3,00,000	3,20,000	3,00,000	9,20,000
B.	Machine hour rate (₹) (Refer Working note-2)	3.5	3.5	3.5	
C.	**Machining services cost (₹) [A×B]**	**10,50,000**	**11,20,000**	**10,50,000**	**32,20,000**
D.	Labour hours (Refer Working note-1)	6,00,000	3,20,000	1,80,000	11,00,000
E.	Labour hour rate (₹) (Refer	2	2	2	

	Working note-2)				
F.	**Assembly services cost (₹) [D×E]**	**12,00,000**	**6,40,000**	**3,60,000**	**22,00,000**
G.	Machine set-ups	4,500	3,000	1,500	9,000
H.	Rate per set-up (₹) (Refer Working note-2)	50	50	50	
I.	**Set-up cost (₹) [G×H]**	**2,25,000**	**1,50,000**	**75,000**	**4,50,000**
J.	Customer orders	2,200	2,400	2,600	7,200
K.	Rate per order (₹) (Refer Working note-2)	50	50	50	
L.	**Order processing cost (₹)[J×K]**	**1,10,000**	**1,20,000**	**1,30,000**	**3,60,000**
M.	Purchase orders	300	350	150	800
N.	Rate per order (₹) (Refer Working note-2)	250	250	250	
O.	**Purchasing cost (₹) [M×N]**	**75,000**	**87,500**	**37,500**	**2,00,000**

Q.17 ABC v/s Absorption | MTP May 22(1)

MG Ltd. manufactures three types of products namely A, B and C. The data relating to a period are as under:

Particulars	A	B	C
Machine hours per unit	10	18	14
Direct Labour hours per unit	4	12	8
Direct Material per unit (₹)	1,350	1,200	1,800
Production (units)	3,000	5,000	20,000

Currently the company uses traditional costing method and absorbs all production overheads on the basis of machine hours. The machine hour rate of overheads is ₹ 90 per hour. Direct labour hour rate is ₹ 300 per hour. The company proposes to use activity based costing system and the activity analysis is as under:

Particulars	A	B	C
Batch size (units)	150	500	1,000
Number of purchase orders per batch	3	10	8

Number of inspections per batch	5	4	3

The total production overheads are analysed as under:

Machine set up costs	20%
Machine operation costs	30%
Inspection costs	40%
Material procurement related costs	10%

Required:

(i) CALCULATE the cost per unit of each product using traditional method of absorbing all production overheads on the basis of machine hours.

(ii) CALCULATE the cost per unit of each product using activity based costing principles.

Ans. (i) Statement Showing "Cost per unit - Traditional Method"

Particulars of Costs	**A (₹)**	**B (₹)**	**C (₹)**
Direct Materials	1,350	1,200	1,800
Direct Labour [(4, 12, 8 hours) × ₹ 300]	1,200	3,600	2,400
Production Overheads [(10, 18, 14 hours) × ₹ 90]	900	1,620	1,260
Cost per unit	**3,450**	**6,420**	**5,460**

(ii) Statement Showing "Cost per unit - Activity Based Costing"

Products	**A**	**B**	**C**
Production (units)	**3,000**	**5,000**	**20,000**
	(₹)	**(₹)**	**(₹)**
Direct Materials (1350, 1200, 1800)	40,50,000	60,00,000	3,60,00,000
Direct Labour (1200, 3600, 2400)	36,00,000	1,80,00,000	4,80,00,000
Machine Related Costs @ ₹ 27 per hour (30,000, 90,000, 2,80,000)	8,10,000	24,30,000	75,60,000
Setup Costs @ ₹ 1,44,000 per setup (20, 10, 20)	28,80,000	14,40,000	28,80,000
Inspection Costs @ ₹ 72,000 per inspection (100, 40, 60)	72,00,000	28,80,000	43,20,000
Purchase Related Costs @ ₹ 11,250 per purchase (60, 100, 160)	6,75,000	11,25,000	18,00,000
Total Costs	**1,92,15,00**	**3,18,75,00**	**10,05,60,00**
Cost per unit (Total Cost × Units)	**6,405**	**6,375**	**5,028**

Working Notes:

1. Number of Batches, Purchase Orders, and Inspections-

	Particulars	**A**	**B**	**C**	**Total**

A.	Production (units)	3,000	5,000	20,000	
B.	Batch Size (units)	150	500	1,000	
C.	Number of Batches [A. ÷ B.]	20	10	20	50
D.	Number of Purchase Order per batch	3	10	8	
E.	Total Purchase Orders [C. × D.]	60	100	160	320
F.	Number of Inspections per batch	5	4	3	
G.	Total Inspections [C. × F.]	100	40	60	200

2. Total Machine Hours-

	Particulars	A	B	C
A.	Machine Hours per unit	10	18	14
B.	Production (units)	3,000	5,000	20,000
C.	Total Machine Hours [A. x B.]	30,000	90,000	2,80,000

Total Machine Hours = 4,00,000
Total Production Overheads-
= 4,00,000 hrs. x 90 = 3,60,00,000

3. Cost Driver Rates-

Cost Pool	%	Overheads (₹)	Cost Driver Basis	Cost Driver (Units)	Cost Driver Rate (₹)
Setup	20%	72,00,000	Number of batches	50	1,44,000 per Setup
Inspection	40%	1,44,00,000	Number of inspections	200	72,000 per Inspection
Purchases	10%	36,00,000	Number of purchases	320	11,250 per Purchase
Machine Operation	30%	1,08,00,000	Machine Hours	4,00,000	27 per Machine Hour

Q.18 ABC v/s Absorption | MTP Nov 22(1)

SMD Limited manufactures four products namely A, B, C and D using the same production and process facilities. The company has been following conventional method of costing and wishes to shift to activity-based costing system.
The data pertaining to four products are:

Product	Units produced	Material per unit (₹)	Labour hours per unit	Machine hours per unit
A	1,500	140	1	3
B	2,500	90	3	2

C	10,000	180	2	6
D	6,000	150	1.5	4

The following activity volumes are associated to the production process for the relevant period –

	Number of Inspections	Number of Material Movements	Number of set-ups
A	200	15	100
B	250	20	125
C	900	100	600
D	650	85	400

The cost data also states that:

- Direct Labour cost: ₹ 60 per hour
- Machine hour rate: ₹ 280 per hour
- Production overheads are absorbed on machine hour basis.
- For activity-based costing, a thorough, analysis of the production process revealed that: Costs relating to set-ups and inspection bears the equal percentage while costs relating to machinery accounts for 20% of the production overhead.

Costs relating to material handling stands at 50% of costs relating to machinery. You are required to:

(i) Prepare a statement showing the unit costs and total costs of each product using the absorption costing method.

(ii) Prepare a statement showing the unit costs and total costs of each product using activity - based costing system.

Ans (i) Cost per unit - Conventional Costing: Absorption rate method

Particulars	A (₹)	B (₹)	C (₹)	D (₹)
Material	140	90	180	150
Labour @ ₹ 60 per labour hour	60	180	120	90
Overheads @ ₹ 280 per machine hour	840	560	1680	1120
Cost per unit (in ₹)	**1,040**	**830**	**1,980**	**1,360**
No of units	1,500	2,500	10,000	6,000
Total cost (₹)	**15,60,00**	**20,75,00**	**1,98,00,00**	**81,60,00**

(ii) Statement of apportionment of overheads: Amount (₹)

	Cost Driver	A	B	C	D
Setups	No Setups	7,48,000 (100 x 7,480)	9,35,000 (125x7,480)	44,88,000 (600 x 7,480)	29,92,000 (400 x7,480)
Machinery	Machine hours	2,52,000 (4,500 x 56)	2,80,000 (5,000 x 56)	33,60,000 (60,000 x 56)	13,44,000 (24,000 x 56)
Material Handling	No. Movements of material	1,78,500 (15 x 11,900)	2,38,000 (20 x 11,900)	11,90,000 (100 x 11,900)	10,11,500 (85 x 11,900)
Inspection	No. Inspections	9,16,300 (200x4,581.50	11,45,375 (250x4,581.50	41,23,350 (900x4,581.50	29,77,975 (650x4,581.50)

Total		**20,94,800**	**25,98,375**	**1,31,61,350**	**83,25,475**
Output Units		1,500	2,500	10,000	6,000
Overhead/ unit		1,396.53	1,039.35	1,316.14	1,387.58

Statement showing Cost per unit and Total cost using Activity Based Costing

	A (₹)	B (₹)	C (₹)	D (₹)
Material	140.00	90.00	180.00	150.00
Labour	60.00	180.00	120.00	90.00
Total	**200.00**	**270.00**	**300.00**	**240.00**
No. of units	1,500	2,500	10,000	6,000
Total cost (excluding overheads)	3,00,000	6,75,000	30,00,000	14,40,000
Add: Overheads (as calculated)	20,94,800	25,98,375	1,31,61,350	83,25,475
Total cost	**23,94,80**	**32,73,37**	**1,61,61,35**	**97,65,47**
Cost per unit	**1,596.5**	**1,309.3**	**1,616.1**	**1,627.5**

Working Notes:

1. Calculation of Total machine hours

Particular				
(a) Machine hours per unit				4
(b) Production(units)	1,500	2,500	10,000	6,000
(c) Total machine hours (a) x(b)	4,500	5,000	60,000	24,000

Total Machine hours = 93,500
Total production overheads= 93,500 x 280 = 2,61,80,000

2. Calculation of cost driver rate

Cost pool	Amount of cost (₹)	Cost Driver (basis)	Cost Driver (units)	Cost Driver Rate (₹)
Setups	91,63,000	No. of Setups	**1,225**	7,480 per set up
Machinery	52,36,000	Machine Hrs.	93,500	56 per machine hour
Material Handlings	26,18,000	No. of Material Movements	220	11,900 per material movement
Inspection	91,63,000	No. of Inspections	2,000	4,581.50 per inspection
	2,61,80,00			

Q.19 ABC v/s Absorption | MTP May 23(1)

Bopanna Ltd. produces three products Zm, Rm and Pm using the same plant and resources. It has given the following information for the year ended on 31st March 2022:

	Zm	Rm	Pm
Production Quantity (units)	6000	7200	9840
Cost per unit:			

Direct Material (₹)	450	420	880
Direct Labour (₹)	80	150	200

Budgeted direct labour rate was ₹40 per hour and the production overheads, shown in table below, were absorbed to products using direct labour hour rate.
Company followed Absorption Costing Method. However, the company is now considering adopting Activity Based Costing Method.

	Budgeted Overheads (₹)	Cost Driver	Remarks
Material Procurement	2,50,000	No. of orders	No. of orders was 30 units for each product.
Set-up	1,50,000	No. of production Runs	All the three products are produced in production runs of 50 units.
Quality Control	1,00,000	No. of Inspections	Done for each production run.
Maintenance	3,00,000	Maintenance hours	Total maintenance hours were 10,000 and was allocated in the ratio of 2:1:2 between X, Y & Z.

Required:

(i) CALCULATE the total cost per unit of each product using the Absorption Costing Method
(ii) CALCULATE the total cost per unit of each product using the Activity Based Costing Method.

Ans

(i) Traditional Absorption Costing

	Z	Rm	Pm	Total
(a) Quantity (units)	6,000	7,200	9,840	23,040
(b) Direct labour per unit (₹)	8	150	200	-
(c) Direct labour hours (a × b)/₹ 40	12,000	27,000	49,200	88,200

Overhead rate per direct labour hour = Budgeted overheads / Budgeted labour hours
= (2,50,000 + 1,50,000 + 1,00,000 + 3,00,000) / 88,200 hours
= 8,00,000 / 88,200 hours
= 9 per direct labour hour(approx..)

Calculation of Cost per Unit

	Zm	Rm	Pm
Direct Costs:			
Direct Material	450	420	880
Direct Labour (₹)	80	150	200
Production Overhead: (₹)	18	33.75	45
	(80× 9/40)	(150× 9/40)	(200× 9/40)
Total cost per unit (₹)	**548**	**603.75**	**1125**

(ii) Calculation of Cost-Driver level under Activity Based Costing

	Zm	Rm	Pm	Total
Quantity (units)	6,000	7,200	9,84	-
No. of orders (to be rounded off for fraction)	200 (6,000 / 30)	240 (7,200 / 30)	32 (9,840 / 30)	768
No. of production runs	120 (6,000 / 50)	144 (7,200 / 50)	19 (9,840 / 50)	461
No. of Inspections (done for each production run)	120	144	19 7	461
Maintenance hours	4,000	2,000	4,00	10,000

Calculation of Cost-Driver rate

Activity	Budgeted Cost (₹)	Cost-driver level	Cost Driver rate (₹)
	(a)	(b)	(c) = (a) / (b)
Material procurement	2,50,000	768	325.5
Set-up	1,50,000	461	325.5
Quality control	1,00,000	461	217.0
Maintenance	3,00,000	10,000	30.0

Calculation of total cost of products using Activity Based Costing

Particulars	Product		
	Zm (₹)	Rm (₹)	Pm (₹)
Direct Material	450	420	88
Direct Labour	80	150	20
Prime Cost per unit (A)	530	570	108
Material procurement	10.85 (325.5×200/6000)	10.85 (325.5×240/7200)	10.8 (325.5×328/9840)
Set-up	6.51 (325.5×120/6000)	6.51 (325.5×144/7200)	6.5 (325.5×196.8/9840
Quality control	4.34 (217×120/6000)	4.34 (217×144/7200)	4.3 (217×196.8/9840)
Maintenance	20.0 (4000×30/6000)	8.3 (2000×30/7200)	12. (4000×30/9840)
Overhead Cost per unit	41.7	30.0	33.
Total Cost per unit (A + B)	**571.7**	**600.0**	**1113.**

Q.20 Allocate Cost & Calc. Income | PY May 19

PQR Ltd has decided to analyse the profitability of its five new customers. It buys soft drink bottles in cases at ₹ 45 per case and sells them to retail customers at a list price of ₹ 54 per case. The data pertaining to five customers are given below:

Particulars	A	B	C	D	E
Number of Cases Sold	9,360	14,200	62,000	38,000	9,800
List Selling Price (₹)	54	54	54	54	54
Actual Selling Price (₹)	54	53.40	49	50.20	48.60
Number of Purchase Orders	30	50	60	50	60
Number of Customers visits	4	6	12	4	6
Number of Deliveries	20	60	120	80	40
Kilometers travelled per delivery	40	12	10	20	60
Number of expediate Deliveries	0	0	0	0	2

Its five activities and their cost drivers are:

Activity	Cost Driver
Order taking	₹ 200 per purchase order
Customer visits	₹ 300 per each visit
Deliveries	₹ 4.00 per delivery km travelled
Product Handling	₹ 2.00 per case sold
Expedited deliveries	₹ 100 per such delivery

You are required to :

(i) Compute the customer level operating income of each of five retail customers by using the Cost Driver rates.

(ii) Examine the results to give your comments on Customer 'D' in comparison with Customer 'C' and on Customer 'E' in comparison with Customer 'A'.

Ans

Working note:

Computation of revenues (at listed price), discount, cost of goods sold and customer level operating activities costs:

Particular	Customers				
	A	B	C	D	E
Cases sold: (a)	9,360	14,200	62,000	38,000	9,800
Revenues (at listed price) (₹): (b) {(a) × ₹ 54)}	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
Discount (₹): (c) {(a) × Discount per case}	-	8,520 (14,200 cases ×₹ 0.6)	3,10,000 (62,000 cases ×₹ 5)	1,44,400 (38,000 cases × ₹ 3.80)	52,920 (9,800 cases ×₹ 5.40)
Cost of goods sold (₹): (d) {(a) × ₹ 45}	4,21,200	6,39,000	27,90,000	17,10,000	4,41000
Customer level operating activities costs					
Order taking costs (₹): (No. of purchase × ₹ 200)	6,000	10,000	12,000	10,000	12,000

Customer visits costs (₹) (No. of customer visits × ₹ 300)	1,200	1,800	3,600	1,200	1,800
Delivery vehicles travel costs (₹) (Kms travelled by delivery vehicles × ₹ 4 per km.)	3,200	2,880	4,800	6,400	9,600
Product handling costs (₹) {(a) ×₹ 2}	18,720	28,400	1,24,000	76,000	19,600
Cost of expediting deliveries (₹) {No. of expedited deliveries × ₹ 100}	-	-	-	-	200
Total cost of customer level operating activities (₹)	29,120	43,080	1,44,400	93,600	43,200

(i) Computation of Customer level operating income

Particular	Customers				
	A(₹)	B (₹)	C (₹)	D (₹)	E (₹)
Revenues (At list price) (Refer to working note)	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
Less: Discount (Refer to working note)	-	8,520	3,10,000	1,44,400	52,920
Revenue (At actual price)	5,05,440	7,58,280	30,38,000	19,07,600	4,76,280
Less: Cost of goods sold (Refer to working note)	4,21,200	6,39,000	27,90,000	17,10,000	4,41000
Gross margin	84,240	1,19280	2,48,000	1,97,600	35,280
Less: Customer level operating activities costs (Refer to working note)	29,120	43,080	1,44,400	93,600	43,200
Customer level operating income	55,120	76,200	1,03,600	1,04,000	(7,920)

(iii) Customer D in comparison with Customer C: Operating income of Customer D is more than of Customer C, despite having only 61.29% (38,000 units) of the units volume sold in comparison to Customer C (62,000 units). Customer C receives a higher percent of discount i.e. 9.26% (₹ 5) while Customer D receive a discount of 7.04% (₹ 3.80). Though the gross margin of customer C (₹ 2,48,000) is more than Customer D (₹ 1,97,600) but total cost of customer level operating activities of C (₹ 1,44,400) is more in comparison to Customer D (₹ 93,600). As a result, operating income is more in case of Customer D.

Customer E in comparison with Customer A: Customer E is not profitable while Customer A is profitable. Customer E receives a discount of 10% (₹ 5.4) while Customer A doesn't receive any discount. Sales Volume of Customer A and E is almost same. However, total cost of customer level operating activities of E is far more (₹ 43,200) in comparison to Customer A (₹ 29,120). This has resulted in occurrence of loss in case of Customer E.

Q.21 Allocate Cost & Calc. Income | PY Jul 21

PQR Ltd. is engaged in the production of three products P, Q and R. The company calculates Activity Cost Rates on the basis of Cost Driver capacity which is provided as below:

Activity	Cost Driver	Cost Driver Capacity	Cost (₹)
Direct Labour hours	Labour hours	30,000 Labour hours	3,00,000
Production runs	No. of Production runs	600 Production runs	1,80,000
Quality Inspections	No. of Inspection	8000 Inspections	2,40,000

The consumption of activities during the period is as under:

Activity / Products	P	Q	R
Direct Labour hours	10,000	8,000	6,000
Production runs	200	180	160
Quality Inspection	3,000	2,500	1,500

You are required to:

(i) Compute the costs allocated to each Product from each Activity.

(ii) Calculate the cost of unused capacity for each Activity.

(iii) A potential customer has approached the company for supply of 12,000 units of a new product. 'S' to be delivered in lots of 1500 units per quarter. This will involve an initial design cost of ₹ 30,000 and per quarter production will involve the following:

Direct Material	₹ 18,000
Direct Labour hours	1,500 hours
No. of Production runs	15
No. of Quality Inspection	250

Prepare cost sheet segregating Direct and Indirect costs and compute the Sales value per quarter of product 'S' using ABC system considering a markup of 20% on cost.

Ans

(i) Statement of cost allocation to each product from each activity

	Product			
	P (₹)	Q (₹)	R (₹)	Total (₹)
Direct Labour hours (Refer to working note)	1,00,000 (10,000 Labour hours × ₹10)	80,000 (8,000 Labour hours × ₹10)	60,000 (6,000 Labour hours × ₹10)	2,40,000
Production runs (Refer to working note)	60,000 (200 Production runs × ₹ 300)	54,000 (180 Production runs × ₹ 300)	48,000 (160 Production runs × ₹ 300)	1,62,000
Quality Inspections (Refer to working note)	90,000 (3,000 Inspections × ₹30)	75,000 (2,500 Inspections ×₹30)	45,000 (1,500 Inspections ×₹30)	2,10,000

Working note:

Rate per unit of cost driver

Direct Labour hours	(₹3,00,000/30,000 Labour hours)	₹ 10 per Labour hour
Production runs	(₹1,80,000/600 Production runs)	₹ 300 per Production run
Quality Inspection	(₹ 2,40,000/8,000 Inspections)	₹ 30 per Inspection

(ii) Computation of cost of unused capacity for each activity

Particulars	(₹)
Direct Labour hours [(₹ 3,00,000 – ₹ 2,40,000) or (6,000 x ₹ 10)]	60,000
Production runs [(₹ 1,80,000 – ₹ 1,62,000) or (60 x ₹ 300)]	18,000
Quality Inspection [(₹ 2,40,000 – ₹ 2,10,000) or (1,000 x ₹ 30)]	30,000
Total cost of unused capacity	1,08,000

(iii) Cost sheet and Computation of Sales value per quarter of product 'S' using ABC System

Particulars	(₹)
1500 units of product 'S' to be delivered per quarter	
Initial design cost per quarter (₹ 30,000 / 8 quarters)	3,750
Direct Material Cost	18,000
Direct Labour Cost (1,500 Labour hours x ₹ 10)	15,000
Direct Costs (A)	36,750
Set up Cost (15 Production runs × ₹ 300)	4,500
Inspection Cost (250 Inspections × ₹ 30)	7,500
Indirect Costs (B)	12,000
Total Cost (A + B)	48,750
Add: Mark-up (20% on cost)	9,750
Sale Value	58,500
Selling Price per unit 'S' (₹ 58,500/1500 units)	39

Q.22 Allocate Cost & Calc. Income | PY Nov 22

XYZ Ltd. is engaged in manufacturing two products- Express Coffee and Instant Coffee. It furnishes the following data for a year:

Product	Actual Output (units)	Total Machine hours	Total Number of Purchase orders	TotalNumber 3of set ups
Express Coffee	5,000	20,000	160	20
Instant Coffee	60,000	1,20,000	384	44

The annual overheads are as under:

Particulars	₹
Machine Processing costs Set up related costs	7,00,000
Purchase related costs	7,68,000
	6,80,000

You are required to:

(i) Compute the costs allocated to each product – Express Coffee and Instant Coffee from each activity on the basis of Activity- Based Costing (ABC) method.

(ii) Find out the overhead cost per unit of each product – Express coffee and Instant coffee based on (i) above.

Ans

(i) Estimation of Cost-Driver rate

Activity	Overhead cost	Cost-driver level	Cost driver rate

	(₹)		(₹)
Machine processing	7,00,000	1,40,000 Machine hours	5
Set up Costs	7,68,000	64 Number of set up	12,000
Purchase related Costs	6,80,000	544 Number of purchase order	1250

Cost Allocation under Activity based Costing

	Express Coffee	Instant Coffee
	(₹)	(₹)
Overhead Cost		
Machine processing (Cost Driver rate - ₹ 5) (or 20,000:1,20,000)	5 × 20,000 = 1,00,000	5 × 1,20,000 = 6,00,000
Set up Costs (Cost Driver rate - ₹ 12,000)) (or 20:44)	12,000 × 20 = 2,40,000	12,000 × 44 = 5,28,000
Purchase related Costs (Cost Driver rate - ₹ 1250) (or 160:384)	1,250 × 160 = 2,00,000	1,250 × 384 = 4,80,000
Total overhead cost	5,40,000	16,08,000

(ii) **Overhead Cost per unit**

Per unit Overhead cost	(₹)	(₹)
5,40,000 /5,000	108	
16,08,000/60,000		26.80

Q.23 Allocate Cost & Calc. Income | RTP May 18

G-2020 Ltd. is a manufacturer of a range of goods. The cost structure of its different products is as follows:

	Product	Product	Product	
Particulars				
	A	B	C	
Direct Materials	50	40	40	₹/u
Direct Labour @ ₹ 10/ hour	30	40	50	₹/u
Production Overheads	30	40	50	₹/u
Total Cost	110	120	140	₹/u
Quantity Produced	10,000	20,000	30,000	Units

G-2020 Ltd. was absorbing overheads on the basis of direct labour hours. A newly appointed management accountant has suggested that the company should introduce ABC system and has identified cost drivers and cost pools as follows:

Activity Cost Pool	Cost Driver	Associated Cost (₹)

Stores Receiving	Purchase Requisitions	2,96,000
Inspection	Number of Production Runs	8,94,000
Dispatch	Orders Executed	2,10,000
Machine Setup	Number of Setups	12,00,000

The following information is also supplied:

Details	Product A	Product B	Product C
No. of Setups	360	390	450
No. of Orders Executed	180	270	300
No. of Production Runs	750	1,050	1,200
No. of Purchase Requisitions	300	450	500

Required
CALCULATE activity-based production cost of all the three products.

Ans

The total production overheads are ₹26,00,000:
Product A: 10,000 × ₹ 30 = ₹ 3,00,000
Product B: 20,000 × ₹ 40 = ₹ 8,00,000
Product C: 30,000 × ₹ 50 = ₹ 15,00,000
On the basis of ABC analysis this amount will be apportioned as follows:
Statement Showing "Activity Based Production Cost"

Activity Cost Pool	Cost Driver	Ratio	Total Amount (₹)	A (₹)	B (₹)	C (₹)
Stores Receiving	Purchase Requisition	6:9:10	2,96,000	71,040	1,06,560	1,18,400
Inspection	Production Runs	5:7:8	8,94,000	2,23,500	3,12,900	3,57,600
Dispatch	Orders Executed	6:9:10	2,10,000	50,400	75,600	84,000
Machine Setups	Setups	12:13:15	12,00,000	3,60,000	3,90,000	4,50,000
Total Activity Cost				7,04,940	8,85,060	10,10,000
Quantity Produces				10,000	20,000	30,000
Unit Cost (Overheads)				70.49	44.25	33.67
Add: Conversion Cost (Material + Labour)				80	80	90
Total				150.49	124.25	123.67

Q.24 Allocate Cost & Calc. Income | RTP May 20

Following are the data of three product lines of a departmental store for the year 2019 -20:

	Soft drinks	Fresh produce	Packaged food
Revenues	₹ 39,67,500	₹ 1,05,03,000	₹ 60,49,500
Cost of goods sold	₹ 30,00,000	₹ 75,00,000	₹ 45,00,000
Cost of bottles returned	₹ 60,000	₹ 0	₹ 0

Number of purchase orders placed	360	840	360
Number of deliveries received	300	2,190	660
Hours of shelf-stocking time	540	5,400	2,700
Items sold	1,26,000	11,04,000	3,06,000

Additional information related with the store are as follows:

Activity	Description of activity	Total Cost	Cost-allocation base
Bottles returns	Returning of empty bottles	₹ 60,000	Direct tracing to soft drink line
Ordering	Placing of orders for purchases	₹ 7,80,000	1,560 purchase orders
Delivery	Physical delivery and receipt of goods	₹ 12,60,000	3,150 deliveries
Shelf stocking	Stocking of goods on store shelves and on-going restocking	₹ 8,64,000	8,640 hours of shelf-stocking time
Customer Support	Assistance provided to customers including check-out	₹ 15,36,000	15,36,000 items sold

Required:

CALCULATE the total cost and operating income using Activity Based Costing method.

Ans

(i) Total support cost:

	(₹)
Bottles returns	60,000
Ordering	7,80,000
Delivery	12,60,000
Shelf stocking	8,64,000
Customer support	15,36,000
Total support cost	45,00,000

(ii) Cost for each activity cost driver:

Activity (1)	Total cost (₹) (2)	Cost allocation base (3)	Cost driver rate (4) = [(2) ÷ (3)]
Ordering	7,80,000	1,560 purchase orders	₹500 per purchase order
Delivery	12,60,000	3,150 deliveries	₹400 per delivery
Shelf-stocking	8,64,000	8,640 hours	₹100per stocking hour
Customer support	15,36,000	15,36,000 items sold	₹1 per item sold

Statement of Total cost and Operating income

	Soft drinks (₹)	Fresh Produce (₹)	Packaged Food (₹)	Total (₹)
Revenues: (A)	**39,67,500**	**1,05,03,000**	**60,49,500**	**2,05,20,000**
Cost & Goods sold	30,00,000	75,00,000	45,00,000	1,50,00,000
Bottle return costs	60,000	0	0	60,000

Ordering cost* (360:840:360)	1,80,000	4,20,000	1,80,000	7,80,000
Delivery cost* (300:2190:660)	1,20,000	8,76,000	2,64,000	12,60,000
Shelf stocking cost* (540:5400:2700)	54,000	5,40,000	2,70,000	8,64,000
Customer Support cost* (1,26,000:11,04,000:3,06,000)	1,26,000	11,04,000	3,06,000	15,36,000
Total cost: (B)	35,40,000	1,04,40,000	55,20,000	1,95,00,000
Operating income C:{(A)- (B)}	4,27,500	63,000	5,29,500	10,20,000

* Refer to working note (ii)

Q.25 Allocate Cost & Calc. Income | RTP May 22

PCP Limited belongs to the apparel industry. It specializes in the distribution of fashionable garments. It buys from the industry and resells the same to the following two different supermarkets:

(i) Supermarket A dealing in Adults' garments (Age group 15 - 30)

(ii) Supermarket B dealing in Kids' garments (Age group 5 - 10)

The following data for the month of April in respect of PCP Limited has been reported:

	Supermarket A (₹)	Supermarket B (₹)
Average revenue per delivery	1,69,950	57,750
Average cost of goods sold per delivery	1,65,000	55,000
Number of deliveries	660	1,650

In the past, PCP Limited has used gross margin percentage to evaluate the relative profitability of its supermarket segments.

The company plans to use activity -based costing for analysing the profitability of its supermarket segments.

The April month's operating costs (other than cost of goods sold) of PCP Limited are ₹ 16,55,995. These operating costs are assigned to five activity areas. The cost in each area and Activity analysis including cost driver for the month of April are as follows:

Activity Area	Total costs (₹)	Cost Driver
Store delivery	3,90,500	Store deliveries
Cartons dispatched to store	4,15,250	Cartons dispatched to a store per delivery
Shelf-stocking at customer store	64,845	Hours of shelf-stocking
Line-item ordering	3,45,400	Line-items per purchase order
Customer purchase order processing	4,40,000	Purchase orders by customers

Other data for the month of April include the following:

	Supermarket A	Supermarket B
Total number of store deliveries	1,100	2,805
Average number of cartons shipped per store delivery	250	50
Average number of hours of shelf-stocking per store delivery	6	1.5
Average number of line items per order	14	12
Total number of orders	770	1,980

Required:

(i) COMPUTE gross-margin percentage for each of its supermarket segments and compute PCP Limited's operating income.

(ii) COMPUTE the operating income of each supermarket segments using the activity- based costing information.

Ans **(i)**

PCP Limited's

Statement of operating income and gross margin percentage for each of its supermarket segments

Particulars	Supermarket A	Supermarket B	Total
Revenues: (₹)	11,21,67,000 (660 × ₹ 1,69,950)	9,52,87,500 (1,650 × ₹ 57,750)	20,74,54,500
Less: Cost of goods sold: (₹)	10,89,00,000 (660 × ₹ 1,65,000)	9,07,50,000 (1650 × ₹ 55,000)	19,96,50,000
Gross Margin: (₹)	32,67,000	45,37,500	78,04,500
Less: Other operating costs: (₹)			16,55,995
Operating income: (₹)			61,48,505
Gross Margin	2.91%	4.76 %	3.76%
Operating income %			2.96%

(ii) **Operating Income Statement of each distribution channel in April (Using the Activity based Costing information)**

	Supermarket A	Supermarket B
Gross margin (₹) : (A) (Refer to (i) part of the answer)	32,67,000	45,37,500
Operating cost (₹): (B) (Refer to working note)	6,55,600	10,00,395
Operating income (₹): (A-B)	26,11,400	35,37,105
Operating income (in %) (Operating income/Revenue) ×100	2.33	3.71

Working note:

Computation of rate per unit of the cost allocation base for each of the five activity areas for the month of April

	(₹)
Store delivery [₹ 3,90,500/ (1,100 + 2,805 store deliveries)]	100 per delivery
Cartons dispatched [₹ 4,15,250/ {(250×1,100) +(50×2,805)} carton dispatches]	1 per carton dispatch
Shelf-stocking at customer store (₹) [₹ 64,845/ {(6×1,100) + (1.5×2,805)} hours]	6 per hour
Line item ordering [₹ 3,45,400/ {(14×770) + (12×1,980)} line items]	10 per line item order
Customer purchase order processing [₹ 4,40,000/ (770 + 1,980 orders)]	160 per order

Computation of operating cost of each distribution channel:

	Supermarket A (₹)	Supermarket B (₹)
Store delivery	1,10,000 (₹ 100 × 1,100 deliveries)	2,80,500 (₹ 100 × 2,805 deliveries)

Cartons dispatched	2,75,000 (₹ 1× 250 cartons × 1,100 deliveries)	1,40,250 (₹ 1 × 50 cartons × 2,805 deliveries)
Shelf stocking	39,600 (₹ 6 × 1,100 deliveries × 6 Av. hrs.)	25,245 (₹ 6 × 2,805 deliveries × 1.5 Av. hrs)
Line item ordering	1,07,800 (₹ 10 × 14 line item x 770 orders)	2,37,600 (₹ 10 × 12 line item x 1,980 orders)
Customer purchase order processing	1,23,200 (₹ 160 × 770 orders)	3,16,800 (₹ 160 × 1,980 orders)
Operating cost	6,55,600	10,00,395

Q.26 Allocate Cost & Calc. Income | RTP May 23

Hygiene Care Ltd. is a manufacturer of a range of goods. The cost structure of its different products is as follows:

Particulars	Hand Wash	Detergent Powder	Dishwasher
Direct Materials (₹ / Pu)	150	120	120
Direct Labour @₹10/ hour (₹ / Pu)	45	60	75
Production Overheads (₹ / Pu)	40	50	40
Total Cost (₹ / Pu)	235	230	235
Quantity Produced (Units)	30,000	60,000	90,000

Hygiene Care Ltd. was absorbing overheads on the basis of direct labour hours. Management accountant has suggested that the company should introduce ABC system and has identified cost drivers and cost pools as follows:

Activity Cost Pool	Cost Driver	Associated Cost (₹)
Goods Receiving	Number of Dispatch Order	8,88,000
Inspecting and Testing costs	Number of Production Runs	26,82,000
Dispatching	Number of dispatch order	6,30,000
Storage Cost	Number of Batches of material	36,00,000

The following information is also supplied:

Details	Hand Wash	Detergent Powder	Dishwasher
Batches of material	720	780	900
Number of dispatch order	360	540	600
No. of Production Runs	1,500	2,100	2,400
Number of Dispatch Orders	600	900	1,000

Required:
CALCULATE activity-based production cost of all the three products.

Ans

1. **The Total Production Overhead are** **78,00,000**

Items	Labour Hour	Overheads allocation on the basis of direct Labour Hour (₹)
Labour Hour Ratio	(4.5:6:7.5)	
Hand Wash	1,35,000	9,00,000

Detergent Powder	3,60,000	24,00,000
Dishwasher	6,75,000	45,00,000
Total	11,70,000	78,00,000

2. **On the basis of ABC analysis this amount will be apportioned as follows: Statement Showing "Activity Based Production Cost"**

Activity Cost Pool	Cost Driver	Ratio	Total Amount (₹)	Hand Wash (₹)	Detergent Powder (₹)	Dishwasher (₹)
Goods Receiving	Dispatch order	06:09:10	8,88,000	2,13,120	3,19,680	3,55,200
Inspecting and Testing costs	Production Runs	05:07:08	26,82,000	6,70,500	9,38,700	10,72,800
Dispatching	Dispatch Order	06:09:10	6,30,000	1,51,200	2,26,800	2,52,000
Storage Cost	Batches of material	12:13:15	36,00,000	10,80,000	11,70,000	13,50,000
Total Activity Cost				21,14,820	26,55,180	30,30,000
Quantity Produces				30,000	60,000	90,000
Unit Cost (Overheads)				70.49	44.25	33.67
Add: Conversion Cost (Material + Labour)				195	180	195
Total				265.49	224.25	228.67

Note: This question can also be solved by using cost driver rate

Q.27 Allocate Cost & Calc. Income | RTP Nov 23

L Limited manufactures three products P, Q and R which are similar in nature and are usually produced in production runs of 100 units. Product P and R require both machine hours and assembly hours, whereas product Q requires only machine hours. The overheads incurred by the company during the first quarter are as under:

	₹
Machine Department expenses	18,48,000
Assembly Department expenses	6,72,000
Setup costs	90,000
Stores receiving cost	1,20,000
Order processing and dispatch	1,80,000
Inspect and Quality control cost	36,000

The data related to the three products during the period are as under:

	P	Q	R
Units produced and sold	15,000	12,000	18,000
Machine hours worked	30,000 hrs.	48,000 hrs.	54,000 hrs.
Assembly hours worked (direct labour hours)	15,000 hrs.	-	27,000 hrs.
Customers' orders executed (in numbers)	1,250	1,000	1,500

Number of requisitions raised on the stores	40	30	50

Prepare a statement showing details of overhead costs allocated to each product type using activity-based costing.

Ans

Calculation of "Activity Rate"

Cost Pool	Cost (₹) [A]	Cost Driver [B]	Cost Driver Rate (₹) [C] = [A]÷[B]
Machine Department Expenses	18,48,000	Machine Hours (1,32,000 hrs.)	14.00
Assembly Department Expenses	6,72,000	Assembly Hours (42,000 hrs.)	16.00
Setup Cost	90,000	No. of Production Runs (450*)	200.00
Stores Receiving Cost	1,20,000	No. of Requisitions Raised on the Stores (120)	1,000.00
Order Processing and Dispatch	1,80,000	No. of Customers Orders Executed (3,750)	48.00
Inspection and Quality Control Cost	36,000	No. of Production Runs (450*)	80.00
Total (₹)	29,46,000		

*Number of Production Run is 450 (150 + 120 + 180)

Statement Showing "Overheads Allocation"

Particulars of Cost	Cost Driver	P	Q	R	Total
Machine Department Expenses	Machine Hours	4,20,000 (30,000 ×₹14)	6,72,000 (48,000×₹14)	7,56,000 (54,000 × ₹14)	18,48,000
Assembly Department Expenses	Assembly Hours	2,40,000 (15,000 × ₹16)	---	4,32,000 (27,000 × ₹16)	6,72,000
Setup Cost	No. of Production Runs	30,000 (150 × ₹200)	24,000 (120 ×₹200)	36,000 (180 × ₹200)	90,000
Stores Receiving Cost	No. of Requisitions Raised on the Stores	40,000 (40 × ₹1,000)	30,000 (30 ×₹1,000)	50,000 (50 × ₹1,000)	1,20,000
Order Processing and Dispatch	No. of Customers Orders Executed	60,000 (1,250 × ₹48)	48,000 (1,000 ×₹48)	72,000 (1,500 × ₹48)	1,80,000
Inspection and Quality Control Cost	No. of Production Runs	12,000 (150 × ₹80)	9,600 (120 ×₹80)	14,400 (180 ×₹80)	36,000
Overhead (₹)		8,02,000	7,83,600	13,60,400	29,46,000

Q.28 Allocate Cost & Calc. Income | MTP May 19(1)

Linex Limited manufactures three products P, Q and R which are similar in nature and are usually produced in production runs of 100 units. Product P and R require both machine hours and assembly hours, whereas product Q requires only machine hours. The overheads incurred by the company during the first quarter are as under:

Machine Department expenses.....	18,48,000
Assembly Department expenses.....	6,72,000
Setup costs.....	90,000
Stores receiving cost.....	1,20,000
Order processing and dispatch.....	1,80,000

Inspect and Quality control cost..... 36,000

The date related to the three products during the period are as under:

	P	Q	R
Units produced and sold	15,000	12,000	18,000
Machine hours worked	30,000 hrs.	48,000 hrs.	54,000 hrs.
Assembly hours worked (direct labour hours)	15,000 hrs.	-	27,000 hrs.
Customers' orders executed (in numbers)	1,250	1,000	1,500
Number of requisitions raised on the stores	40	30	50

Required

PREPARE a statement showing details of overhead costs allocated to each product type using activity based costing.

Ans

Calculation of "Activity Rate"

Cost Pool	Cost (Rs.) [A]	Cost Driver [B]	Cost Driver Rate(Rs.) [C] = [A]÷[B]
Machine Department Expenses	18,48,000	Machine Hours (1,32,000 hrs.)	14.00
Assembly Department Expenses	6,72,000	Assembly Hours (42,000 hrs.)	16.00
Setup Cost	90,000	No. of Production Runs (450*)	200.00
Stores Receiving Cost	1,20,000	No. of Requisitions Raised on the Stores (120)	1,000.00
Order Processing and Dispatch	1,80,000	No. of Customers Orders Executed (3,750)	48.00
Inspection and Quality Control Cost	36,000	No. of Production Runs (450*)	80.00
Total (Rs.)	29,46,000		

***Number of Production Run is 450 (150 + 120 + 180)**

Statement Showing "Overheads Allocation"

Particulars of Cost	Cost Driver	P	Q	R	Total
Machine Department Expenses	Machine Hours	4,20,000 (30,000 × Rs.14)	6,72,000 (48,000 × Rs.14)	7,56,000 (54,000 × Rs.14)	18,48,000
Assembly Department Expenses	Assembly Hours	2,40,000 (15,000 ×Rs.16)	---	4,32,000 (27,000 × Rs.16)	6,72,000
Setup Cost	No. of Production Runs	30,000 (150 × Rs.200)	24,000 (120 × Rs.200)	36,000 (180 × Rs.200)	90,000
Stores Receiving Cost	No. of Requisitions Raised on the Stores	40,000 (40 × Rs.1,000)	30,000 (30 × Rs.1,000)	50,000 (50 × Rs.1,000)	1,20,000

Order Processing and Dispatch	No. of Customers Orders Executed	60,000 (1,250 × Rs.48)	48,000 (1,000 × Rs.48)	72,000 (1,500 × Rs.48)	1,80,000
Inspection and Quality Control Cost	No. of Production Runs	12,000 (150 × Rs.80)	9,600 (120 × Rs.80)	14,400 (180 × Rs.80)	36,000
Overhead (Rs.)		8,02,000	7,83,600	13,60,400	29,46,000

Q.29 Allocate Cost & Calc. Income | MTP Dec 21(2)

Breezle Ltd has decided to analyse the profitability of its five new customers. It buys soft drink bottles in cases at ₹ 54 per case and sells them to retail customers at a list price of ₹ 64.80 per case. The data pertaining to five customers are given below:

Particulars	Customers				
	Aey	Bee	Cee	Dee	Eey
Number of Cases Sold	9,360	14,200	62,000	38,000	9,800
List Selling Price (₹)	64.80	64.80	64.80	64.80	64.80
Actual Selling Price (₹)	64.80	64.08	58.80	60.24	58.32
Number of Purchase Orders	30	50	60	50	60
Number of Customers visits	4	6	12	4	6
Number of Deliveries	20	60	120	80	40
Kilometers travelled per delivery	40	12	10	20	60
Number of expediate Deliveries	0	0	0	0	2

Its five activities and their cost drivers are:

Activity	Cost Driver
Order taking	₹ 240 per purchase order
Customer visits	₹ 360 per each visit
Deliveries	₹ 4.80 per delivery km travelled
Product Handling	₹ 2.40 per case sold
Expedited deliveries	₹ 120 per such delivery

You are REQUIRED to :

(i) Compute the customer level operating income of each of five retail customers by using the Cost Driver rates.

(ii) Examine the results to give your comments on Customer 'Dee' in comparison with Customer 'Cee' and on Customer 'Eey' in comparison with Customer 'Aey'.

Ans

Working note:

Computation of revenues (at listed price), discount, cost of goods sold and customer level operating activities costs:

Particulars	Customers				
	Aey	Bee	Cee	Dee	Eey
Cases sold: (a)	9,360	14,200	62,000	38,000	9,800

Revenues (at listed price) (₹): (b) {(a) × ₹ 64.80)}	6,06,528	9,20,160	40,17,600	24,62,400	6,35,040
Discount (₹): (c) {(a) × Discount per case}	-	10,224 (14,200 cases × ₹ 0.72)	3,72,000 (62,000 cases × ₹ 6)	1,73,280 (38,000 cases × ₹ 4.56)	63,504 (9,800 cases × ₹ 6.48)
Cost of goods sold (₹): (d) {(a) × ₹ 54}	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
Customer level operating activities costs					
Order taking costs (₹): (No. of purchase × ₹ 240)	7,200	12,000	14,400	12,000	14,400
Customer visits costs (₹) (No. of customer visits × ₹ 360)	1,440	2,160	4,320	1,440	2,160
Delivery vehicles travel costs (₹) (Kms travelled by delivery vehicles × ₹ 4.80 per km.)	3,840	3,456	5,760	7,680	11,520
Product handling costs (₹) {(a) ×₹ 2.40}	22,464	34,080	1,48,800	91,200	23,520
Cost of expediting deliveries (₹) {No. of expedited deliveries × ₹ 120}	-	-	-	-	240
Total cost of customer level operating activities (₹)	34,944	51,696	1,73,280	1,12,320	51,840

(i) Computation of Customer level operating income

Particulars	Customers				
	Aey (₹)	Bee (₹)	Cee (₹)	Dee (₹)	Eey (₹)
Revenues (At list price) (Refer to working note)	6,06,528	9,20,160	40,17,600	24,62,400	6,35,040
Less: Discount (Refer to working note)	-	10,224	3,72,000	1,73,280	63,504
Revenue (At actual price)	6,06,528	9,09,936	36,45,600	22,89,120	5,71,536
Less: Cost of goods sold (Refer to working note)	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
Gross margin	1,01,088	1,43,136	2,97,600	2,37,120	42,336
Less: Customer level operating activities costs (Refer to working note)	34,944	51,696	1,73,280	1,12,320	51,840
Customer level operating income	66,144	91,440	1,24,320	1,24,800	(9,504)

(ii) Comments

Customer Dee in comparison with Customer Cee: Operating income of Customer Dee is more than that of Customer Cee, despite having only 61.29% (38,000 units) of the units

volume sold in comparison to Customer Cee (62,000 units). Customer Cee receives a higher percent of discount i.e. 9.26% (₹ 6) while Customer Dee receive a discount of 7.04% (₹ 4.56). Though the gross margin of customer Cee (₹ 2,97,600) is more than that of Customer Dee (₹ 2,37,120) but total cost of customer level operating activities of Cee (₹ 1,73,280) is more in comparison to Customer Dee (₹ 1,12,320). As a result, operating income is more in case of Customer Dee.

Customer Eey in comparison with Customer Aey: Customer Eey is not profitable while Customer Aey is profitable. Customer Eey receives a discount of 10% (₹ 6.48) while Customer Aey doesn't receive any discount. Sales Volume of Customer Aey and Eey is almost same. However, total cost of customer level operating activities of Eey is far more (₹ 51,840) in comparison to Customer Aey (₹ 34,944). This has resulted in occurrence of loss in case of Customer Eey.

Q.30 Allocate Cost & Calc. Income | MTP Nov 22(2)

ANI Limited is a trader of a Product Z. It has decided to analyse the profitability of its five new customers. It buys Z article at ₹5,400 per unit and sells to retail customers at a listed price of ₹6,480 per unit. The data pertaining to five customers are:

	Customers				
	A	B	C	D	E
Units sold	4,500	6,000	9,500	7,500	12,750
Listed Selling Price	₹6,480	₹6,480	₹6,480	₹6,480	₹6,480
Actual Selling Price	₹6,480	₹6,372	₹5,940	₹6,264	₹5,832
Number of Purchase orders	15	25	30	25	30
Number of Customer visits	2	3	6	2	3
Number of deliveries	10	30	60	40	20
Kilometers travelled per delivery	20	6	5	10	30
Number of expedited deliveries	0	0	0	0	1

Its five activities and their cost drivers are:

Activity	Cost Driver Rate
Order taking	₹4,500 per purchase order
Customer visits	₹3,600 per customer visit
Deliveries	₹7.50 per delivery Km travelled
Product handling	₹22.50 per case sold
Expedited deliveries	₹13,500 per expedited delivery

Required:

(i) COMPUTE the customer-level operating income of each of five retail customers (A, B, C, D and E).
(ii) STATE the factors ANI Limited should consider in deciding whether to drop a customer.

Ans

1. Computation of revenues (at listed price), discount, cost of goods sold and customer level operating activities costs:

	Customers				
	A	B	C	D	E
Units sold: (a)	4,500	6,000	9,500	7,500	12,750
Revenues (at listed price) (Rs.): (b) {(a) ×Rs.6,480)}	2,91,60,000	3,88,80,000	6,15,60,000	4,86,00,000	8,26,20,000

Revenues (at listed price) (Rs.): (c) {(a) ×Actual selling price)}	2,91,60,000 (4,500×6,480)	3,82,32,000 (6,000×6,372)	5,64,30,000 (9,500×5,940)	4,69,80,000 (7,500×6,264)	7,43,58,000 (12,750×5,832)
Discount (Rs.) (d) {(b) – (c)}	0	6,48,000	51,30,000	16,20,000	82,62,000
Cost of goods sold (Rs.) : (d) {(a) x Rs.5,400}	2,43,00,000	3,24,00,000	5,13,00,000	4,05,00,000	6,88,50,000
Customer level operating activities costs					
Order taking costs (Rs.): (No. of purchase orders × Rs. 4,500)	67,500	1,12,500	1,35,000	1,12,500	1,35,000
Customer visits costs (Rs.) (No. of customer visits x Rs. 3,600)	7,200	10,800	21,600	7,200	10,800
Delivery vehicles travel costs (Rs.) (Kms travelled by delivery vehicles x Rs. 7.50 per km.)	1,500	1,350	2,250	3,000	4,500
Product handling costs (Rs.) {(a) x Rs. 22.50}	1,01,250	1,35,000	2,13,750	1,68,750	2,86,875
Cost of expediting deliveries (Rs.) {No. of expedited deliveries x Rs. 13,500}	-	-	-	-	13,500
Total cost of customer level operating activities (Rs.)	1,77,450	2,59,650	3,72,600	2,91,450	4,50,675
delivery vehicles x Rs. 7.50 per km.)					
Product handling costs (Rs.) {(a) x Rs. 22.50}	1,01,250	1,35,000	2,13,750	1,68,750	2,86,875

Cost of expediting deliveries (Rs.) {No. of expedited deliveries x Rs. 13,500}	-	-	-	-	13,500
Total cost of customer level operating activities (Rs.)	1,77,450	2,59,650	3,72,600	2,91,450	4,50,675

(i) Computation of Customer level operating income

	Customers				
	A	B	C	D	E
	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Revenues (At list price) (Refer to working note)	2,91,60,000	3,82,32,000	5,64,30,000	4,69,80,000	7,43,58,000
Less: Cost of goods sold (Refer to working note)	(2,43,00,000)	(3,24,00,000)	(5,13,00,000)	(4,05,00,000)	(6,88,50,000)
Gross margin	48,60,000	58,32,000	51,30,000	64,80,000	55,08,000
Less: Customer level operating activities costs (Refer to working note)	(1,77,450)	(2,59,650)	(3,72,600)	(2,91,450)	(4,50,675)
Customer level operating income	46,82,550	55,72,350	47,57,400	61,88,550	50,57,325

(ii) Factors to be considered for dropping a customer:

Dropping customers should be the last resort to be taken by an entity. Factors to be considered should include:

- What is the expected future profitability of each customer?
- Are the currently least profitable or low profitable customers are likely to be highly profitable in the future?
- What costs are avoidable if one or more customers are dropped?
- Can the relationship with the "problem" customers be restructured so that there is at "win- win" situation

Q.31 Cost Driver Rate | PY Nov 20

ABC Ltd. is engaged in production of three types of Fruit Juices: Apple, Orange and Mixed Fruit. The following cost data for the month of March 2020 are as under:

Particulars	Apple	Orange	Mixed Fruit
Units produced and sold	10,000	15,000	20,000
Material per unit (₹)	8	6	5
Direct Labour per unit (₹)	5	4	3
No. of Purchase Orders	34	32	14
No. of Deliveries	110	64	52
Shelf Stocking Hours	110	160	170

Overheads incurred by the company during the month are as under :

	(₹)
Ordering costs	64,000
Delivery costs	1,58,200
Shelf Stocking costs	87,560

Required:

(i) Calculate cost driver's rate.
(ii) Calculate total cost of each product using Activity Based Costing

Ans

(i) Calculation Cost-Driver's rate

Activity	Overhead cost (₹) (A)	Cost-driver level (B)	Cost driver rate (₹) (C) = (A)/(B)
Ordering	64,000	34 + 32 + 14 = 80 no. of purchase orders	800
Delivery	1,58,200	110 + 64 + 52 = 226 no. of deliveries	700
Shelf stocking	87,560	110 + 160 + 170 = 440 shelf stocking hours	199

(ii) Calculation of total cost of products using Activity Based Costing

Particulars	Fruit Juices		
	Apple (₹)	Orange (₹)	Mixed Fruit (₹)
Material cost	80,000 (10,000 x ₹ 8)	90,000 (15,000 x ₹ 6)	1,00,000 (20,000 x ₹ 5)
Direct labour cost	50,000 (10,000 x ₹ 5)	60,000 (15,000 x ₹ 4)	60,000 (20,000 x ₹ 3)
Prime Cost (A)	1,30,000	1,50,000	1,60,000
Ordering cost	27,200 (800 x 34)	25,600 (800 x 32)	11,200 (800 x 14)
Delivery cost	77,000 (700 x 110)	44,800 (700 x 64)	36,400 (700 x 52)

Shelf stocking cost	21,890 (199 x 110)	31,840 (199 x 160)	33,830 (199 x 170)
Overhead Cost (B)	1,26,090	1,02,240	81,430
Total Cost (A + B)	2,56,090	2,52,240	2,41,430

Q.32 Cost Driver Rate | RTP Nov 20

KD Ltd. is following Activity based costing. Budgeted overheads, cost drivers and volume are as follows:

Cost pool	Budgeted overheads (₹)	Cost driver	Budgeted volume
Material procurement	18,42,000	No. or orders	1,200
Material handling	8,50,000	No. of movement	1,240
Maintenance	24,56,000	Maintenance hours	17,550
Set-up	9,12,000	No. of set-ups	1,450
Quality control	4,42,000	No. of inspection	1,820

The company has produced a batch of 7,600 units, its material cost was ₹24,62,000 and wages ₹4,68,500. Usage activities of the said batch are as follows:

Material orders	56
Material movements	84
Maintenance hours	1,420 hours
Set-ups	60
No. of inspections	18

Required:

(i) CALCULATE cost driver rates.

(ii) CALCULATE the total and unit cost for the batch.

Ans

(i) Calculation of cost driver rate:.

Cost pool	Budgeted overheads (₹)	Cost driver	Cost driver rate (₹)
Material procurement	18,42,000	1,200	1,535.00
Material handling	8,50,000	1,240	685.48
Maintenance	24,56,000	17,550	139.94
Set-up	9,12,000	1,450	628.97
Quality control	4,42,000	1,820	242.86

(ii) Calculation of cost for the batch:

Particulars	Amount (₹)	Amount (₹)
Material cost		24,62,000.00
Wages		4,68,500.00
Overheads:		
- Material procurement (₹1,535×56 orders)	85,960.00	
- Material handling (₹685.48×84 movements)	57,580.32	
- Maintenance (₹139.94×1,420 hours)	1,98,714.80	

- Set-up (₹628.97×60 set-ups)	37,738.20	
- Quality control (₹242.86×18 inspections)	4,371.48	3,84,364.80
Total Cost		33,14,864.80
No. of units		7,600
Cost per units		436.17

Q.33 Cost Driver Rate | MTP May 18

Bank of Surat operated for years under the assumption that profitability can be increased by increasing Rupee volume. But that has not been the case. Cost analysis has revealed the following:

Activity	Activity Cost (₹)	Activity Driver	Activity Capacity
Providing ATM Service	1,00,000	No. of Transactions	2,00,000
Computer Processing	10,00,000	No. of Transactions	25,00,000
Issuing Statements	8,00,000	No. of Statements	5,00,000
Customer Inquiries	3,60,000	Telephone Minutes	6,00,000

The following annual information on three products was also made available:

Activity Driver	Checking Accounts	Personal Loans	Gold Visa
Units of Product	30,000	5,000	10,000
ATM Transactions	1,80,000	0	20,000
Computer Transactions	20,00,000	2,00,000	3,00,000
Number of Statements	3,00,000	50,000	1,50,000
Telephone Minutes	3,50,000	90,000	1,60,000

Required

(i) CALCULATE rates for each activity.

(ii) Using the rates computed in requirement (i), CALCULATE the cost of each product.

Ans

(i) Statement Showing "Activity Rate"

Activity	Activity Cost [a] (₹)	Activity Driver	No. of Units of Activity Driver [b]	Activity Rate[a] / [b] (₹)
Providing ATM Service	1,00,000	No. of ATM Transactions	2,00,000	0.50
Computer Processing	10,00,000	No. of Computer Transactions	25,00,000	0.40
Issuing Statements	8,00,000	No. of Statements	5,00,000	1.60
Customer Inquiries	3,60,000	Telephone Minutes	6,00,000	0.60

(ii) Statement Showing "Cost of Product"

Activity	Checking Accounts (₹)	Personal Loans (₹)	Gold Visa (₹)
Providing ATM Service	90,000 (1,80,000 tr.× ₹ 0.50)	---	10,000 (20,000 tr. × ₹ 0.50)
Computer Processing	8,00,000 (20,00,000 tr. × ₹ 0.40)	80,000 (2,00,000 tr. × ₹ 0.40)	1,20,000 (3,00,000 tr. × ₹ 0.40)

Issuing Statements	4,80,000 (3,00,000 st. × ₹ 1.60)	80,000 (50,000 st. × ₹1.60)	2,40,000 (1,50,000 st. × ₹ 1.60)
Customer Inquiries	2,10,000 (3,50,000 min. × ₹ 0.60)	54,000 (90,000 min. × ₹ 0.60)	96,000 (1,60,000 min. × ₹ 0.60)
Total Cost [a]	₹ 15,80,000	₹ 2,14,000	₹ 4,66,000
Units of Product [b]	30,000	5,000	10,000
Costof each Product [a] / [b]	52.67	42.80	46.60

Q.34 Cost Driver Rate | MTP May 19(2)

'Humara - Apna' bank offers three products, viz., deposits, Loans and Credit Cards. The bank has selected 4 activities for a detailed budgeting exercise, following activity based costing methods.
The bank wants to know the product wise total cost per unit for the selected activities, so that prices may be fixed accordingly.
The following information is made available to formulate the budget:

Activity	Present Cost(Rs.)	Estimation for the budget period
ATM Services:		
(a) Machine Maintenance	4,00,000	All fixed, no change.
(b) Rents	2,00,000	Fully fixed, no change.
(c) Currency Replenishment Cost	1,00,000	Expected to double during budget period.
	7,00,000	(This activity is driven by no. of ATM transactions)
Computer Processing	5,00,000	Half this amount is fixed and no change is expected. The variable portion is expected to increase to three times the current level. (This activity is driven by the number of computer transactions)
Issuing Statements	18,00,000	Presently, 3 lakh statements are made. In the budget period, 5 lakh statements are expected. For every increase of one lakh statement, one lakh rupees is the budgeted increase. (This activity is driven by the number of statements)
Computer Inquiries	2,00,000	Estimated to increase by 80% during the budget period. (This activity is driven by telephone minutes)

The activity drivers and their budgeted quantifies are given below:

Activity Drivers	Deposits	Loans	Credit Cards
No. of ATM Transactions	1,50,000	---	50,000
No. of Computer Processing Transactions	15,00,000	2,00,000	3,00,000
No. of Statements to be issued	3,50,000	50,000	1,00,000
Telephone Minutes	3,60,000	1,80,000	1,80,000

The bank budgets a volume of 58,600 deposit accounts, 13,000 loan accounts, and 14,000 Credit Card Accounts.

Required

(i) CALCULATE the budgeted rate for each activity.

(ii) PREPARE the budgeted cost statement activity wise.

(iii) COMPUTE the budgeted product cost per account for each product using (i) and (ii) above.

Ans

Statement Showing "Budgeted Cost per unit of the Product"

Activity	Activity Cost (Budgete d) (Rs.)	Activity Driver	No. of Units of Activity Driver (Budget)	Activity Rate (Rs.)	Deposits	Loans	Credit Cards
ATM Services	8,00,000	No. of ATM Transaction	2,00,000	4.00	6,00,000	---	2,00,000
Computer Processing	10,00,000	No. of Computer Transaction	20,00,000	0.50	7,50,000	1,00,000	1,50,000
Issuing Statements	20,00,000	No. of Statements	5,00,000	4.00	14,00,000	2,00,000	4,00,000
Customer Inquiries	3,60,000	Telephone Minutes	7,20,000	0.50	1,80,000	90,000	90,000
Budgeted Cost	41,60,000				29,30,000	3,90,000	8,40,000
Units of Product (as estimated in the budget period)					58,600	13,000	14,000
Budgeted Cost per unit of the product					50	30	60

Working Note

Activity	Budgeted Cost (Rs.)	Remark
ATM Services:		
Machine Maintenance	4,00,000	All fixed, no change.
Rents	2,00,000	Fully fixed, no change.
Currency Replenishment Cost	2,00,000	Doubled during budget period.
Total	8,00,000	
Computer Processing	2,50,000	- Rs.2,50,000 (half of Rs.5,00,000) is fixed and no change is expected.
	7,50,000	- Rs.2,50,000 (variable portion) is expected to increase to three times the current level.
Total	10,00,000	

Issuing Statements	18,00,000	- Existing.
	2,00,000	- 2lakh statements are expected to be increased in budgeted period. For every Increase of one lakh statement, one lakh rupees is the budgeted increase.
Total	20,00,000	
Computer Inquiries	3,60,000	- Estimated to increase by 80% during the budget period. (Rs.2,00,000 x 180%)
Total	3,60,000	

Q.35 Cost Driver Rate | MTP May 20

ZA Ltd. is a manufacturer of a range of goods. The cost structure of its different products is as follows:

Particulars	Product A	Product B	Product C	
Direct Materials	100	80	80	Rs./u
Direct Labour @Rs.10/ hour	30	40	50	Rs./u
Production Overheads	30	40	50	Rs./u
Total Cost	160	160	180	Rs./u
Quantity Produced	20,000	40,000	60,000	Units

ZA Ltd. was absorbing overheads on the basis of direct labour hours. A newly appointed management accountant has suggested that the company should introduce ABC system and has identified cost drivers and cost pools as follows:

Activity Cost Pool	Cost Driver	Associated Cost (Rs.)
Stores Receiving	Purchase Requisitions	5,92,000
Inspection	Number of Production Runs	17,88,000
Dispatch	Orders Executed	4,20,000
Machine Setup	Number of Setups	24,00,000

The following information is also supplied:

Details	Product A	Product B	Product C
No. of Setups	360	390	450
No. of Orders Executed	180	270	300
No. of Production Runs	750	1,050	1,200
No. of Purchase Requisitions	300	450	500

Required:

CALCULATE activity based production cost of all the three products.

Ans

The total production overheads are Rs.52,00,000:

Product A: 20,000 × Rs.30 = Rs.6,00,000
Product B: 40,000 × Rs.40 = Rs.16,00,000
Product C: 60,000 × Rs.50 = Rs.30,00,000

On the basis of ABC analysis this amount will be apportioned as follows:

Statement Showing "Activity Based Production Cost"

Activity Cost Pool	Cost Driver	Ratio	Total Amount (Rs.)	A (Rs.)	B (Rs.)	C (Rs.)
Stores Receiving	Purchase Requisition	6:9:10	5,92,000	1,42,080	2,13,120	2,36,800
Inspection	Production Runs	5:7:8	17,88,000	4,47,000	6,25,800	7,15,200
Dispatch	Orders Executed	6:9:10	4,20,000	1,00,800	1,51,200	1,68,000
Machine Setups	Setups	12:13:15	24,00,000	7,20,000	7,80,000	9,00,000
Total Activity Cost				14,09,880	17,70,120	20,20,000
Quantity Produces				20,000	40,000	60,000
Unit Cost (Overheads)				70.49	44.25	33.67
Add: Conversion Cost (Material + Labour)				130	120	130
Total				200.49	164.25	163.67

Q.36 Cost Driver Rate | MTP May 22(2)

Equate bank offers 3 products, viz., deposits, Loans and Credit Cards. The bank has selected 4 activities for a detailed budgeting exercise, following activity -based costing methods.
The bank wants to know the product wise total cost per unit for the selected activities, s o that prices may be fixed accordingly.

The following information is made available to formulate the budget:

Activity	Present Cost (₹)	Estimation for the budget period
ATM Services:		
(a) Machine Maintenance	5,20,000	All fixed, no change. Fully fixed, no change.
(b) Rents	2,60,000	
(c) Currency Replenishment Cost	1,30,000	Expected to double during budget period.
	9,10,000	
Computer Processing	6,50,000	Half this amount is fixed, and no change is expected. The variable portion is expected to increase to three times the current level.
Issuing Statements	23,40,000	Presently, 3.90 lakh statements are made. In the budget period, 6.5 lakh statements are expected. For every single increase of statement, one rupee is the budgeted increase.
Computer Inquiries	2,60,000	Estimated to increase by 80% during the budget period.

The activity drivers and their budgeted quantifies are given below:

Activity Drivers	Deposits	Loans	Credit Cards
No. of ATM Transactions	1,95,000	---	65,000
No. of Computer Processing Transactions	19,50,000	2,60,000	3,90,000
No. of Statements to be issued	4,55,000	65,000	1,30,000
Telephone Minutes	4,68,000	2,34,000	2,34,000

The bank budgets a volume of 76,180 deposit accounts, 16,900 loan accounts, and 18,200 Credit Card Accounts. Required:

(i) CALCULATE the budgeted rate for each activity.
(ii) PREPARE the budgeted cost statement activity wise.
(iii) COMPUTE the budgeted product cost per account for each product using (i) and (ii) above.

Ans **Statement Showing "Budgeted Cost per unit of the Product"**

Activity	Activity Cost (Budgeted) (₹)	Activity Driver	No. of Units of Activity Driver (Budget)	Activity Rate (₹)	Deposits	Loans	Credit Cards
ATM Services	10,40,000	No. of ATM Transaction	2,60,000	4.00	7,80,000	---	2,60,000
Computer Processing	13,00,000	No. of Computer processing Transaction	26,00,000	0.50	9,75,000	1,30,000	1,95,000
Issuing Statements	26,00,000	No. of Statements	6,50,000	4.00	18,20,000	2,60,000	5,20,000
Customer Inquiries	4,68,000	Telephone Minutes	9,36,000	0.50	2,34,000	1,17,000	1,17,000
Budgeted Cost	54,08,000				38,09,000	5,07,000	10,92,000
Units of Product (as estimated in the budget period)					76,180	16,900	18,200
Budgeted Cost per unit of the product					50	30	60

Working Note:

Activity	Budgeted Cost (₹)	Remark
ATM Services:		
(a) Machine Maintenance		
(b) Rents	5,20,000	- All fixed, no change.
(c) Currency Replenishment Cost	2,60,000	- Fully fixed, no change.
Total	2,60,000 10,40,000	- Doubled during budget period.
Computer Processing	3,25,000	- ₹ 3,25,000 (half of ₹ 6,50,000) is fixed and no change is expected.

	9,75,000	- ₹ 3,25,000 (variable portion) is expected to increase to three times the current level.
Total	13,00,000	
Issuing Statements	23,40,000	- Existing.
	2,60,000	- 2.60 lakh statements are expected to be increased in budgeted period. For every single increase of statement, one rupee is the budgeted increase.
Total	26,00,000	
Computer Inquiries	4,68,000	- Estimated to increase by 80% during the budget period. (₹ 2,60,000 x 180%)
Total	4,68,000	

Q.37 Cost Driver Rate | MTP May 23(1)

Secure lifeline Ltd. operates in life insurance business. It launched a new insurance policy 'Total secure'. The company has incurred the following expenditures during the last year for the policy:

	₹
Cost of marketing of the policy	74,58,000
Sales support expenses	18,89,250
Policy issuance cost	16,59,735
Claims management cost	2,07,240
Policy development cost	18,56,250
Postage and logistics	16,91,250
Facilities cost	25,14,600
Policy servicing cost	58,09,155
Employees cost	9,24,000
IT cost	1,22,62,800
Office administration cost	26,73,660

Number of policies sold- 844.

Total insured value of policies - ₹ 1,640 crore. Required:

(i) CALCULATE total cost for Professionals Protection Plus' policy segregating the costs into four main activities namely (a) Marketing and Sales support, (b) Operations, (c) IT and (d) Support functions.

(ii) CALCULATE cost per policy.

(iii) CALCULATE cost per rupee of insured value.

Ans

(i) Calculation of total cost for 'Professionals Protection Plus' policy

	Particulars	Amount (₹)	Amount (₹)
1	Marketing and Sales support:		
	- Policy development cost	18,56,250	
	- Cost of marketing	74,58,000	
	- Sales support expenses	18,89,250	1,12,03,500
2	Operations:		

	- Policy issuance cost	16,59,735	
	- Policy servicing cost	58,09,155	
	- Claims management cost	2,07,240	76,76,130
3	IT Cost		1,22,62,800
4	Support functions		
	- Postage and logistics	16,91,250	
	- Facilities cost	25,14,600	
	- Employees cost	9,24,000	
	- Office administration cost	26,73,660	78,03,510
	Total Cost		3,89,45,940

(ii) Calculation of cost per policy $\frac{\text{Total cost}}{\text{Number of policies}} = \frac{3,89,45,940}{844}$

(iii) Cost per rupee of insured value $\frac{\text{Total cost}}{\text{Total insured value}} = \frac{3,89,45,940}{1,640 \text{ crore}}$

= ₹ 0.0024

Q.38 Cost Driver Rate | MTP May 23(2)

KD Ltd. is following Activity based costing. Budgeted overheads, cost drivers and volume are as follows:

Cost pool	Budgeted overheads (₹)	Cost driver	Budgeted volume
Material procurement	18,42,000	No. of orders	1,200
Material handling	8,50,000		1,240
Maintenance	24,56,000	No. of movement	17,550
Set-up	9,12,000	Maintenance hours No. of	1,450
Quality control	4,42,000	set-ups	1,820
		No. of inspection	

The company has produced a batch of 7,600 units, its material cost was ₹24,62,000 and wages ₹4,68,500. Usage activities of the said batch are as follows:

Material orders	56
Material movements	84
Maintenance hours	1,420 hours
Set-ups	60
No. of inspections	18

Required:

(i) CALCULATE cost driver rates.

(ii) CALCULATE the total and unit cost for the batch.

Ans **Calculation of cost driver rate:**

Cost pool	Budgeted overheads (₹)	Cost driver	Cost driver rate (₹)
Material procurement	18,42,000	1,200	1,535.00
Material handling	8,50,000	1,240	685.48
Maintenance	24,56,000	17,550	139.94
Set-up	9,12,000	1,450	628.97
Quality control	4,42,000	1,820	242.86

Q.39 SP on basis of ABC | RTP Nov 19

SMP Pvt. Ltd. manufactures three products using three different machines. At present the overheads are charged to products using labour hours. The following statement for the month of September 2019, using the absorption costing method has been prepared:

Particulars	Product X (using machine A)	Product Y (using machine B)	Product Z (using machine C)
Production units	45,000	52,500	30,000
Material cost per unit (₹)	350	460	410
Wages per unit @ ₹80 per hour	240	400	560
Overhead cost per unit (₹)	240	400	560
Total cost per unit (₹)	830	1,260	1,530
Selling price (₹)	1,037.50	1,575	1,912.50

The following additional information is available relating to overhead cost drivers.

Cost driver	Product X	Product Y	Product Z	Total
No. of machine set-ups	40	160	400	600
No. of purchase orders	400	800	1,200	2,400
No. of customers	1,000	2,200	4,800	8,000

Actual production and budgeted production for the month is same. Workers are paid at standard rate. Out of total overhead costs, 30% related to machine set-ups, 30% related to customer order processing and customer complaint management, while the balance proportion related to material ordering.

Required:

(i) COMPUTE overhead cost per unit using activity based costing method.

(ii) DETERMINE the selling price of each product based on activity-based costing with the same profit mark-up on cost.

Ans Total labour hours and overhead cost:

Particulars	Product X	Product Y	Product Z	Total
Production units	45,000	52,500	30,000	1,27,500
Hour per unit	3	5	7	
Total hours	1,35,000	2,62,500	2,10,000	6,07,500
Rate per hour				₹80.00
Total overhead				₹4,86,00,000

Cost per activity and driver

Activity	Machine Set-up	Customer order processing	Customer complaint management	Total
Total overhead (₹)	1,45,80,000	1,45,80,000	1,94,40,000	4,86,00,000
No. of drivers	600	2,400	8,000	
Cost per driver (₹)	24,300	6,075	2,430	

(i) Computation of Overhead cost per unit:

Particulars	Product X	Product Y	Product Z
No. of machine set-ups	40	160	400
Cost per driver (₹)	24,300	24,300	24,300
Total Machine set-up cost (₹) [A]	9,72,000	38,88,000	97,20,000
No. of purchase orders	400	800	1,200
Cost per driver (₹)	6,075	6,075	6,075

Total order processing cost (₹) [B]	24,30,000	48,60,000	72,90,000
No. of customers	1,000	2,200	4,800
Cost per driver (₹)	2,430	2,430	2,430
Total customer complaint management cost (₹) [C]	24,30,000	53,46,000	1,16,64,000
Total Overhead cost (₹) [A+B+C]	58,32,000	1,40,94,000	2,86,74,000
Production units	45,000	52,500	30,000
Cost per unit (₹)	129.60	268.46	955.80

(ii) Determination of Selling price per unit

Particulars	Product X (using machine A)	Product Y (using machine B)	Product Z (using machine C)
Material cost per unit (₹)	350.00	460.00	410.00
Wages per unit @ ₹80 per hour	240.00	400.00	560.00
Overhead cost per unit (₹)	129.60	268.46	955.80
Total cost per unit (₹)	719.60	1,128.46	1,925.80
Profit (25% profit mark-up) (₹)	179.90	282.11	481.45
Selling price (₹)	899.50	1,410.57	2,407.25

Q.40 SP on basis of ABC | MTP May 18

Maximum Production capacity of KM (P) Ltd. is 28,000 units per month. Output at different levels along with cost data is furnished below:

Particulars of Costs	Activity Level		
	16,000 units	18,000 units	20,000 units
Direct Material	₹ 12,80,000	₹ 14,40,000	₹ 16,00,000
Direct labour	₹ 17,60,000	₹ 19,80,000	₹ 22,00,000
Total factory overheads	₹ 22,00,000	₹ 23,70,000	₹ 25,40,000

You are required to CALCULATE the selling price per unit at an activity level of 24,000 units by considering profit at the rate of 25% on sales.

Ans Computation of Overheads

$$\text{Variable Overhead per unit} = \frac{\text{Change in Factory Overheads}}{\text{Change in activity level}}$$

$$= \frac{23,70,000 - 22,00,000}{18,000 - 16,000} \text{ or } \frac{25,40,000 - 23,70,000}{20,000 - 18,000}$$

$$= \frac{1,70,000}{2000} = ₹ 85 \text{ per unit}$$

Fixed Overhead

Activity level = 16,000 units

Particulars	Amount (₹)
Total factory overheads	22,00,000
Less: Variable overheads 16,000 units @ ₹ 85 per unit	(13,60,000)
Fixed Overhead	8,40,000

Computation of Costs at Activity Level 24,000 units

	Per Unit (₹)	Amount (₹)
Direct Material (12,80,000/16,000)	80.00	19,20,000
Direct Labour (17,60,000/16,000)	110.00	26,40,000
Variable Overhead (As calculated above)	85.00	20,40,000
Fixed Overhead		8,40,000
Total Cost		74,40,000

Computation of Selling Price at activity level 24,000 units

Profit required is 25% on selling price, hence cost will be 75%.

$$\text{Therefore desired profit} = \frac{25 \times 74,40,000}{75} = ₹\ 24,80,000$$

Cost of 24,000 units	74,40,000
Desired Profit	24,80,000
Total Sales	99,20,000

Alternatively

$$\text{Total Sales} = \frac{\text{Total Cost}}{75} \times 100 = \frac{74,40,000}{75} \times 100 = ₹\ 99,20,000$$

$$\text{Selling Price per unit} = \frac{\text{Total Sales}}{\text{No of Units}} = \frac{99,20,000}{24,000} = ₹\ 413.33$$

Q.41 Unused Capacity | RTP May 19

MST Limited has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity.

Activity	Cost Driver	Capacity	Cost (₹)
Power	Kilowatt hours	50,000 kilowatt hours	40,00,000
Quality Inspections	Number of Inspections	10,000 Inspections	60,00,000

The company makes three products M, S and T. For the year ended March 31, 20X 9, the following consumption of cost drivers was reported:

Product	Kilowatt hours	Quality Inspections
M	10,000	3,500
S	20,000	2,500
T	15,000	3,000

Required:

(i) PREPARE a statement showing cost allocation to each product from each activity.

(ii) CALCULATE the cost of unused capacity for each activity.

(iii) STATE the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate.

Ans (i) Statement of cost allocation to each product from each activity

	Product			
	M (₹)	S (₹)	T (₹)	Total (₹)
Power (Refer to working note)	8,00,000 (10,000 kWh × ₹80)	16,00,000 (20,000 kWh × ₹80)	12,00,000 (15,000 kWh × ₹80)	36,00,000
Quality Inspections (Refer to working note)	21,00,000 (3,500 inspections × ₹600)	15,00,000 (2,500 inspections × ₹600)	18,00,000 (3,000 inspections × ₹600)	54,00,000

Working Note:

Rate per unit of cost driver:

Power : (₹40,00,000 ÷ 50,000 kWh) = ₹80/kWh

Quality Inspection : (₹60,00,000 ÷ 10,000 inspections) = ₹600 per inspection

(ii) Calculation of cost of unused capacity for each activity:

	(₹)
Power (₹40,00,000 – ₹36,00,000)	4,00,000
Quality Inspections (₹60,00,000 – ₹54,00,000)	6,00,000
Total cost of unused capacity	10,00,000

(iii) Factors management consider in choosing a capacity level to compute the budgeted fixed overhead cost rate:

- Effect on product costing & capacity management
- Effect on pricing decisions.
- Effect on performance evaluation
- Effect on financial statements
- Regulatory requirements.
- Difficulties in forecasting for any capacity level.

6 CHAPTER MARGINAL COSTING

Q.1 MOS/BEP/Pv ratio calc | PY May 18

Following figures have been extracted from the books of M/s. RST Private Limited:

Financial Year	Sales (₹)	Profit/Loss (₹)
2016-17	4,00,000	15,000(loss)
2017-18	5,00,000	15,000 (Profit)

You are required to calculate:
(i) Profit Volume Ratio
(ii) Fixed Costs
(iii) Break Even Point
(iv) Sales required to earn a profit of ₹ 45,000.
(v) Margin of Safety in Financial Year 2017-18.

Ans.

	Sales (₹)	Profit (₹)
Year 2016	4,00,000	15,000 (loss)
Year 2017	5,00,000	15,000 (profit)
Difference	1,00,000	30,000

(i) $\text{P/V Ratio} = \frac{\text{Difference in profit}}{\text{Difference in Sales}} \times 100 = \frac{30,000}{1,00,000} \times 100 = 30\%$

(ii) Contribution in 2016 (4,00,000 x 30%) 1,20,000
Add: Loss 15,000
Fixed Cost* 1,35,000
*Contribution = Fixed cost + Profit
∴ Fixed cost = Contribution – Profit

(iii) Break-even point $= \frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{1,35,000}{30\%} = 4,50,000$

(iv) Sales to earn a profit of 45,000

$\frac{\text{Fixed cost+Desired profit}}{\text{P/V ratio}} = \frac{1,35,000 + 45,000}{30\%} = 6,00,000$

(v) Margin of safety in 2017 –18

Margin of safety = Actual sales – Break-even sales
= 5,00,000-4,50,000 = 50,000

Q.2 Calculate sales for fixed profit | PY May 18

PH Gems Ltd. is manufacturing readymade suits. It has annual production capacity of 2,000 pieces. The Cost Accountant has presented following information for the year to the management:

Particulars	Amount (₹)	Amount (₹)
Sales 1,500 pieces @ ₹ 1,800 per piece		27,00,000
Direct Material	5,94,200	
Direct Labour	4,42,600	
Overheads (40% Fixed)	11,97,000	22,33,800
Net Profit		4,66,300

Evaluate following options:

(i) If selling price is increased by ₹ 200, the sales will come down to 60% of the total annual capacity. Should the company increase its selling price?

(ii) The company can earn a profit of 20% on sales if the company provide TIEPIN with ready-made suit. The cost of each TIEPIN is ₹ 18. Calculate the sales to earn a profit of 20% on sales.

Ans.

(i) Evaluation of Option

Selling Price = 1800 + 200 = 2,000

Sales = 2000 x 60% = 1200 Pieces

	(₹)
Sales (1,200 pieces @ ₹ 2,000)	24,00,000
Less: Direct Material $\left(\frac{5,94,200}{1500 \text{ units}} x 1,200\right)$	4,75,360
Direct Labour $\left(\frac{4,42,600}{1,500 \text{ units}} x 1,200\right)$	3,54,080
Variable Overhead $\left(\frac{11,97,000 x 60\%}{1,500 \text{ units}} x 1,200\right)$	5,74,560
Contribution	9,96,000
Less: Fixed cost (Rs. 11,97,000x40%)	4,78,800
Profit	5,17,200

If price has been increased by 11.11% (increases by 200 on 1,800) sales goes down by 20% (decreased by 300 on 1,500). Change in demand is greater than change in price. Since the variable costs are still same profit has been arose to ₹ 5,17,200 in-spite of high elasticity of demand. PH gems would not be able to sustain this policy on account of change if any in variable costs.

(ii) Evaluation of Option

	(₹)
Sales	1,800.00
Less: Direct Material $\frac{5,94,200}{1500}$	396.13
Cost of Tie PIN	18.00

Direct Labour $\frac{4,42,600}{1,500}$	295.07
Variable Overheads $\left(\frac{11,97,000x60\%}{1,500}\right)$	478.80
Contribution	612.00
P/V Ratio (612/1800x100)	34.0%

Sales to required earn a profit of 20%

Sales = $\frac{4,78,800+0.20 \text{ of Sales}}{34.00\%}$

Sales= 34,20,000 or 1,900 units (34,20,000/1800)

To earn profit 20% on sales of readymade suit (along with TIE PIN) company has to sold 1,900 units i.e. 95% of the full capacity. This sales level of 1,900 units is justified only if variable cost is constant. Any upside in variable cost would impact profitability, to achieve the desired profitability. Production has to be increased but the scope is limited to 5% only.

Q.3 Reorder Qty, Max, Min | PY Nov 18

M/s. SJ Private Limited manufactures 20000 units of a product per month. The cost of placing an order is ₹ 1,500. The purchase price of the raw material is ₹ 100 per kg. The re-order period is 5 to 7 weeks. The consumption of raw materials varies from 200 kg to 300 kg per week, the average consumption being 250 kg. The carrying cost of inventory is 9.75% per annum.

You are required to calculate:

(i) Re-order quantity
(ii) Re-order level
(iii) Maximum level
(iv) Minimum level
(v) Average stock level

Ans. Annual consumption 250 kg × 52 weeks = 13,000 kg.

(i) Re-order Quantity or EOQ = $\sqrt{\frac{2xAXO}{cxi}}$

A = Annual Consumption = 13,000 kg
O = Ordering Cost = . 1,500
C = Cost per kg = ₹. 100
i = carrying cost rate = 9.75%
Carrying cost per kg per annum (c× i) = 100 × 9.75% = ₹. 9.75

$\therefore$ EOQ = $\sqrt{\frac{2x13,000x1,500}{9.75}}$

= $\sqrt{\frac{39000000}{9.75}}$ = 2000 kg.

(ii) Re-order level = Max. re-order period × Max, Consumption
= 7 weeks × 300 kg = 2,100 kg

(iii) Maximum level = Re-order level + Re-order Qty – (Min re-order Period × Min. Consumption)

= 2100 kg + 2000 kg – (5 × 200) kg = 3100 kg.

(iv) Minimum level = Re-order level – (Avg. re-order period × Avg. Consumption)
= 2,100 kg – (6 × 250) kg = 600 kg.

(v) Avg. stock level = $\frac{1}{2}$(max level+min level)

$\frac{1}{2}$(3100+600) = 1850 kg

OR

= Minimum level + $\frac{1}{2}$ROQ

= 600 kg+ $\frac{1}{2}$x2000 kg. = 1600 kg.

Q.4 Calculate sales for fixed | PY Nov 18

A manufacturing company is producing a product 'A' which is sold in the market at ₹45 per unit. The company has the capacity to produce 40000 units per year. The budget for the year 2018-19 projects a sale of 30000 units.

The costs of each unit are expected as under:

	₹
Materials	12
Wages	9
Overheads	6

Margin of safety is ₹ 4,12,500.

You are required to:

(i) calculate fixed cost and break-even point.

(ii) calculate the volume of sales to earn profit of 20% on sales.

Ans

Margin of Safety = $\frac{\text{Pmfit}}{\text{P/V ratio}}$ = 4,12,500

= $\frac{\text{Profit}}{\frac{45-(12+9+6)}{45}}$ =4,12,500

= $\frac{\text{Profit}}{\frac{18}{45}}$ = 4,12,500

Profit = 1,65,000 OR P/V = (18/45) x 100 =40%

(i) Fixed Cost

Profit= (Sales × P/V Ratio) – Fixed Cost

1,65,000 = $\left((30{,}000x45)x\frac{18}{45}\right)$-Fixed Cost

Or Fixed Cost = 5,40,000 – 1,65,000
= ₹ 3,75,000

OR

Profit = Contribution – Fixed Cost=₹ 5,40,000-₹ 3,75,000 =₹.1,65,000

P/V Ratio = $\frac{18}{45}$ =40%

Break-even Point = Total Sales – Margin of Safety

= ₹ (30,000 × 45) – 4,12,500
= 13,50,000 – 4,12,500 =₹ 9,37,500

Q.5 BEP Units & Sales for fixed | PY May 19

M/s Gaurav Private Limited is manufacturing and selling two products: 'BLACK' and 'WHITE' at selling price of ₹ 20 and ₹ 30 respectively.

The following sales strategy has been outlined for the financial year 2019-20:

(i) Sales planned for the year will be ₹ 81,00,000 in the case of 'BLACK' and ₹ 54,00,000 in the case of 'WHITE'.

(ii) The selling price of 'BLACK' will be reduced by 10% and that of 'WHITE' by 20%.

(iii) Break-even is planned at 70% of the total sales of each product.

(iv) Profit for the year to be maintained at ₹ 8,26,200 in the case of 'BLACK' and ₹ 7,45,200 in the case of 'WHITE'. This would be possible by reducing the present annual fixed cost of ₹ 42,00,000 allocated as ₹ 22,00,000 to 'BLACK' and ₹ 20,00,000 to 'WHITE'.

You are required to calculate:

(1) Number of units to be sold of 'BLACK' and 'WHITE' to Break even during the financial year 2019-20.

(2) Amount of reduction in fixed cost product-wise to achieve desired profit mentioned at (iv) above.

Ans **(i)** Statement showing Break Even Sales

Particulars	Black	White
Sales Planned	81,00,000	54,00,000
Selling Price (₹)	18	24
Number of Units to be sold	4,50,000	2,25,000
Break Even sales (in Units),70% of total sales	**3,15,00**	**1,57,500**
Or		
Break Even sales (in ₹),70% of total sales	**56,70,00**	**37,80,000**

(ii) Statement Showing Fixed Cost Reduction

Profit to be maintained (₹)	8,26,200	7,45,200
Margin of Safety (70% of Sales) (₹)	24,30,000	16,20,000
PVR (Profit/ Margin of Safety) x 100	34%	46%
Contribution (Sales x 34% or 46%) (₹)	27,54,000	24,84,000
Less: Profit (₹)	8,26,200	7,45,200
Revised Fixed Cost (₹)	**19,27,80**	**17,38,800**
Present Fixed Cost (₹)	22,00,000	20,00,000
Reduction in Fixed Cost	**2,72,20**	**2,61,200**

Q.6 Variable/Fixed Cost | PY Nov 19

When volume is 4,000 units; average cost is ₹ 3.75 per unit. When volume is 5,000 units, average cost is ₹ 3.50 per unit. The Break-Even point is 6,000 units.

Calculate:

(i) Variable Cost per unit

(ii) Fixed Cost and
(iii) Profit Volume Ratio.

Ans

(i) Variable cost per unit = $\frac{\text{Change in Total Cost}}{\text{Change in Units}}$

$$= \frac{(3.50 \times 5{,}000 \text{ units}) - (3.75 \times 4{,}000 \text{ units})}{5{,}000 - 4{,}000}$$

$$= \frac{17{,}500 - 15{,}000}{1{,}000} = \frac{2{,}500}{1{,}000} = 2.5$$

(ii) Fixed cost = Total Cost – Variable cost (at 5,000 units level)
= 17,500-2.5 x 5000 = 5,000

(iii) Contribution per unit = $\frac{\text{Fixed cost}}{\text{BEP(in units)}} = \frac{5{,}000}{6{,}000 \text{units}} = 0.833$

P/V Ratio = $\frac{\text{Contribution per unit}}{\text{Sale price per unit}} = \frac{0.833}{2.5+0.833} = 25\%$

Q.7 Calculate lowest Sp | PY Nov 19

PJ Ltd manufactures hockey sticks. It sells the products at ₹ 500 each and makes a profit of ₹ 125 on each stick. The Company is producing 5,000 sticks annually by using 50% of its machinery capacity.
The cost of each stick is as under:
Direct Material ₹ 150
Direct Wages ₹ 50
Works Overhead ₹ 125 (50% fixed)
Selling Expenses ₹ 50 (25% variable)
The anticipation for the next year is that cost will go up as under:
Fixed Charges 10%
Direct Wages 20%
Direct Material 5%
There will not be any change in selling price.
There is an additional order for 2,000 sticks in the next year.
Calculate the lowest price that can be quoted so that the Company can earn the same profit as it has earned in the current year?

Ans

Selling Price = ₹ 500 Profit = ₹ 125 No of Sticks = 5,000

Particular	Current Year (₹)	Next Year (₹)
Direct Material	150	157.50 (150 + 5%)
Direct Wages	50	60 (50+20%)
Works Overheads	62.50 (125 × 50%)	62.5
Selling Expenses	12.50 (50 × 25%)	12.5

Total Variable Cost	275	292.50
Fixed Cost (62.5 × 5,000) = 3,12,500; (37.5 × 5,000) = 1,87,500	5,00,000	5,50,000

Let: Lowest Price Quoted = K
Now, Sales = Target Profit (5,000 units × ₹ 125) + Variable Cost + Fixed Cost Or, = (5,000 × 500) + (2,000 × K)
= 6,25,000 + 20,47,500 + 5,50,000 Or, K = ₹ 361.25
So, Lowest Price that can be quoted to earn the profit of ₹ 6,25,000 (same as current year) is ₹ 361.25

Q.8 Best Product Mix | PY Nov 20

Moon Ltd. produces products 'X', 'Y' and 'Z' and has decided to analyse it's production mix in respect of these three products - 'X', 'Y' and 'Z'.
You have the following information :

	X	Y	Z
Direct Materials ₹ (per unit)	160	120	80
Variable Overheads ₹ (per unit)	8	20	12

Direct labour :

Departments:	Rate per Hour (₹)	Hours per unit	Hours per unit	Hours per unit
		X	Y	Z
Department-A	4	6	10	5
Department-B	8	6	15	11

From the current budget, further details are as below :

	X	Y	Z
Annual Production at present (in units)	10,000	12,000	20,000
Estimated Selling Price per unit (₹)	312	400	240
Sales departments estimate of possible sales in thecoming year (in units)	12,000	16,000	24,000

There is a constraint on supply of labour in Department-A and its manpower cannot be increased beyond its present level.
Required:
(i) Identify the best possible product mix of Moon Ltd.
(ii) Calculate the total contribution from the best possible product mix.

Ans (i) Statement Showing "Calculation of Contribution/ unit"

Particulars	X (₹)	Y (₹)	Z (₹)
Selling Price (A)	312	400	240
Variable Cost:			
Direct Material	160	120	80

Direct Labour			
Dept. A (Rate x Hours)	24	40	20
Dept. B (Rate x Hours)	48	120	88
Variable Overheads	8	20	12
Total Variable Cost (B)	240	300	200
Contribution per unit (A - B)	**72**	**100**	**40**
Hours in Dept. A	6	10	5
Contribution per hour	12	10	8
Rank	I	II	III

Existing Hours = 10,000 x 6hrs. + 12,000 x 10 hrs. + 20,000 x 5 hrs. = 2,80,000 hrs. Best possible product mix (Allocation of Hours on the basis of ranking)

Produce 'X'	=	12,000 units
Hours Required	=	72,000 hrs (12,000 units × 6 hrs.)
Balance Hours Available	=	2,08,000 hrs (2,80,000 hrs. – 72,000 hrs.)
Produce 'Y' (the Next Best)	=	16,000 units
Hours Required	=	1,60,000 hrs (16,000 units × 10 hrs.)
Balance Hours Available	=	48,000 hrs (2,08,000 hrs. – 1,60,000 hrs.)
Produce 'Z' (balance)	=	9,600 units (48,000 hrs./ 5 hrs.)

(ii) Statement Showing "Contribution"

Product	Units	Contribution/ Unit (₹)	Total Contribution (₹)
X	12,000	72	8,64,000
Y	16,000	100	16,00,000
Z	9,600	40	3,84,000
		Total	**28,48,000**

Q.9 Fixed Cost, Sales, BEP | PY Jan 21

During a particular period ABC Ltd has furnished the following data: Sales ₹ 10,00,000
Contribution to sales ratio 37% and Margin of safety is 25% of sales.
A decrease in selling price and decrease in the fixed cost could change the "contribution to sales ratio" to 30% and "margin of safety" to 40% of the revised sales. Calculate:

(i) Revised Fixed Cost.
(ii) Revised Sales and
(iii) New Break-Even Point.

Ans

(a) Contribution to sales ratio (P/V ratio) = 37%
Variable cost ratio = 100% - 37% = 63%
Variable cost 10,00,000 x 63% = 6,30,000
After decrease in selling price and fixed cost, sales quantity has not changed.
Thus, variable cost is ₹ 6,30,000
Revised Contribution to sales = 30%
Thus, Variable cost ratio = 100%-30% = 70%

Thus, Revised sales = $\frac{6,30,000}{70\%}$ =9,00,000

Revised, Break-even sales ratio = 100% - 40% (revised Margin of safety) = 60%

(i) Revised fixed cost = revised breakeven sales x revised contribution to sales ratio

(ii) Revised sales = ₹ 9,00,000 (as calculated above)

(iii) Revised Break-even point = Revised sales x Revised break-even sales ratio

= ₹ 9,00,000 x 60%

= ₹ 5,40,000

Q.10 BE Sales, Sales t/0 | PY Jan 21

Two manufacturing companies A and B are planning to merge. The details are as follows:

	A	B
Capacity utilisation (%)	90	60
Sales (₹)	63,00,000	48,00,000
Variable Cost (₹)	39,60,000	22,50,000
Fixed Cost (₹)	13,00,000	15,00,000

Assuming that the proposal is implemented, calculate:

(i) Break-Even sales of the merged plant and the capacity utilization at that stage.

(ii) Profitability of the merged plant at 80% capacity utilization.

(iii) Sales Turnover of the merged plant to earn a profit of ₹ 60,00,000.

(iv) When the merged plant is working at a capacity to earn a profit of ₹ 60,00,000, what percentage of increase in selling price is required to sustain an increase of 5% in fixed overheads.

Ans **Workings:**

1. Statement showing computation of Breakeven of merged plant and other required information

S.No.	Particulars	Plan A		Plant B		Merged Plant (100%) (₹)
		Before (90%) (₹)	After (100%)(₹)	Before (60%) (₹)	After (100%) (₹)	
(i)	Sales	63,00,000	70,00,000	48,00,000	80,00,000	1,50,00,000
(ii)	Variable cost	39,60,000	44,00,000	22,50,000	37,50,000	81,50,000
(iii)	Contribution (i - ii)	23,40,000	26,00,000	25,50,000	42,50,000	68,50,000
(iv)	Fixed Cost	13,00,000	13,00,000	15,00,000	15,00,000	28,00,000
(v)	Profit (iii - iv)	10,40,000	13,00,000	10,50,000	27,50,000	40,50,000

2 PV ratio of merged plant = $\frac{\text{Contribution}}{\text{Sales}} \times 100$

$= \frac{68,50,000}{1,50,00,000} \times 100 = 45.67\%$

(i) Break even sales of merged plant = $\frac{\text{Fixed Cost}}{\text{P/V Ratio}}$

$$= \frac{28,00,000}{45.67\%}$$

$$= 61,30,939.34 \text{ (approx..)}$$

$$\text{Capacity utilisation} = \frac{61,30,939.34}{1,50,00,000} \times 100 = 40.88\%$$

(ii) Profitability of the merged plant at 80% capacity utilisation
= (1,50,00,000 x 80%) x P/v ratio-fixed cost
= 1,20,00,000 x 45.67%-28,00,000

(iii) Sales to earn a profit of ₹ 60,00,000

$$\text{Desired sales} = \frac{\text{Fixed Cost + desired profit}}{\text{P/V Ratio}}$$

$$= \frac{28,00,000+60,00,000}{45.67\%}$$

= ₹ 1,92,68,666 (approx.)

(iv) Increase in fixed cost

= ₹ 28,00,000 x 5% = ₹ 1,40,000

Therefore, percentage increase in sales price

$$= \frac{1,40,000}{1,92,68,666} \times 100 = 0.726\% \text{ (approx.)}$$

Q.11 BEP/ Cost Indifference | PY July 21

LR Ltd. is considering two alternative methods to manufacture a new product it intends to market. The two methods have a maximum output of 50,000 units each and produce identical items with a selling price of ₹ 25 each. The costs are:

	Method-1 Semi-Automatic (₹)	Method-2 Fully-Automatic (₹)
Variable cost per unit	15	10
Fixed costs	1,00,000	3,00,000

You are required to calculate:
(1) Cost Indifference Point in units. Interpret your results.
(2) The Break-even Point of each method in terms of units.

Ans **(i)** Cost Indifference Point

	Method-1 and Method- (₹))
Differential Fixed Cost (I)	2,00,000 (3,00,000 - 1,00,000)
Differential Variable Costs (II)	5 (15 - 10)
Cost Indifference Point (I/II) (Differential Fixed Cost / Differential Variable Costs per unit)	**40,000**

Interpretation of Results
At activity level below the indifference points, the alternative with lower fixed costs and higher variable costs should be used. At activity level above the indifference point, alternative with higher fixed costs and lower variable costs should be used.

No. of Product	Alternative to be Chosen
Product ≤ 40,000 units	Method-1, Semi-Automatic
Product ≥ 40,000 units	Method-2, Automatic

(ii) Break Even point (in units)

	Method-1	Method-2
BEP (in units) = Fixed cost / Contribution per unit	$\frac{1,00,000}{(25-15)}$ = 10,000	$\frac{3,00,000}{(25-10)}$ = 20,000

Q.12 BEP/ PV | PY Dec 21

AZ company has prepared its budget for the production of 2,00,000 units. The variable cost per unit is ₹ 16 and fixed cost is ₹ 4 per unit. The company fixes its selling price to fetch a profit of 20% on total cost.
You are required to calculate:
(i) Present break-even sales (in ₹ and in quantity).
(ii) Present profit-volume ratio.
(iii) Revised break-even sales in ₹ and the revised profit-volume ratio, if it reduces its selling price by 10%.
(iv) What would be revised sales- in quantity and the amount, if a company desires a profit increase of 20% more than the budgeted profit and selling price is reduced by 10% as above in point (iii).

Ans

Variable Cost per Unit=₹16
Fixed Cost per Unit =₹ 4, Total Fixed Cost= 2,00,000 units x ₹ 4 = ₹8,00,000 Total Cost per Unit =₹20
Selling Price per Unit=Total Cost+ Profit =₹ 20+₹ 4 =₹ 24 Contribution per Unit=₹ 24-₹16=₹ 8

(i) Present Break-even Sales (Quantity) $= \frac{\text{Fixed Cost}}{\text{Contribution margin per unit}} = \frac{8,00,000}{8}$

= 1,00,000 units

Present Break-even Sales (₹) = 1,00,000 units x ₹ 24 = ₹ 24,00,000

(ii) Present P/V Ratio = $\frac{8}{24} \times 100 = 33.33\%$

(iii) Revised Selling Price per Unit = 24-10% of 24 = 21.60
Revised Contribution per Unit= 21.60-16= 5.60

Revised P/V Ratio = $\frac{5.60}{21.60} \times 100 = 25.926\%$

Revised Break-even point = $\frac{\text{Fixed Cost}}{\text{P/V ratio}} = \frac{8,00,000}{25.926\%} = 30,85,705$

Or

Revised Break-even point (units) = $\frac{\text{Fixed Cost}}{\text{Contributionmarginperunit}} = \frac{8,00,000}{5.60}$ = 1,42,857 units

Revised Break-even point (₹) = 1,42,857 units x 21.60 = 30,85,711

(iv) Present profit =₹ 8,00,000
Desired Profit = 120% of ₹ 8,00,000 =₹ 9,60,000 Sales to earn a profit of ₹ 9,60,000
Total contribution required = 8.00.000 + 9,60,000 = ₹ 17,60,000

$$\frac{\text{Fixed cost+ Desired profit}}{\text{Contribution per unit}} = \frac{8,00,000+9,60,000}{5.60} = 3,14,286 \text{ units}$$

Revised sales (in ₹) = 3,14,286 units x 21.60 = 67,88,578

Q.13 Which M/c to Choose | PY May 22

A skilled worker is paid a guaranteed wage rate of ₹ 150 per hour. The standard time allowed for a job is 10 hours. He took 8 hours to complete the job. He has been paid the wages under Rowan Incentive Plan.
You are required to:
(i) Calculate an effective hourly rate of earnings under Rowan Incentive Plan.
(ii) Calculate the time in which he should complete the job, if the worker is placed under Halsey Incentive Scheme (50%) and he wants to maintain the same effective hourly rate of earnings.

Ans

(i) Calculation of Effective hourly rate of earnings under Rowan Incentive Plan:
Standard time allowed = 10 hours
Time taken = 8 hours; Time saved = 2 hours

	Particulars	Amount (₹)
A	Basic guaranteed wages (₹150×8 hours)	1,200
B	Add: Bonus for time saved $\frac{2x8x150}{10}$	240
C	Total earnings (A+B)	1,440
D	Hours worked	8 hours
E	Effective hourly rate (C÷D)	180

(ii) Let the time taken to complete the job is "T" and the time saved is 10-T
Effective hourly rate under the Halsey Incentive scheme

$$= \frac{(\text{Rate x Hours Worked}) + (\text{Rate x 50\% of Time Saved})}{\text{Hours Worked}} = 180$$

$$= \frac{(150xT)+150\%(10-T)}{T} = 180$$

150T+750-75T = 180T
180T-75T = 750

$$T = \frac{750}{105} = 7.14 \text{ hours}$$

Q.14 Fixed Cost/ BEP | PY May 22

UV Limited started a manufacturing unit from 1st October 2021. It produces designer lamps and sells its lamps at ₹ 450 per unit.
During the quarter ending on 31st December, 2021, it produced and sold 12,000 units and suffered a loss of ₹35 per unit.
During the quarter ending on 31st March, 2022, it produced and sold 30,000 units and earned a profit of ₹ 40 per unit.

You are required to calculate:
(i) Total fixed cost incurred by UV ltd. per quarter.
(ii) Break Even sales value (in rupees)
(iii) Calculate Profit, if the sale volume reaches 50,000 units in the next quarter (i.e., quarter ending on 30th June, 2022).

Ans

	Quarter ending 31st December, 2021 (₹)	Quarter ending 31st March, 2022 (₹)
Sales (No. of units sold x ₹ 450 per unit)	54,00,000	1,35,00,000
Profit (Loss)	(4,20,000) [12,000 × 35]	12,00,000 [30,000 × 40]

$$\text{P/V Ratio} = \frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$$

$$\therefore \frac{16,20,000}{81,00,000} \times 100 = 20\%$$

(i) Fixed Cost= Sales x P/V ratio-profit
=1,35,00,000 x 20%-12,00,000
= 15,00,000
Alternative Presentation for the calculation of Fixed cost

	Quarter ending 31st December, 2021 (₹)	Quarter ending 31st March, 2022 (₹)
Sales (No. of units sold x ₹ 450 per unit)	54,00,000	1,35,00,000
Profit (Loss)	(4,20,000) [12,000 × 35]	12,00,000 [30,000 × 40]
Total cost	58,20,000	1,23,00,000

VC per unit = (1,23,00,000-58,20,000)/ (30,000-12,000)
= 64,80,000/18,000 = 360 per unit
Fixed cost TC – VC 58,20,000 (360 x 12,000 units) 15,00,000

(ii) Break even sales value (in Rupees) = $\frac{\text{Fixed Cost}}{\text{P/V ratio}} \times 100$

$$= \frac{15,00,000}{20\%} = 75,00,000$$

(iii) Profit, if sales reach 50,000 units for the quarter ending 30th June, 2022

	(₹)
Sales (50,000 × ₹ 450)	2,25,00,000
Less: Variable cost	1,80,00,000

Contribution	45,00,000
Less: Fixed cost	15,00,000
Profit	**30,00,000**

Q.15 BEP/ Mos | PY Nov 22

ABC Ltd sells its Product 'Y' at a price of ₹ 300 per unit and its variable cost is ₹ 180 per unit. The fixed costs are ₹ 16,80,000 per year uniformly incurred throughout the year. The Profit for the year is ₹ 7,20,000.
You are required to calculate:
BEP in value (₹) and units.
Margin of Safety
Profits made when sales are 24,000 units.
Sales in value (₹) to be made to earn a net profit of ₹ 10,00,000 for the year.

Ans

(i) Calculation of BEP in value

$$\text{P/V ratio} = \frac{\text{Sales price-Variable Cost}}{\text{Sales}} = \frac{300-180}{300} = 40\%$$

$$\text{Break Even Point in Value (₹)} = \frac{\text{Fixed Cost}}{\text{P/V ratio}} = \frac{16,80,000}{40\%} = 42,00,000$$

$$\text{Break Even Po int in Units} = \frac{\text{Fixed Cost}}{\text{Contribution}} = \frac{16,80,000}{120} = 14,000 \text{ Units}$$

(Alternatively, $\frac{42,00,000}{300}$ = 14,000 units)

(ii) $$\text{Margin of safety (In Amount)} = \frac{\text{Profit}}{\text{P/V ratio}} = \frac{7,20,000}{40\%} = 18,00,000$$

Margin of safety may also be calculated by deducting BEP sales from present sale. Present sale is ₹ 60,00,000 i.e. (16,80,000 + 7,20,000)/40%.

$$\text{Margin of safety (in units)} = \frac{\text{Profit}}{\text{P/V ratio}} = \frac{7,20,000}{40\%} = 18,00,000$$

(iii) Profit when sales are 24,000 units

Particular	(₹)
Contribution (24,000 □ 120)	28,80,000
Less: Fixed cost	16,80,000
Profit	12,00,000

(iv) Sales in value to earn a net profit of ₹10,00,000

$$\frac{\text{Fixed Cost+ Desired profit}}{\text{P/V Ratio}} = \frac{16,80,000+10,00,000}{40\%} = 67,00,000$$

Q.16 Cup Analysis | PY Nov 22

An agriculture based company having 210 hectares of land is engaged in growing three different cereals namely, wheat, rice and maize annually. The yield of the different crops and their selling prices are given below:

	Wheat	Rice	Maize
Yield (in kgs per hectare)	2,000	500	100

Selling Price (₹ per kg)	20	40	250

The variable cost data of different crops are given below:

Crop	Labour charges	Packing Materials	Other variable expenses
Wheat	8	2	4
Rice	10	2	1
Maize	120	10	20

The company has a policy to produce and sell all the three kinds of crops. The maximum and minimum area to be cultivated for each crop is as follows:

Crop	Maximum Area (in hectares)	Minimum Area (in hectares)
Wheat	160	100
Rice	50	40
Maize	60	10

You are required to:

(i) Rank the crops on the basis of contribution per hectare.

(ii) Determine the optimum product mix considering that all the three cereals are to be produced.

(iii) Calculate the maximum profit which can be achieved if the total fixed cost per annum is ₹ 21,45,000. (10 Marks)

(Assume that there are no other constraints applicable to this company)

Ans

(i) Statement showing Ranking of crops on the basis of Contribution per hectare

Sl. No	Particulars	Wheat	Rice	Maize
(I)	Sales price per kg (₹)	20	40	250
(II)	Variable cost* per kg (₹)	14	13	150
(III)	Contribution per kg (₹)	6	27	100
(IV)	Yield (in kgs per hectare)	2,000	500	100
(V)	Contribution per hectare (₹)	12,000	13,500	10,000
(VI)	Ranking	II	I	III

*Variable cost = Labour Charges +Packing Material+ Other Variable Expenses

Therefore, to maximize profits, the order of priority of production would be Rice, Wheat and Maize.

(ii) & (iii) Statement showing optimum product mix considering that all the three cereals are to be produced and maximum profit thereof

Sl. No.	Particulars	Wheat	Rice	Maize	Total
(i)	Minimum Area (in hectare)	100	40	10	150
(ii)	Remaining area (in hectare)				60
(iii)	Distribution of remaining area based on ranking considering Maximum area	50	10	-	60
(iv)	Optimum mix (in hectare)	150	50	10	210

(v)	Contribution per hectare (₹)	12,000	13,500	10,000	
(vi)	Total contribution (₹)	18,00,000	6,75,000	1,00,000	25,75,000
(vii)	Fixed cost (₹)				21,45,000
(viii)	Maximum Profit (₹)				4,30,000

Optimum Product Mix and calculation of maximum profit earned by company can also be presented as below

(ii) Optimum Product Mix:

Particular	Area (in hectares)	Yield (kg per hectare)	Total Production (in kgs)
(a) Maximum of Rice	50	500	25000
(b) Minimum of Maize	10	100	1000
(c) Balance of Wheat	150	2000	300000
	210		326000

(iii) Calculation of maximum profit earned by the company:

	Production (in kgs)	Contribution (₹ per kg)	Total contribution (₹)
(a) Rice	25,000	24	6,75,000
(b) Maize	1,000	100	1,00,000
(c) Wheat	3,00,000	6	18,00,000
Total contribution			25,75,000
Less: Total Fixed Cost per annum			(21,45,000)
Maximum profits earned by the company			4,30,000

Q.17 BEP/ Mos | PY May 23

The following information pertains to ZB Limited for the year:

Profit volume ratio	30%
Margin of Safety (as % of total sales	25%
Fixed cost	₹ 12,60,000

You are required to calculate:

(i) Break even sales value (₹).

(ii) Total sales value (₹) at present,

(iii) Proposed sales value (₹) if company wants to earn the present profit after reduction of 10% in fixed cost,

(iv) Sales in value (₹) to be made to earn a profit of 20% on sales assuming fixed cost remains unchanged,

(v) New Margin of Safety if the sales value at present as computed in (ii) decreased by 12.5%.

Ans

(i) Calculation of Break-even sales in value:

= Fixed Cost ÷ P/V Ratio

= 12,60,000 ÷ 30% = 42,00,000

(ii) **Calculation of Total Sales value:**
Sales value (S) = Break-even Sales + Margin of Safety Or, S = 42,00,000 + 0.25 S
Or, 0.75 S = 42,00,000
Or, S = 42,00,000 ÷ 0.75
Or, Sales = ₹ 56,00,000

(iii) **Calculation of proposed sales value to earn present profit:**
Present profit = Sales – Variable cost – Fixed Cost
= ₹ 56,00,000 – 70% of 56,00,000 – ₹ 12,60,000
= ₹ 56,00,000 – ₹ 39,20,000 – ₹ 12,60,000
= ₹ 4,20,000
Proposed Sales value (S) = 0.7S + (90% of ₹ 12,60,000) + 4,20,000 S = 0.7S + 11,34,000 + 4,20,000
S = 15,54,000 ÷ 0.3 = ₹ 51,80,000

(iv) **Calculation of sales value to earn 20% on sales:**
Sales Value (S) = 0.7 S + 12,60,000 + 0.2S S = 12,60,0000 ÷ 0.10 = ₹ 1,26,00,000

(v) **New Margin of Safety:**
= (Sales – BES) ÷ Sales
= (87.5% of 56,00,000 – 42,00,000) ÷ (87.5% of 56,00,000)
= (49,00,000 – 42,00,000) ÷ 49,00,000
= 7,00,000 ÷ 49,00,000 = 14.29%

Or
= (Sales – BES)
= (87.5% of 56,00,000 – 42,00,000)
= ₹ 7,00,000

Q.18 Cup Analysis | PY May 23

MNP Company Limited produces two products 'A' and 'B'. The relevant cost and sales data per unit of output is as follows.

Particulars	Product A (₹)	Product B (₹)
Direct material	55	60
Direct labour	35	45
Variable factory overheads	40	20
Selling Price	180	175

The availability of machine hours is limited to 55,000 hours for the month. The monthly demand for product 'A' and product 'B' is 5,000 units and 6,000 units, respectively. The fixed expenses of the company are ₹1,40,000 per month. Variable factory overheads are
₹ 4 per machine hour. The company can produce both products according to the market demand.
Required:
Calculate the product mix that generates maximum profit for the company in the situation and also calculate profit of the company.

Ans

Particulars	Product A ₹	Product B ₹

Selling Price	180	175
Variable cost:		
Direct Material	55	60
Direct labour	35	45
Variable factory overheads	40	20
	130	125
Contribution	50	50
Machine hour (p.u.)	10	5
Contribution per hour	**5**	**10**
Rank	**II**	**I**

Calculation of Product Mix

Hours available	55,000
Product B (6000 x 5)	**30,000**
Balance Hours	25,000
Product A (2500 x 10)	**25,000**
Balance Hours	0

Calculation of Profit

		₹
Contribution		
A	2500 units x 50	
B	6000 units x 50	4,25,000
Less:	Fixed cost	(1,40,000)
	Profit	**2,85,000**

Q.19 Compute best option | RTP May 18

A company manufactures two types of herbal product, A and B. Its budget shows profit figures after apportioning the fixed joint cost of ₹15 lacs in the proportion of the numbers of units sold. The budget for 2018, indicates:

	A	B
Profit (₹)	1,50,000	30,000
Selling Price / unit (₹)	200	120
P/V Ratio (%)	40	50

Required:

COMPUTE the best option among the following, if the company expects that the number of units to be sold would be equal.

(i) Due to exchange in a manufacturing process, the joint fixed cost would be reduced by 15% and the variables would be increased by 7½ %.

(ii) Price of A could be increased by 20% as it is expected that the price elasticity of demand would be unity over the range of price.

(iii) Simultaneous introduction of both the option, viz, (i) and (ii) above.

Ans

Option (i)

Increase in profit when due to change in a manufacturing process there is reduction in joint fixed cost and increase in variable costs.

	(₹)
Revised Contribution from 12,000 units of A due to 7.5% increase in Variable Cost {12,000 units × (₹200 – ₹129)}	8,52,000
Revised Contribution from 12,000 units of B due to 7.5% increase in Variable Cost {12,000 units × (₹120 – ₹64.50)}	6,66,000
Total Revised Contribution	15,18,000
Less: Fixed Cost (₹15,00,000 – 15% × ₹15,00,000)	12,75,000
Revised Profit	2,43,000
Less: Existing Profit	1,80,000
Increase in Profit	63,000

Option (ii)

Increase in profit when the price of product A increased by 20% and the price elasticity of its demand would be unity over the range of price.

	(₹)
Budgeted Revenue from Product A (12,000 units × ₹200)	24,00,000
Revised Demand (in units) (₹24,00,000 / ₹240)	10,000
Revised Contribution (in ₹) [10,000 units × (₹240 – ₹120)]	12,00,000
Less: Existing Contribution (12,000 units × ₹80)	9,60,000
Increase in Profit (Contribution)	2,40,000

*Note: Since Price Elasticity of Demand is 1, therefore the Revenue in respect of Products will remain same.

Option (iii)

Increase in profit on the simultaneous introduction of above two options.

	(₹)
Revised Contribution from Product A [10,000 units × (₹240 – ₹129)]	11,10,000
Revised Contribution from Product B [12,000 units × (₹120 – ₹64.50)]	6,66,000
Total Revised Contribution	17,76,000
Less: Revised Fixed Cost	12,75,000
Revised Profit	5,01,000
Less: Existing Profit	1,80,000
Increase in Profit	3,21,000

A comparison of increase in profit figures under above three options clearly indicates that the option (iii) is the best as it increases the profit of the concern by ₹3,21,000.

Note: The budgeted profit / (loss) for 2018 in respect of products A and B should be ₹ 2,10,000 and (₹30,000) respectively instead of ₹ 1,50,000 and ₹ 30,000.

Workings

1. Contribution per unit of each product:

	Product	
	A (₹)	B (₹)
Contribution per unit	80	60
(Sales × P/V Ratio)	(₹200 × 40%)	(₹120 × 50%)

2. Number of units to be sold:

Total Contribution – Fixed Cost = Profit

Let x be the number of units of each product sold, therefore:

(80x + 60x) – ₹15,00,000	=	₹1,50,000 + ₹30,000
Or x	=	12,000 units

Q.20 BEP in cost & E | RTP Nov 18

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

Ans

We know that S – V = F + P (S - Sales, V - Variable cost, F - Fixed cost and P - Profit/loss)

Suppose variable cost = x per unit Fixed Cost = y

When sales is 8,000 units, then

15 x8,000 - 8,000 x = y - 40,000..... (1)

When sales volume raised to 20,000 units, then

15 x 20,000 - 20,000 x = y + 80,000..... (2)

Or, 1,20,000 – 8,000 x = y – 40,000..... (3)

And 3,00,000 – 20,000 x = y + 80,000..... (4)

From (3) & (4) we get x = ₹ 5. Variable cost per unit = ₹ 5

Putting this value in 3rd equation:

1,20,000 – (8,000 x5) = y 40,000

or y = ₹ 1,20,000

Fixed Cost = ₹ 1,20,000

$$\text{P/V ratio} = \frac{S-V}{S} = \frac{15-5}{15} \times 100 = \frac{200}{3} = 66\frac{2}{3}\%$$

Suppose break-even sales = x

15x – 5x = 1,20,000 (at BEP, contribution will be equal to fixed cost) x = 12,000 units.

Or Break-even sales in units = 12,000

Break-even sales in rupees = 12,000 x₹ 15 = ₹ 1,80,000

Q.21 BEP/ Pv ratio/ Sales for | RTP May 19

MNP Ltd sold 2,75,000 units of its product at ₹ 375 per unit. Variable costs are ₹ 175 per unit (manufacturing costs of ₹140 and selling cost ₹35 per unit). Fixed costs are incurred uniformly throughout the year and amount to ₹3,50,00,000 (including depreciation of

₹ 1,50,00,000). there are no beginning or ending inventories.

Required:

(i) COMPUTE breakeven sales level quantity and cash breakeven sales level quantity.

(ii) COMPUTE the P/V ratio.

(iii) COMPUTE the number of units that must be sold to earn an income (EBIT) of ₹ 25,00,000.

(iv) COMPUTE the sales level achieve an after-tax income (PAT) of ₹ 25,00,000. Assume 40% corporate Income Tax rate.

Ans (i) Contribution = ₹375 - ₹175 = ₹200 per unit.

$$\text{Break even Sales Quantity} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}} = \frac{3,50,00,000}{200} = 1,75,000 \text{ units}$$

$$\text{Cash Break even Sales Qty} = \frac{\text{Cash Fixed Cost}}{\text{Contribution margin per unit}} = \frac{2,00,00,000}{200} = 1,00,000 \text{ units.}$$

(ii) $\text{P/V ratio} = \frac{\text{Contribution / unit}}{\text{Selling Price / unit}} \times 100 = \frac{200}{375} \times 100 = 53.33\%$

(iii) No. of units that must be sold to earn an Income (EBIT) of ₹ 25,00,000

$$\frac{\text{Fixed cost + Desired EBIT level}}{\text{Contribution margin per unit}} = \frac{3,50,00,000 + 25,00,000}{200} = 1,87,500 \text{ units}$$

(iv) After Tax Income (PAT) = ₹25,00,000
Tax rate = 40%

$$\text{Desired level of Profit before tax} = \frac{25,00,000}{60} \times 100 = ₹41,66,667$$

$$\text{Estimate Sales Level} = \frac{\text{Fixed Cost + Desired Profit}}{\text{P / V ratio}}$$

$$\text{Or, } \left(\frac{\text{Fixed Cost + Desired Profit}}{\text{Contribution per unit}} \times \text{SellingPrice per unit}\right)$$

$$= \frac{3,50,00,000 + 41,66,667}{53.33\%} = ₹7,34,42,091$$

Q.22 BEP/ Pv ratio/ Sales for | RTP Nov 19

PVC Ltd sold 55,000 units of its product at ₹375 per unit. Variable costs are ₹175 per unit (manufacturing costs of ₹140 and selling cost ₹35 per unit). Fixed costs are incurred uniformly throughout the year and amount to ₹65,00,000 (including depreciation of ₹15,00,000). There is no beginning or ending inventories.

Required:

(i) COMPUTE breakeven sales level quantity and cash breakeven sales level quantity.
(ii) COMPUTE the P/V ratio.
(iii) COMPUTE the number of units that must be sold to earn an income (EBIT) of ₹5,00,000.
(iv) COMPUTE the sales level achieve an after-tax income (PAT) of ₹5,00,000, assume 40% corporate tax rate..

Ans (i) Contribution = ₹375 - ₹175 = ₹200 per unit.

$$\text{Break even Sales Quantity} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}} = \frac{65,00,000}{200} = 32,500 \text{ units}$$

$$\text{Cash Break even Sales Qty} = \frac{\text{cash Fixed cost}}{\text{Contribution margin per unit}} = \frac{50,00,000}{200} = 25,000 \text{ units.}$$

(ii) $\text{P/V ratio} = \frac{\text{Contribution / unit}}{\text{Selling Price / unit}} \times 100 = \frac{200}{375} \times 100 = 53.33\%$

(iii) No. of units that must be sold to earn an Income (EBIT) of ₹5,00,000

$$\frac{\text{Fixed cost + Desired EBIT level}}{\text{Contribution margin per unit}} = \frac{65,00,000 + 5,00,000}{200} = 35,000 \text{ units}$$

(iv) After Tax Income (PAT) = ₹5,00,000
Tax rate = 40%

$$\text{Desired level of Profit before tax} = \frac{5,00,000}{60} \times 100 = ₹8,33,333$$

$$\text{Estimate Sales Level} = \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V ratio}}$$

$$\text{Or, } \left(\frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Contribution per unit}} \times \text{Selling Price per unit}\right)$$

$$\frac{65,00,000 + 8,33,333}{53.33\%} = ₹1,37,50,859$$

Q.23 BEP/ Mos/Sales for profit | RTP May 20

A Ltd. manufacture and sales its product R-9. The following figures have been collected from cost records of last year for the product R-9:

Elements of Cost	Variable Cost portion	Fixed Cost
Direct Material	30% of Cost of Goods Sold	--
Direct Labour	15% of Cost of Goods Sold	--
Factory Overhead	10% of Cost of Goods Sold	₹ 2,30,000
Administration Overhead	2% of Cost of Goods Sold	₹ 71,000
Selling & Distribution Overhead	4% of Cost of Sales	₹ 68,000

Last Year 5,000 units were sold at ₹185 per unit. From the given DETERMINE the followings:

(i) Break-even Sales (in rupees)

(ii) Profit earned during last year

(iii) Margin of safety (in %)

(iv) Profit if the sales were 10% less than the actual sales.

(Assume that Administration Overhead is related with production activity)

Ans

(1) Calculation of Cost of Goods Sold (*COGS*):

COGS = DM + DL + FOH + AOH

COGS = {0.3 *COGS* + 0.15 *COGS* + (0.10 *COGS* + ₹ 2,30,000) + (0.02 *COGS* + ₹ 71,000)}

Or, *COGS* = 0.57 *COGS* + ₹ 3,01,000

$$\text{Or, } COGS = \frac{3,01,000}{0.43} = ₹\ 7,00,000$$

(2) Calculation of Cost of Sales (*COS*):

COS = *COGS* + S&DOH

COS = *COGS* + (0.04 *COS* + ₹ 68,000)

Or, *COS* = ₹ 7,00,000 + (0.04 *COS* + ₹ 68,000)

$$\text{Or, } COS = \frac{7,68,000}{0.96} = ₹\ 8,00,000$$

(3) Calculation of Variable Costs:

Direct Material-	(0.30 × ₹ 7,00,000)	₹ 2,10,000
Direct Labour-	(0.15 × ₹ 7,00,000)	₹ 1,05,000
Factory Overhead-	(0.10 × ₹ 7,00,000)	₹ 70,000
Administration OH-	(0.02 × ₹ 7,00,000)	₹ 14,000
Selling & Distribution OH	(0.04 × ₹ 8,00,000)	₹ 32,000
		₹ 4,31,000

(4) Calculation of total Fixed Costs:

Factory Overhead-	₹ 2,30,000
Administration OH-	₹ 71,000
Selling & Distribution OH	₹ 68,000
	₹ 3,69,000

(5) Calculation of P/V Ratio:

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{\text{Sales} - \text{Variable Costs}}{\text{Sales}} \times 100$$

$$= \frac{(185 \times 5{,}000 \text{ units}) - 4{,}31{,}000}{185 \times 5{,}000 \text{units}} \times 100 = 53.41\%$$

(i) Break-Even Sales

$$\frac{\text{Sales} - \text{Breakeven sales}}{\text{Sales}} = \frac{3{,}69{,}000}{53.41\%} = ₹6{,}90{,}882$$

(ii) Profit earned during the last year

= (Sales – Total Variable Costs) – Total Fixed Costs

= (₹9,25,000 - ₹4,31,000) - ₹3,69,000

= ₹1,25,000

(iii) Margin of Safety (%)

$$= \frac{\text{Fixed Costs}}{\text{P / V Ratio}} \times 100$$

$$= \frac{9{,}25{,}000 - 6{,}90{,}882}{9{,}25{,}000} \times 100 = 25.31\%$$

(iv) Profit if the sales were 10% less than the actual sales:

Profit = 90% (₹9,25,000 - ₹4,31,000) - ₹3,69,000

= ₹4,44,600 - ₹3,69,000 = ₹75,600

Q.24 BEP/ Mos/Sales for profit | RTP Nov 20

J Ltd. manufactures a Product-Y. Analysis of income statement indicated a profit of ₹ 250 lakhs on a sales volume of 5,00,000 units. Fixed costs are ₹1,000 lakhs which appears to be high. Existing selling price is ₹680 per unit. The company is considering revising the profit target to ₹ 700 lakhs. You are required to COMPUTE –

(i) Break- even point at existing levels in units and in rupees.

(ii) The number of units required to be sold to earn the target profit.

(iii) Profit with 10% increase in selling price and drop in sales volume by 10%.

(iv) Volume to be achieved to earn target profit at the revised selling price as calculated in (ii) above, if a reduction of 10% in the variable costs and ₹ 170 lakhs in the fixed cost is envisaged.

Ans Sales Volume 5,00,000 Units

Computation of existing contribution

Particulars	Per unit (₹)	Total (₹ In lakhs)
Sales	680	3,400
Fixed Cost	200	1,000
Profit	50	250
Contribution	250	1,250
Variable Cost (Sales – Contribution)	430	2,150

(i) Break even sales in units = $\frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{10,00,00,000}{250}$ = 4,00,000 units

Break even sales in rupees = 4,00,000 units × ₹ 680 = ₹ 2,720 lakhs OR

P/V Ratio = $\frac{250}{680}$ x100 = 36.76%

B.EP (Rupees) = $\frac{\text{Fixed Cost}}{\text{P / V Ratio}} = \frac{10,00,00,000}{36.76\%}$ =₹ 2,720 lakhs (approx.)

(ii) Number of units sold to achieve a target profit of ₹700 lakhs:

Desired Contribution = Fixed Cost + Target Profit

= 1,000 L + 700 L = 1,700 L

Number of units to be sold = $\frac{\text{Desired Contribution}}{\text{Contribution per unit}} = \frac{17,00,00,000}{250}$ = 6,80,000 units

(iii) Profit if selling price is increased by 10% and sales volume drops by 10%:

Existing Selling Price per unit = ₹ 680

Revised selling price per unit = ₹ 680 × 110% = ₹748

Existing Sales Volume = 5,00,000 units

Revised sales volume = 5,00,000 units – 10% of 5,00,000 = 4,50,000 units.

Statement of profit at sales volume of 4,50,000 units @ ₹ 748 per unit

Particulars	Per unit (₹)	Total (₹ In lakhs)
Sales	748	3,366
Less: Variable Costs	430	1,935
Contribution	318	1,431
Less: Fixed Cost		1,000
Profit		431

(iv) Volume to be achieved to earn target profit of ₹700 lakhs with revised selling price and reduction of 10% in variable costs and ₹170 lakhs in fixed cost:

Revised selling price per unit = ₹748

Variable costs per unit existing = ₹430

Revised Variable Costs

Reduction of 10% in variable costs = ₹ 430 – 10% of 430

= ₹ 430 – ₹43

= ₹387

Total Fixed Cost (existing) = ₹ 1,000 lakhs

Reduction in fixed cost = ₹ 170 lakhs

Revised fixed cost = ₹ 1,000 lakhs – ₹ 170 lakhs = ₹830 lakhs

Revised Contribution (unit) = Revised selling price per unit – Revised Variable Costs per units

Revised Contribution per unit = ₹ 748 – ₹ 387 = ₹ 361

Desired Contribution = Revised Fixed Cost + Target Profit

= ₹ 830 lakhs + ₹700 lakhs = ₹1,530 lakhs

No. of units to be sold = $\frac{\text{Desired Contribution}}{\text{Contribution per unit}} = \frac{15,30,00,000}{361}$ = 4,23,823 units

Q.25 Pv ratio/BEP/Total Contri | RTP May 22

A Limited manufactures three different products and the following information has been collected from the books of accounts:

	Products		
	S	T	U
Sales Mix	25%	35%	40%
Selling Price	₹ 600	₹800	₹400
Variable Cost	₹ 300	₹400	₹240
Total Fixed Costs			₹ 36,00,000
Total Sales			₹ 1,20,00,000

The company has currently under discussion, a proposal to discontinue the manufacture of Product U and replace it with Product M, when the following results are anticipated:

	Products		
	S	T	M
Sales Mix	40%	35%	25%
Selling Price	₹ 600	₹ 800	₹ 600
Variable Cost	₹ 300	₹ 400	₹ 300
Total Fixed Costs			₹ 36,00,000
Total Sales			₹ 1,28,00,000

Required:

(i) COMPUTE the PV ratio, total contribution, profit and Break-even sales for the existing product mix.

(ii) COMPUTE the PV ratio, total contribution, profit and Break-even sales for the proposed product mix

Ans

(i) Computation of PV ratio, contribution, profit and break-even sales for existing product mix

	Products			Total
	S	T	U	
Selling Price (₹)	600	800	400	
Less: Variable Cost (₹)	300	400	240	
Contribution per unit (₹)	300	400	160	
P/V Ratio (Contribution/Selling price)	50%	50%	40%	
Sales Mix	25%	35%	40%	
Contribution per rupee of sales (P/V Ratio × Sales Mix)	12.5%	17.5%	16%	46%
Present Total Contribution (₹1,20,00,000 × 46%)				₹ 55,20,000
Less: Fixed Costs				₹ 36,00,000
Present Profit				₹ 19,20,000
Present Break Even Sales (₹ 36,00,000/0.46)				₹ 78,26,087

(ii) Computation of PV ratio, contribution, profit and break-even sale for proposed product mix

	Products	

	S	T	M	Total
Selling Price (₹)	600	800	600	
Less: Variable Cost (₹)	300	400	300	
Contribution per unit (₹)	300	400	300	
P/V Ratio (Contribution/Selling price)	50%	50%	50%	
Sales Mix	40%	35%	25%	
Contribution per rupee of sales (P/V Ratio x Sales Mix)	20%	17.5%	12.5%	
				50%
Proposed Total Contribution (₹ 1,28,00,000 x 50%)				₹ 64,00,000
Less: Fixed Costs				₹ 36,00,000
Proposed Profit				₹ 28,00,000
Proposed Break- Even Sales (₹ 36,00,000/0.50)				₹ 72,00,000

Q.26 Special order, Minimum price | RTP Nov 22

(a) RPP Manufacturers is approached by an international customer for one-time special order similar to one offered to its domestic customers. Per unit data for sales to regular customers is provided below:

Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Fixed manufacturing support	₹ 1092
Total manufacturing costs	₹ 2604
Markup (50%)	₹ 1302
Targeted selling price	₹ 3906

It is provided that RPP Manufacturers has excess capacity. Required:

(i) WHAT is the full cost of the product per unit?

(ii) WHAT is the contribution margin per unit?

(iii) WHICH costs are relevant for making the decision regarding this one-time special order? WHY?

(iv) For RPP Manufacturers, WHAT is the minimum acceptable price of this one- time-special order only

(v) For this one-time-only special order, SHOULD RPP Manufacturers consider a price of ₹ 2100 per unit? WHY or why not?

(b) The lab corner of Newlife Hospital Trust operates two types of specialist MRI scanning machine- MR10 and MR59. Following details are estimated for the next period:

Machine	MR10	MR59
Running hours	1,100	2,000
	(₹)	(₹)
Variable running costs excluding special technology	68,750	1,60,000
Fixed Costs	50,000	2,43,750

A brain scan is normally carried out on machine type MR10. This task uses special technology costing ₹ 100 each and takes four hours of machine time. Because of the nature of the process, around 10% of the scans produce blurred and therefore useless results.

Required:

(i) CALCULATE the total cost of a satisfactory brain scan on machine type MR10.

(ii) Brain scans can also be done on machine type MR59 and would take only 1.8 hours per scan with a reduced reject rate of 6%. However, the cost of the special technology would be ₹ 137.50 per scan. ADVISE which type should be used, assuming sufficient capacity is available on both types of machines. Consider fixed costs will remain unchanged.

Ans (a) (i) Full cost of the product per unit

Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Fixed manufacturing support	₹ 1092
Total manufacturing costs	₹ 2604

(ii) Contribution margin per unit

Selling price	₹ 3906
Less: Variable costs	
Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Contribution margin per unit	₹ 2394

(iii) Costs for decision making are those costs that differ between alternatives, which in this situation are the incremental costs.

Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Total incremental costs	₹ 1512

(iv) Minimum acceptable price would be the incremental costs in the short term i.e. ₹ 1512

(v) Yes, RPP Manufacturers may consider a price of ₹ 2100 per unit because this price is greater than the minimum acceptable price.

(b) (i)

Particulars	(₹)
Variable cost per running hour of Machine MR10 (₹ 68,750/1100 hours)	62.50
Fixed cost (₹ 50,000/1100 hours)	45.46
Cost of brain scan on Machine MR10:	(₹)
xVariable machine cost (4 hours × ₹ 62.50)	250.00
Special technology	100.00
Total variable cost	350.00
Fixed machine cost (4 hours × ₹ 45.46)	181.84

Total cost of a scan	531.84
Total cost of a satisfactory scan (₹ 531.84/0.9)	590.93

(ii) It is given that fixed cost will remain unchanged and thus they are not relevant for the decision. The relevant costs would be the incremental costs of an additional scan:

Machine MR10:	(₹)
Variable cost per scan	350.00
Variable cost per satisfactory scan (₹ 350/0.9)	388.89
Machine MR59:	(₹)
Variable machine cost per scan (₹ 1,60,000 / 2000 hours × 1.8 hours)	144.00
Special technology	137.50
Variable cost per scan	281.50
Variable cost per satisfactory scan (₹ 281.50/0.94)	299.47

The relevant costs per satisfactory scan are cheaper on Machine MR59 and therefore brain scans should be undertaken on said machine.

Q.27 Break even point | RTP May 23

The following data are available from the budget records of Finesign Women's Handbag Company for the forthcoming budget period.

	₹
Selling Price per unit	1000
Variable cost per unit:	
Cost of Material used	750.00
Sales commission	50.00
Total Variable Cost	800.00
Annual fixed expenses:	
Rent	7,00,000
Salaries	11,00,000
Other fixed expenses	5,00,000
Total Fixed Cost	23,00,000

Although the firm manufactures Bags with different styles, they have identical purchase costs and selling price.
Requirement:

(a) What is the annual break-even point both in terms of units and value?

(b) If the store manager is paid 1 per cent commission on sales, what would be the annual break-even point both in terms of units and value?

(c) If the firm decides to pay a fixed salary of ₹ 9,00,000 in lieu of sales commission, what would be the annual break-even point in terms of units and value.Considering break-even point in requirement (a), If the stores manager is paid 2 per cent commission on each bag sold in excess of the break-even point, what would be the profit if 20000 bags were sold.

Ans (a) P/V ratio: $\frac{\text{Sales perunit} - \text{Variable Cost per unit}}{\text{Selling priceper unit}} \times 100$

$$= \frac{1000 - 800}{1000} \times 100$$

$$= \frac{200}{1000} \times 100 = 20\%$$

Annual BEP in units $\frac{\text{Annual fixed cost}}{\text{Contribution per unit}}$

$$= \frac{23,00,000}{200} = 11,500 \text{ units}$$

Annual BEP in value: $\frac{\text{Annual fixed cost}}{\text{P / V ratio}}$

$$\frac{23,00,000}{20\%} = ₹1,15,00,000$$

(b) Revised P/V ratio and BEP :

commission on sales per unit= 1% of 1,000= ₹10

So, P/V ratio : $\frac{1000 - (750 + 50 + 10)}{1000}$

$$= \frac{190}{1000} \times 100 = 19\%$$

BEP in terms of units: $\frac{\text{Annual fixed cost}}{\text{Contribution per unit}}$

$$= \frac{29,00,000}{190} = 12,106 \text{ units}$$

BEP in terms of value: $\frac{\text{Annual fixed cost}}{\text{P / V}}$

$$\frac{23,00,000}{19\%} = ₹1,21,05,263$$

(c) Break-even point under fixed salary plan:

$$\text{P/V ratio} = \frac{\text{Contribution per unit}}{\text{Selling price per unit}} = \frac{1000 - 750}{1000} \times 100 = \frac{250}{1000} \times 100 = 25\%$$

Revised fixed cost

Original fixed cost	₹ 23,00,000
Proposed fixed salary	₹ 9,00,000
Total	₹ 32,00,000

BEP in terms of units: $\frac{\text{Annual fixed cost}}{\text{Contribution per unit}} = \frac{32,00,000}{250} = 12.800 \text{ units}$

BEP in terms of value: $\frac{\text{Annual fixed cost}}{\text{P / v ratio}} = \frac{32,00,000}{25\%} = 1,28,00,000$

(d) Annual break-even point under requirement (a) is 11,500 units.

Margin of safety at sales volume of 20,000 unit of bags (20,000 – 11,500) = 8500 units

Contribution on sales beyond break-even sales:

Revised contribution per unit: 200 – (2% of 1000) = 180
Profit = Margin of safety (in units) × Contribution per unit

= 8500 × 180 = ₹ 15,30,000

Q.28 Break even volume, more | RTP Nov 23 

A dairy product company manufacturing baby food with a shelf life of one year furnishes the following information:

(i) On 1st April, 2023, the company has an opening stock of 20,000 packets whose variable cost is ₹ 180 per packet.

(ii) In 2022-23, production was 1,20,000 packets and the expected production in 2023-24 is 1,50,000 packets. Expected sales for 2023-24 is 1,60,000 packets.

(iii) In 2022-23, fixed cost per unit was ₹ 60 and it is expected to increase by 10% in 2023-24. The variable cost is expected to increase by 25%. Selling price for 2023-24 has been fixed at ₹ 300 per packet.

You are required to calculate the Break-even volume in units for 2023-24.

Ans Working Notes:

Particulars	2022-23 (₹)	2023-24 (₹)
Fixed Cost	72,00,000 (₹ 60 × 1,20,000 units)	79,20,000 (110% of ₹ 72,00,000)
Variable Cost	180	225 (125% of ₹ 180)

Calculation of Break-even Point (in units):

Since, shelf life of the product is one year only, hence, opening stock is to be sold first.

	(₹)
Total Contribution required to recover total fixed cost in 2023- 24 and to reach break-even volume.	79,20,000
Less: Contribution from opening stock {20,000 units × (₹ 300 – ₹ 180)}	24,00,000
Balance Contribution to be recovered	55,20,000

Units to be produced to get balance contribution

$= \frac{55,20,000}{300 - 225} = 73,600$ packets.

Break-even volume in units for 2023-24

	Packets
From 2023-24 production	73,600

Add: Opening stock from 2022-23	20,000
	93,600

Q.29 BEP/ no of units for profit | MTP May 18

SK Ltd. engaged in the manufacture of tyres. Analysis of income statement indicated a profit of ₹150 lakhs on a sales volume of 50,000 units. The fixed cost is ₹ 850 lakhs which appears to be high. Existing selling price is ₹ 3,400 per unit. The company is considering to revise the profit target to ₹ 350 lakhs. You are required to COMPUTE –

(i) Break-even point at existing levels in units and in rupees.

(ii) The number of units required to be sold to earn the target profit.

(iii) Profit with 15% increase in selling price and drop in sales volume by 10%.

(iv) Volume to be achieved to earn target profit at the revised selling price as calculated in (ii) above, if a reduction of 8% in the variable costs and ₹ 85 lakhs in the fixed cost is envisaged.

Ans

Sales Volume 50,000 Units

Computation of existing contribution

Particulars	Per unit (₹)	Total (₹ in lakhs)
Sales	3,400	1,700
Fixed Cost	1,700	850
Profit	300	150
Contribution	2,000	1,000
Variable Cost	1,400	700

(i) Break even sales in units = $\frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{8,50,00,000}{2,000}$ = 42,500 units

Break even sales in rupees = 42,500 units x ₹ 3,400 = ₹ 1,445 lakhs

OR

P/V Ratio= $\frac{2,000}{3,400}$ x100 =58.82%

B.E.P (in rupees) = $\frac{\text{Fixed Cost}}{\text{P / V Ratio}} = \frac{8,50,00,000}{2,000}$ = ₹ 1,445 lakhs (approx.)

(ii) Number of units sold to achieve a target profit of ₹ 350 lakhs:

Desired Contribution = Fixed Cost + Target Profit
= 850 lakhs + 350 lakhs
= 1,200 lakhs

Number of units to be sold= $\frac{\text{Desired Contribution}}{\text{Contribution per unit}} = \frac{12,00,00,000}{2,000}$ =60,000 units

(iii) Profit if selling price is increased by 15% and sales volume drops by 10%

Existing Selling Price per unit = ₹ 3,400

Revised selling price per unit = ₹ 3,400 × 115% = ₹ 3,910 Existing Sales Volume = 50,000 units

Revised sales volume = 50,000 units – 10% of 50,000 = 45,000 units.

Statement of profit at sales volume of 45,000 units @ ₹ 3,910 per unit

Particulars	Per unit (₹)	Total (₹ in lakhs)
Sales	3,910.00	1,759.50

Less: Variable Costs	(1,400.00)	(630.00)
Contribution	2,510.00	1,129.50
Less: Fixed Cost		(850.00)
Profit		279.50

(iv) Volume to be achieved to earn target profit of ₹ 350 lakhs with revised selling price and reduction of 8% in variable costs and ₹ 85 lakhs in fixed cost.

Revised selling price per unit = ₹ 3,910

Variable costs per unit existing = ₹ 1,400

Revised Variable Costs

Reduction of 8% in variable costs = ₹ 1,400 – 8% of 1,400

= ₹ 1,400 – ₹ 112

= ₹ 1,288

Total Fixed Cost (existing) = ₹ 850 lakhs

Reduction in fixed cost = ₹ 85 lakhs

Revised fixed cost = ₹ 850 lakhs – ₹ 85 lakhs = ₹ 765 lakhs

Revised Contribution (unit) = Revised selling price per unit – Revised Variable Costs per units

Revised Contribution per unit = ₹ 3,910 – ₹ 1,288 = ₹ 2,622

Desired Contribution = Revised Fixed Cost + Target Profit

= ₹ 765 lakhs + ₹350 lakhs= ₹1,115 lakhs

No. of units to be sold = $\frac{\text{Desired Contribution}}{\text{Contribution per unit}} = \frac{1,115 \text{ lakh}}{2,622} = 42,525$ units

Q.30 Compute best option | MTP Nov 18(1)

The M-Tech Manufacturing Company is presently evaluating two possible processes for the manufacture of a toy. The following information is available:

Particulars	Process A (Rs.)	Process B (Rs.)
Variable cost per unit	12	14
Sales price per unit	20	20
Total fixed costs per year	30,00,000	21,00,000
Capacity (in units)	4,30,000	5,00,000
Anticipated sales (Next year, in units)	4,00,000	4,00,000

SUGGEST:

1. Which process should be chosen?
2. Would you change your answer as given above, if you were informed that the capacities of the two processes are as follows:
   A - 6,00,000 units; B - 5,00,000 units? STATE the reason?

Ans (1) Comparative Profitability Statements

Particulars	Process- A (Rs.)	Process- B (Rs.)
Selling Price per unit	20.00	20.00
Less: Variable Cost per unit	12.00	14.00

Contribution per unit	8.00	6.00
Total Contribution	32,00,000 (Rs. 8 × 4,00,000)	24,00,000 (Rs. 6 × 4,00,000)
Less: Total fixed costs	30,00,000	21,00,000
Profit	2,00,000	3,00,000
*Capacity (units)	4,30,000	5,00,000
Total Contribution at full capacity	34,40,000 (Rs. 8 × 4,30,000)	30,00,000 (Rs. 6 × 5,00,000)
Fixed Cost	30,00,000	21,00,000
Profit	4,40,000	9,00,000

Process- B should be chosen as it gives more profit as compared to Process-A.

(2)

Particulars	Process- A (Rs.)	Process- B (Rs.)
*Capacity (units)	6,00,000	5,00,000
Total contribution	48,00,000 (Rs. 8 × 6,00,000)	30,00,000 (Rs. 6 × 5,00,000)
Fixed Cost	30,00,000	21,00,000
Profit	18,00,000	9,00,000

If the capacity of the Process A and B is 6,00,000 units and 5,00,000 units respectively then Process-A is giving double profit than Process C. Thus Process A be chosen.
*Note: It is assumed that capacity produced equals sales

Q.31 Simple Over diff scenario sp | MTP Nov 18(1)

Fixed Cost	Rs. 1,20,000
Variable costs	Rs. 3 per unit
Selling price	Rs. 7 per unit
Output	Rs. 50,000 units

CALCULATE the profit for each of the following situation with the above data:
(i) with the data above
(ii) with a 10% increase in output & sales.
(iii) with a 10% increase in fixed costs.
(iv) with a 10% increase in variable costs.
(v) with a 10% increase in selling price.
(vi) taking all the above situations.

Ans (i)

	Rs.
Sales 50,000 units at Rs. 7	3,50,000
Variable cost 50,000 × 3	1,50,000
Contribution 50,000 × 4	2,00,000
Fixed costs	1,20,000
Profit	80,000

.

$$\text{P/V ratio} = \frac{s-v}{s} \times 100 = \frac{7-3}{7} \times 100 = \frac{4}{7} \times 100 = 57.14\%$$

$$\text{BEP (units)} = \frac{F}{\text{contribution per unit}} = \frac{1,20,000}{4} = 30,000 \text{ Units}$$

BEP (Value) = 30,000 Units × 7 = Rs. 2,10,000
Profit Rs. 80,000 (as calculated above)

(ii) with a 10% increase in output & sales i.e., 50,000+ 5,000 = 55,000 units

Contribution 55,000 × Rs. 4 per unit	Rs. 2,20,000
Fixed costs	Rs. 1,20,000
Profit	Rs. 1,00,000

(iii) with a 10% increase in Fixed Cost

Contribution (50,000 ×Rs. 4 per unit)	Rs. 2,00,000
Fixed cost (1,20,000+ 12,000)	Rs. 1,32,000
Profit	Rs 68,000

(iv) with a 10% increase in variable costs

Selling price per unit	7.00
Less: variable cost (3+0.30)	3.30
Contribution per unit	3.70
Total contribution 50,000 × 3.70	1,85,000
Fixed costs	1,20,000
Profit	65,000

(v) with a 10% increase in selling price

Selling price per unit (7.00+0.70)	7.70
Variable cost per unit	3.00
Contribution per unit	4.70
Total contribution 50,000 × Rs. 4.70	2,35,000
Fixed costs	1,20,000
Profit	1,15,000

(vi) Effect of all the four above:-

Sales 55,000 × Rs. 7.70 per unit	Rs. 4,23,500
Variable cost 55,000 × 3.30	Rs. 1,81,500
Contribution 55,000 × 4.40	Rs. 2,42,000
Fixed cost 1,20,000+ 12,000	Rs. 1,32,000
Profit	Rs. 1,10,000

Note: It is assumed that the increased output of 55,000 units has been sold.

Q.32 BEP/ Sales/ no of Units | MTP Nov 18(2)

Arnav Ltd. is producing a single product, has the profit-volume ratio of 40%. The company wishes to increase the selling price by 10% which will increase the variable cost by 5%. The fixed overheads will increase from its present level of Rs.20,00,000 to Rs.30,00,000.
required:

(i) COMPUTE the company's original break-even point sales and the break-even point sales after the increase.
(ii) ESTIMATE the sales value for the firm to make a profit of Rs. 4,50,000 after the increase.

Ans Let us assume that the selling price before increment is Rs.100, the other relevant details are as follows:

Particulars	Before increase	After increase
Selling Price	100	110
Variable Cost	60	63
Contribution	40	47
P/V Ratio	40%	42.73%

(i) Computation of Break-even point sales:

$$\text{Break-even point sales} = \frac{\text{Fixed Overheads}}{\text{P / V ratio}}$$

- Before increase $= \frac{20,00,000}{40\%} =$ Rs. 50,00,000

- After increase $= \frac{30,00,000}{42.73\%} =$ Rs. 70,20,828 (approx.)

(ii) Sales value to make a profit of Rs.4,50,000:

$$= \frac{\text{Fixed Overheads} + \text{Desired profit}}{\text{P / V ratio}} = \frac{30,00,000 + \text{Rs.}4,50,000}{42.73\%} = \text{Rs.}80,73,953$$

Q.33 BEP/ Sales/ no of Units | MTP May 19(1)

M Ltd. has an annual fixed cost of Rs. 98,50,000. In the year 20X8-X9, sales amounted to Rs.7,80,60,000 as compared to Rs.5,93,10,000 in the preceding year 20X7-X8. Profit in the year 20X8-X9 is Rs.37,50,000 more than that in 20X7-X8.

Required:

(i) CALCULATE Break-even sales of the company;
(ii) DETERMINE profit/ loss on a forecasted sales volume of Rs.8,20,00,000.
(iii) If there is a reduction in selling price by 10% in the financial year 20X8-X9 and company desires to earn the same amount of profit as in 20X7-X8, COMPUTE the required sales amount?

Ans (i) $\text{Break-even sales} = \frac{\text{Fixed Cost}}{\text{P / V Ratio}}$

$$\text{P/V Ratio} = \frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100 \text{ or } \frac{37,50,000}{7,80,60,000 - 5,93,10,000} \times 100$$

$$\text{or } \frac{37,50,000}{1,87,50,000} \times 100 \text{ or, } 20\%$$

$$\text{Break-even sales} = \frac{98,50,000}{20\%} = \text{Rs.}4,92,50,000$$

(ii) Profit/ loss = Contribution – Fixed Cost
= Rs.8,20,00,000 × 20% - Rs.98,50,000
= Rs.1,64,00,000 – Rs.98,50,000 = Rs.65,50,000

(iii) To earn same amount of profit in 20X8-X9 as was in 20X7-X8, it has to earn the same amount of contribution as in 20X7-X8.
Sales – Variable cost = Contribution equal to 20X7-X8 contribution Contribution in 20X7-X8 = Sales in 20X7-X8 × P/V Ratio in 20X7-X8
= Rs.5,93,10,000 × 20% = Rs.1,18,62,000
Let the number of units to be sold in 20X8-X9 = X

Sales in 20X8-X9 – Variable cost in 20X8-X9 = Desired Contribution 90 X – 80 X = Rs.1,18,62,000
Or, 10 X = 1,18,62,000
Or, X = 11,86,200 units
Therefore, Sales amount required to earn a profit equals to 20X7-X8 profit
= Rs. 90 × 11,86,200 units = Rs. 10,67,58,000

Q.34 BEP/ Sales/ no of Units | MTP May 19(2)

Yamuna Ltd. manufactures a product, currently utilising 80% capacity with a turnover of Rs.8,00,000 at Rs.25 per unit. The cost data are as under:
Material cost Rs.7.50 per unit, Labour cost Rs.6.25 per unit
Semi-variable cost (Including variable cost of Rs.3.75) per unit Rs.1,80,000.
Fixed cost Rs. 90,000 upto 80% level of output, beyond this an additional Rs. 20,000 will be incurred.
CALCULATE:
(i) Activity level at Break-Even-Point
(ii) Number of units to be sold to earn a net income of 8% of sales
(iii) Activity level needed to earn a profit of Rs. 95,000.

Ans

1. (i) Number of units sold at 80% capacity

$$= \frac{\text{Turnover}}{\text{Selling price p.u.}} = \frac{8,00,000}{25} = 32,000 \text{ units}$$

(ii) Number of units sold at 100% capacity

$$= \frac{32,\ 000 \text{ units}}{80} \times 100 = 40,000 \text{ units}$$

2. Component of fixed cost included in semi-variable cost of 32,000 units.
Fixed cost= {Total semi-variable cost – Total variable cost }
= Rs.1,80,000 – 32,000 units × Rs.3.75
= Rs.1,80,000 – Rs.1,20,000
= Rs.60,000

3. (i) Total fixed cost at 80% capacity
= Fixed cost + Component of fixed cost included in semi—variable cost
(Refer to working note 2)
= Rs.90,000 + Rs.60,000 = Rs.1,50,000
(ii) Total fixed cost beyond 80% capacity
= Total fixed cost at 80% capacity + Additional fixed cost to be incurred
= Rs.1,50,000 + Rs.20,000 = Rs.1,70,000

4. Variable cost and contribution per unit
Variable cost per unit = Material cost + Labour cost + Variable cost component in semi variable cost = Rs.7.50 + Rs.6.25 + Rs.3.75 = Rs.17.50
Contribution per unit = Selling price per unit – Variable cost per unit
= Rs.25 – Rs.17.50 = Rs.7.50

5. Profit at 80% capacity level
= Sales revenue – Variable cost – Fixed cost
= Rs.8,00,000 – Rs.5,60,000 (32,000 units × Rs.17.50) – Rs.1,50,000
= Rs.90,000

(i) Activity level at Break-Even Point

$$\text{Break-even point (units)} = \frac{\text{Fixed cost}}{\text{Contribution per unit}} = \frac{1,50,000}{7.50} = 20,000 \text{ units}$$

(Refer to working notes 3 & 4)

$$\text{Activity level at BEP} = \frac{\text{Break – Even point (units)}}{\text{No. of units at 100\% capacity level}} \times 100$$

(Refer to working note 1(ii))

$$= \frac{20,000 \text{ units}}{40,000 \text{ units}} \times 100 = 50\%$$

(ii) Number of units to be sold to earn a net income of 8% of sales

Let S be the number of units sold to earn a net income of 8% of sales.

Mathematically it means that : (Sales revenue of S units)

= Variable cost of S units + Fixed cost + Net income

$$\text{Or, Rs.25S} = \text{Rs.17.5S} + \text{Rs.1,50,000} + \frac{8}{100} \times (\text{Rs.25S})$$

Or, Rs.25S = Rs.17.5S + Rs.1,50,000 + Rs.2S

Or, S = (Rs.1,50,000/Rs.5.5) units

Or, S = 27,273 units.

(iii) Activity level needed to earn a profit of Rs. 95,000

The profit at 80% capacity level, is Rs. 90,000 which is less than the desired profit of Rs. 95,000, therefore the needed activity level would be more than 80%. Thus the fixed cost to be taken to determine the activity level needed should be Rs.1,70,000 (Refer to Working Note 3 (ii))

Units to be sold to earn a profit of Rs.95,000

$$= \frac{\text{Fixed cost + Desired profit}}{\text{Contribution per unit}}$$

$$= \frac{\text{Rs.1,70,000 + Rs. 95,000}}{\text{Rs. 7.5}}$$

= 35,333.33 units

Activity level needed to earn a profit of Rs.95,000

$$= \frac{35,333.33 \text{ units}}{40,000 \text{ units}} \times 100 = 88.33\%$$

Q.35 BEP/ Break even sales | MTP Nov 19

C.T . Ltd. manufactures and sells a single product X whose selling price is Rs. 100 per unit and the variable cost is Rs. 60 per unit.

(i) If the Fixed Costs for this year are Rs. 24,00,000 and the annual sales are at 60% margin of safety, CALCULATE the rate of net return on sales, assuming an income tax level of40%.

(ii) For the next year, it is proposed to add another product line Y whose selling price would be Rs. 150 per unit and the variable cost Rs. 100 per unit. The total fixed costs are estimated at Rs. 28,00,000. The sales mix of X : Y would be 5 : 3. COMPUTE the break- even sales in units for both the products.

Ans

(i) Contribution per unit = Selling price – Variable cost

= Rs.100 – Rs.60

= Rs.40

$$\text{Break-even Point} = \frac{24,00,000}{40}$$

= 60,000 units

$$\text{Percentage Margin of Safety} = \frac{\text{Actual Sales – Break – even Sales}}{\text{Actual Sales}}$$

$$\text{Or, } 60\% = \frac{\text{Actual Sales – 60,000units}}{\text{Actual Sales}}$$

Actual Sales = 1,50,000 units

	(Rs.)
Sales Value (1,50,000 units × Rs.100)	1,50,00,000
Less: Variable Cost (1,50,000 units ×Rs.60)	90,00,000
Contribution	60,00,000
Less: Fixed Cost	24,00,000
Profit	36,00,000
Less: Income Tax @ 40%	14,40,000
Net Return	21,60,000

Rate of Net Return on Sales = $14.40\% \left(\frac{21,60,000}{1,50,00,000} x100\right)$

(ii) Products

	X (Rs.)	Y (Rs.)
Selling Price per unit	100	150
Variable Cost per unit	60	100
Contribution per unit	40	50

Composite contribution will be as follows:

Contribution per unit $= \left(\frac{40}{8} x5\right) + \left(\frac{50}{8} x3\right)$

= 25 + 18.75 = Rs.43.75

Break-even Sale = 64,000 units $\left(\frac{28,00,000}{43.75}\right)$

Break-even Sales Mix:

X (64,000 units × 5/8) = 40,000 units

Y (64,000 units × 3/8) = 24,000 units

Q.36 P/v ratio/ BEP/ Fixed cost | MTP May 20

A company gives the following information:

Margin of Safety	Rs.7,50,000
Total Cost	Rs.7,75,000
Margin of Safety (Qty.)	15,000 units
Break Even Sales in Units	5,000 units

You are required to CALCULATE:

(i) Selling price per unit

(ii) Profit

(iii) Profit/ Volume Ratio

(iv) Break Even Sales (in Rupees)

(v) Fixed Cost

Ans (i) Selling Price per unit = $\frac{\text{Margin of safety in Rupee value}}{\text{Margin of Safety in Quantity}}$

$$= \frac{\text{Rs } 750{,}000}{15{,}000 \text{units}} = \text{Rs } 50$$

(ii) Profit = Sales Value – Total Cost

Selling price per unit × (BEP units + MoS units) – Total Cost

= Rs.50 × (5,000 + 15,000) units – Rs.7,75,000

= Rs.10,00,000 – Rs.7,75,000 = Rs.2,25,000

(iii) Profit/ Volume (P/V) Ratio = $\frac{\text{Profit}}{\text{Margin of Safety in Rupee value}} x100$

= Rs $\frac{2{,}25{,}000}{7{,}50{,}000} x100 = 30\%$

(iv) Break Even Sales (in Rupees) = BEP units × Selling Price per unit

= 5,000 units × Rs.50 = Rs.2,50,000

(v) Fixed Cost = Contribution – Profit

= Sales Value × P/V Ratio – Profit

= (Rs.10,00,000 × 30%) – Rs.2,25,000

= Rs.3,00,000 – Rs.2,25,000 = Rs.75,000

Q.37 Opportunity Cost | MTP Nov 20

A company can make any one of the 3 products X, Y or Z in a year. It can exercise its option only at the beginning of each year.

Relevant information about the products for the next year is given below.

	X	Y	Z
Selling Price (Rs. / unit)	100	120	120
Variable Costs (Rs. / unit)	60	90	70
Market Demand (unit)	3,000	2,000	1,000
Production Capacity (unit)	2,000	3,000	900
Fixed Costs (Rs.)		3,00,000	

Required

COMPUTE the opportunity costs for each of the products.

Ans

	X	Y	Z
(i) Contribution per unit (Rs.)	40	30	50
(ii) Units (Lower of Production / Market Demand)	2000	2,000	90
(iii) Possible Contribution (Rs.) [I × II]	80,000	60,000	45,000
(iv) Opportunity Cost* (Rs.)	60,000	80,000	80,000

(*) Opportunity cost is the maximum possible contribution forgone by not producing alternative product i.e. if Product X is produced then opportunity cost will be maximum of (Rs. 60,000 from Y, Rs. 45,000 from Z).

Q.38 BEP & Sp per bottle | MTP Nov 20

CanCola, a zero sugar cold drink manufacturing Indian company, is planning to establish a subsidiary company in Nepal to produce coconut flavoured juice. Based on the estimated annual sales of 60,000 bottles of the juice, cost studies produced the following estimates for the Nepalese subsidiary:

	Total Annual Costs (₹)	Percent of Total Annual Cost which is variable
Material	2,70,000	100%
Labour	1,97,000	80%
Factory Overheads	1,20,000	60%
Administration Expenses	52,000	35%

The Nepalese production will be sold by manufacturer's representatives who will receive a commission of 9% of the sale price. No portion of the Indian office expenses is to be allocated to the Nepalese subsidiary. You are required to-

(i) COMPUTE the sale price per bottle to enable the management to realize an estimated 20% profit on sale proceeds in Nepal.

(ii) CALCULATE the break-even point in rupees value sales and also in number of bottles for the Nepalese subsidiary on the assumption that the sale price is ₹ 14 per bottle.

Ans

(i) Computation of Sale Price Per Bottle

Output: 60,000 Bottles

		(₹)
Variable Cost:		
	Material	2,70,000
	Labour (₹ 1,97,000 × 80%)	1,57,600
	Factory Overheads (₹1,20,000 × 60%)	72,000
	Administrative Overheads (₹ 52,000 × 35%)	18,200
	Commission (9% on ₹9,00,000 (Working Note -1))	81,000
Fixed Cost:		
	Labour (₹ 1,97,000 × 20%)	39,400
	Factory Overheads (₹ 1,20,000 × 40%)	48,000
	Administrative Overheads (₹ 52,000 × 65%)	33,800
Total Cost		7,20,000
Profit (20% of ₹ 9,00,000)		1,80,000
Sales Proceeds		9,00,000
Sales Price per bottle Rs $\left(\frac{9,00,000}{60,000}\right)$		15

(ii) Calculation of Break-even Point

Sales Price per Bottle = ₹ 14

Variable Cost per Bottle = $\frac{\text{Rs 5,93,400(workingnote-2)}}{\text{60,000bottles}}$ = 9.89

Contribution per Bottle = 14-9.89 = 4.11

Break -even Point (in number of Bottles) = $\frac{\text{Fixed cost}}{\text{Contributionperbottle}}$

= $\frac{\text{Rs 1,21,200}}{\text{Rs 4.11}}$ = 29,489

Break- even Point (in Sales Value) = 29,489 Bottles x 14
4,12,846

Working Note

(1) Let the Sales Price be 'X'

Commission = $\frac{9X}{100}$

Profit = $\frac{20X}{100}$

$$X = 2,70,000 + 1,57,600 + 72,000 + 18,200 + 39,400 + 48,000 + 33,800 + \frac{9X}{100} + \frac{20X}{100}$$

$$X = 6,39,000 + \frac{9X}{100} + \frac{20X}{100}$$

100X – 9X – 20X = 6,39,00,000

71X = 6,39,00,000

$$X = \frac{6,39,00,000}{71} = 9,00,000$$

(2)

Total Variable Cost	(₹)
Material	2,70,000
Labour	1,57,600
Factory Overheads	72,000
Administrative Overheads	18,200
Commission [(60,000 Bottles × ₹ 14) × 9%]	75,600
	5,93,400

Q.39 BEP, Sales extra Units | MTP May 21

The following information has been obtained from the records of a manufacturing unit:

	Rs.	Rs.
Sales 80,000 units @ Rs. 50		40,00,000
Material consumed	16,00,000	

Variable Overheads	4,00,000	
Labour Charges	8,00,000	
Fixed Overheads	7,20,000	35,20,000
Net Profit		4,80,000

CALCULATE:

(i) The number of units by selling which the company will neither lose nor gain anything.

(ii) The sales needed to earn a profit of 20% on sales.

(iii) The extra units which should be sold to obtain the present profit if it is proposed to reduce the selling price by 20% and 25%.

(iv) The selling price to be fixed to bring down its Break-even Point to 10,000 units under present conditions.

Ans

Workings:

(1) Contribution per unit = Selling price per unit – Variable cost per unit

= Rs. 50 – {Rs. (16,00,000 + 4,00,000 + 8,00,000) ÷ 80,000 units}

= Rs. 50 – Rs. 35 = Rs. 15

(2) Profit-Volume (P/V) Ratio = $\frac{\text{Contribution per unit}}{\text{Selling price per unit}} \times 100 = \frac{15}{50} \times 100 = 30\%$

Calculations:

(i) The number of units to be sold for neither loss nor gain i.e. Break-even units:

$= \frac{\text{Fixed overheads}}{\text{Contribution per unit}} = \frac{7,20,000}{15} = 48,000 \text{ units}$

(ii) The sales needed to earn a profit of 20% on sales:

As we know

S = V + F + P

(S = Sales; V = Variable Cost; F = Fixed Cost; P = Profit)

Suppose Sales units are x then

Rs. 50x = Rs. 35 x + Rs. 7,20,000 + Rs. 10x

Rs. 50x – Rs. 45x = Rs. 7,20,000

Or x = $\frac{7,20,000}{5}$ = 1,44,000 units

Therefore, Sales needed = 1,44,000 units x Rs. 50 = Rs. 72,00,000 to earn a profit of 20% on sales.

(iii) Calculation of extra units to be sold to earn present profit of Rs.4,80,000 under the following proposed selling price:

		When selling price is reduced by	
		20% (Rs.)	25% (Rs.)
	Selling price per unit	40.00 (Rs. 50 × 80%)	37.50 (Rs. 50 × 75%)

	Less: Variable Cost per unit	35.00	35.00
	Contribution per unit	5.00	2.50
	Desired Contribution:		
	Fixed Overheads	7,20,000	7,20,000
	Desired Profit	4,80,000	4,80,000
		12,00,000	12,00,000
(a)	Sales unit for desired contribution $\frac{\text{Deseired}}{\text{Contribution}}$	2,40,000 units	4,80,000 units
		$\left[\frac{12,00,000}{5}\right]$	$\left[\frac{12,00,000}{5}\right]$
(b)	Units presently sold	80,000 units	80,000 units
(c)	Extra units to be sold {(a) – (b)}	1,60,000 units	4,00,000 units

(iv) Sales price to bring down BEP to 10,000 units:

$$\text{B.E.P (Units)} = \frac{\text{Fixedcost}}{\text{Contribution per unit}}$$

$$\text{Or, Contribution per unit} = \frac{\text{Rs}7,20,000}{10,000 \text{ units}} = \text{Rs } 72$$

So, Sales Price (per unit) = Variable Cost + Contribution

= Rs. 35 + Rs. 72 = Rs. 107

Q.40 Identity SP | MTP Dec 21(1)

A factory can produce 1,80,000 units per annum at its 60% capacity. The estimated costs of production are as under:
Direct material ₹ 50 per unit
Direct employee cost ₹ 16 per unit

Ans Statement of Cost

	First three months (₹)	Remaining nine months	Total (₹)
	37,500 units	1,68,750 units	2,06,250 units
Direct material	18,75,000	84,37,500	1,03,12,500
Direct employee cost	6,00,000	27,00,000	33,00,000
Indirect-	3,75,000	16,87,500	20,62,500

expenses			
Indirect – fixed	8,12,500	24,37,500	32,50,000
Indirect- semi-expenses			
- For first three 40,000 p.m.	1,20,000		1,20,000
- For remaining nine months @ ₹ 70,000* p.m.		6,30,000	6,30,000
Total cost	37,82,500	1,58,92,500	1,96,75,000
Desired profit	-	-	10,00,000
Sales value	-	-	2,06,75,000
Average selling price per unit			100.24

* ₹ 40,000 for 50% capacity + ₹ 15,000 for 20% increase in capacity + ₹ 15,000 for 5% increase in capacity (because cost is increased for every 20% increase in capacity or part thereof)

Q.41 Pv ratio/ BEP Sales | MTP Dec 21(1)

A Limited manufactures three different products and the following information has been collected from the books of accounts:

	Products		
	S	T	U
Sales Mix	25%	35%	40%
Selling Price	₹ 600	₹ 800	₹ 400
Variable Cost	₹ 300	₹ 400	₹ 240
Total Fixed Costs			₹ 36,00,000
Total Sales			₹ 1,20,00,000

The company has currently under discussion, a proposal to discontinue the manufacture of Product U and replace it with Product M, when the following results are anticipated:

	Products		
	S	T	M
Sales Mix	40%	35%	25%
Selling Price	₹ 600	₹800	₹600
Variable Cost	₹ 300	₹400	₹300
Total Fixed Costs			₹ 36,00,000
Total Sales			₹1,28,00,000

Required

(i) Compute the PV ratio, total contribution, profit and Break-even sales for the existing product mix.

(ii) Compute the PV ratio, total contribution, profit and Break-even sales for the proposed product mix.

Ans (i) Computation of PV ratio, contribution and break-even sales for existing product mix

	Products			Total
	S	T	U	
Selling Price (₹)	600	800	400	
Less: Variable Cost (₹)	300	400	240	
Contribution per unit (₹)	300	400	160	
P/V Ratio (Contribution/Selling price)	50%	50%	40%	
Sales Mix	25%	35%	40%	
Contribution per rupee of sales (P/V Ratio × Sales Mix)	12.5%	17.5%	16%	46%
Present Total Contribution (₹ 1,20,00,000 × 46%)				₹55,20,000
Less: Fixed Costs				₹36,00,000
Present Profit				₹19,20,000
Present Break Even Sales (₹ 36,00,000/0.46)				₹ 78,26,087

(ii) Computation of PV ratio, contribution and break-even sale for proposed product mix

	Products			
	S	T	M	Total
Selling Price (₹)	600	800	600	
	300	400	300	
	300	400	300	
Less: Variable Cost (₹)	50%	50%	50%	
Contribution per unit	40%	35%	25%	
(₹)				
P/V Ratio (Contribution/Selling	20%	17.5%	12.5%	50%
Proposed Total Contribution	000 x 50%)			₹64,00,000
Less: Fixed Costs				₹36,00,000
Proposed Profit				₹28,00,000
Proposed Break Even Sales (₹36,00,000/0.50)				₹72,00,000

Q.42 BEP/ Mos/ Profit | MTP Dec 21(2)

Amy Ltd. manufacture and sales its product RM. The following figures have been collected from cost records of last year for the product RM:

Elements of Cost	Variable Cost portion	Fixed Cost
Direct Material	30% of Cost of Goods Sold	--
Direct Labour	15% of Cost of Goods Sold	--
Factory Overhead	10% of Cost of Goods Sold	₹ 3,45,000
Administration Overhead	2% of Cost of Goods Sold	₹ 1,06,500
Selling & Distribution Overhead	4% of Cost of Sales	₹ 1,02,000

Last Year, 7,500 units were sold at ₹ 185 per unit. From the given information, DETERMINE the followings:

(i) Break-even Sales (in rupees)
(ii) Profit earned during last year
(iii) Margin of safety (in %)
(iv) Profit if the sales were 10% less than the actual sales.
(Assume that Administration Overhead is related with production activity)

Ans

(1) Calculation of Cost of Goods Sold (COGS):

$COGS = DM + DL + FOH + AOH$

$COGS = \{0.3\ COGS + 0.15\ COGS + (0.10\ COGS + 3,45,000) + (0.02\ COGS + 1,06,500)\}$

$Or,\ COGS = 0.57\ COGS + 4,51,500$

$Or,\ COGS = \frac{4,51,500}{0.43} = 10,50,000$

(2) Calculation of Cost of Sales (COS):

$COS = COGS + S\&DOH$

$COS = COGS + (0.04\ COS + ₹\ 1,02,000)$

$Or\ COS = 10,50,000 + (0.04\ COS + 1,02,000)$

$Or,\ COS = \frac{11,52,000}{0.96} = 12,00,000$

(3) Calculation of Variable Costs:

Direct Material-	(0.30 × ₹ 10,50,000)	₹ 3,15,000
Direct Labour-	(0.15 × ₹ 10,50,000)	₹ 1,57,500
Factory Overhead-	(0.10 × ₹ 10,50,000)	₹ 1,05,000
Administration OH-	(0.02 × ₹ 10,50,000)	₹ 21,000
Selling & Distribution OH	(0.04 × ₹ 12,00,000)	₹ 48,000
		6,46,500

(4) Calculation of total Fixed Costs:

Factory Overhead	3,45,000
Administration OH	1,06,500
Selling & Distribution OH	1,02,000
	5,53,500

(5) Calculation of P/V Ratio:

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{\text{Sales-VariableCosts}}{\text{Sales}} \times 100$$

$$\frac{(185 \times 7{,}500 \text{units}) - 6{,}46{,}500}{185 \times 7{,}500 \text{units}} \times 100$$

$$\frac{13{,}87{,}500 - 6{,}46{,}500}{13{,}87{,}500} \times 100 = 53.41\%$$

(i) Break-Even Sales = $\frac{\text{Fixedcosts}}{\text{P/V Ratio}} = 5{,}53{,}500 = 10{,}36{,}323$

(ii) Profit earned during the last year

= (Sales – Total Variable Costs) – Total Fixed Costs

= (₹ 13,87,500 - ₹ 6,46,500) - ₹ 5,53,500

= 1,87,500

(iii) Margin of Safety (%) = $\frac{\text{Sales-Breakevensales}}{\text{Sales}} \times 100$

$$= \frac{13{,}87{,}500 - 10{,}36{,}323}{13{,}87{,}500} \times 100$$

(iv) Profit if the sales were 10% less than the actual sales:

Profit = 90% (₹ 13,87,500 - ₹ 6,46,500) - ₹ 5,53,500

= ₹ 1,13,400

Q.43 SP/Unit | MTP May 22(1)

The following data relates to the manufacturing project received for the budgeted output of 19,600 units. You are required to CALCULATE the selling price per unit covering a profit of 25% on the selling price.

Direct materials: 40 sq. m. per unit @ ₹ 10.60 per sq. m.

Direct wages: Bonding department 48 hours per unit @ ₹ 25 per hour

Finishing department 30 hours per unit @ ₹ 19 per hour

Budgeted costs and hours per annum-

Variable overhead:

	(₹)	Total hours
Bonding department	15,00,000	10,00,000
Finishing department	6,00,000	6,00,000

Fixed overhead-

	(₹)
Production	15,68,000
Selling and distribution	7,84,000
Administration (General)	3,92,000

Ans **Decision making Cost Sheet (per unit)**

Particulars	(Amount in ₹)	(Amount in ₹)

Direct materials 40 m2 at ₹ 10.60 per m2		424
Direct wages:		
Bonding department- 48 hours at ₹ 25 per hour	1,200	
Finishing department- 30 hours at ₹ 19 per hour	570	1,770
Prime Cost		2,194
Variable overhead:*		
Bonding department- 48 hours at ₹ 1.50 per hour	72	
Finishing department- 30 hours at ₹ 1.00 per hour	30	102
Variable production cost		2,296
Fixed production overhead#		80
Total production cost		2,376
Selling and distribution cost$	40	
Administration cost$	20	60
Total Cost		2,436

Selling price per unit = $2,436 x \frac{100}{75} = 3,248$

Working Notes:

* Variable overhead rates-

Bonding: $\frac{15,00,000}{10,00,000 hours} = 1.50$

Finishing: $\frac{6,00,000}{6,00,000 hours} = 1.00$

Q.44 Pv ratio | MTP May 22(1)

The standard time allowed for a certain piece of work is 240 hours. Normal wage rate is ₹ 75 per hour. The bonus system applicable to the work is as follows:

Percentage of time saved to time allowed (slab rate)	Bonus
(i) Up to the first 20% of time allowed	25% of the corresponding saving in time.
(ii) For and within the next 30% of time allowed	40% of the corresponding saving in time.
(iii) For and within the next 30% of time allowed	30% of the corresponding saving in time.
(iv) For and within the next 20% of time allowed	10% of the corresponding saving in time.

CALCULATE the total earnings of a worker over the piece of work and his earnings per hour when he takes-

(a) 256 hours,

(b) 120 hours, and

(c) 24 hours respectively.

Ans **Calculation of total earnings and earnings per hour:**

	Particulars	(a) Time taken is 256 hours	(b) Time taken is 120 hours	(c) Time taken is 24 hours
A.	Time Allowed	240 hours	240 hours	240 hours
B.	Time taken	256 hours	120 hours	24 hours
C.	Time Saved (A-B)	Nil	120 hours	216 hours
D.	Bonus hours (Refer workings)	Nil	40.80 hours	64.80 hours
E.	Hours to be paid (B+D)	256 hours	160.80 hours	88.80 hours
F.	Wages rate per hour	₹ 75	₹ 75	₹ 75
G.	**Total earnings (E×F)**	**₹ 19,200**	**₹ 12,060**	**₹ 6,660**
H.	**Earnings per hour (G÷B)**	**₹ 75**	**₹ 100.50**	**₹ 277.50**

Working Notes:
Calculation of bonus hours:

	Time saved 120 hours	Time saved 216 hours
For first 20% of time allowed i.e. 48 hours	12 (25% of 48 hours)	12 (25% of 48 hours)
For next 30% of time allowed i..e. 72 hours	28.80 (40% of 72 hours)	28.80 (40% of 72 hours)
For next 30% of time allowed i..e. 72 hours	-	21.60 (30% of 72 hours)
For next 20% of time allowed i..e. 48 hours	-	2.40 (10% of 24 hours)
Bonus hours	**40.80**	**64.80**

Q.45 Calculate Profit | MTP May 22(2)

Company manufacture and sell 3 types of mobile handset. It also manufactures wireless charger for mobile. The company has worked out following estimates for next year.

	Annual Demand (in units)	Selling Price (₹ per unit)	Material cost (₹ per unit)	Labour cost (₹ per unit)
X5	5,000	8,000	2,000	1,000
X6	4,000	9,000	2,500	1,500
X7	3,000	12,000	3,000	2,000
Wireless Charger	15,000	1,500	300	200

To encourage the sale of wireless charger a discount of 10% in its price is being offered if it were to be purchased along with mobile. It is expected that customer buying mobile will also buy the wireless charger. The company factory has an effective capacity of 35,000 labour hours. The labour is paid @ ₹ 500 per hour. Overtime of labour has to be paid at double the normal rate. Other variable cost work out to be 50% of direct labour cost and fixed cost is ₹ 1,00,00,000. There will be no inventory at the end of the year.

Ans

Calculation of Labour overtime hours

Total hours required for production		
X5	(5,000 x 2 hrs)	10,000
X6	(4,000 x 3 hrs)	12,000
X7	(3,000 x 4 hrs)	12,000
Wireless Charger(15,000 x 0.40 hrs)		6,000
		40,000
		(35,000)
Overtime		5,000

Statement of Profitability

Particulars	Amount (₹)	Amount (₹)
Sales		
X5 (5,000 x 8,000)	4,00,00,000	
X6 (4,000 x 9,000)	3,60,00,000	
X7 (3,000 x 12,000)	3,60,00,000	
Wireless Charger [(12,000 x 1,350) + (3,000 x 1,500)	2,07,00,000	**13,27,00,00**
Less: Variable cost		
Material:		
X5 (5,000 x 2,000)		
X6 (4,000 x 2,500)		
X7 (3,000 x 3,000)		
Wireless Charger (15,000 x 300)	3,35,00,000	
Labour:		
X5 (5,000 x 1,000)		
X6 (4,000 x 1,500)		
X7 (3,000 x 2,000)		
Wireless Charger (15,000 x 200)		
Overtime (5,000 x 1,000)	2,50,00,000	
Other variable overheads	1,25,00,000	**7,10,00,000**
Contribution		**6,17,00,000**
Less: Fixed Cost		**1,00,00,000**
Profit		**5,17,00,000**

Q.46 BEP level | MTP Nov 22(1)

PS Limited is a manufacturing company and is operating at 75% capacity utilization. The PV ratio at this level of activity is 40%. The flexible budget drafted by the company for two levels of activity is given below:

	Capacity utilization (75	Capacity utilization (100

	Amount in ₹	Amount in ₹ (Lakhs)
Direct materials	180	240
Direct wages	120	160
Power and fuel	12	16
Repairs and maintenance	18	21
Consumables	21	28
Supervision	20	20
Indirect labour	36	42
Administrative expenses	21	21
Selling expenses	18	18
Depreciation	54	54

You are required to:
i. CALCULATE the profit earned by PS Limited at 75% level of activity.
ii. CALCULATE the break-even level of activity.

Ans

Calculation of Semi Variable component

	Repairs and Maintenance (₹)	Indirect labour (₹)
At 75% capacity	18,00,000	36,00,000
At 100% capacity	21,00,000	42,00,000
Variable component for 25%	3,00,000	6,00,000
Hence variable cost at 75%	3,00,000 x 75/25=**9,00,000**	6,00,000 x 75/25 =**18,00,000**
Fixed cost at 75% capacity	18,00,000 – 9,00,000 = **9,00,000**	36,00,000 – 18,00,000=**18,00,000**

Segregation of Fixed and Variable cost

	75%	100%	VC at 75%	FC at 75%
Direct Material	180	240	180	
Direct Labour	120	160	120	
Power and fuel	12	16	12	
Repairs and maintenance	18	21	**9**	**9**
Consumables	21	28	21	
Supervision	20	20		20
Indirect labour	36	42	**18**	**18**
Administrative expenses	21	21		21
Selling expenses	18	18		18
Depreciation	54	54		54
Total	500	620	**360**	**140**

(i) Calculation of profit earned at 75% capacity

Given PV ratio = 40%, Hence variable cost would be 60%

If variable cost is ₹ 360 lakhs then sales would be 360/ 0.60 = 600 lakhs
Less: Variable cost = ₹ 360 lakhs
Less: Fixed cost = ₹ 140 lakhs
Profit = ₹ 100 lakhs

(ii) **Break-even level of activity**
BEP Sales = FC/ P/V ratio = 140 /0.40 = ₹ 350 lakhs

Q.47 SP per unit | MTP Nov 22(2)

A factory can produce 1,80,000 units per annum at its 60% capacity. The estimated costs of production are as under:
Direct material ₹300 per unit
Direct employee cost ₹160 per unit
Indirect expenses:
- Fixed ₹32,50,000 per annum
- Variable ₹50 per unit
- Semi- variable

₹20,000 per month up to 50% capacity and ₹2,500 for every 20% increase in the capacity or part thereof.
If production program of the factory is as indicated below and the management desires to ensure a profit of ₹1,00,00,000 for the year, DETERMINE the average selling price at which each unit should be quoted:
First three months of the year- 50% of capacity;
Remaining nine months of the year- 75% of capacity.

Ans

Statement of Cost

	First three months (Rs.)	Remaining nine months (Rs.)	Total (Rs.)
	37,500 units	1,68,750 units	2,06,250 units
Direct material	1,12,50,000	5,06,25,000	6,18,75,000
Direct employee cost	60,00,000	2,70,00,000	3,30,00,000
Indirect- variable expenses	18,75,000	84,37,500	1,03,12,500
Indirect – fixed expenses	8,12,500	24,37,500	32,50,000
Indirect- semi-variable expenses			
- For first three months @ Rs.20,000 p.m.	60,000		
- For remaining nine months @ Rs.25,000 p.m.		2,25,000	2,85,000
Total cost	1,99,97,500	8,87,25,000	10,87,22,500
Desired profit	-	-	1,00,00,000
Sales value	-	-	11,87,22,500
Average selling price per unit			575.62

Q.48 BEP & Sales for profit | MTP May 23(1)

LNP Ltd. and MNT Ltd. are engaged in manufacturing of identical products. Existing revenue and cost data is as follows:

	LNP Ltd. (₹)	MNT Ltd.
Sales	13,60,000	17,00,000
Variable Cost	10,88,000	10,20,000
Fixed Cost	1,72,000	5,80,000

You are required to calculate:

(i) Break-even point (in Value) for each company

(ii) Sales at which each company will earn a profit of ₹ 5,00,000.

(iii) Sales at which both companies will have same profits.

Ans

	LNP Ltd. (₹)	MNT Ltd. (₹)
Sales (Rs.)	13,60,000	17,00,000
Less: Variable Cost	10,88,000	10,20,000
Contribution	2,72,000	6,80,000
P.V. Ratio $\left(\frac{\text{Contribution}}{\text{Sales}} \times 100\right)$	20%	40
Fixed Cost (₹)	1,72,000	5,80,000
Profit (₹)	1,00,000	1,00,000

(i) Break-Even Point = $\frac{\text{Fixedcost}}{\text{P.V. Ratio}}$

$$\text{LNP Ltd.} = \frac{1,72,000}{20\%} = 8,60,000$$

$$\text{MNT Ltd.} = \frac{5,80,000}{40\%} = 14,50,000$$

(ii) Sales value to earn a profit of ₹ 5,00,000

$$\text{Sales} = \frac{\text{Fixedcost} + \text{DesiredProfit}}{\text{P.V. Ratio}}$$

$$\text{LNP Ltd} = \frac{1,72,000 + 5,000}{40\%} = ₹\ 33,60,000$$

$$\text{MNT Ltd} = \frac{5,80,000 + 5,00,000}{40\%} = ₹27,00,000$$

(iii) Sales value at which both companies will earn same profit

Let S = Sales value and P = Profit

Sales – Variable cost = Fixed cost + Profit or, Contribution = Fixed cost + Profit

or, Contribution = Fixed cost + Profit

LNP Ltd.:

20% S = ₹1,72,000 + P

or, 0.20S = ₹ 1,72,000 + P .....(i)

MNT Ltd.
40% S = ₹5,80,000 + P
or, 0.40S = ₹ 5,80,000 + P .....(ii)
By solving these equations, we will get the value of 'S' and 'P'
0.20S = 1,72,000 + P
0.40S = 5,80,000 + P
- - -
- 0.20S = -4,08,000
or, S = ₹ 20,40,000
Putting the value of 'S' in equation no. (i) we will get the value of 'P'
or, S = ₹ 20,40,000
Putting the value of 'S' in equation no. (i) we will get the value of 'P'

Q.49 BEP & Sales for profit | MTP May 23(2)

NG Ltd. has an annual fixed cost of ₹ 98,50,000. In the year 2022-23, sales amounted to ₹7,80,60,000 as compared to ₹5,93,10,000 in the preceding year 2021-22. Profit in the year 2022-23 is ₹37,50,000 more than that in 2021-22. Required:
(i) CALCULATE Break-even sales of the company.
(ii) DETERMINE profit/ loss on a forecasted sales volume of ₹8,20,00,000.
(iii) If there is a reduction in selling price by 10% in the financial year 20 22-23 and company desires to earn the same amount of profit as in 2021-22, COMPUTE the required sales amount?

Ans

(i) Break-even sales = $\frac{\text{Fixed cost}}{\text{P/V Ratio}}$

P/V Ratio = $\frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$

Or, $\frac{37,50,000}{7,80,60,000 - 5,93,10,000} \times 100$

Or, $\frac{37,50,000}{1,87,50,000} \times 100$ or, 20%

Break-even sales = $\frac{98,50,000}{20\%} = 4,92,50,000$

(ii) Profit/ loss = Contribution – Fixed Cost
= ₹8,20,00,000 × 20% - ₹98,50,000
= ₹1,64,00,000 – ₹98,50,000 = ₹65,50,000

(iii) To earn same amount of profit in 2022-23 as it was in 2021-22, the company has to earn the same amount of contribution as it had earned in 2021-22.
Sales – Variable cost = Contribution equal to 2021-22 contribution

Contribution in 2021-22 = Sales in 2021-22 × P/V Ratio in 2021-22
= ₹5,93,10,000 × 20% = ₹1,18,62,000

Let the number of units to be sold in 2022-23 = X

Sales in 2022-23 – Variable cost in 2022-23 = Desired Contribution

90 X – 80 X = ₹1,18,62,000

Or, 10 X = 1,18,62,000, X = 11,86,200 units

Therefore, Sales amount required to earn a profit equal to 2021-22

= ₹ 90 × 11,86,200 units = ₹ 10,67,58,000

Q.50 Pv ratio & BEP | MTP May 23(2)

The following figures are related to KG Limited for the year ending 31st March, 2023:
Sales - 48,000 units @ ₹ 400 per unit;
P/V Ratio 25% and Break-even Point 50% of sales.
You are required to CALCULATE:
(i) Fixed cost for the year
(ii) Profit earned for the year
(iii) Units to be sold to earn a target net profit of ₹ 22,00,000 for a year.
(iv) Number of units to be sold to earn a net income of 25% on cost.

Ans

Break- even point (in units) is 50% of sales i.e. 24,000 units.
Hence, Break- even point (in sales value) is 24,000 units × ₹ 400 = ₹ 96,00,000

(i) Break even sales = $\frac{\text{Fixedcost}}{\text{P/V ratio}}$

Or, ₹ 96,00,000 = $\frac{\text{Fixedcost}}{25\%}$

Or, Fixed Cost = 96,00,000 x 25%
= 24,00,000

(ii) Contribution for the year = (48,000 units x 400) x25% 48,00,000

Profit for the year = Contribution – Fixed Cost
= ₹48,00,000 - ₹ 24,00,000
= ₹ 24,00,000

(iii) Target net profit is ₹22,00,000
Hence, Target contribution = Target Profit + Fixed Cost
= 22,00,000 + 24,00,000
= 46,00,000
Contribution per unit = 25% of ₹ 400 = ₹ 100 per unit
No. of units = ₹46, 00, 000 = 46,000 units
So, 46,000 units to be sold to earn a target net profit of ₹ 22,00,000 for a year.

(iv) Let desired total Sales (Number of units × Selling price) be x then desired profit is 25% on Cost or 20% on Sales i.e. 0.2 x

Desired Sales = $\frac{\text{Desiredsales=Fixedsales+Desiredprofit}}{\text{P/Vratio}}$

$X = \frac{24,00,000 + 0.2x}{25\%}$

or, 0.25 x = 24,00,000 + 0.2x
or, 0.05 x = 24,00,000
or, x = ₹ 4,80,00,000

No. of units to be sold = $\frac{4,80,00,000}{400}$ = 1,20,000 units

7 CHAPTER
STANDARD COSTING

Q.1 Material Variance | PY May 18

Beta Ltd. is manufacturing Product N. This is manufactured by mixing two materials namely Material P and Material Q. The Standard Cost of Mixture is as under:
Material P 150 ltrs. @ ₹ 40 per ltr.
Material Q 100 ltrs. @ ₹ 60 per ltr.
Standard loss @ 20 of total input is expected during production. The cost records for the period exhibit following consumption: Material P 140 ltrs. @ ₹ 42 per ltr,
Material Q 110 ltrs. @ ₹ 56 per ltr,
Quantity produced was 195 ltrs.
Calculate:
(i) Material Cost Variance
(ii) Material Usage Variance.
(iii) Material Price Variance

Ans

Take the good output of 195 ltr. The standard quantity of material required for 195 ltr. of output is

$\frac{195}{80} \times 100 = 243.75$ ltr.

Statement showing computation of Standard Cost/Actual Cost/ Revised Actual Quantity

Material	Standard Cost			Actual Cost		
	Quantity [SQ] (Kg.)	Rate [SP] (₹)	Amount [SQ × SP] (₹)	Quantity [AQ] (Kg.)	Rate [AP] (₹)	Amount [AQ × AP] (₹)
A (60% of 243.75 ltr.)	146.25	40	5,850.00	140	42	5,880
B (40% of. 243.75 Kg.)	97.50	60	5,850.00	110	56	6,160
	243.75		11,700.00	200		12,040

Note:

SQ = Standard Quantity = Expected Consumption for Actual Output
AQ = Actual Quantity of Material Consumed
SP = Standard Price Per Unit
AP = Actual Price Per Unit

Computation of Variances:
Material Cost Variance = SQ × SP – AQ × AP
A = ₹ 146.25 ltr. × ₹ 40– 140 ltr. × ₹ 42 = ₹ 30.00 (A)
B = ₹ 97.50 ltr. × ₹ 60 – 110 ltr. × ₹ 56 = ₹ 310.00 (A)
Total = ₹ 30.00 (A) + ₹ 310.00 (A)
= ₹ 340.00 (A)

Material Usage Variance = SP × (SQ – AQ)
A = ₹ 40 × (146.25 ltr. –140 ltr.) = ₹ 250.00 (F)
B = ₹ 60 × (97.50 ltr. – 110 ltr.) = ₹ 750.00 (A)
Total = ₹ 250.00 (F) + ₹ 750.00 (A)
= ₹ 500.00 (A)

Material Price Variance = AQ × (SP – AP)

A = 140 Kg. × (₹ 40 – ₹ 42) = ₹ 280 (A)
B = 110 Kg. × (₹ 60 – ₹ 56) = ₹ 440 (F)
Total = ₹ 280 (A) + ₹ 440 (F)
= ₹ 160 (F)

Q.2 Material Variance | PY Nov 19

The standard cost of a chemical mixture is as follows: 60% of Material A @ ₹ 50 per kg
40% Material B @ ₹ 60 per kg
A standard loss of 25% on output is expected in production. The cost records for a period has shown the following usage.
540 kg of Material A @ ₹ 60 per kg 260 kg of Material B @ ₹ 50 per kg
The quantity processed was 680 kilograms of good product. From the above given information
Calculate:
(i) Material Cost Variance
(ii) Material Price Variance
(iii) Material Usage Variance
(iv) Material Mix Variance
(v) Material Yield Variance.

Ans

Basic Calculation

Material	Standard for 640 kg. output			Actual for 680 kg. output		
	Qty. Kg.	Rate (₹)	Amount (₹)	QtyKg.	Rate (₹)	Amount (₹)
A	480	50	24,000	540	60	32,400
B	320	60	19,200	260	50	13,000
Total	800		43,200	800		45,400
Less: Loss	160	-	-	120	-	-
	640		43,200	680		45,400

Std. cost of actual output = ₹ 43,200 × 680/640 = ₹ 45,900
Calculation of Variances
(i) Material Cost Variance = (Std. cost of actual output – Actual cost)
= (45,900– 45,400)
= ₹ 500 (F)
(ii) Material Price Variance = (SP – AP) × AQ
Material A= (50 – 60) × 540 = ₹ 5400 (A)
Material B= (60 – 50)) × 260 = ₹ 2600 (F)
MPV = ₹ 2800 (A)

(iii) Material Usage Variance (MUV) = (Std. Quantity for actual output – Actual Quantity) × Std. Price

Material A = $\left(\frac{480 \times 680}{640} - 540\right) x50$ = ₹ 1,500 (A)

Material B = $\left(\frac{320 \times 680}{640} - 260\right) x60$ = ₹4,800 (F)

MUV = ₹ 3,300 (F)

(iv) Material Mix Variance = SP × (RAQ – AQ)
A = ₹ 50× (480 Kg – 540 Kg) = ₹ 3,000 (A)

B = ₹ 60 × (320 Kg. – 260 Kg.) = ₹ 3,600 (F)
Total = ₹ 3,000 (A) + ₹ 3,600 (F) = ₹ 600 (F)

(v) Material Yield Variance = SP × (SQ – RAQ)
A = ₹ 50 × (510 Kg. – 480 Kg) = ₹ 1,500 (F)
B = ₹ 60 × (340 Kg. – 320 Kg.) = ₹ 1,200 (F)
Total = ₹ 1,500 (F) + ₹ 1,200 (F) = ₹ 2,700 (F)

Q.3 Materail Variance | PY Nov 22

Y Lid manufactures "Product M" which requires three types of raw materials - "A", "B" & "C". Following information related to 1st quarter of the F.Y. 2022-23 has been collected from its books of accounts. The standard material input required for 1,000 kg of finished product 'M' are as under:

Material	Quantity (Kg.)	Std. Rate per Kg. (₹)
A	500	25
B	350	45
C	250	55
	1100	
Standard Loss	100	
Standard Output	1000	

During the period, the company produced 20,000 kg of product "M" for which the actual quantity of materials consumed and purchase prices are as under:

Material	Quantity (Kg.)	Purchase price per Kg. (₹)
A	11,000	23
B	7,500	48
C	4,500	60

You are required to calculate:

(i) Material Cost Variance

(ii) Material Price Variance for each raw material and Product 'M'

(iii) Material Usage Variance for each raw material and Product 'M'

(iv) Material Yield Variance

Note: Indicate the nature of variance i.e. Favourable or Adverse.

Ans

(a) Basic Calculations:

	Standard for 20,000 kg.			Actual for 20,000 kg.		
	Qty. Kg.	Rate (₹)	Amount (₹)	Qty. Kg.	Rate (₹)	Amount (₹)
A	10,000	25	2,50,000	11,000	23	2,53,000
B	7,000	45	3,15,000	7,500	48	3,60,000
C	5,000	55	2,75,000	4,500	60	2,70,000
Total	22,000		8,40,000	23,000		8,83,000

Calculation of Variances:

(i) Material Cost Variance = Std. Cost for actual output–Actual cost
MCV=8,40,000– 8,83,000 = ₹ 43,000(A)

(ii) Material Price Variance = (SP–AP) × AQ
A = (25 - 23) x 11,000 = 22,000 (F)

B = (45 – 48) x 7,500 = 22,500 (A)
C = (55 – 60) x 4,500 = 22,500 (A)
23000 (A)

(iii) Material Usages Variance = (SQ–AQ) × SP
A = (10,000 – 11,000) x 25 = 25,000 (A)
B = (7,000 – 7,500) x 45 = 22,500 (A)
C = (5,000 – 4,500) x 55 = 27,500 (F)
20,000 (A)

(iv) Material Yield Variance = (SQ–RSQ*) × SP
A = (10,000 – 10,454.54) x 25 = 11,363.5(A)
B = (7,000 – 7,318.18) x 45 = 14,318.1(A)
C = (5,000 – 5,227.27) x 55= 12,500(A)
38,181.6(A)

Revised Standard Quantity (RSQ)

$A = \frac{10,000}{22,000} \times 23,000 = 10,454.54$

$B = \frac{7,000}{22,000} \times 23,000 = 7,318.18$

$C = \frac{5,000}{22,000} \times 23,000 = 5,227.27$

Material Yield Variance can also be Calculated as below
Material yield variance = Standard cost per unit (Actual yield – Standard yield)

Standard cost per unit = $\frac{8,40,000}{20,000}$ = ₹ 42

New Standard Yield = $\frac{20,000}{22,000} \times 23,000 = 20,909$

Material yield variance = ₹ 42 (20,000 – 20,909)
= ₹ 38,178 (A)

Q.4 Material Variance | PY May 23

NC Limited uses a standard costing system for the manufacturing of its product 'X'. The following information is available for the last week of the month:

- 25,000 kg of raw material were actually purchased for ₹ 3,12,500. The expected output is 8 units of product 'X' from each one kg of raw material. There is no opening and closing inventories. The material price variance and material cost variance, as per cost records, are ₹ 12,500 (F) and ₹ 1800 (A), respectively.
- The standard time to produce a batch of 10 units of product 'X' is 15 minutes. The standard wage rate per labour hour is 50. The company employs 125 workers in two categories, skilled and semi-skilled, in a ratio of 60:40. The hourly wages actually paid were ₹ 50 per hour for skilled workers and ₹ 40 per hour for semi- skilled workers. The weekly working hours are 40 hours per worker. Standard wage rate is the same for skilled and semi- skilled workers.
- The monthly fixed overheads are budgeted at ₹ 76,480 Overheads are evenly distributed throughout the month and assume 4 weeks in a month. In the last week of the month, the actual fixed overhead expenses were ₹ 19,500.

Required:
(i) Calculate the standard price per kg and the standard quantity of raw material.
(ii) Calculate the material usage variance, labour cost variance, and labour efficiency variance.
(iii) Calculate the fixed overhead cost variance, the fixed overhead expenditure variance and the fixed overhead volume variance.

Note: Indicate the nature of variance i.e Favourable or Adverse.

Ans

(i) Calculation of Standard price per kg and the standard quantity of raw material:

Standard Price

(a) Material Price Variance = Standard Cost of Actual Quantity – Actual Cost

12,500 (F) = (SP × AQ) – ₹ 3,12,500

12,500 (F) = (SP × 25,000) – ₹ 3,12,500

SP = ₹ 13

Standard Quantity

(b) Material Cost Variance = Standard Cost – Actual Cost

1,800 (A) = SQ × ₹13 – ₹ 3,12,500

SQ = 23,900 kg.

(ii) Calculation of Material Usage Variance, Labour Cost Variance and Labour Efficiency Variance

(a) Material Usage Variance = Standard Cost of Standard Quantity for Actual Output – Standard Cost of Actual Quantity

= SQ × SP – AQ × SP

Or

= SP × (SQ – AQ)

= ₹ 13 × (23,900 kg. – 25,000 kg.)

= ₹ 14,300 (A)

(b) Labour Cost Variance = Standard Cost – Actual Cost

= (SH × SR) – (AH × AR)

= ₹ 2,39,000 – ₹ 2,30,000

= ₹ 9,000 (F)

(c) Labour Efficiency Variance = Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time

= (SH × SR) – (AH × SR)

Or

= (SH – AH) × SR

= ₹ 50 × [4,780 hrs. – 5,000 hrs.]

= ₹ 11,000 (A)

(iii) Calculation of Fixed Overhead Cost Variance, Fixed Overhead Expenditure Variance and Fixed Overhead Volume Variance:

(a) Fixed overhead cost variance = Standard Fixed Overheads – Actual Fixed Overheads

= 18,279 – 19,500

= ₹ 1,221(A)

(b) Fixed Overhead Expenditure = Budgeted Fixed Overheads – Actual Fixed Overheads

Variance = ₹ 19,120 – ₹ 19,500

= **₹ 380 (A)**

(c) Fixed overhead volume variance = (Budgeted output – Actual Output) X Budgeted rate per unit

= (2,00,000 – 1,91,200) 0.0956

= ₹ 8,800 x 0.0956

= ₹ 841 (A)

Alternative presentation to part (iii) (a) and (b)

(i) Fixed Overhead Cost Variance:

= Overhead absorbed for actual production – Actual overhead incurred

$= \frac{19,120}{2,00,000} \times 1,91,200 - 19,500 = ₹ 1,221(A)$

(iii) Fixed Overhead Volume Variance:

= Absorbed overhead – Budgeted overhead

$= \frac{19,120}{2,00,000} \times 1,91,200 - 19,120 = ₹ 841(A)$

Working Notes:

1. Standard time to produce 10 units of product X is 15 minutes. Therefore we can manufacture 40 units in an hour.

   Hours available in a week

   125 Workers x 40 Hours = 5,000 hours

   Therefore budgeted output = 5,000 x 40 units per hour = 2,00,000 units

   Alternatively

   $\text{Budgeted time per unit} = \frac{15 \text{ units}}{10 \text{ units}} = 1.5 \text{ minutes}$

   $\text{So, Budgeted output} = \frac{5,\ 000 \text{ Hours} \times 60 \text{ Minutes}}{1.5 \text{ Minutes}} = 2,00,000 \text{ units}$

   Actual output = 23,900 x 8 units = 1,91,200 units

   $\text{Standard hour for actual output} = 1,\ 91,\ 200 \times \frac{0.25 \text{ Hrs}}{10 \text{ units}} = 4,\ 780 \text{ Hrs}$

2.

Labour									
Budget			Revised standard			Actual			
Hours	Rate	₹	Hours	Rate	₹		Hours	Rate	₹
5,000	50	2,50,000	4,780	50	2,39,000	Skilled	3000	50	1,50,000
						Semi-Skilled	2000	40	80,000
							5000		2,30,000

3.

	Budget	Actual
Units	2,00,000	1,91,200
Fixed Overheads	19,120	19,500

4. Standard Fixed overheads:

$\frac{19,120}{2,00,000} \times 1,91,200 = ₹18,279$

Budgeted rate per unit:

$\frac{19,120}{2,00,000} = ₹ 0.0956$

Q.5 Material Variance | MTP Nov 20

Following data is extracted from the books of XYZ Ltd. for the month of January, 2020:

(i) Estimation-

Particulars	Quantity (kg.)	Price (₹)	Amount (₹)

Material-A	800	?	--
Material-B	600	30.00	18,000
			--

Normal loss was expected to be 10% of total input materials.

(ii) Actuals-

1480 kg of output produced.

Particulars	Quantity (kg.)	Price (₹)	Amount (₹)
Material-A	900	?	--
Material-B	?	32.50	--
			59,825

(iii) Other Information-

Material Cost Variance = ₹ 3,625 (F)

Material Price Variance = ₹ 175 (F)

You are required to CALCULATE: (i) Standard Price of Material-A; (ii) Actual Quantity of Material-B; (iii) Actual Price of Material-A; (iv) Revised standard quantity of Material-A and Material-B; and (v) Material Mix Variance;

Ans

(i) Material Cost Variance (A + B) = {(SQ × SP) – (AQ × AP)}

₹ 3,625 = (SQ × SP) – ₹ 59,825

(SQ × SP) = ₹ 63,450

$(SQ_A \times SP_A) + (SQ_B \times SP_B)$ = ₹ 63,450

(940 kg × SPA) + (705 kg × ₹ 30) = ₹ 63,450

$(940\ kg \times SP_A)$ + ₹ 21,150 = ₹ 63,450

$(940\ kg \times SP_A)$ = ₹ 42,300

$$SP_A = \frac{42,300}{940kg}$$

Standard Price of Material-A = ₹ 45

Working Note:

SQ i.e. quantity of inputs to be used to produce actual output

$$= \frac{1,480\ kg}{90\%} = 1,645\ kg$$

= 1,645 kg

$$SQ_A = \frac{800kg}{(800 + 600)} \times 1,645kg. = 940\ kg$$

$$SQ_B = \frac{600kg}{(800 + 600)} \times 1,645kg. = 705\ kg$$

(ii) Material Price Variance (A + B) = {(AQ × SP) – (AQ × AP)}

₹ 175 = (AQ × SP) – ₹ 59,825

(AQ × SP) = ₹ 60,000

$(AQ_A \times SP_A) + (AQ_B \times SP_B)$ = ₹ 60,000

(900 kg × ₹ 45 (from (i) above)) + $(AQ_B \times$ ₹30) = ₹ 60,000

₹ 40,500 + $(AQ_B \times$ ₹ 30) = ₹ 60,000

$(AQ_B \times$ ₹ 30) = ₹ 19,500

$$AQ_B = \frac{19,500}{30} = 650 \text{ kg}$$

Actual Quantity of Material B = 650 kg.

(iii) (AQ × AP) = ₹ 59,825
(AQA × APA) + (AQB × APB) = ₹ 59,825
(900 kg × APA) + (650 kg (from (ii) above) × ₹ 32.5) = ₹ 59,825
(900 kg × APA) + ₹ 21,125 = ₹ 59,825
(900 kg × APA) = ₹ 38,700

$$AP_A = \frac{38,700}{900} = 43$$

Actual Price of Material-A = ₹ 43

(iv) Total Actual Quantity of Material-A and Material-B
= AQA + AQB
= 900 kg + 650 kg (from (ii) above)
= 1,550 kg

Now,

$$\text{Revised } SQ_A = \frac{800kg}{(800 + 600)} \times 1,550kg. = 886 \text{ kg}$$

$$\text{Revised } SQ_B = \frac{600kg}{(800 + 600)} \times 1,550kg. = 664 \text{ kg}$$

(v) Material Mix Variance (A + B) = {(RSQ × SP) – (AQ × SP)}
= {(RSQA × SPA) + (RSQB × SPB) – 60,000}
= (886 kg (from (iv) above) × ₹ 45 (from (i) above))
+ (664 kg (from (iv) above) × ₹ 30) - ₹60,000
= (39,870 + 19,920) – 60,000 = ₹ 210 (A)

Q.6 Material Variance | MTP May 22(2)

Rounak Minerals Ltd. operates in iron ore mining through open cast mining method. Explosives and detonators are used for excavation of iron ores from the mines. The following are the details of standard quantity of explosives materials used for mining:

Particulars	Rate (₹)	Standard Qty. for Iron ore	Standard Qty. for Overburden (OB)
SME	40.00 per kg.	2.4 kg per tonne	1.9 kg per cubic- meter
Detonators	20.00 per piece	2 pcs per tonne	2 pcs per cubic-meter

The standard stripping ratio is 3:1 (means 3 cubic- meter of overburden soil to be removed to get one tonne of iron ore).
During the month of December 2021, the company produced 20,000 tonnes of iron ore and removed 58,000 cubic- meter of OB. The quantity of explosive materials used and paid for the month is as below:

Material	Quantity	Amount (₹)
SME	1,67,200 kg.	63,53,600
Detonators	1,18,400 pcs	24,27,200

You are required to COMPUTE:

(i) Material price variance
(ii) Material quantity variance
(iii) Material cost variance.

Ans

1. Calculation of Standard Qty. of Explosives and Detonators for actual output:

	Particulars	Iron ore	Overburden (OB)	Total
SME:				
A	Actual Output	20,000 tonne	58,000 M3	
B	Standard Qty per unit	2.4 kg./tonne	1.9 kg./M3	
C	Standard Qty. for actual production [A×B]	48,000 kg.	1,10,200 kg.	1,58,200 kg.
Detonators:				
D	Standard Qty per unit	2 pcs/ tonne	2 pcs/ M3	
E	Standard Qty. for actual production [A×D]	40,000 pcs.	1,16,000 pcs	1,56,000 pcs

2. Calculation of Actual Price per unit of materials:

Material	Quantity [A]	Amount (₹) [B]	Rate (₹) [C = B÷A]
SME	1,67,200 kg.	63,53,600	38.00
Detonators	1,18,400 pcs	24,27,200	20.50

(i) Computation of material price variance:

Material Price Variance = Actual Qty. × (Std. Price - Actual Price)
SME = 1,67,200 kg. × (₹40 - ₹38) = ₹ 3,34,400 (F)
Detonators = 1,18,400 pcs × (₹20 - ₹20.5) = ₹ 59,200 (A)
Total = ₹ 2,75,200 (F)

(ii) Computation of material quantity variance:

Material Qty. Variance = Std. Price × (Std. Qty for actual output - Actual Qty.)
SME = ₹40 × (1,58,200 kg. - 1,67,200 kg.) = ₹ 3,60,000 (A)
Detonators = ₹20 × (1,56,000 pcs -1,18,400 pcs) = ₹ 7,52,000 (F)
Total = ₹ 3,92,000 (F)

(iii) Computation of material cost variance:

Material cost variance = Std. cost – Actual Cost
Or, (Std. Price × Std. Qty) – (Actual Price × Actual Qty.)
SME = (₹40 × 1,58,200 kg) – (₹38 × 1,67,200 kg.)
= ₹63,28,000 – ₹63,53,600 = ₹ 25,600 (A)
Detonators = (₹20 × 1,56,000 pcs) – (₹20.50 × 1,18,400 pcs)
= ₹31,20,000 – ₹24,27,200 = ₹ 6,92,800 (F)
Total = ₹ 6,67,200 (F)

Q.7 Material Variance | MTP May 23(1)

Following data is extracted from the books of RAMZY Ltd. for the month of March:

(i) Estimation-

Particulars	Quantity (kg.)	Price (₹)	Amount (₹)
Material-A	1320	?	--
Material-B	990	50	49500
			--

Normal loss was expected to be 5% of total input materials. (ii) Actuals- 2,500 kg of output produced.

Particulars	Quantity (kg.)	Price (₹)	Amount (₹)
Material-A	1500	?	--
Material-B	?	53	--
			98,000

(iii) Other Information-
Material Cost Variance = ₹ 5,500 (F)
Material Price Variance = ₹ 300 (F)
You are required to CALCULATE:
(i) Standard Price of Material-A;
(ii) Actual Quantity of Material-B;
(iii) Actual Price of Material-A;
(iv) Revised standard quantity of Material-A and Material-B; and
(v) Material Mix Variance.

Ans

(i)	Material Cost Variance (A + B)	= {(SQ × SP) – (AQ × AP)}
	Or ₹5,500	= (SQ × SP) – ₹98,000
	Or (SQ × SP)	= ₹1,03,500
	Or (SQA × SPA) + (SQB × SPB)	= ₹ 1,03,500
	Or (1,503.8 kg × SPA) + (1,127.8 kg × ₹50)	= ₹ 1,03,500
	Or (1,503.8 kg × SPA) + ₹56,390	= ₹1,03,500
	Or (1,503.8 kg × SPA)	= ₹ 47,110
	Or SPA	$= \frac{47,110}{1503.80 \text{ kg}}$ = ₹31.33
(ii)	Material Price Variance (A + B)	= {(AQ × SP) – (AQ × AP)}
	Or ₹300	= (AQ × SP) – ₹ 98,000
	Or (AQ × SP)	= ₹ 98,300
	Or (AQA × SPA) + (AQB × SPB)	= ₹98,300
	Or (1,500 kg × ₹31.33 (from (i) above)) + AQB × ₹50	= ₹98,300
	Or ₹ 46,995 + (AQB × ₹ 50)	= ₹ 98,300
	Or (AQB × ₹ 50)	= ₹ 51,305
	Or AQB	= 1,026kg
	Actual Quantity of Material B	**= 1,026 kg.**
(iii)	(AQ × AP)	= ₹98,000
	Or ($AQ_A \times AP_A$) + ($AQ_B \times AP_B$)	= ₹ 98,000
	Or (1,500 kg × AP_A) + (1,026 kg (from (ii) above) × ₹53)	= ₹ 98,000
	Or (1,500 kg × AP_A) + ₹ 54,378	= ₹ 98,000
	Or (1,500 kg AP_A)	= ₹ 43,622
	Or AP $= \frac{43,622}{1,500}$	= ₹ 29.10
	Actual Price of Material A	**= ₹ 29.10**

(iv) Total Actual Quantity of Material-A and Material-B	= AQA + AQB
Or 1,500 kg + 1,026 kg (from (ii) above)	= 2,526 kg
Revised SQ_A = $\frac{1320\ kg}{(1,320 + 990)}$ x 2,526 kg	= 1,443 kg
Revised SQ_B = $\frac{990\ kg}{(1,320 + 990)}$ x 2,526 kg	= 1,083 kg

(v) Material Mix Variance (A + B) ={(RSQ × SP) – (AQ × SP)}
= {(RSQA × SPA) + (RSQB × SPB) – ₹98,300} = (1,443 kg (from iv) above) × ₹ 31.33 (from (i) above)) + (1,083 kg (from iv) above) × ₹50) - ₹98,300
= (₹45,209 + ₹54,150) – ₹98,300 = ₹ 1059 (F)

Q.8 Material Variance | MTP May 19(2)

BBC Ltd. manufactures Ordinary Portland Cement (OPC). The standard data for the raw materials that are used to manufacture OPC are as follows:

Material	Composition (%)	Rate per Metric Ton (Rs.)
Limestone	65	565
Silica	20	4,800
Alumina	5	32,100
Iron ore	5	1,800
Others	5	2,400

During the month of February 20X8, A Ltd. produced 500 MT OPC. Actual data related with the consumption and costs are as follows:

Raw Material	Quantity (MT)	Total Cost (Rs.)
Limestone	340	1,90,400
Silica	105	5,09,250
Alumina	25	8,12,500
Iron ore	30	53,400
Others	23	51,750

You are required to COMPUTE the following variances related with the production of OPC for the month of February 20X8:
(i) Material Price Variance
(ii) Material Mix Variance
(iii) Material Yield Variance
(iv) Material Cost Variance.

Ans

(i) Material Price Variance = Actual Quantity (Std. Price – Actual Price)

Limestone = $340\left(565 - \frac{1,90,400}{340}\right)$

= 340 (Rs. 565 - Rs. 560) = 1,700 (F)

Silica = $105\left(4800 - \frac{5,09,250}{105}\right)$

=105 (Rs. 4,800 - Rs. 4,850) = 5,250 (A)

Alumina $= 25\left(32,100 - \frac{8,12,500}{25}\right)$

=25 (Rs. 32,100 - Rs. 32,500) = 10,000 (A)

Iron ore $=30\left(18,00 - \frac{53,400}{30}\right)$

=30 (Rs. 1,800 - Rs. 1,780) = 600 (F)

Others $= 23\left(2,400 - \frac{51,750}{23}\right)$

=23 (Rs. 2,400 - Rs. 2,250) = 3,450 (F)

9,500 (A)

(ii) Material Mix Variance = Std. Price (Revised Std. Quantity – Actual Quantity)

Limestone	= Rs. 565 (523 × 65% - 340)	
	= Rs. 565 (339.95 - 340)	= 28.25 (A)
Silica	= Rs. 4,800 (523 × 20% - 105)	
	= Rs. 4,800 (104.6 - 105)	= 1,920 (A)
Alumina	= Rs. 32,100 (523 × 5% - 25)	
	= Rs. 32,100 (26.15 - 25)	= 36,915 (F)
Iron ore	= Rs. 1,800 (523 × 5% - 30)	
	= Rs. 1,800 (26.15 - 30)	= 6,930 (A)
Others	= Rs. 2,400 (523 × 5% - 23)	
	= Rs. 2,400 (26.15 - 23)	= 7,560 (F)
		35,596.75 (F)

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

Limestone	= Rs. 565 (500 × 65% - 523 × 65%)	
	= Rs. 565 (325 - 339.95)	= 8,446.75 (A)
Silica	= Rs. 4,800 (500 × 20% - 523 × 20%)	
	= Rs. 4,800 (100 - 104.6)	= 22,080 (A)
Alumina	= Rs. 32,100 (500 × 5% - 523 × 5%)	
	= Rs. 32,100 (25 - 26.15)	= 36,915 (A)
Iron ore	= Rs. 1,800 (500 × 5% - 523 × 5%)	
	= Rs. 1,800 (25 - 26.15)	= 2,070 (A)
Others	= Rs. 2,400 (500 × 5% - 523 × 5%)	
	= Rs. 2,400 (25 - 26.15)	= 2,760 (A)
		72,271.75 (A)

(iv) Material Cost Variance = (Std. Quantity × Std. Price) – (Actual Quantity × Actual Price)

Limestone	= Rs. 565 × (500 × 65%) - Rs. 1,90,400	
	= Rs. 1,83,625 - Rs. 1,90,400	= 6,775 (A)
Silica	= Rs. 4,800 × (500 × 20%) - Rs. 5,09,250	
	= Rs. 4,80,000 – Rs. 5,09,250	= 29,250 (A)
Alumina	= Rs. 32,100 (500 × 5%) – Rs. 8,12,500	
	= Rs. 8,02,500 – Rs. 8,12,500	= 10,000 (A)
Iron ore	= Rs. 1,800 (500 × 5%) – Rs. 53,400	
	= Rs. 45,000 – Rs. 53,400	= 8,400 (A)
Others	= Rs. 2,400 (500 × 5%) – Rs. 51,750	

= Rs. 60,000 – Rs. 51,750 = 8,250 (F)
46,175 (A)

Q.9 Material, Labour Variance | RTP May 19

ABC Ltd. had prepared the following estimation for the month of April:

	Quantity	Rate (₹)	Amount (₹)
Material-A	800 kg.	45.00	36,000
Material-B	600 kg.	30.00	18,000
Skilled labour	1,000 hours	37.50	37,500
Unskilled labour	800 hours	22.00	17,600

Normal loss was expected to be 10% of total input materials and an idle labour time of 5% of expected labour hours was also estimated.

At the end of the month the following information has been collected from the cost accounting department:

The company has produced 1,480 kg. finished product by using the followings:

	Quantity	Rate (₹)	Amount (₹)
Material-A	900 kg.	43.00	38,700
Material-B	650 kg.	32.50	21,125
Skilled labour	1,200 hours	35.50	42,600
Unskilled labour	860 hours	23.00	19,780

You are required to CALCULATE:

(a) Material Cost Variance;

(b) Material Price Variance;

(c) Material Mix Variance;

(d) Material Yield Variance;

(e) Labour Cost Variance;

(f) Labour Efficiency Variance and

(g) Labour Yield Variance.

Ans

Material Variances:

Material	SQ (WN-1)	SP (₹)	SQ × SP (₹)	RSQ (WN-2)	RSQ × SP (₹)	AQ	AQ × SP (₹)	AP (₹)	AQ × AP (₹)
A	940 kg.	45.00	42,300	886 kg.	39,870	900 kg.	40,500	43.00	38,700
B	705 kg.	30.00	21,150	664 kg.	19,920	650 kg.	19,500	32.50	21,125
	1645 kg		63,450	1550 kg	59,790	1550kg	60,000		59,825

WN-1: Standard Quantity (SQ):

Material A- $\left(\frac{800kg}{0.9x1,400kg}x1,400g\right)$ = 939.68 or 940 kg.

Material B- $\left(\frac{600kg}{0.9x1,400kg}x1,400g\right)$ =704.76 or 705 kg.

WN- 2: Revised Standard Quantity (RSQ):

Material A- $\left(\frac{800kg}{1,400kg} x 1,550Kg\right)$ = 885.71 or 886 kg.

Material B- $\left(\frac{600kg}{1,400kg} x 1,550Kg\right)$ = 664.28 or 664 kg.

(a) Material Cost Variance (A + B) = {(SQ × SP) – (AQ × AP)}
= {63,450 – 59,825} = 3,625 (F)

(b) Material Price Variance (A + B) = {(AQ × SP) – (AQ × AP)
= {60,000 – 59,825} = 175 (F)

(c) Material Mix Variance (A + B) = {(RSQ × SP) – (AQ × SP)}
= {59,790 – 60,000} = 210 (A)

(d) Material Yield Variance (A + B) = {(SQ × SP) – (RSQ × SP)}
= {63,450 – 59,790} = 3,660 (F)

Labour Variances:

Labour	SH (WN-3)	SR (₹)	SH × SR (₹)	RSH (WN-4)	RSH × SR (₹)	AH	AH × SR (₹)	AR (₹)	AH × AR (₹)
Skilled	1,116 hrs	37.50	41,850	1144	42,900	1,200	45,000	35.50	42,600
Unskilled	893 hrs	22.00	19,646	916	20,152	860	18,920	23.00	19,780
	2,009 hrs		61,496	2,060	63,052	2,060	63,920		62,380

WN- 3: Standard Hours (SH):

Skilled labour- $\left(\frac{0.95X1,000hr}{0.90X1,400kg.} x 1,480Kg\right)$ =1,115.87 or 1,116 hrs.

Unskilled labour- $\left(\frac{0.95X800hr}{0.90X1,400kg.} x 1,480Kg\right)$ = 892.69 or 893 hrs.

WN- 4: Revised Standard Hours (RSH):

Skilled labour- $\left(\frac{1000hr}{1,800hr} x 2,060hr\right)$ =1,144.44 or 1,144 hrs.

Unskilled labour- $\left(\frac{800hr}{1,800hr} x 2,060hr\right)$ = 915.56 or 916 hrs.

(e) Labour Cost Variance (Skilled + Unskilled) = {(SH × SR) – (AH × AR)}
= {61,496 – 62,380} = 884 (A)

(f) Labour Efficiency Variance (Skilled + Unskilled) = {(SH × SR) – (AH × SR)}
= {61,496 – 63,920} = 2,424 (A)

(g) Labour Yield Variance (Skilled + Unskilled) = {(SH × SR) – (RSH × SR)}

Q.10 Material, Labour Variance | RTP Nov 19

JVG Ltd. produces a product and operates a standard costing system and value material and finished goods inventories at standard cost. The information related with the product is as follows:

Particulars	Cost per unit (₹)
Direct materials (30 kg at ₹350 per kg)	10,500
Direct labour (5 hours at ₹80 per hour)	400

The actual information for the month just ended is as follows:

(a) The budgeted and actual production for the month of September 2019 is 1,000 units.

(b) Direct materials –5,000 kg at the beginning of the month. The closing balance of direct materials for the month was 10,000 kg. Purchases during the month were made at ₹ 365 per kg. The actual utilization of direct materials was 7,200 kg more than the budgeted quantity.

(c) Direct labour – 5,300 hours were utilised at a cost of ₹ 4,34,600.

Required:

CALCULATE (i) Direct material price and usage variances (ii) Direct labour rate and efficiency variances.

Ans

Quantity of material purchased and used.

No. of units produced	1,000 units
Std. input per unit	30kg.
Std. quantity (Kg.)	30,000 kg.
Add: Excess usage	7,200 kg.
Actual Quantity	37,200 kg.
Add: Closing Stock	10,000 kg.
Less: Opening stock	5,000 kg.
Quantity of Material purchased	42,200 kg.

(i) Direct Material Price Variance:

= Actual Quantity purchased (Std. Price – Actual Price)

= 42,200 kg.(₹350 – ₹365) = 6,33,000 (Adverse)

Direct Material Usage Variance:

= Std. Price (Std. Quantity – Actual Quantity)

= ₹350 (30,000 kg. – 37,200 kg.) = ₹25,20,000 (Adverse)

(ii) Direct Labour Rate Variance:

= Actual hours (Std. Rate – Actual Rate)

= 5,300 hours (₹80 – ₹82) = ₹10,600 (Adverse)

Direct Labour Efficiency Variance:

= Std. Rate (Std. hours – Actual hours)

= ₹80 (1,000 units × 5 hours – 5,300 hours) = ₹24,000 (Adverse)

Q.11 Material, Labour Variance | RTP May 20

ABC Ltd. had prepared the following estimation for the month of January:

	Quantity	Rate (₹)	Amount (₹)
Material-A	800 kg.	90.00	72,000
Material-B	600 kg.	60.00	36,000
Skilled labour	1,000 hours	75.00	75,000
Unskilled labour	800 hours	44.00	35,200

Normal loss was expected to be 10% of total input materials and an idle labour time of 5% of expected labour hours was also estimated.

At the end of the month the following information has been collected from the cost accounting department:

The company has produced 1,480 kg. finished product by using the followings:

	Quantity	Rate (₹)	Amount (₹)
Material-A	900 kg.	86.00	77,400
Material-B	650 kg.	65.00	42,250
Skilled labour	1,200 hours	71.00	85,200
Unskilled labour	860 hours	46.00	39,560

You are required to CALCULATE:

(a) Material Cost Variance;
(b) Material Price Variance;
(c) Material Mix Variance;
(d) Material Yield Variance;
(e) Labour Cost Variance;
(f) Labour Efficiency Variance and
(g) Labour Yield Variance.

Ans **Material Variances:**

Material	SQ (WN-1)	SP (₹)	SQ × SP (₹)	RSQ (WN-2)	RSQ × SP (₹)	AQ	AQ × SP (₹)	AP (₹)	AQ × AP (₹)
A	940 kg.	90.00	84,600	886 kg.	79,740	900 kg.	81,000	86.00	77,400
B	705 kg.	60.00	42,300	664 kg.	39,840	650 kg.	39,000	65.00	42,250
	1645 kg		1,26,900	1550 kg	1,19,580	1550 kg	1,20,000		1,19,650

WN-1: Standard Quantity (SQ):

Material A- $\left(\frac{800kg}{0.9x1,400kg}x1,480kg\right)$ = 939.68 or 940 kg.

Material B- $\left(\frac{600kg}{0.9x1,400kg}x1,480kg\right)$ = 704.76 or 705 kg

WN- 2: Revised Standard Quantity (RSQ):

Material A- $\left(\frac{800kg}{1,400kg}x1,550kg\right)$ = 885.71 or 886 kg.

Material B- $\left(\frac{600kg}{1,400kg}x1,550kg\right)$ = 664.28 or 664 kg

(a) Material Cost Variance (A + B) = {(SQ × SP) – (AQ × AP)}
= {1,26,900 – 1,19,650} = 7,250 (F)

(b) Material Price Variance (A + B) = {(AQ × SP) – (AQ × AP)
= {1,20,000 – 1,19,650} = 350 (F)

(c) Material Mix Variance (A + B) = {(RSQ × SP) – (AQ × SP)}
= {1,19,580 – 1,20,000} = 420 (A)

(d) Material Yield Variance (A + B) = {(SQ × SP) – (RSQ × SP)}
= {1,26,900 – 1,19,580} = 7,320 (F)

Labour Variances:

Labour	SH (WN-3)	SR (₹)	SH × SR (₹)	RSH (WN-4)	RSH × SR (₹)	AH	AH × SR (₹)	AR (₹)	AH × AR (₹)
Skilled	1,116 hrs	75.00	83,700	1144	85,800	1,200	90,000	71.00	85,200
Unskilled	893 hrs	44.00	39,292	916	40,304	860	37,840	46.00	39,560
	2,009 hrs		1,22,992	2,060	1,26,104	2,060	1,27,840		1,24,760

WN- 3: Standard Hours (SH):

Skilled labour- $\left(\frac{0.95x1,000hr.}{0.90x1,400kg.}x1,480kg\right)$ =1,115.87 or 1,116 hrs.

Unskilled labour- $\left(\frac{0.95x800hr.}{0.90x1,400kg.}x1,480kg\right)$ = 892.69 or 893 hrs.

WN- 4: Revised Standard Hours (RSH):

Skilled labour- $\left(\frac{1,000hr.}{1,800hr} x 2,060hr\right)$ = 1,144.44 or 1,144 hrs.

Unskilled labour- $\left(\frac{800hr.}{1,800hr} x 2,060hr\right)$ = 915.56 or 916 hrs.

(e) Labour Cost Variance (Skilled + Unskilled) = {(SH × SR) – (AH × AR)}
= {1,22,992 – 1,24,760} = 1,768 (A)

(f) Labour Efficiency Variance (Skilled + Unskilled) = {(SH × SR) – (AH × SR)}
= {1,22,992 – 1,27,840} = 4,848 (A)

(g) Labour Yield Variance (Skilled + Unskilled) = {(SH × SR) – (RSH × SR)}
= {1,22,992 – 1,26,104} = 3,112 (A)

Q.12 Material, Labour Variance | RTP Nov 22

Ahaan Limited operates a system of standard costing in respect of one of its products 'AH1' which is manufactured within a single cost centre. Details of standard per unit are as follows:

- The standard material input is 20 kilograms at a standard price of ₹ 24 per kilogram.
- The standard wage rate is ₹ 72 per hour and 5 hours are allowed to produce one unit.
- Fixed production overhead is absorbed at the rate of 100% of wages cost. During the month of April 2022, the following was incurred:
- Actual price paid for material purchased @ ₹ 22 per kilogram.
- Total direct wages cost was ₹ 43,92,000
- Fixed production overhead cost incurred was ₹ 45,00,000

Analysis of variances was as follows:

Variances	Favourable	Adverse
Direct material price	₹ 4,80,000	-
Direct material usage	₹ 48,000	
Direct labour rate	-	₹ 69,120
Direct labour efficiency	₹ 33,120	-
Fixed production overhead expenditure		₹ 1,80,000

You are required to CALCULATE the following for the month of April, 2022

(i) Material cost variance
(ii) Budgeted output (in units)
(iii) Quantity of raw materials purchased (in kilograms)
(iv) Actual output (in units)
(v) Actual hours worked
(vi) Actual wage rate per labour hour
(vii) Labour cost variance
(viii) Production overhead cost variance

Ans

(i) Direct Material Cost Variance = Direct Material Price Variance + Direct Material Usage Variance
= ₹ 4,80,000 F + ₹ 48,000 F = ₹ 5,28,000 F

(ii) Budgeted Output (units)
Fixed Production Overhead Expenditure Variance
= Budgeted Fixed Overhead - Actual Fixed Overheads

= Budgeted Output x Standard Overhead Rate - Actual Fixed Overheads
₹ 1,80,000 A = Budgeted Output x ₹ 360 (5 hrs @ ₹ 72) - ₹ 45,00,000

$$\text{Budgeted Output} = \frac{45,00,000 - 1,80,000}{360} = 12,000 \text{ units}$$

(iii) Quantity of Materials purchased (in kilograms)
Material Price Variance = Actual Usage (Standard Price per kg - Actual price per kg)
₹ 4,80,000 F = Actual Usage (₹ 24 - ₹ 22)

$$\text{Actual usage in kgs} = \frac{4,8,0,000 - 1,80,000}{2} = 2,40,000 \text{ kgs}$$

(iv) Actual Output (units)

Actual Direct Wages	₹ 43,92,000
Direct labour rate variance	₹ 69,120 A
Direct labour efficiency variance	₹ 33,120 F
Standard labour cost for actual output	₹ 43,56,000

$$\text{Actual Output} = \frac{\text{Standard labour cost for actual output}}{\text{Standard wage rate per unit}}$$

$$= \frac{43,56,000}{360\ (72 \times 5)} = 12,100 \text{ units}$$

Alternatively, let X be the actual quantity of output
Then, Standard Quantity of input for actual output 'X'
20X = SQ
Material cost variance = (SQ x SP) - (AQ x AP)
₹ 5,28,000 = (20 x ₹ 24) - (2,40,000 kgs x ₹ 22)
480X = ₹ 52,80,000 + ₹ 5,28,000
480X = ₹ 58,08,000

$$X = \frac{58,08,000}{480} = 12,100 \text{ units}$$

(v) Actual hours worked
Labour Efficiency Variance = Standard Labour Rate (Standard time for actual output - Actual time)
₹ 33,120 F = ₹ 72 (5 hours x 12100 units - Actual time)
460 hours = 60,500 hours - Actual time
Actual time = 60,500 - 460 = 60,040 hours

(vi) Actual wage rate per hour
Actual Wages paid = ₹ 43,92,000
Actual hours worked = 60,040 hours

$$\text{Actual Wage rate per hour} = \frac{43,92,000}{60,040 \text{ hours}} = ₹ 73.15 \text{ per hour}$$

(vii) Labour cost variance
= Labour rate variance + Labour efficiency variance
= ₹ 69,120 A + ₹ 33,120 F
= ₹ 36,000 A

(viii) Production Overhead Cost Variance
= Actual Output x Standard overhead rate - Actual Overheads Incurred
= 12,100 units x ₹ 360 - ₹ 45,00,000
= ₹ 43,56,000 - ₹ 45,00,000
= ₹ 1,44,000 A

Q.13 Material, Labour Variance | RTP May 23

XYZ Manufacturing Ltd. had prepared the following estimation for the month of January:

	Quantity	Rate (₹)	(₹)
Raw Material-DF	1,600 kg.	50	80,000
Raw Material-CE	1,200 kg.	35	42,000
Skilled labour	2,000 hours	40	80,000
Semiskilled labour	1,600 hours	25	40,000

Standard loss in the process was expected to be 10% of total input materials and an idle labour time of 5% of expected labour hours was also estimated.
At the end of the month the following information has been collected from the cost accounting department:
The company has produced 2,960 kg. finished product by using the followings:

	Quantity	Rate (₹)	(₹)
Raw Material-DF	1,800 kg.	40	72,000
Raw Material-CE	1,300 kg.	30	39,000
Skilled labour	2,400 hours	35	84,000
Semiskilled labour	1,720 hours	20	34,400

You are required to CALCULATE:

(a)	Material Cost Variance;
(b)	Material Price Variance;
(c)	Material Mix Variance;
(d)	Material Yield Variance;
(e)	Labour Cost Variance;
(f)	Labour Efficiency Variance and
(g)	Labour Yield Variance

Ans

Raw Material	SQ (kg.) (WN-1)	SP (₹)	SQ × SP (₹)	RSQ (WN-2) (kg.)	RSQ × SP (₹)	AQ	AQ × SP (₹)	AP (₹)	AQ ×AP (₹)
DF	1879	50	93,950	1771	88,550	1800	90,000	40	72,000
CE	1410	35	49,350	1329	46,515	1300	45,500	30	39,000
	3289		1,43,300	3,100	1,35,065	3100	1,35,500		1,11,000

WN-1: Standard Quantity (SQ):

1879.365 or 1879 kg. $= \left(\frac{1,600\ kg}{0.9 \times 2,800\ kg.} x 2,960 kg.\right)$

Raw Material DF $= \left(\frac{1,200\ kg}{0.9 \times 2,800\ kg.} x 2,960 kg.\right)$

Raw Material CE $= 1409.52 \text{ or } 1410\ kg \left(\frac{1,200\ kg}{2,800\ kg.} x 3,100\ kg.\right)$

WN- 2: Revised Standard Quantity (RSQ):

Raw Material DF = 1,771.43 or 1,771 kg. $\left(\frac{1,200\ kg}{2,800\ kg.} x 3,100\ kg.\right)$

Raw Material CE = 1,328.57 or 1,329 kg.

(a) Material Cost Variance (A + B) = {(SQ × SP) – (AQ × AP)}
{1,43,300 –1,11,000 = 32,300(F) (F)

(b) Material Price Variance (A + B) = {(AQ × SP) – (AQ ×AP)
{1,35,500 – 1,11,000} = 24,500(F)

(c) Material Mix Variance (A + B) = {(RSQ × SP) – (AQ × SP)}
{1,35,065 – 1,35,500} = 435 (A)

(d) Material Yield Variance (A + B) = {(SQ × SP) – (RSQ × SP)}
{1,43,300 – 1,35,065} = 8,235 (F)

Labour Variances:

Labour	SH (WN-3)	SR (₹)	SH × SR (₹)	RSH (WN-4)	RSH × SR (₹)	AH	AH × SR (₹)	AR (₹)	AH × AR (₹)
Skilled	2232	40	89,280	2289	91,560	2,400	96,000	35	84,000
Semiskilled	1785	25	44,625	1831	45,775	1720	43,000	20	34,400
	4,017 hrs		1,33,905	4,120	1,37,335	4,120	1,39,000		1,18,400

Skilled labour = 2,231.746 or 2,232 hrs $\left(\frac{0.95 \times 2,000\ hr}{0.90 \times 2,800\ kg} x 2,960 kg\right)$

Semiskilled labour = 1785.397 or 1785 hrs $\left(\frac{0.95 \times 1600\ hr}{0.90x\ 2,800 kg} x 2,960 kg\right)$

WN- 4: Revised Standard Hours (RSH):

Skilled labour = 2,288.889 or 2,289 hrs. = $\left(\frac{2,000\ hrs}{3,600 kg} x 4,120 hrs\right)$

Semiskilled labour = 1831.11 or 1831 hrs. = $\left(\frac{1,600\ hrs}{3,600 kg} x 4,120 hrs\right)$

(e) Labour Cost Variance (Skilled + Semiskilled) = {(SH × SR) – (AH × AR)}
{1,33,905 – 1,18,400} =15,505 (F)

(f) Labour Efficiency Variance (Skilled + Semiskilled) = {(SH × SR) – (AH × SR)}
{1,33,905 – 1,39,000} = 5,095 (A)

(g) Labour Yield Variance (Skilled + Semiskilled) = {(SH × SR) – (RSH × SR)}
= {1,33,905 – 1,37,335} = 3,430 (A)

Q.14 Material, Labour Variance | MTP May 19(1)

The following standards have been set to manufacture a product:

Direct Materials:	(Rs.)
2 units of X at Rs.40 per unit	80.00
3 units of Y at Rs. 30 per unit	90.00
15 units of Z at Rs.10 per unit	150.00
	320.00
Direct labour 3 hours @ Rs. 55 per hour	165.00
Total standard prime cost	485.00

The company manufactured and sold 6,000 units of the product during the year 20X8.

Direct material costs were as follows:

12,500 units of X at Rs. 44 per unit.

18,000 units of Y at Rs. 28 per unit.

88,500 units of Z at Rs.12 per unit.

The company worked 17,500 direct labour hours during the year 20X8. For 2,500 of these hours the company paid at Rs. 58 per hour while for the remaining hours the wages were paid at the standard rate.

Required:

COMPUTE the following variances:

Material Price, Material Usage, Material Mix, Material Yield, Labour Rate and Labour Efficiency.

Ans

Material Price Variance = Actual Quantity (Std. Price – Actual Price)
X = 12,500 units (Rs.40 – Rs.44) = 50,000 (A)
Y = 18,000 units (Rs.30 – Rs.28) = 36,000 (F)
Z = 88,500 units (Rs.10 – Rs.12) = 1,77,000 (A)
1,91,000 (A)

Material Usage Variance = Std. Price (Std. Qty – Actual Qty.)
X = Rs.40 (6,000 × 2 – 12,500) = 20,000 (A)
Y = Rs.30 (6,000 × 3 – 18,000) = Nil
Z = Rs.10 (6,000 × 15 – 88,500) = 15,000 (F)
5,000 (A)

Material Mix Variance = Std. Price (Revised Std. Qty. – Actual Qty.)

$X = Rs.40\left(\frac{1,19,000x2}{20} - 12,500\right) = 24,000\ (A)$

$Y = Rs.30\left(\frac{1,19,000x3}{20} - 18,000\right) = 4,500\ (A)$

$Z = Rs.10\left(\frac{1,19,000x15}{20} - 88,500\right) = 7,500\ (F)$

21,000 (A)

Material Yield Variance = Std. Price (Std. Qty. – Revised Std. Qty.)

$X = Rs.40\left(6,000 \times 2 - \frac{1,19,000x2}{20}\right) = 4,000\ (F)$

$Y = Rs.30\left(6,000 \times 3 - \frac{1,19,000x3}{20}\right) = 4,500\ (F)$

$Z = Rs.10\left(6,000 \times 15 - \frac{1,19,000x15}{20}\right) = 7,500\ (F)$

16,000 (F)

Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)
= 2,500 hours (Rs.55 – Rs.58) = 7,500 (A)

Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)
= Rs.55 (6,000 × 3 – 17,500)= 27,500 (F)

Q.15 Material, Labour Variance | MTP Nov 22(1)

The details regarding a product manufactured by the company for the last one week are as follows: Standard cost (per unit)

Direct materials 10 units @ ₹ 22.50 ₹ 225

Direct wages 5 hours @ ₹ 120	₹ 600
Total:	₹ 825
Actual (for whole activity):	
Direct materials	₹ 96,525
Direct wages	₹ 2,44,860
Analysis of variances: Direct materials:	
Price	₹ 8,775 (Adverse)
Usage	₹ 5,625 (Favourable)
Direct wages (labour):	
Efficiency	₹ 5,400 (Adverse)

You are required to CALCULATE:

(i) Material Cost variance
(ii) Actual output units
(iii) Actual price of material per unit
(iv) Actual Wages rate per labour hour
(v) Labour rate variance
(vi) Labour Cost variance

Ans

(i) Material Cost Variance = Material Price Variance+ Material Usage Variance
= ₹ 8,775 A + ₹ 5,625 F= ₹ 3,150 Adverse

(ii) Actual output units
Let x be the actual quantity of output
Then Standard Quantity of input for actual output 'x'
SQ = 10x

Material cost variance	= (SQ x SP) - (AQ x AP)
-3,150	= (10x x ₹ 22.50) - ₹ 96,525
-3,150	= 225x - ₹ 96,525
225x	= ₹ 96,525 - 3,150 = ₹ 93,375
x	= ₹ 93,375/225 = 415 Units

(iii) Actual Price of Material per unit

Material Usage variance	= (SQ - AQ) x SP
5,625	= (10x - AQ) x ₹ 22.50
5,625	= (10 x 415 units - AQ) x ₹ 22.50
5,625/22.50	= 4,150 - AQ
AQ	= 4,150 - 250 = 3,900 units

Now, AQ x AP = ₹ 96,525 (given) AP = ₹ 96,525/AQ
= ₹ 96,525/3,900 units = ₹ 24.75

(iv) Actual wages rate per labour hour
Labour efficiency variance = 5,400 Adverse (given)
Standard rate per hour (Standard time – Actual time) = -5,400
₹ 120 [(Actual output units x Number of hours per output) – Actual time] = -5,400

₹ 120 [(415 units x 5 hrs) – Actual time]	= -5,400
2,075 hrs – Actual time	= -5,400/120
Actual time	= 2,075 + 45
	= 2,120 hrs
Now Direct wages	= ₹ 2,44,860 (given)
Actual time x Actual rate per hour	= ₹ 2,44,860
Actual rate per hour	= ₹ 2,44,860 / 2,120 hrs
	= ₹ 115.50

(v) Labour rate variance
= Actual time (Standard Rate – Actual Rate)

= 2,120 hrs (₹ 120 - ₹ 115.50)
= 2,120 hrs x ₹ 4.50 = 9,540 Favourable

(vi) Labour Cost variance
= Labour rate variance+ Labour efficiency variance
= 9,540 F + 5,400 A = 4,140 Favourable

Q.16 Material, Labour Variance | MTP Nov 22(2)

The following information is available from the cost records of a company for the month of July, 2022:

(1)	Material purchased	22,000 pieces	₹ 9,00,000
(2)	Material consumed	21,000 pieces	
(3)	Actual wages paid for	5,150 hours	₹ 2,57,500
(4)	Fixed Factory overhead incurred		₹ 4,60,000
(5)	Fixed Factory overhead budgeted		₹ 4,20,000
(6)	Units produced	1,900	
(7)	Standard rates and prices are:		
	Direct material	₹ 45 per piece	
	Standard input	10 pieces per unit	
	Direct labour rate	₹ 60 per hour	
	Standard requirement	2.5 hours per unit	
	Overheads	₹ 80 per labour hour	

You are required to CALCULATE the following variances:

(i) Material price variance Material
(ii) usage variance Labour rate variance
(iii) Labour efficiency variance
(iv) Fixed overhead expenditure variance
(v) Fixed overhead expenditure variance
(vi) Fixed overhead efficiency variance
(vii) Fixed overhead capacity variance

Ans

(i) Material price variance (on the basis of Single plan):
= Actual Quantity Purchased (Std. Price – Actual Price)

$$=22{,}000 \text{ pcs } (Rs.\ 45 - \frac{9{,}00{,}000}{22{,}000 \text{pcs}} = \text{Rs.90,000* (Favourable)}$$

OR

Material price variance (on the basis of Partial plan):
= Actual Quantity consumed (Std. Price – Actual Price)

$$= 21{,}000 \text{ pcs } (Rs.\ 45 - \frac{9{,}00{,}000}{22{,}000 \text{pcs}} = \text{Rs.85,909* (Favourable)}$$

(*Figure may slightly differ due to rounding off the actual price per unit)

(ii) Material usage variance:
= Std. price per piece (Std. Quantity – Actual Quantity consumed)
= Rs.45 (1,900 units × 10 – 21,000) = Rs. 90,000 (Adverse)

(iii) Labour rate variance:
= Actual hours paid (Std. rate – Actual rate)

= 5,150 hours ($Rs.$ 60- $\frac{2,57,500}{5,150 hours}$ = Rs. 51,500 (Favourable)

(iv) Labour efficiency variance:
= Std. rate per hour (Std. hours – Actual hoursworked)
= Rs.60 (1,900 units × 2.5 hours – 5,150 hours) = Rs. 24,000 (Adverse)

(v) Fixed overhead expenditure variance:
= Budgeted Overhead – Actual Overhead
= Rs. 4,20,000 – Rs. 4,60,000 = Rs. 40,000 (Adverse)

(vi) Fixed overhead efficiency variance:
= Std. rate (Std. hours - Actual hours worked)
= Rs.80 (1,900 units × 2.5 hours - 5,150 hours) = Rs. 32,000 (Adverse)

Or,

Fixed overhead efficiency variance on basis of units
= Std. rate per unit (Actual output – Standard output for actual hours)
= Rs.200 (1,900 units - 5,150 / 2.5 hours) = Rs. 32,000 (Adverse)

(vii) Fixed overhead capacity variance:
= Std. rate (Actual hours worked – Budgeted hours)

= Rs. 80 $\left(5,150 hours - \frac{4,20,000}{80} \right)$ = Rs. 8,000 (Adverse)

Or,

Fixed overhead capacity variances on basis of units
= Std. rate per unit (Standard output for actual hours – Budgeted output)
= Rs.200 (2,060 units - 4,20,000 / 200) = Rs. 8,000 (Adverse)

Q.17 Material, Labour, OH Variance | MTP May 23(2)

Following are the standard cost for a product-X:

	(₹)
Direct materials 10 kg @ ₹ 90 per kg	900
Direct labour 8 hours @ ₹100 per hour	800
Variable Overhead 8 hours @ ₹15 per hour	120
Fixed Overhead	400
	2,220

Budgeted output for the year was 2,000 units. Actual output is 1,800 units. Actual cost for year is as follows:

	(₹)
Direct Materials 17,800 Kg @ ₹ 92 per Kg. Direct Labour 14,000 hours @ ₹ 104 per hour	16,37,600
Variable Overhead incurred	14,56,000
Fixed Overhead incurred	2,17,500
	7,68,000

You are required to CALCULATE:
(i) Material Usage Variance
(ii) Material Price Variance
(iii) Material Cost Variance
(iv) Labour Efficiency Variance
(v) Labour Rate Variance
(vi) Labour Cost Variance
(vii) Variable Overhead Cost Variance

(viii) Fixed Overhead Cost Variance.

Ans

(i) Material Usage Variance = Std. Price (Std. Quantity – Actual Quantity)
= ₹ 90 (18,000 kg. – 17,800 kg.)
= ₹ 18,000 (Favourable)

(ii) Material Price Variance = Actual Quantity (Std. Price – Actual Price)
= 17,800 kg. (₹ 90 – ₹ 92) = ₹ 35,600 (Adverse)

(iii) Material Cost Variance = Std. Material Cost – Actual Material Cost
= (SQ × SP) – (AQ × AP)
= (18,000 kg. × ₹ 90) – (17,800 kg. × ₹ 92)
= ₹ 16,20,000 – ₹ 16,37,600
= ₹17,600 (Adverse)

(iv) Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)
= ₹ 100 (1,800 units × 8 – 14,000 hrs.)
= ₹ 100 (14,400 hrs. – 14,000 hrs.)
= ₹ 40,000 (Favourable)

(v) Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)
= 14,000 hrs. (₹ 100 – ₹104)
= ₹ 56,000 (Adverse)

(vi) Labour Cost Variance = Std. Labour Cost – Actual Labour Cost
= (SH × SR) – (AH × AR)
= (14,400 hrs. × ₹ 100) – (14,000 hrs. × ₹ 104)
= ₹ 14,40,000 – ₹ 14,56,000
= ₹16,000 (Adverse)

(vii) Variable Cost Variance = Std. Variable Cost – Actual Variable Cost
= (14,400 hrs. × ₹ 15) – ₹2,17,500
= ₹ 1,500 (Adverse)

(viii) Fixed Overhead Cost Variance = Absorbed Fixed Overhead – Actual Fixed Overhead
= (1,800 units × ₹400) – ₹ 7,68,000
= ₹ 7,20,000 – ₹ 7,68,000 = ₹ 48,000 (Adverse)

Q.18 Material, labour, OH Variance | RTP May 18

ABC Ltd. had prepared the following estimation for the month of April:

	Quantity	Rate (₹)	Amount (₹)
Material-A	800 kg.	45.00	36,000
Material-B	600 kg.	30.00	18,000
Skilled labour	1,000 hours	37.50	37,500
Unskilled labour	800 hours	22.00	17,600

Normal loss was expected to be 10% of total input materials and an idle labour time of 5% of expected labour hours was also estimated.

At the end of the month the following information has been collected from the cost accounting department:

The company has produced 1,480 kg. finished product by using the followings:

	Quantity	Rate (₹)	Amount (₹)
Material-A	900 kg.	43.00	38,700
Material-B	650 kg.	32.50	21,125
Skilled labour	1,200 hours	35.50	42,600
Unskilled labour	860 hours	23.00	19,780

Required:
CALCULATE:
(i) Material Cost Variance;
(ii) Material Price Variance;
(iii) Material Mix Variance;
(iv) Material Yield Variance;
(v) Labour Cost Variance;
(vi) Labour Efficiency Variance and
(vii) Labour Yield Variance.

Ans

WN-1: Standard Quantity (SQ):

Material A- $\left(\frac{800kg.}{0.9x1,400kg.}x1,480kg\right)$ = 939.68 or 940 kg.

Material B- $\left(\frac{600kg.}{0.9x1,400kg.}x1,480kg\right)$ = 704.76 or 705 kg.

WN- 2: Revised Standard Quantity (RSQ):

Material A- $\left(\frac{800kg.}{1,400kg.}x1,550kg\right)$ = 885.71 or 886 kg.

Material B- $\left(\frac{600kg.}{1,400kg.}x1,550kg\right)$ = 664.28 or 664 kg.

(i) Material Cost Variance (A + B) = {(SQ × SP) – (AQ × AP)}
= {63,450 – 59,825} = 3,625 (F)

(ii) Material Price Variance (A + B) = {(AQ × SP) – (AQ × AP)
= {60,000 – 59,825} = 175 (F)

(iii) Material Mix Variance (A + B) = {(RSQ × SP) – (AQ × SP)}
= {59,790 – 60,000} = 210 (A)

(iv) Material Yield Variance (A + B) = {(SQ × SP) – (RSQ × SP)}
= {63,450 – 59,790} = 3,660 (F)

Labour Variances:

Labour	SH (WN-3)	SR (₹)	SH × SR (₹)	RSH (WN-4)	RSH × SR (₹)	AH	AH × SR (₹)	AR (₹)	AH × AR (₹)
Skilled	1,116 hrs	37.50	41,850	1144	42,900	1,200	45,000	35.50	42,600
Unskilled	893 hrs	22.00	19,646	916	20,152	860	18,920	23.00	19,780
	2,009 hrs		61,496	2,060	63,052	2,060	63,920		62,380

WN- 3: Standard Hours (SH):

Skilled labour- $\left(\frac{0.95x1,000hr.}{0.90x1,400kg}x1,480kg\right)$ =1,115.87 or 1,116 hrs.

Unskilled labour- $\left(\frac{0.95x800hr.}{0.90x1,400kg}x1,480kg\right)$ = 892.69 or 893 hrs.

WN- 4: Revised Standard Hours (RSH):

Skilled labour- $\left(\frac{1,000hr.}{1,800hr}x2,060hr\right)$ = 1,144.44 or 1,144 hrs.

Unskilled labour- $\left(\frac{800hr}{1,800hr}x1,480hr\right)$ =915.56 or 916 hrs.

(v) Labour Cost Variance (Skilled + Unskilled) = {(SH × SR) – (AH × AR)}
= {61,496 – 62,380} = 884 (A)

(vi) Labour Efficiency Variance (Skilled + Unskilled) = {(SH × SR) – (AH × SR)}
= {61,496 – 63,920} = 2,424 (A)

(vii) Labour Yield Variance (Skilled + Unskilled) = {(SH × SR) – (RSH × SR)}
= {61,496 – 63,052} = 1,556 (A)

Q.19 Material, Labour & OH Variance | RTP Nov 18

Aaradhya Ltd. manufactures a commercial product for which the standard cost per unit is as follows:

	(₹)
Material:	
5 kg. @ ₹ 4 per kg.	20.00
Labour:	
3 hours @ ₹10 per hour	30.00
Overhead	
Variable: 3 hours @ ₹1	3.00
Fixed: 3 hours @ ₹0.50	1.50
Total	54.50

During Jan. 20X8, 600 units of the product were manufactured at the cost shown below:

	(₹)
Materials purchased:	
5,000 kg. @ ₹4.10 per kg.	20,500
Materials used:	
3,500 kg.	
Direct Labour:	
1,700 hours @ ₹ 9	15,300
Variable overhead	1,900
Fixed overhead	900
Total	38,600

The flexible budget required 1,800 direct labour hours for operation at the monthly activity level used to set the fixed overhead rate.

COMPUTE:

(a)Material price variance,

(b) Material Usage variance;

(c) Labour rate variance;

(d) Labour efficiency variance;

(e) Variable overhead expenditure variance;

(f) Variable overhead efficiency variance;

(g) Fixed overhead expenditure variance;

(h) Fixed overhead volume variance;

(i) Fixed overhead capacity variance; and

(j) Fixed overhead efficiency variance.

Also RECONCILE the standard and actual cost of production.

Ans

(a) Material price variance:
= (Standard price – Actual Price) × Actual quantity
= (₹ 4 – ₹ 4.10) × 5,000 = ₹ 500 Adv.

(b) Material usage variance:
= (Std. quantity for actual output – Actual qtty.) × Std. price
= (600 × 5 – 3,500) × 4 = ₹ 2,000 Adv.

(c) Labour Rate Variance:
= (Standard rate – Actual rate) × Actual hours
= (₹10 – ₹9) × 1,700 = ₹ 1,700 Fav.

(d) Labour Efficiency Variance:
= (Standard hours for actual output – Actual hours) × Standard rate
= (600 × 3 – 1,700) × ₹10
= ₹ 1,000 Fav.

(e) Variable Overhead Expenditure Variance
= (Actual Hours × Standard Rate) – Actual Overhead
= (1,700 × ₹ 1) – ₹ 1,900
= ₹ 200 Adv.

(f) Variable Overhead Efficiency Variance:
= Std. hours for actual output – Actual hours) × Std. rate
= (600 × 3 – 1,700) × ₹1 = ₹100 Fav.

(g) Fixed Overhead Expenditure Variance:
= (Budgeted overhead – Actual overhead)
= (1,800 × 0.50 – 900) = Nil

(h) Fixed Overhead Volume Variance:
= (Std. hours for actual output – Budgeted hours) × Std. rate
= (600 × 3 – 1,800) × ₹ 0.50 = Nil

(i) Fixed Overhead Capacity Variance:
= (Budgeted hours – Actual Hours) × Standard rate
= (1,800 – 1,700) × ₹ 0.50 = ₹ 50 Adv.

(j) Fixed Overhead Efficiency Variance:
= (Std. hours for actual output – Actual hours) × Standard rate
= (600 × 3 – 1,700) × ₹ 0.50 = ₹ 50 Fav.

Verification:	(₹)	(₹)
Overhead recovered: 600 units @ ₹4.50		2,700
Actual Overhead:		
Variable	1,900	
Fixed	900	2,800
		100 Adv.
Variable expenditure variance		200 Adv
Variable Efficiency variance		100 Fav.
Fixed expenditure variance		Nil
Fixed overhead volume variance		Nil
		100 Adv.

Reconciliation Statement

Standard Cost: 600 units @ ₹54.50		32,700	

Actual Cost:	38,600		
Less: Material Stock at standard cost: (1,500 × ₹4)	6,000	(32,600)	100 Fav.
Variances:	Adv. (₹)	Fav. (₹)	
Material price	500		
Material usage	2,000		
Labour rate		1,700	
Labour efficiency		1,000	
Variable expenditure	200		
Variable efficiency		100	
Total	2,700	2,800	100 Fav.

Q.20 Material, Labour, OH Variance | RTP Nov 20

Following are the standard cost for a product-X:

	(₹)
Direct materials 10 kg @ ₹ 90 per kg	900
Direct labour 8 hours @ ₹100 per hour	800
Variable Overhead 8 hours @ ₹15 per hour	120
Fixed Overhead	400
	2,220

Budgeted output for the year was 2,000 units. Actual output is 1,800 units.

Actual cost for year is as follows:	(₹)
Direct Materials 17,800 Kg @ ₹ 92 per Kg.	16,37,600
Direct Labour 14,000 hours @ ₹ 104 per hour	14,56,000
Variable Overhead incurred	2,17,500
Fixed Overhead incurred	7,68,000

You are required to CALCULATE:

(i) Material Usage Variance

(ii) Material Price Variance

(iii) Material Cost Variance

(iv) Labour Efficiency Variance

(v) Labour Rate Variance

(vi) Labour Cost Variance

(vii) Variable Overhead Cost Variance

(viii) Fixed Overhead Cost Variance.

Ans

(i) Material Usage Variance = Std. Price (Std. Quantity – Actual Quantity)
= ₹ 90 (18,000 kg. – 17,800 kg.)
= ₹ 18,000 (Favourable)

(ii) Material Price Variance = Actual Quantity (Std. Price – Actual Price)
= 17,800 kg. (₹ 90 – ₹ 92) = ₹ 35,600 (Adverse)

(iii) Material Cost Variance = Std. Material Cost – Actual Material Cost
= (SQ × SP) – (AQ × AP)
= (18,000 kg. × ₹ 90) – (17,800 kg. × ₹ 92)
= ₹ 16,20,000 – ₹ 16,37,600

= ₹17,600 (Adverse)

(iv) Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)
= ₹ 100 (1,800 units × 8 – 14,000 hrs.)
= ₹ 100 (14,400 hrs. – 14,000 hrs.)
= ₹ 40,000 (Favourable)

(v) Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)
= 14,000 hrs. (₹ 100 – ₹104)
= ₹ 56,000 (Adverse)

(vi) Labour Cost Variance = Std. Labour Cost – Actual Labour Cost
= (SH × SR) – (AH × AR)
= (14,400 hrs. × ₹ 100) – (14,000 hrs. × ₹ 104)
= ₹ 14,40,000 – ₹ 14,56,000
= ₹16,000 (Adverse)

(vii) Variable Cost Variance = Std. Variable Cost – Actual Variable Cost
= (14,400 hrs. × ₹ 15) – ₹ 2,17,500
= ₹ 1,500 (Adverse)

(viii) Fixed Overhead Cost Variance = Absorbed Fixed Overhead – Actual Fixed Overhead
= (1,800 units × ₹400) - ₹ 7,68,000
= ₹ 7,20,000 – ₹ 7,68,000 = ₹ 48,000 (Adverse)

Q.21 Material & Labour, OH Variance | RTP Jul 21

LM Limited produces a product 'SX4' which is sold in a 10 Kg. packet. The standard cost card per packet of 'SX4' is as follows:

	(₹)
Direct materials 10 kg @ ₹ 90 per kg	900
Direct labour 8 hours @ ₹ 80 per hour	640
Variable Overhead 8 hours @ ₹ 20 per hour	160
Fixed Overhead	250
	1,950

Budgeted output for a quarter of a year was 10,000 Kg. Actual output is 9,000 Kg. Actual costs for this quarter are as follows:

	(₹)
Direct Materials 8,900 Kg @ ₹ 92 per Kg.	8,18,800
Direct Labour 7,000 hours @ ₹ 84 per hour	5,88,000
Variable Overhead incurred	1,40,000
Fixed Overhead incurred	2,60,000

You are required to CALCULATE:

(i) Material Usage Variance
(ii) Material Price Variance
(iii) Material Cost Variance
(iv) Labour Efficiency Variance
(v) Labour Rate Variance
(vi) Labour Cost Variance
(vii) Variable Overhead Cost Variance
(viii) Fixed Overhead Cost Variance

Ans

(i) Material Usage Variance = Std. Price (Std. Quantity – Actual Quantity)
= ₹ 90 (9,000 kg. – 8,900 kg.)
= ₹ 9,000 (Favourable)

(ii) Material Price Variance = Actual Quantity (Std. Price – Actual Price)
= 8,900 kg. (₹ 90 – ₹ 92) = ₹ 17,800 (Adverse)

(iii) Material Cost Variance = Std. Material Cost – Actual Material Cost
= (SQ × SP) – (AQ × AP)
= (9,000 kg. × ₹ 90) – (8,900 kg. × ₹ 92)
= ₹ 8,10,000 – ₹ 8,18,800
= ₹ 8,800 (Adverse)

(iv) Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)
= ₹ 80 ($\frac{9,000}{10}$ x 8hours – 7,000 hrs.)
= ₹ 80 (7,200 hrs. – 7,000 hrs.)
= ₹ 16,000 (Favourable)

(v) Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)
= 7,000 hrs. (₹ 80 – ₹ 84)
= ₹ 28,000 (Adverse)

(vi) Labour Cost Variance = Std. Labour Cost – Actual Labour Cost
= (SH × SR) – (AH × AR)
= (7,200 hrs. × ₹ 80) – (7,000 hrs. × ₹ 84)
= ₹ 5,76,000 – ₹ 5,88,000
= ₹ 12,000 (Adverse)

(vii) Variable Cost Variance = Std. Variable Cost – Actual Variable Cost
= (7,200 hrs. × ₹ 20) – ₹ 1,40,000
= ₹ 4,000 (Adverse)

(viii) Fixed Overhead Cost Variance= Absorbed Fixed Overhead – Actual Fixed Overhead
= $\frac{250}{10 \text{ kgs.}}$ 9,000kgs. x ₹ 2,60,000
= ₹ 2,25,000 – ₹ 2,60,000 = ₹ 35,000 (Adverse)

Q.22 Material, Labour, OH Variance | RTP Dec 21

BabyMoon Ltd. uses standard costing system in manufacturing one of its product 'Baby Cap'. The details are as follows:

Direct Material 1 Meter @ ₹ 60 per meter		₹ 60
Direct Labour 2 hour @ ₹ 20 per hour	₹ 40	
Variable overhead 2 hour @ ₹ 10 per hour	₹ 20	
Total	₹ 120	

During the month of August, 10,000 units of 'Baby Cap' were manufactured. Details are as follows:

Direct material consumed	11,400 meters	@	₹ 58 per meter	
Direct labour Hours	?	@	?	₹ 4,48,800
Variable overhead incurred				₹ 2,24,400

Variable overhead efficiency variance is ₹ 4,000 A. Variable overheads are based on Direct Labour Hours.
You are required to CALCULATE the following Variances:

(a) Material Variances- Material Cost Variance, Material Price Variance and Material Usage Variance.

(b) Variable Overheads variances- Variable overhead Cost Variance, Variable overhead Efficiency Variance and Variable overhead Expenditure Variance.

(c) Labour variances- Labour Cost Variance, Labour Rate Variance and Labour Efficiency Variance.

Ans (i) Material Variances

Budget			Std. for actual			Actual		
Quantity (Meter)	Price (₹)	Amount (₹)	Quantity (Meter)	Price (₹)	Amount (₹)	Quantity (Meter)	Price (₹)	Amount (₹)
1	60	60	10,000	60	6,00,000	11,400	58	6,61,200

Material Cost Variance = (SQ × SP – AQ × AP)

= 6,00,000 – 6,61,200 = ₹ 61,200 (A)

Material Price Variance = (SP – AP) AQ

= (60 - 58) 11,400 = ₹ 22,800 (F)

Material Usage Variance = (SQ – AQ) SP

= (10,000 – 11,400) 60 = ₹ 84,000 (A)

(ii) Variable Overheads variances Variable overhead cost Variance

= Standard variable overhead – Actual Variable Overhead

= (10,000 units × 2 hours × ₹ 10) – 2,24,400 = ₹ 24,400 (A)

Variable overhead Efficiency Variance

= (Standard Hours – Actual Hours) × Standard Rate per Hour

Let Actual Hours be 'X', then:

(20,000 – X) × 10 = 4,000 (A)

2,00,000 – 10X = - 4,000

X = 2,04,000 ÷ 10

Therefore, Actual Hours (X) = 20,400

Variable overhead Expenditure Variance

= Variable Overhead at Actual Hours - Actual Variable Overheads

= 20,400 × ₹ 10 – 2,24,400 = ₹ 20,400 (A)

(iii) Labour variances

Budget			Std. for actual			Actual		
Hours	Rate (₹)	Amount (₹)	Hours	Rate (₹)	Amount (₹)	Hours	Rate (₹)	Amount (₹)
2	20	40	20,000	20	4,00,000	20,400	22	4,48,800

*Actual Rate = ₹ 4,48,800 ÷ 20,400 hours = ₹ 22

Labour Cost Variance = (SH × SR) – (AH × AR)

= 4,00,000 – 4,48,800 = ₹ 48,800 (A)

Labour Rate Variance = (SR – AR) × AH

= (20 – 22) × 20,400 = ₹ 40,800 (A)

Labour Efficiency Variance = (SH – AH) × SR

= (20,000 – 20,400) × 20 = ₹ 8,000 (A)

Q.23 Labour Variance | PY May 19

A gang of workers normally consists of 30 skilled workers, 15 semi-skilled workers and 10 unskilled workers. They are paid at standard rate per hour as under:

Skilled ₹ 70
Semi-skilled ₹ 65
Unskilled ₹ 50

In a normal working week of 40 hours, the gang is expected to produce 2,000 units of output. During the week ended 31st March, 2019, the gang consisted of 40 skilled, 10 semi-skilled and 5 unskilled workers. The actual wages paid were at the rate of ₹ 75, ₹ 60 and ₹ 52 per hour respectively. Four hours were lost due to machine breakdown and 1,600 units were produced.

Calculate the following variances showing clearly adverse (A) or favourable (F)

(i) Labour Cost Variance (ii) Labour Rate Variance
(iii) Labour Efficiency Variance (iv) Labour Mix Variance
(v) Labour Idle Time Variance

Ans

(i) Labour Cost Variance = Standard Cost – Actual Cost
= ₹1,14,400 – ₹1,54,400
= 40,000 (A)
(1,600*75+400*60+200*52= ₹1,54,400)
Or

Types of workers	Standard Cost – Actual Cost	Amount (₹)
Skilled Workers	(30x40x70/2,000x1,600)- (40x40x75) 67,200-1,20,000	52,800 (A)
Semi- Skilled	(15x40x65/2,000x1,600)- (10x40x60) 31,200-24,000	7,200 (F)
Un-Skilled Workers	(10x40x50/2,000x1,600)- (5x40x52) 16,000-10,400	5,600 (F)
Total	1,14,400-1,54,400	**40,000 (A)**

(ii) Labour Rate Variance

Types of workers	Actual Hours × (Standard Rate - Actual Rate)	Amount (₹)
Skilled Workers	1,600 hours × (₹70.00 – ₹75.00)	8,000 (A)
Semi- Skilled	400 hours × (₹65.00 – ₹60.00)	2,000 (F)
Un-Skilled Workers	200 hours × (₹50.00 – ₹52.00)	400 (A)
Total	₹8,000 (A) + ₹2,000 (F) + ₹400 (A)	6,400 (A)

(iii) Labour Efficiency Variance

Types of workers	Standard Rate × (Standard Hours – Actual Hours)	Amount (₹)
Skilled Workers	₹70.00 × (960 hours – 1,440 hours)	33,600 (A)
Semi- Skilled	₹65.00 × (480 hours – 360 hours)	7,800 (F)
Un-Skilled Workers	₹50.00 × (320 hours – 180 hours)	7,000 (F)
Total	33,600 (A) + 7,800 (F) + 7,000 (F)	18,800 (A)

Alternatively labour efficiency can be calculated on basis of labour hours paid

Types of workers	Standard Rate × (Standard Hours – Actual Hours)	Amount (₹)
Skilled Workers	70.00 × (960 hours – 1600 hours)	44,800 (A)

Semi- Skilled	65.00 × (480 hours – 400 hours)	5,200 (F)
Un-Skilled Workers	50.00 × (320 hours – 200 hours)	6,000 (F)
Total	33,600 (A) + 7,800 (F) + 7,000 (F)	33,600 (A)

(iv) Labour Mix Variance

= Total Actual Time Worked (hours) × {Average Standard Rate per hour of Standard Gang Less Average Standard Rate per hour of Actual Gang}

@on the basis of hours worked

$$= 1{,}980 \text{ hours} \times \frac{1{,}14{,}400}{1{,}760 \text{ hrs.}} - \frac{1{,}440\text{hrs.} \times 70 + 360\text{hrs.} \times 65 + 180\text{hrs.} \times 50}{1{,}980 \text{ hrs}}$$

= ₹ 4,500 (A)

Or

Labour Mix Variance

Types of workers	Std. Rate x (Revised Actual Hours Worked- Actual Hours Worked)	Amount (₹)
Skilled Workers	₹70 × (1,080 hrs. – 1440 hrs.)	25,200 (A)
Semi- Skilled	₹65 × (540 hrs. – 360 hrs.)	11,700 (F)
Un Skilled Workers	₹50 × (360 hrs. – 180 hrs.)	9,000 (F)
Total	₹25,200 (A) + ₹11,700 (F) + ₹9,000 (F)	4,500 (A)

(v) Labour Idle Time Variance

Types of workers	Standard Rate × (Hours Paid – Hours Worked)	Amount (₹)
Skilled Workers	₹70.00 × (1,600 hours – 1,440 hours)	11,200 (A)
Semi- Skilled	₹65.00 × (400 hours – 360 hours)	2,600 (A)
Un-Skilled Workers	₹50.00 × (200 hours – 180 hours)	1,000 (A)
Total	11,200 (A) + 2,600 (A) + 1,000 (A)	14,800 (A)

Verification:

Labour Cost Variance

= Labour Rate Variance + Labour Efficiency Variance + Labour Idle Time Variance

= 6,400 (A) + 18,800 (A) + 14,800 (A) = ₹ 40,000 (A)

Labour Cost Variance

= Labour Rate Variance + Labour Efficiency Variance

= 6400(A) + 33600(A)= ₹40000(A)

In this case, labour idle time variance is a part of labour efficiency variance.

Working Notes:

Category	Standard Cost			Actual (1600 units)			Revised Actual Hours
	Hrs.	Rate	Amt. (₹)	Hrs.	Rate	Amt. (₹)	
Skilled	960	70.00	67,200	1,440		1,08,000	1,080
	(30Wx40x1,600/ 2, 000)			(40Wx36)	75.00		(1,980x6/11)
Semi-	480	65.00	31,200	360		21,600	540
Skilled	(15Wx40 x1,600/2,000)			(10Wx36)	60.00		(1,980x3/11)
Unskilled	320	50.00	16,000	180	52.00	9,360	360
	(10Wx40 x1,600/2,000)			(5Wx36)			(1,980x2/11)
Total	1,760	65	1,14,400	1,980		1,38,960	1,980

Q.24 Labour Variance | PY Jul 21

The standard output of a Product 'DJ' is 25 units per hour in manufacturing department of a Company employing 100 workers. In a 40 hours week, the department produced 960 units of product 'DJ' despite 5% of the time paid was lost due to an abnormal reason. The hourly wage rates actually paid were ₹ 6.20, ₹ 6.00 and ₹ 5.70 respectively to Group 'A' consisting 10 workers, Group 'B' consisting 30 workers and Group 'C' consisting 60 workers. The standard wage rate per labour is same for all the workers. Labour Efficiency Variance is given ₹ 240 (F).

You are required to compute:

(i) Total Labour Cost Variance.
(ii) Total Labour Rate Variance.
(iii) Total Labour Gang Variance.
(iv) Total Labour Yield Variance, and
(v) Total Labour Idle Time Variance

Ans

1. Calculation of Standard Man hours

When 100 workers work for 1 hour, the standard output is 25 units.

$$\text{Standard man hours per unit} = \frac{100 \text{ hours}}{25 \text{ units}} = 4 \text{ hours per unit}$$

2. Calculation of standard man hours for actual output:

= 960 units x 4 hours = 3,840 hours.

3. Calculation of actual cost

Type of Workers	No of Workers	Actual Hours Paid	Rate (₹)	Amount(₹)	Idle Hours (5% of hours paid)	Actual hours Worked
Group 'A'	10	400	6.2	2,480	20	380
Group 'B'	30	1,200	6	7,200	60	1,140
Group 'C'	60	2,400	5.7	13,680	120	2,280
	100	4,000		23,360	200	3,800

4. Calculation of Standard wage Rate:

Labour Efficiency Variance = 240F

(Standard hours for Actual production – Actual Hours) x SR = 240F

(3,840 – 3,800) x SR = 240

Standard Rate (SR) = ₹ 6 per hour

(i) Total Labour Cost Variance

= (Standard hours x Standard Rate) – (Actual Hours x Actual rate)

= (3,840 x 6) – 23,360 = 320A

(ii) Total Labour Rate Variance

= (Standard Rate – Actual Rate) x Actual Hours

Group 'A' = (6- 6.2) 400 = 80A

Group 'B' = (6- 6) 1,200 = 0

Group 'C' = (6 – 5.7) 2,400 = 720F

640F

(iii) Total Labour Gang Variance

= Total Actual Time Worked (hours) × {Average Standard Rate per hour of Standard Gang - Average Standard Rate per hour of Actual Gang@}

@ on the basis of hours worked

$$= 3,800 \times \left(6 \frac{3,840 \times 6}{3,800}\right)$$

= 0

(iv) Total Labour Yield Variance
= Average Standard Rate per hour of Standard Gang × {Total Standard Time (hours) - Total Actual Time worked (hours)}
= 6 x (3,840 – 3,800)
= 240F

(v) Total Labour idle time variance
= Total Idle hours x standard rate per hour
= 200 hours x 6
= 1,200A

Q.25 Labour Variance | PY May 22

A manufacturing department of a company has employed 120 workers. The standard output of product ''NPX" is 20 units per hour and the standard wage rate is ₹ 25 per labour hour.
In a 48 hours week, the department produced 1,000 units of 'NPX' despite 5% of the time paid being lost due to an abnormal reason. The hourly wages actually paid were ₹ 25.70 per hour.
Calculate:
(i) Labour Cost Variance
(ii) Labour Rate Variance
(iii) Labour Efficiency Variance
(iv) Labour Idle time Variance

Ans

1. Calculation of standard man hours
When 120 worker works for 1 hr., then the std. output is 20 units.

Std. man hour per unit = $\frac{120 \text{ hrs.}}{20 \text{ units}}$ = 6 hrs.

2. Calculation of std. man hours for actual output
Total std. man hours = 1,000 units × 6 hrs. = 6,000 hrs.

Standard for actual			Actual				
Hours	Rate (₹)	Amount (₹)	Actual hrs. paid	Idle time hrs.	Production hrs.	Rate (₹)	Amount paid (₹)
6,000	25	1,50,000	5,760 (48 hrs. x 120 workers)	288	5,472	25.70	1,48,032

(i) Labour cost variance
= Std. labour cost – Actual labour cost
= 1,50,000 – 1,48,032= ₹ 1,968 F

(ii) Labour rate variance
= (SR – AR) × AHPaid
= (25 - 25.70) × 5,760 = ₹ 4,032 A

(iii) Labour efficiency variance
= (SH – AH) × SR
= (6,000 – 5,472) × 25 = ₹ 13,200 F

(iv) Labour Idle time variance
= Idle Hours × SR
= 288 × 25 = ₹ 7,200 A

Note: Variances can also be calculated for one worker instead of 120.

Q.26 Labour Variance | RTP May 22

The standard output of a Product 'D' is 50 units per hour in manufacturing department of a Company employing 100 workers. In a 40 hours week, the department produced 1,920 units of product 'D' despite 5% of the time paid was lost due to an abnormal reason. The hourly wage rates actually paid were ₹ 12.40, ₹ 12.00 and ₹ 11.40 respectively to Group 'A' consisting 10 workers, Group 'B' consisting 30 workers and Group 'C' consisting 60 workers. The standard wage rate per labour is same for all the workers. Labour Efficiency Variance is given ₹ 480 (F).

You are required to COMPUTE:

(i) Total Labour Cost Variance.
(ii) Total Labour Rate Variance.
(iii) Total Labour Gang Variance.
(iv) Total Labour Yield Variance, and
(v) Total Labour Idle Time Variance.

Ans

1. Calculation of Standard Man hours

When 100 workers work for 1 hour, the standard output is 50 units.

$$\text{Standard man hours per unit} = \frac{100 \text{ hours}}{50 \text{ units}} = 2 \text{ hours per unit}$$

2. Calculation of standard man hours for actual output:

= 1,920units x 2 hours = 3,840 hours.

3. Calculation of actual cost

Type of Workers	No of Workers	Actual Hours Paid	Rate (₹)	Amount (₹)	Idle Hours (5% of hours paid)	Actual hours Worked
Group 'A'	10	400	12.40	4,960	20	380
Group 'B'	30	1,200	12	14,400	60	1,140
Group 'C'	60	2,400	11.40	27,360	120	2,280
	100	4,000		46,720	200	3,800

4. Calculation of Standard wage Rate:

Labour Efficiency Variance = 480F

(Standard hours for Actual production – Actual Hours) x SR = 480F

(3,840 – 3,800) x SR = 480

Standard Rate (SR) = ₹ 12 per hour

(i) Total Labour Cost Variance

= (Standard hours x Standard Rate) – (Actual Hours x Actual rate)

= (3,840 x 12) – 46,720 = 640A

(ii) Total Labour Rate Variance

= (Standard Rate – Actual Rate) x Actual Hours

Group 'A' = (12 - 12.40) 400 = 160A

Group 'B' = (12 - 12) 1,200 = 0

Group 'C' = (12 – 11.40) 2,400 = 1,440F

1,280F

(iii) Total Labour Gang Variance

= Total Actual Time Worked (hours) × {Average Standard Rate per hour of Standard Gang - Average Standard Rate per hour of Actual Gang@}

@ on the basis of hours worked

= 3,800 × (12- 3,840×12)
3,800

= 0

[Note: As the number of workers in standard and actual is the same, there is no difference in mix ratio, so labour gang variance will be NIL]

(iv) Total Labour Yield Variance
= Average Standard Rate per hour of Standard Gang × {Total Standard Time (hours) - Total Actual Time worked (hours)}
= 12 x (3,840 – 3,800)
= 480F

(v) Total Labour idle time variance
= Total Idle hours x standard rate per hour
= 200 hours x 12
= 2,400A

Q.27 Labour Variance | MTP May 18

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

	Skilled Workers	Semi-skilled Workers	Un-Skilled workers
Standard number of workers in the gang	32	12	6
Standard wage rate per hour (₹)	30	20	10
Actual number of workers employed in the gang during the week	28	18	4
Actual wages rate per hour (₹)	34	23	12

During the 40 hours working week the gang produced 1,800 standard labour hours of work. CALCULATE:
(i) Total labour cost variance;
(ii) Labour yield variance;
(iii) Labour mix variance; and
(iv) Labour wage rate variance.

Ans

Work produced by the gang 1,800 standard labour hours, i.e.,

$\frac{1,800}{32 + 12 + 6}$ or 36 gang hours

Standard hours of Skilled Labour	(36 x 32)	1,152 hours
Standard hours of Semi-skilled Labour	(36 x12)	432 hours
Standard hours of Un-skilled Labour	(36 x 6)	216 hours
Total		1,800 hours
Actual hours of Skilled Labour	(40 x 28)	1,120 hours
Actual hours of Semi-skilled Labour	(40 x 18)	720 hours
Actual hours of Un-skilled Labour	(40 x 4)	160 hours
Total		2,000 hours

Revised Standard hours (actual hours worked expressed in standard ratio)

Skilled Labour	$\frac{1,152}{1,800}$ x200	1,280 hours
Semi-skilled Labour	$\frac{432}{1,800}$ x200	480 hours

Unskilled Labour	$\frac{216}{1,800}$ x200	240 hours
		2,000 hours

Skilled Labour	1,152 hours @ ₹ 30	34,560
Semi-skilled Labour	432 hours @ ₹ 20	8,640
Unskilled Labour	216 hours @ ₹ 10	2,160
	1,800 hours	45,360
Actual Cost:		
Skilled Labour	1,120 hours @ ₹ 34	38,080
Semi-skilled Labour	720 hours @ ₹ 23	16,560
Unskilled Labour	160 hours @ ₹ 12	1,920
	2,000 hours	56,560

(i) Total Labour Cost Variance
Standard Cost- Actual Cost ₹
₹ 45,360 - ₹ 56,560 — 11,200 (A)

(ii) Labour Yield Variance:
(Standard hours for Actual Output - Revised Standard hours) x Standard Rate

Skilled	(1,152 - 1,280) x ₹ 30	3,840 (A)	
Semi -skilled	(432 - 480) x ₹ 20	960 (A)	
Un-skilled	(216 - 240) x ₹ 10	240 (A)	
		5,040 (A)	5,040(A)

(iii) Labour Mix Variance:
(Revised Standard Hours - Actual Hours) x Standard Rate

Skilled	(1,280 - 1,120) x ₹ 30	4,800 (F)	
Semi-skilled	(480-720) x ₹ 20	4,800(A)	
Un-skilled	(240-160) x ₹ 10	800 (F)	
		800(F)	800 (F)

(iv) Labour Wage Rate Variance:
(Standard Rate - Actual Rate) x Actual Hours

Skilled	(₹ 30 - ₹ 34) x1,120	4,480 (A)	
Semi-skilled	(₹ 20 - ₹ 23) x 720	2,160 (A)	
Un-skilled	(₹ 10 - ₹ 12) x 160	320 (A)	
		6,960 (A)	6,960 (A)
Check : Total Labour Cost Variance = Yield + Mix + Rate			11,200 (A)

Q.28 Labour Variance | RTP Nov 23

The following information has been provided by a company:

Number of units produced and sold	6,000
Standard labour rate per hour	₹ 8
Standard hours required for 6,000 units	-
Actual hours required	17094 hours
Labour efficiency	105.3%
Labour rate variance	
You are required to calculate:	₹ 68,376 (A)

(i) Actual labour rate per hour
(ii) Standard hours required for 6,000 units
(iii) Labour Efficiency variance

(iv) Standard labour cost per unit
(v) Actual labour cost per unit.

Ans

SR – Standard labour Rate per Hour
AR – Actual labour rate per hour
SH – Standard Hours
AH – Actual hours

(i) Labour rate Variance = AH (SR – AR)
Or 17,094 (8 – AR) = 68,376(A)
Or 17,094 (8 – AR) = - 68,376
Or 8 – AR = -4
Or AR = ₹12

(ii) Labour Efficiency $= \frac{SH}{AH} \times 100 = 105.3$

$= SH = \frac{AH \times 105.3}{100} = \frac{17,094 \times 105.3}{100}$

= 17,999.982
= SH = 18,000 hours

(iii) Labour Efficiency Variance = SR (SH – AH)
= 8(18,000 – 17,094)
= 8 X 906
= ₹ 7,248(F)

(iv) Standard Labour Cost per Unit $= \frac{18,000 \times 8}{6,000} =$ ₹ 24

(v) Actual Labour Cost Per Unit $= \frac{17,094 \times 12}{6,000} =$ ₹ 34.19

Q.29 Labout, OH Variance | MTP Nov 18(1)

Z. Ltd. uses standard costing system in manufacturing of its single product 'M'. The standard cost per unit of M is as follows:

	Rs.
Direct Material – 2 metres @ Rs. 6 per metre	12.00
Direct labour- 1 hour @ Rs. 4.40 per hour	4.40
Variable overhead- 1 hour @ Rs. 3 per hour	3.00

During July, 2016, 6,000 units of M were produced and the related data are as under:
Direct material acquired- 19,000 metres @ Rs.5.70 per metre.

Material consumed – 12,670 metres.

Direct labour – ? hours @ Rs. ? per hour Rs. 27,950

Variable overheads incurred Rs. 20,475
The variable overhead efficiency variance is Rs. 1,500 adverse. Variable overheads are based on direct labour hours. There was no stock of the material in the beginning.
You are required to DETERMINE the missing figures and work out all the relevant variances.

Ans

Standard Costs

	Rs.
Direct materials (6,000 × Rs. 12)	72,000
Direct labour (6,000 × Rs. 4.40)	26,400
Variable overheads (6,000 × Rs. 3)	18,000
Total	1,16,400

Actual Cost

Direct Materials (12,670 × 5.70)	72,219
Direct wages	27,950
Variable overhead incurred	20,475
Total	1,20,644

Total Variance = SC- AC = 1,16,400 –1,20,644 = Rs. 4,244 (A)

Missing Figures

1. Actual Direct Labour Hours (DLH)

We can find out this through Variable overhead efficiency variance of Rs. 1,500 adverse

VOH Efficiency Variance= SR (SH – AH)

1,500 A	=	3(6,000 – AH)
-1,500	=	18,000 – 3 AH
3AH	=	18,000 + 1,500 = 19,500
AH = 19,500/3	=	6,500 Actual Hours i.e. Actual DLH.

Actual Labour Rate per hour = $\frac{\text{Rs. } 27,950}{6,500 \text{ DLH}}$ = Rs. 4.30

Relevant Variances:

1	Material Variances:	
	(a) MCV = SC – AC = 72,000 – 72,219 =	Rs. 219 (A)
	(b) MPV = AQ (SR – AR) = 12,670 (6 – 5.70) =	Rs. 3,801 (F)
	or = 19,000 (6 – 5.70) =	Rs. 5,700(F)
	(c) MUV = SR (SQ – AQ) = 6 (6,000 × 2 – 12,670)	
	= 6 (12,000 – 12,670) =	Rs. 4,020 (A)
2.	Labour Variances:	
	(a) LCV = SC – AC = 26,400 – 27,950 =	Rs. 1,550 (A)
	(b) LRV = AHP (SR – AR) = 6,500 (4.40 – 4.30) =	Rs. 650 (F)
	(c) LEV = SR (SH – AHP) = 4.40 (6,000 – 6,500) =	Rs. 2,200 (A)
3.	Variable Overhead Variances : (Output Basis)	
	(a) VOH Variance = SVO – AVO= 18,000 – 20,475	Rs. 2,475 (A)
	(b) Efficiency Variance = SR (SQ – AQ) (Note 1)	
	= 3 (6,500 – 6,000) =	Rs. 1,500 (A)
	(b) Expenditure Variance = (SVOSP – AVO) (Note 2)	
	= (19,500 – 20,475) =	Rs. 975 (A)

Note :

1. One unit of production in one hour. For 6,500 DLH, 6,500 units should have been produced (SQ). But AQ = 6,000 units. i.e. less than SQ. Hence, it is adverse variance of Rs. 1 ,500.

2. Standard Variable Overhead on Standard Production = 6,500 × 3 = Rs. 19,500

Q.30 Labour, OH Variance | MTP Nov 18(2)

Arnav Ltd. manufactures a product Q, the standard cost of which is as follows:

	Standard Cost per unit (Rs.)
Direct Material	600
Direct labour:	
- Skilled @ Rs.80 per hour	120
- Unskilled @ Rs.60 per hour	90
Variable overheads	75
Fixed overheads	30
	915

During the month just ended 4,000 units of Q were produced. The actual labour cost was as follows.

	Rate per hour (Rs.)	Cost (Rs.)
Skilled	87.50	5,77,500
Unskilled	55.00	2,97,000

10% of the labour time was lost due to idle time. The standard idle time was 7.5% of labour time. Arnav Ltd. has budgeted to produce 4,200 units of Q. Arnav Ltd. absorbs its overheads on direct labour hour (effective hours) basis. Actual fixed and variable overheads incurred were Rs.1,55,000 and Rs.2,85,000 respectively.

CALCULATE:

(i) Labour rate variance;
(ii) Labour efficiency variance;
(iii) Labour mix variance;
(iv) Labour yield variance;
(v) Labour idle time variance;
(vi) Variable overhead expenditure variance and
(vii) Variable overhead efficiency variance.

Ans

	Skilled	Unskilled
Standard Rate per hour	80	60
Standard time for producing one unit	1.5 hours (Rs.120 ÷ Rs.80)	1.5 hours (Rs.90 ÷ Rs.60)
Actual hours paid (AH Paid)	6,600 hours	5,400 hours
Standard hours required to produce 4,000 units (SH)	6,000 hours (1.5 hours× 4,000 units)	6,000 hours (1.5 hours× 4,000 units)
Actual hours worked (AH Workd)	$\frac{6,600}{100} \times 97.5$ = 6,435 hours	$\frac{5,400}{100} \times 97.5$ = 5,265 hours
Revised Std. Hours (RSH)	$\left(\frac{6,600 + 5,400}{100} \times 97.5\right) 0.5$ = 5,850 hours	$\left(\frac{6,600 + 5,400}{100} \times 97.5\right) 0.5$ = 5,850 hours
Idle timeAbnormal	6,600 - 6,435 = 165 hours	5,400 – 5,265 = 135 hours
	Skilled	**Unskilled**
Standard Rate per hour	80	60
Standard time for producing one unit	1.5 hours (Rs.120 ÷ Rs.80)	1.5 hours (Rs.90 ÷ Rs.60)
Actual hours paid (AHPaid)	6,600 hours	5,400 hours

Standard hours required to produce 4,000 units (SH)	6,000 hours (1.5 hours× 4,000 units)	6,000 hours (1.5 hours× 4,000 units)
Actual hours worked (AH Workd)	$\frac{6,600}{100} x97.5$ = 6,435 hours	$\frac{5,400}{100} x97.5$ = 5,265 hours
Revised Std. Hours (RSH)	$\left(\frac{6,600 + 5,400}{100} x97.5\right) 0.5$ = 5,850 hours	$\left(\frac{6,600 + 5,400}{100} x97.5\right) 0.5$ = 5,850 hours
Idle timeAbnormal	6,600 - 6,435 = 165 hours	5,400 – 5,265 = 135 hours

(i) Labour Rate Variance = AH Paid(Std. Rate – Actual Rate)
- Skilled = 6,600 hours (Rs.80 – Rs.87.50) = Rs.49,500 (A)
- Unskilled= 5,400 hours (Rs.60 – Rs.55) = Rs.27,000 (F)
= Rs.22,500 (A)

(ii) Labour Efficiency Variance = Std. Rate (SH – AH Worked)
- Skilled = Rs.80 (6,000 hours – 6,435 hours) = Rs.34,800 (A)
- Unskilled= Rs.60 (6,000 hours – 5,265 hours) = Rs.44,100 (F)
= Rs.9,300 (F)

(iii) Labour Mix Variance = Std. Rate (RSH – AH Worked)
- Skilled = Rs.80 (5,850 hours – 6,435 hours) = Rs.46,800 (A)
- Unskilled= Rs.60 (5,850 hours – 5,265 hours) = Rs.35,100 (F)
= Rs.11,700 (A)

(iv) Labour Yield Variance = Std. Rate (SH – RSH)
- Skilled = Rs.80 (6,000 hours – 5,850 hours) = Rs.12,000 (F)
- Unskilled= Rs.60 (6,000 hours – 5,850 hours) = Rs.9,000 (F)
= Rs.21,000 (F)

(v) Labour Idle time Variance = Std. Rate × Idle time Abnormal
- Skilled = Rs.80 × 165 hours = Rs.13,200 (A)
- Unskilled= Rs.60 × 135 hours = Rs.8,100 (A)
= Rs.21,300 (A)

(vi) Variable Overhead Expenditure Variance
= AH Worked (SR - AR)

$$= 11,700 \text{ hours} \left(\frac{Rs.75}{2x1.5 hours} - \frac{Rs.2,85,000}{11,700 hours}\right)$$

= 11,700 hours (Rs.25 – Rs.24.36) = Rs.7,488 (F)

(vii) Variable Overhead Efficiency Variance
= Std. Rate (SH – AH Worked)
= Rs.25 (12,000 – 11,700) = Rs.7,500 (F)

Q.31 OH Variance | PY Jan 21

Premier Industries has a small factory where 52 workers are employed on an average for 25 days a month and they work 8 hours per day. The normal down time is 15%. The firm has introduced standard costing for cost control. Its monthly budget for November, 2020 shows that the budgeted variable and fixed overhead are ₹ 1,06,080 and ₹ 2,21,000 respectively.
The firm reports the following details of actual performance for November, 2020, after the end of the month:

Actual hours worked	8,100 hrs.
Actual production expressed in standard hours	8,800 hrs.
Actual Variable Overheads	₹ 1,02,000
Actual Fixed Overheads	₹ 2,00,000

You are required to calculate:

(i) Variable Overhead Variances:
- (a) Variable overhead expenditure variance.
- (b) Variable overhead efficiency variance.

(ii) Fixed Overhead Variances:
- (a) Fixed overhead budget variance.
- (b) Fixed overhead capacity variance.
- (c) Fixed overhead efficiency variance.

(iii) Control Ratios:
- (a) Capacity ratio.
- (b) Efficiency ratio.
- (c) Activity ratio.

Ans

Calculation of budgeted hours

Budgeted hours = (52 x 25 x 8) x 85% = 8,840 hours

(i) Variable overheads variance

(a) Variable overhead expenditure variance

= Std. overhead for Actual hours – Actual variable Overhead

$$= \left(\frac{1,06,080}{8,840} x 8,100\right) - 1,02,000$$

= 4800 A

(b) Variable overhead efficiency variance

Std. rate per hour x (Std. hours for actual production – Actual hours)

$$= \frac{1,06,080}{8,840} (8,800 \text{ hours} - 8,100 \text{ hours})$$

= 8400 F

(ii) Fixed overhead variances

(a) Fixed overhead budget variance

= Budgeted overhead – Actual overhead

= ₹ 2,21,000 – ₹ 2,00,000

= 21,000 F

(b) Fixed overhead capacity variance

= Std rate x (Actual hours – budgeted hours)

$$= \frac{2,21,000}{8,840} \times (8,100 - 8,840)$$

(c) Fixed overhead efficiency variance

= Std rate x (Std hours for actual production – Actual hours)

$$= \frac{2,21,000}{8,840} \times (8,800 - 8,100)$$

= 17,500 F

(iii) Control Ratios

(a) Capacity Ratio

$$= \frac{\text{Actual hours}}{\text{Budgeted hours}} x100$$

$$= \frac{8,100}{8,840} \times 100 = 91.63\%$$

(b) Efficiency Ratio

$$= \frac{\text{Standard hours}}{\text{Actual hours}} \times 100$$

$$= \frac{8,800}{8,100} \times 100 = 108.64\%$$

(c) Activity Ratio

$$= \frac{\text{Standard hours}}{\text{Budgted hours}} \times 100$$

$$= \frac{8,800}{8,840} \times 100 = 99.55\%$$

Q.32 OH Variance | PY Dec 21

In a manufacturing company the standard units of production for the year were fixed at 1,20,000 units and overhead expenditures were estimated to be as follows:

Particulars	Amount (₹)
Fixed	12,00,000
Semi-variable (60% expenses are of fixed nature and 40% are ofvariable nature)	1,80,000
Variable	6,00,000

Actual production during the month of April, 2021 was 8,000 units. Each month has 20 working days. During the month there was one public holiday. The actual overheads were as follows:

Particulars	Amount (₹)
Fixed	1,10,000
Semi-variable (60% expenses are of fixed nature and 40% are of variable)	19,200
Variable	48,000

You are required to calculate the following variances for the month of April 2021:

i. Overhead Cost variance
ii. Fixed Overhead Cost variance
iii. Variable Overhead Cost variance
iv. Fixed Overhead Volume variance
v. Fixed Overhead Expenditure Variance
vi. Calendar Variance

Ans

Fixed Overheads = $\frac{\text{Budgeted FixedOverheads}}{\text{Budgeted Output}} = \frac{12,00,000}{1,20,000 \text{ units}}$	₹ 10
Fixed Overheads element in Semi-Variable Overheads i.e. 60% of ₹1,80,000	₹ 1,08,000
Fixed Overheads = $\frac{\text{Budgeted FixedOverheads}}{\text{Budgeted Output}} = \frac{1,08,000}{1,20,000 \text{ units}}$	₹ 0.90
Standard Rate of Absorption of Fixed Overheads *per unit* (₹10 + ₹0.90)	₹ 10.90
Fixed Overheads Absorbed on 8,000 units @ ₹ 10.90	₹ 87,200

Budgeted Variable Overheads *Add:* Variable element in Semi-Variable Overheads 40% of ₹ 1,80,000 Total Budgeted Variable Overheads Standard Variable Cost per unit = $\frac{\text{Budgeted Variable Overheads}}{\text{Budgeted Output}} = \frac{6,72,000}{1,20,000 \text{ units}}$	₹ 6,00,000 ₹ 72,000 ₹ 6,72,000 ₹5.60
Standard Variable Overheads for 8,000 units @ ₹5.60	₹ 44,800
Budgeted Annual Fixed Overheads (₹ 12,00,000 + 60% of ₹ 1,80,000)	₹ 13,08,000
Possible Fixed Overheads = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Days}} \times \text{Actual Days} = \left[\frac{1,09,000}{20 \text{ Days}} \times 19 \text{Days}\right]$	₹ 1,03,550
Actual Fixed Overheads (₹1,10,000 + 60% of ₹ 19,200)	₹ 1,21,520
Actual Variable Overheads (₹48,000 + 40% of ₹19,200)	₹ 55,680

COMPUTATION OF VARIANCES

i. Overhead Cost Variance = Absorbed Overheads – Actual Overheads
= (₹ 87,200 + ₹ 44,800) – (₹ 1,21,520 + ₹ 55,680)
= ₹ 45,200 (A)

ii. Fixed Overhead Cost Variance= Absorbed Fixed Overheads – Actual Fixed Overheads
= ₹ 87,200 – ₹ 1,21,520
= ₹ 34,320 (A)

iii. Variable Overhead Cost Variance = Standard Variable Overheads for Production– Actual Variable Overheads
= ₹ 44,800 – ₹ 55,680
= ₹ 10,880 (A)

iv. Fixed Overhead Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads
= ₹ 87,200 – ₹1,09,000
= ₹ 21,800 (A)

v. Fixed Overhead Expenditure Variance = Budgeted Fixed Overheads – Actual Fixed Overheads
= ₹ 10.90 × 10,000 units – ₹ 1,21,520
= ₹ 12,520 (A)

vi. Calendar Variance = Possible Fixed Overheads – Budgeted Fixed Overheads
= ₹ 1,03,550 – ₹ 1,09,000
= ₹ 5,450 (A)

OR

Calendar Variance = (Actual days – Budgeted days) x Standard fixed overhead rate per day
Standard fixed overhead rate per day = 1308000/20*12 = ₹ 5450
Fixed Overhead Calendar Variance = (19-20) x 5450 = 5450(A)

Q.33 OH Variance | MTP Nov 19

In a manufacturing company the standard units of production of the year were fixed at 1,20,000 units and overhead expenditures were estimated to be:

Fixed Rs. 12,00,000; Variable Rs. 6,00,000;
Semi-Variable Rs. 1,80,000

Actual production during the April, 2019 of the year was 8,000 units. Each month has 20 working days. During the month there was one public holiday. The actual overheads amounted to:

Fixed Rs. 1,10,000; Variable Rs. 48,000

Semi-variable Rs. 19,200

Semi-variable charges are considered to include 60 per cent expenses of fixed nature and 40 per cent of variable character.

CALCULATE the followings:

(i) Overhead Cost Variance
(ii) Fixed Overhead Cost Variance
(iii) Variable Overhead Cost Variance
(iv) Fixed Overhead Volume Variance
(v) Fixed Overhead Expenditure Variance
(vi) Calendar Variance.

Ans

COMPUTATION OF VARIANCES

(i) Overhead Cost Variance = Absorbed Overheads – Actual Overheads
= (Rs.87,200 + Rs.44,800) – (Rs.1,21,520 + Rs.55,680)
= Rs. 45,200 (A)

(ii) Fixed Overhead Cost Variance = Absorbed Fixed Overheads – Actual Fixed Overheads
= Rs. 87,200 – Rs.1,21,520
= Rs.34,320 (A)

(iii) Variable Overhead Cost Variance = Standard Variable Overheads for Production – Actual Variable Overheads
= Rs. 44,800 – Rs. 55,680
= Rs. 10,880 (A)

(iv) Fixed Overhead Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads
= Rs. 87,200 – Rs.1,09,000
= Rs. 21,800 (A)

(v) Fixed Overhead Expenditure Variance = Budgeted Fixed Overheads – Actual Fixed Overheads
= Rs.10.90 × 10,000 units – Rs.1,21,520
= Rs.12,520 (A)

(vi) Calendar Variance = Possible Fixed Overheads – Budgeted Fixed Overheads
= Rs.1,03,550 – Rs.1,09,000
= Rs. 5,450 (A)

WORKING NOTE

Fixed Overheads per Unit= $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Output}} = \frac{\text{Rs.12,00,000}}{\text{1,20,000units}}$	Rs. 10
Fixed Overheads element in Semi-Variable Overheads i.e. 60% of Rs.1,80,000	Rs. 1,08,000

Fixed Overheads per Unit = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Output}} = \frac{\text{Rs.1,08,000}}{\text{1,20,000units}}$ Standard Rate of Absorption of Fixed Overheads per unit (Rs.10 + Rs.0.90)	Rs. 0.90 Rs.10.90
Fixed Overheads Absorbed on 8,000 units @ Rs10.90	Rs. 87,200
Budgeted Variable Overheads Add : Variable element in Semi-Variable Overheads 40% of Rs. 1,80,000	Rs. 6,00,000 Rs. 72,000
Total Budgeted Variable Overheads Standard Variable Cost per unit = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Output}} = \frac{\text{Rs.6,72,000}}{\text{1,20,000units}}$	Rs. 6,72,000 Rs.5.60
Standard Variable Overheads for 8,000 units @ Rs.5.60	Rs. 44,800
Budgeted Annual Fixed Overheads (Rs. 12,00,000 + 60% of Rs. 1,80,000)	Rs.13,08,000
Possible Fixed Overheads = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Output}}$ xActual Days $= \left[\frac{\text{Rs.1,09,000}}{\text{20Days}} 19\text{Days}\right]$	Rs.1,03,550
Actual Fixed Overheads (Rs.1,10,000 + 60% of Rs. 19,200)	Rs.1,21,520
Actual Variable Overheads (Rs.48,000 + 40% of Rs.19,200)	Rs. 55,680

Q.34 OH Variance | PY Nov 18

A manufacturing concern has provided following information related to fixed overheads:

	Standard	Actual
Output in a month	5000 units	4800 units
Working days in a month	25 days	23 days
Fixed overheads	₹ 5,00,000	₹ 4,90,000

Compute:

(i) Fixed overhead variance

(ii) Fixed overhead expenditure variance

(iii) Fixed overhead volume variance

(iv) Fixed overhead efficiency variance

Ans

(i) Fixed Overhead Variance: Standard fixed overhead – Actual fixed overhead
= ₹ [(5,00,000÷5000) ×4800] – ₹ 4,90,000 = ₹ 10,000 (A)

(ii) Fixed Overhead Expenditure Variances:
Budgeted fixed overhead – Actual fixed overhead

= ₹ 5,00, 000 – ₹ 4,90, 000 = ₹ 10,000 (F)

(iii) Fixed Overhead Volume Variance: Standard fixed overhead – Budgeted fixed overhead
= ₹ 4,80, 000 – ₹ 5,00, 000 = ₹ 20,000 (A)

(iv) Fixed Overhead efficiency Variance: Standard fixed overhead – Budgeted fixed overhead for Actual days
= ₹ 4,80, 000 – [(₹ 5,00, 000÷25) ×23] = ₹ 20,000 (F)

Q.35 OH Variance | PY Nov 20

ABC Ltd. has furnished the following information regarding the overheads for the month of June 2020 :

(i)	Fixed Overhead Cost Variance	₹ 2,800 (Adverse)
(ii)	Fixed Overhead Volume Variance	₹ 2,000 (Adverse)
(iii)	Budgeted Hours for June, 2020	2,400 hours
(iv)	Budgeted Overheads for June,2020	₹ 12,000
(v)	Actual rate of recovery of overheads	₹ 8 Per Hour

From the above given information Calculate:

(1) Fixed Overhead Expenditure Variance

(2) Actual Overheads Incurred

(3) Actual Hours for Actual Production

(4) Fixed Overhead Capacity Variance

(5) Standard hours for Actual Production

(6) Fixed Overhead Efficiency Variance

Ans

(1) Fixed Overhead Expenditure Variance
= Budgeted Fixed Overheads – Actual Fixed Overheads
= ₹ 12,000 – ₹ 12,800 (as calculated below) = ₹ 800 (A)

(2) Fixed Overhead Cost Variance= Absorbed Fixed Overheads – Actual Fixed Overheads
2,800 (A) = ₹ 10,000 – Actual Overheads
Actual Overheads = ₹ 12,800

(3) Actual Hours for Actual Production = ₹ 12,800/ ₹8 = 1,600 hrs.

(4) Fixed Overhead capacity Variance
= Budgeted Fixed Overheads for Actual Hours– Budgeted Fixed Overheads
= ₹ 5 x 1600 hrs. – ₹ 12,000 = ₹ 4,000 (A)

(5) Standard Hours for Actual Production
= Absorbed Overheads/ Std. Rate
= ₹ 10,000/ ₹ 5 = 2,000 hrs.

(6) Fixed Overhead Efficiency Variance
= Absorbed Fixed Overheads – Budgeted Fixed Overheads for Actual Hours
= ₹ 10,000 – ₹ 5 x 1,600 hrs. = ₹ 2,000 (F)

Working Note:

(i) Fixed Overhead Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads
2,000 (A) = Absorbed Fixed Overheads – ₹12,000
Absorbed Fixed Overheads = ₹ 10,000

(ii) Standard Rate/ Hour = ₹ 5 (₹ 12,000/2,400 hrs.)
Cost per unit of spare (c) = ₹ 50
Carrying cost per unit (i × c) = ₹ 50 × 12.5% = ₹ 6.25

Q.36 OH Variance | MTP May 22(1)

Following are the details given:

Budgeted Days	25
Budgeted Fixed Overheads	1,00,000
Budgeted Production	800 units per day
Actual Production	21,000 units
Fixed Overheads are absorbed @ ₹ 10 per hour.	
Fixed overheads efficiency variance	10,000A
Fixed overheads calendar variance	8,000F
Fixed overheads cost variance	15,000A

You are required to CALCULATE:

(a) Actual Fixed Overheads
(b) Actual Days
(c) Actual Hours
(d) Fixed overheads Expenditure variance
(e) Fixed overheads volume variance
(f) Fixed overheads capacity variance

Ans

(i) Fixed Overhead Cost Variance = (Std Fixed Overheads – Actual Fixed Overheads)

$$=\left(\frac{1,00,000}{20,000} \times 21,000 \text{ units} - \text{Actual Fixed Overheads}\right) = 15,000A$$

$$= (1,05,000 - \text{Actual Fixed Overheads}) = 15,000A$$

$$= \text{Actual Fixed Overheads} = 1,20,000$$

(ii) Fixed Overhead Calendar Variance = (Actual Days – Budgeted Days) x Budgeted rate per day

$$= (\text{Actual Days} - 25) \times \frac{1,00,000}{25} = 8,000F$$

$$= (\text{Actual Days} - 25) = 2$$

$$= \text{Actual Days} = 27$$

(iii) Fixed Overhead Efficiency Variance = (Standard Hours for Actual Production – Actual Hours) x Budgeted rate per hour

$$= \left(\frac{10,000}{20,000} \times 21,000 - \text{Actual Hours}\right) \times 10 = 10,000A$$

$$= (10,500 - \text{Actual Hours}) = -1,000$$

$$= \text{Actual Hours} = 11,500$$

(iv) Fixed overheads Expenditure variance = (Budgeted Fixed Overheads – Actual Fixed Overheads)

$$= (1,00,000 - 1,20,000) = 20,000A$$

(v) Fixed overheads volume variance = (Budgeted units – Actual Units) x Budgeted Rate per unit

$$= (20,000 - 21,000) \times \frac{1,00,000}{20,000} = 5,000F$$

(vi) Fixed overheads capacity variance = (Budgeted Hours for Actual Days – Actual Hours) x Budgeted Rate per Hour.

$$= \left(\frac{10,000}{25} \times 27 - 11,500\right) \times 10 = 7,000F$$

Q.37 OH Variance | MTP May 21(1)

AK Ltd. has furnished the following standard cost data per unit of production:
Material 10 kg @ Rs. 100 per kg.
Labour 6 hours @ Rs. 55 per hour
Variable overhead 6 hours @ Rs. 100 per hour.
Fixed overhead Rs.45,00,000 per month (Based on a normal volume of 30,000 labour hrs)
The actual cost data for the month of September 2020 are as follows:
Material used 50,000 kg at a cost of Rs. 52,50,000.
Labour paid Rs. 15,50,000 for 31,000 hours
Variable overheads Rs. 29,30,000
Fixed overheads Rs. 47,00,000
Actual production 4,800 units. CALCULATE:
(i) Material Cost Variance.
(ii) Labour Cost Variance.
(iii) Fixed Overhead Cost Variance.
(iv) Variable Overhead Cost Variance.

Ans

Budgeted Production 30,000 hours ÷ 6 hours per unit = 5,000 units
Budgeted Fixed Overhead Rate = Rs. 45,00,000 ÷ 5,000 units = Rs. 900 per unit Or
= Rs. 45,00,000 ÷ 30,000 hours = Rs. 150 per hour.

(i) Material Cost Variance = (Std. Qty. × Std. Price) – (Actual Qty. × Actual Price)
= (4,800 units × 10 kg. × Rs.100) - Rs. 52,50,000
= Rs. 48,00,000 – Rs. 52,50,000
= Rs. 4,50,000 (A)

(ii) Labour Cost Variance = (Std. Hours × Std. Rate) – (Actual Hours × Actual rate)
= (4,800 units × 6 hours × Rs. 55) – Rs. 15,50,000
= Rs. 15,84,000 – Rs. 15,50,000
= Rs. 34,000 (F)

(iii) Fixed Overhead Cost Variance = (Budgeted Rate × Actual Qty) – Actual Overhead
= (Rs. 900 × 4,800 units) – Rs.47,00,000
= Rs. 3,80,000 (A) OR
= (Budgeted Rate × Std. Hours) – Actual Overhead
= (Rs. 150 × 4,800 units × 6 hours) – Rs. 47,00,000
= Rs. 3,80,000 (A)

(iv) Variable Overhead Cost Variance = (Std. Rate × Std. Hours) – Actual Overhead
= (4,800 units × 6 hours × Rs. 100) - Rs. 29,30,000
= Rs. 28,80,000 - Rs. 29,30,000
= Rs. 50,000 (A)

8 CHAPTER JOINT & BY PRODUCT

Q.1 Allocate Cost | PY May 19

A Factory is engaged in the production of chemical Bomex and in the course of its manufacture a by-product Cromex is produced which after further processing has a commercial value. For the month of April 2019 the following are the summarised cost data:

	Joint Expenses (₹)	Separate Expenses (₹)	
		Bomex	Cromex
Materials	1,00,000	6,000	4,000
Labour	50,000	20,000	18,000
Overheads	30,000	10,000	6,000
Selling Price per unit		100	40
Estimated profit per unit on sale of Cromex			5
Number of units produced		2,000 units	2,000 units

The factory uses net realisable value method for apportionment of joint cost to by-products.
You are required to prepare statements showing :
(i) Joint cost allocable to Cromex
(ii) Product wise and overall profitability of the factory for April 2019.

Ans. **(i) Statement Showing Joint Cost Allocation to 'Cromex'**

Particulars	**Cromex (₹)**
Sales (₹ 40 × 2,000 units)	80,000
Less: Post Split Off Costs (4,000+18,000+6,000)	(28,000)
Less: Estimated Profit (₹ 5 × 2,000 units)	(10,000)
Joint cost allocable	**42,000**

(ii) Statement Showing Product Wise and Overall Profitability

Particulars	**Bomex (₹)**	**Cromex (₹)**	**Total (₹)**
Sales	2,00,000	80,000	2,80,000
Less: Share in Joint Expenses	**(1,38,000)***	(42,000)	(1,80,000)
Less: Post Split Off Costs	(36,000)	(28,000)	(64,000)
Profit	**26,000**	**10,000**	**36,000**

(*) 1,80,000 – 42,000

Q.2 Allocate Cost | PY Nov 19

A Factory produces two products, 'A' and 'B' from a single process. The joint processing costs during a particular month are :
Direct Material ₹30,000

Direct Labour ₹ 9,600
Variable Overheads ₹ 12,000
Fixed Overheads ₹ 32,000
Sales: A- 100 units@ ₹ 600 per unit; B – 120 units @ ₹ 200 per unit.

I. Apportion joints costs on the basis of:
   (i) Physical Quantity of each product.
   (ii) Contribution Margin method, and

II. Determine Profit or Loss under both the methods.

Ans.

Total Joint Cost

	Amount (₹)
Direct Material	30,000
Direct Labour	9,600
Variable Overheads	12,000
Total Variable Cost	51,600
Fixed Overheads	32,000
Total joint cost	83,600

Apportionment of Joint Costs:

			Product-A	**Product-B**
I.	(i)	Apportionment of Joint Cost on the basis of 'Physical Quantity'	**₹ 38,000** $\left(\frac{83600}{100+120units} \times 100\right)$	**₹ 45,600** $\left(\frac{83600}{100+120units} \times 120\right)$
	(ii)	Apportionment of Joint Cost on the basis of 'Contribution Margin Method':		
		- Variable Costs (on basis of physical units)	**₹ 23,455** $\left(\frac{51600}{100+120units} \times 100\right)$	**₹ 28,145** $\left(\frac{51600}{100+120units} \times 120\right)$
		Contribution Margin	**36,545** (₹600×100 – 23,455)	**-4,145** (₹200×120 – 28,145)
		Fixed Costs*	₹ 32,000	
		Total apportioned cost	₹ 55,455	₹ 28,145
II.	**(iii)**	**Profit or Loss:**		
	When Joint cost apportioned on basis of physical units			
	A.	Sales Value	₹ 60,000	₹ 24,000
	B.	Apportioned joint cost on basis of 'Physical Quantity':	₹ 38,000	₹ 45,600
	A-B	**Profit or (Loss)**	**22,000**	**(21,600)**
	When Joint cost apportioned on basis of 'Contribution Margin Method'			
	C	Apportioned joint cost on	₹ 55,455	₹ 28,145

		basis of 'Contribution Margin Method'		
	A-C	**Profit or (Loss)**	₹ 4,545	₹ (4,145)

* The fixed cost of ₹ 32,000 is to be apportioned over the joint products A and B in the ratio of their contribution margin but contribution margin of Product B is Negative so fixed cost will be charged to Product A only.

Q.3 Allocate Cost | PY May 23

Product 'X' that passes through three processes: R, S and T. Three types of raw materials, viz., J, K, and L are used in the ratio of 40:40:20 in process R. The output of each process is transferred to next process. Process loss is 10% of total input in each process. At the stage of output in process T, a by-product 'Z' is emerging and the ratio of the main product 'X' to the by-product 'Z' is 80:20. The selling price of product 'X' is ₹60 per kg.The company produced 14,580 kgs of product 'X'

Material price : Material J @ ₹ 15 per kg;
Material K @ ₹ 9 per kg. Material L@ ₹ 7 per kg Process costs are as follows:

Process	Variable cost per kg (₹)	Fixed cost of Input (₹)
R	5.00	42,000
S	4.50	5,000
T	3.40	4,800

The by-product 'Z' cannot be processed further and can be sold at ₹ 30 per kg at the split- off stage. There is no realizable value of process losses at any stage.

Required:

Present a statement showing the apportionment of joint costs on the basis of the sales value of product 'X' and by-product 'Z' at the split- off point and the profitability of product 'X' and by-product 'Z.

Ans.

Working Notes:

1. **Calculation of Input of Raw Material**

Let assume total raw material in Process R be 100%

∴ Output of Process T will be equal to:

Input R	100%
- 10% Normal Loss	₹ 10
Input S	₹ 90%
- 10% Normal loss	₹ 9
Input T	81%
- 10% Normal loss	₹ 8.1
Output of T	72.9
Actual output of X	14,580 units

Which is 80% of the total output

∴ Output of Process T

$= \frac{14580}{80\%} = 18,225$

∴ Input of Process R $= \frac{18225}{72.9\%} = 25,000$ kgs

Alternative presentation for Calculation of Input in Process R, S and T Working notes:

Process T (Kg.)

To Input (Transfer from process S)	20,250	By Normal loss	2,025
		By Output Product X	14,580
		By output of by-product Z	3,645
	20,250		20,250

Process S (kg.)			
To Input (Transfer from process S)	22,500	By Normal loss (10%)	2,250
		By Transfer to process T	20,250
	22,500		22,500

Process R (kg.)			
To Input	25,000	By Normal loss (10%)	2,500
		By Transfer to process S	22,500
	25,000		25,000

2. Calculation of Joint Cost

Process	Inputs	Variable cost per kg	Variable cost	Fixed Cost	Total Cost
		₹	₹	₹	₹
R	25,000	5	1,25,000	42,000	1,67,000
S	22,500	4.5	1,01,250	5,000	1,06,250
T	20,250	3.4	68,850	4,800	73,650
					3,46,900

Raw material	J	10000 x 15	₹ 1,50,000
	K	10000 x 9	₹ 90,000
	L	5000 x 7	₹ 35,000
			2,75,000
Add: Processing cost (as above)			₹ 3,46,900
Total Joint Cost			6,21,900

(i) Statement showing apportionment of Joint Cost

Particulars	Product X	By-Product Z	Total
Units	14,580	3,645	
Selling price (₹)	60	30	
Sales Value (₹)	8,74,800	1,09,350	9,84,150
(₹ 6,21,900 to apportioned in ratio of sales value at split off point)	5,52,800	69,100	6,21,900

(ii) Statement of Profitability

Particulars	Product X	By-Product Z	Total
Sales Value	8,74,800	1,09,350	9,84,150
Joint Cost (As apportioned above)	(5,52,800)	(69,100)	(6,21,900)

Profit	3,22,000	40,250	3,62,250

Q.4 Allocate cost | PY Nov 20

A company's plant processes 6,750 units of a raw material in a month to produce two products 'M' and 'N'. The process yield is as under:

Product M 80%
Product N 12%
Process Loss 8%

The cost of raw material is ₹ 80 per unit.

Processing cost is ₹ 2,25,000 of which labour cost is accounted for 66%. Labour is chargeable to products 'M' and 'N' in the ratio of 100:80.

Prepare a Comprehensive Cost Statement for each product showing:

(i) Apportionment of joint cost among products 'M' and 'N' and

(ii) Total cost of the products 'M' and 'N'.

Ans. **Comprehensive Cost Statement**

Particulars	Total Cost (₹)	Product-M (₹)	Product-N (₹)
No. of units produced *		5,400 units	810 units
Cost of raw material (₹ 80 × 6,750 units)	5,40,000		
Processing cost:			
- Labour cost (₹ 2,25,000 × 66%)	1,48,500		
- Other costs (₹ 2,25,000 - 1,48,500)	76,500		
Total joint cost	**7,65,000**		
(i) Apportionment of joint costs between the joint products			
Labour cost in the ratio of 100:80	1,48,500	**82,500** $\left(\frac{148500\times100}{180}\right)$	**66,000** $\left(\frac{148500\times80}{180}\right)$
Other joint costs (including material) in the ratio of output (5,400:810)	6,16,500	**5,36,087** $\left(\frac{616500\times5400}{6210}\right)$	**80,413** $\left(\frac{616500\times810}{6210}\right)$
(ii) Total product cost	7,65,000	**6,18,587**	**1,46,413**

No. of units produced of Product M = 6750 units x 80% = 5400 units

No. of units produced of Product N = 6750 units x 12% = 810 units

Q.5 Allocate Cost | PY Jan 21

Mayura Chemicals Ltd buys a particular raw material at ₹ 8 per litre. At the end of the processing Department-I, this raw material splits-off into products X, Y and Z. Product X is sold at the split-off point, with no further processing. Products Y and Z require further processing before they can be sold. Product Y is processed in Department-2, and Product Z is processed in Department-3. Following is a summary of the costs and other related data for the year 2019-20:

Particulars	Department		
	1	2	3

Cost of Raw Material	₹ 4,80,000	-	-
Direct Labour	₹ 70,000	₹ 4,50,000	₹ 6,50,000
Manufacturing Overhead	₹ 48,000	₹ 2,10,000	₹ 4,50,000
	Products		
	X	**Y**	**Z**
Sales (litres)	10,000	15,000	22,500
Closing inventory (litres)	5,000	-	7,500
Sale price per litre (₹)	30	64	50

There were no opening and closing inventories of basic raw materials at the beginning as well as at the end of the year. All finished goods inventory in litres was complete as to processing. The company uses the Net-realisable value method of allocating joint costs.

You are required to prepare:

(i) Schedule showing the allocation of joint costs.

(ii) Calculate the Cost of goods sold of each product and the cost of each item in Inventory.

(iii) A comparative statement of Gross profit.

Ans. (i) Statement of Joint Cost allocation of inventories of X, Y and Z

	Products			Total
	X (₹)	Y (₹)	Z (₹)	(₹)
Final sales value of total production (Working Note 1)	4,50,000 (15,000 x ₹ 30)	9,60,000 (15,000 x ₹ 64)	15,00,000 (30,000 x ₹ 50)	29,10,000
Less: Additional cost	--	6,60,000	11,00,000	17,60,000
Net realisable value (at split-off point)	4,50,000	3,00,000	4,00,000	11,50,000
Joint cost allocated (Working Note 2)	2,34,000	1,56,000	2,08,000	5,98,000

(ii) Calculation of Cost of goods sold and Closing inventory

	Products			Total
	X (₹)	Y (₹)	Z (₹)	(₹)
Allocated joint cost	2,34,000	1,56,000	2,08,000	5,98,000
Add: Additional costs	--	6,60,000	11,00,000	17,60,000
Cost of goods sold (COGS)	2,34,000	8,16,000	13,08,000	23,58,000
Less: Cost of closing inventory (Working Note 1)	78,000 (COGS × 100/3%)	--	3,27,000 (COGS × 25%)	4,05,000
Cost of goods sold	1,56,000	8,16,000	9,81,000	19,53,000

(iii) Comparative Statement of Gross Profit

	Products			Total
	X (₹)	Y (₹)	Z (₹)	(₹)
Sales revenue	3,00,000	9,60,000	11,25,000	23,85,000

	(10,000 x ₹ 30)	(15,000 x ₹ 64)	(22,500 x ₹ 50)	
Less: Cost of goods sold	1,56,000	8,16,000	9,81,000	19,53,000
Gross Profit	**1,44,000**	**1,44,000**	**1,44,000**	4,32,000

Working Notes:

1. Total production of three products for the year 2019-2020

Products	Quantity sold in litres	Quantity of closing inventory in litres	Total production	Closing inventory percentage (%)
(1)	(2)	(3)	(4) = [(2) + (3)}	(5) = (3)/ (4)
X	10,000	5,000	15,000	100/3
Y	15,000	--	15,000	--
Z	22,500	7,500	30,000	25

2. Joint cost apportioned to each product:

$$= \frac{\text{Total Joint cost}}{\text{TotalNetRealisable Value}} \times \text{Net Realisable Value of each product}$$

Joint cost of product X = $\frac{598000}{1150000} \times$ ₹ 4,50,000 = ₹ 2,34,000

Joint cost of product Y = $\frac{598000}{1150000} \times$ ₹ 3,00,000 = ₹ 1,56,000

Joint cost of product Z = $\frac{598000}{1150000} \times$ ₹ 4,00,000 = ₹ 2,08,000

Q.6 Profit after allocation | PY Nov 22

ASR Ltd mainly produces Product 'L' and gets a by-Product 'M' out of a joint process. The net realizable value of the by-product is used to reduce the joint production costs before the joint costs are allocated to the main product. During the month of October 2022, company incurred joint production costs of ₹ 4,00,000. The main Product 'L' is not marketable at the split off point. Thus, it has to be processed further. Details of company's operation are as under:

Particulars	Product L	By- Product M
Production (units)	10,000	200
Selling price per kg	₹ 45	₹ 5
Further processing cost	₹ 1,01,000	-

You are required to find out:

(i) Profit earned from Product 'L'.

(ii) Selling price per kg of product 'L', if the company wishes to earn a profit of ₹ 1,00,000 from the above production.

Ans. **(i) Calculation of profit on product 'L'**

Particular	₹
Sales	4,50,000
Less: Further processing cost	(1,01,000)
	3,49,000

Less: Joint Production Cost*	(3,99,000)
loss	(50,000)

*Joint Production Cost = [4,00,000 – (200 × 5)] = 3,99,000

(ii) Calculation of desired selling price of product 'L'

$$\text{Desired selling price} = \frac{\text{Desired Profit+Total Cost}}{\text{units measured}}$$

$$= \frac{100000 + 101000 + 399000}{10000} = 60 \text{ per kg.}$$

Q.7 Allocate Cost & Further Process | RTP May 18

A company processes a raw material in its Department 1 to produce three products, viz. A, B and X at the same split-off stage. During a period 1,80,000 kgs of raw materials were processed in Department 1 at a total cost of ₹ 12,88,000 and the resultant output of A, B and X were 18,000 kgs, 10,000 kgs and 54,000 kgs respectively. A and B were further processed in Department 2 at a cost of ₹ 1,80,000 and ₹ 1,50,000 respectively.

X was further processed in Department 3 at a cost of ₹1,08,000. There is no waste in further processing. The details of sales affected during the period were as under:

	A	B	X
Quantity Sold (kgs.)	17,000	5,000	44,000
Sales Value (₹)	12,24,000	2,50,000	7,92,000

There were no opening stocks. If these products were sold at split-off stage, the selling prices of A, B and X would have been ₹ 50, ₹ 40 and ₹ 10 per kg respectively.

Required:

(i) PREPARE a statement showing the apportionment of joint costs to A, B and X.

(ii) PREPARE a statement showing the cost per kg of each product indicating joint cost and further processing cost and total cost separately.

(iii) PREPARE a statement showing the product wise and total profit for the period.

(iv) DECIDE with supporting calculations as to whether any or all the products should be further processed or not

Ans. (i) **Statement showing the apportionment of joint costs to A, B and X**

Products	A	B	X	Total
Output (kg)	18,000	10,000	54,000	
Sales value at the point of split off (₹)	9,00,000 (₹ 50 x 18,000)	4,00,000 (₹ 40 x 10,000)	5,40,000 (₹ 10 x 54,000)	18,40,000
Joint cost apportionment on the basis of sales value at the point of split off (₹)	6,30,000 $\left(\frac{1288000}{1840000} \times 900000\right)$	2,80,000 $\left(\frac{1288000}{1840000} \times 400000\right)$	3,78,000 $\left(\frac{1288000}{1840000} \times 540000\right)$	12,88,000

(ii) Statement showing the cost per kg. of each product (indicating joint cost; further processing cost and total cost separately)

Products	A	B	X
Joint costs apportioned (₹) : (I)	6,30,000	2,80,000	3,78,000
Production (kg) : (II)	18,000	10,000	54,000

Joint cost per kg (₹): (I ÷ II)	35	28	7
Further processing Cost per kg. (₹)	10 $\left(\frac{180000}{18000\ kg}\right)$	15 $\left(\frac{150000}{10000\ kg}\right)$	2 $\left(\frac{108000}{54000\ kg}\right)$
Total cost per kg (₹)	45	43	9

(iii) Statement showing the product wise and total profit for the period

Products	A	B	X	Total
Sales value (₹)	12,24,000	2,50,000	7,92,000	
Add: Closing stock value (₹) (Refer to Working note 2)	45,000	2,15,000	90,000	
Value of production (₹)	12,69,000	4,65,000	8,82,000	26,16,000
Apportionment of joint cost (₹)	6,30,000	2,80,000	3,78,000	
Add: Further processing cost (₹)	1,80,000	1,50,000	1,08,000	
Total cost (₹)	8,10,000	4,30,000	4,86,000	17,26,000
Profit (₹)	4,59,000	35,000	3,96,000	8,90,000

Working Notes

1.

Products	A	B	X
Sales value (₹)	12,24,000	2,50,000	7,92,000
Quantity sold (Kgs.)	17,000	5,000	44,000
Selling price ₹/kg	72 $\left(\frac{1224000}{17000\ kg}\right)$	50 $\left(\frac{250000}{5000\ kg}\right)$	18 $\left(\frac{792000}{44000\ kg}\right)$

2. Valuation of closing stock:
Since the selling price per kg of products A, B and X is more than their total costs, therefore closing stock will be valued at cost.

Products	A	B	X	Total
Closing stock (kgs.)	1,000	5,000	10,000	
Cost per kg (₹)	45	43	9	
Closing stock value(₹)	45,000 (₹ 45 x 1,000 kg)	2,15,000 (₹ 43 x 5,000 kg)	90,000 (₹9x10,000 kg)	3,50,00

(iv) Calculations for processing decision

Products	A	B	X
Selling price per kg at the point of split off (₹)	50	40	10
Selling price per kg after further processing (₹) (Refer to working Note 1)	72	50	18
Incremental selling price per kg (₹)	22	10	8
Less: Further processing cost per kg (₹)	(10)	(15)	(2)
Incremental profit (loss) per kg (₹)	12	(5)	6

Product A and X has an incremental profit per unit after further processing, hence, these two products may be further processed. However, further processing of product B is not profitable hence, product B shall be sold at split off point.

Q.8 Material Variance | MTP May 23

A company produces two joint products A and B from the same basic materials. The processing is completed in three departments.

Materials are mixed in Department I. At the end of this process, A and B get separated. After separation, A is completed in the Department II and B in Department III. During a period, 4,00,000 kg of raw material was processed in Department I at a total cost of ₹ 17,50,000, and the resultant 50% becomes A and 40% becomes B and 10% normally lost in processing.

In Department II, 1/5th of the quantity received from Department I is lost in processing. A is further processed in Department II at a cost of ₹ 2,60,000.

In Department III, further new material is added to the material received from Department I and weight mixture is doubled, there is no quantity loss in the department III. Further processing cost (with material cost) in Department III is ₹ 3,00,000.

The details of sales during the said period are:

	Product A	Product B
Quantity sold (kg)	1,50,000	3,00,000
Sales price per kg (₹)	10	4

There were no opening stocks. If these products sold at split-off-point, the selling price of A and B would be ₹ 8 and ₹ 4 per kg respectively.

Required:

(i) PREPARE a statement showing the apportionment of joint cost to A and B in proportion of sales value at split off point.

(ii) PREPARE a statement showing the cost per kg of each product indicating joint cost, processing cost and total cost separately.

(iii) PREPARE a statement showing the product wise profit for the year.

(iv) On the basis of profits before and after further processing of product A and B, give your COMMENT that products should be further processed or not.

Ans. **Calculation of quantity produced**

	Dept I (kg)	Dept II (kg)	Dept III (kg)
Input	4,00,000	2,00,000 (50% of 4,00,000 kg.)	1,60,000 (40% of 4,00,000 kg.)
Weight (lost) or added	(40,000) (10% of 4,00,000 kg.)	(40,000) (1/5th of 2,00,000 kg.)	1,60,000
	3,60,000	1,60,000	3,20,000
Production of A	2,00,000	1,60,000	--
Production of B	1,60,000	--	3,20,000

(i) Statement of apportionment of joint cost of dept I

	Product A	Product B
Output (kg)	2,00,000	1,60,000
Selling price per kg (₹)	8	4
Sales value (₹)	16,00,000	6,40,000

Share in Joint cost (5:2)	12,50,000 (₹ 17,50,000 × 5 ÷ 7)	5,00,000 (₹ 17,50,000 × 2 ÷ 7)

(ii) Statement of cost per kg

	Product A	Product B
Output (kg)	1,60,000	3,20,000
Share in joint cost (₹)	12,50,000	5,00,000
Joint Cost per kg (₹) (A)	7.8125	1.5625
Further processing cost (₹)	2,60,000	3,00,000
Further processing cost per kg (₹) (B)	1.625	0.9375
Total cost per kg (₹) {(A)+(B)}	9.4375	2.5000

(iii) Statement of profit

	Product A	Product B
Output (kg)	1,60,000	3,20,000
Sales (kg)	(1,50,000)	(3,00,000)
Closing stock (kg)	10,000	20,000
	(₹)	(₹)
Sales	15,00,000 (1,50,000 kg × ₹ 10)	12,00,000 (3,00,000 kg × ₹ 4)
Add: closing stock (at full cost)	94,375 (10,000 kg × ₹ 9.4375)	50,000 (20,000 kg × ₹ 2.5)
Value of production	15,94,375	12,50,000
Less: Share in joint cost	12,50,000	5,00,000
Further processing cost	2,60,000	3,00,000
Profit	84,375	4,50,000

(iv) Profitability statement before and after processing

	Product A		Product B	
	Before (₹)	After (₹)	Before (₹)	After (₹)
Sales Value	16,00,000		6,40,000	
Share in joint costs	12,50,000		5,00,000	
Profit	3,50,000	84,375 (as per iii above)	1,40,000	4,50,000 (as per iii above)

Product A should be sold at split off point and product B after processing because of higher profitability.

Q.9 Allocate Cost | RTP Nov 21

A company processes a raw material in its Department 1 to produce three products, viz. A, B and X at the same split-off stage. During a period 1,80,000 kgs of raw materials were processed in Department 1 at a total cost of ₹ 12,88,000 and the resultant output of A, B and X were 18,000 kgs, 10,000 kgs and 54,000 kgs respectively. A and B were further processed in Department 2 at a cost of ₹1,80,000 and ₹1,50,000 respectively.

X was further processed in Department 3 at a cost of ₹1,08,000. There is no waste in further processing. The details of sales affected during the period were as under:

	A	B	X
Quantity Sold (kgs.)	17,000	5,000	44,000
Sales Value (₹)	12,24,000	2,50,000	7,92,000

There were no opening stocks. If these products were sold at split-off stage, the selling prices of A, B and X would have been ₹ 50, ₹ 40 and ₹ 10 per kg respectively.

Required:

(i) PREPARE a statement showing the apportionment of joint costs to A, B and X.

(ii) PRESENT a statement showing the cost per kg of each product indicating joint cost and further processing cost and total cost separately.

(iii) PREPARE a statement showing the product wise and total profit for the period.

(iv) STATE with supporting calculations as to whether any or all the products should be further processed or not

Ans.

(i) Statement showing the apportionment of joint costs to A, B and X

Products	A	B	X	Total
Output (kg)	18,000	10,000	54,000	
Sales value at the point of split off (₹)	9,00,000 (₹ 50 x 18,000)	4,00,000 (₹ 40 x 10,000)	5,40,000 (₹ 10 x 54,000)	18,40,000
Joint cost apportionment on the basis of sales value at the point of split off (₹)	6,30,000 $\left(\frac{1288000}{1840000}\times 900000\right)$	2,80,000 $\left(\frac{1288000}{1840000}\times 400000\right)$	3,78,000 $\left(\frac{1288000}{1840000}\times 540000\right)$	12,88,000

(ii) Statement showing the cost per kg. of each product (indicating joint cost; further processing cost and total cost separately)

Products	A	B	X
Joint costs apportioned (₹) : (I)	6,30,000	2,80,000	3,78,000
Production (kg) : (II)	18,000	10,000	54,000
Joint cost per kg (₹): (I ÷ II)	35	28	7
Further processing Cost per kg. (₹)	10 $\left(\frac{180000}{18000kg}\right)$	15 $\left(\frac{150000}{10000kg}\right)$	2 $\left(\frac{108000}{54000kg}\right)$
Total cost per kg (₹)	45	43	9

(iii) Statement showing the product wise and total profit for the period

Products	A	B	X	Total
Sales value (₹)	12,24,000	2,50,000	7,92,000	
Add: Closing stock value (₹) (Refer to Working note 2)	45,000	2,15,000	90,000	
Value of production (₹)	12,69,000	4,65,000	8,82,000	26,16,000
Apportionment of joint cost (₹)	6,30,000	2,80,000	3,78,000	

Add: Further processing cost (₹)	1,80,000	1,50,000	1,08,000	
Total cost (₹)	8,10,000	4,30,000	4,86,000	17,26,000
Profit (₹)	4,59,000	35,000	3,96,000	8,90,000

Working Notes

1.

Products	A	B	X
Sales value (₹)	12,24,000	2,50,000	7,92,000
Quantity sold (Kgs.)	17,000	5,000	44,000
Selling price ₹/kg	72 $\left(\frac{1224000}{17000kg}\right)$	50 $\left(\frac{250000}{5000kg}\right)$	18 $\left(\frac{792000}{44000kg}\right)$

2. Valuation of closing stock:

Since the selling price per kg of products A, B and X is more than their total costs, therefore closing stock will be valued at cost.

Products	A	B	X	Total
Closing stock (kgs.)	1,000	5,000	10,000	
Cost per kg (₹)	45	43	9	
Closing stock value (₹)	45,000 (₹ 45 x 1,000 kg)	2,15,000 (₹ 43 x 5,000 kg)	90,000 (₹9x10,000 kg)	3,50,000

(iv) Calculations for processing decision

Products	A	B	X
Selling price per kg at the point of split off (₹)	50	40	10
Selling price per kg after further processing (₹) (Refer to working Note 1)	72	50	18
Incremental selling price per kg (₹)	22	10	8
Less: Further processing cost per kg (₹)	(10)	(15)	(2)
Incremental profit (loss) per kg (₹)	12	(5)	6

Product A and X has an incremental profit per unit after further processing, hence, these two products may be further processed. However, further processing of product B is not profitable hence, product B shall be sold at split off point.

Q.10 Allocate Cost | RTP Nov 23

A factory producing article A also produces a by-product B which is further processed into finished product. The joint cost of manufacture is given below:

Material	₹ 5,000
Labour	₹ 3,000
Overhead	₹ 2,000
	₹ 10,000

Subsequent cost in ₹ are given below:

	A	B
Material	3,000	1,500
Labour	1,400	1,000
Overhead	600	500
	5,000	3,000

Selling prices are A ₹ 16,000
B ₹ 8,000

Estimated profit on selling prices is 25% for A and 20% for B.

Assume that selling and distribution expenses are in proportion of sales prices. Show how you would apportion joint costs of manufacture and prepare a statement showing cost of production of A and B.

Ans.

Apportionment of Joint Costs

Particulars	A (₹)	B (₹)
Selling Price	16,000	8,000
Less: Estimated profit	4,000	1,600
	(25% of ₹16,000)	(20% of ₹ 8,000)
Cost of sales	12,000	6,400
Less: Selling & Distribution exp.	267	133
(Refer working note)	(₹ 400 × 2/3)	(₹ 400 × 1/3)
Less: Subsequent cost	5,000	3,000
Share of Joint cost	6,733	3,267

So, Joint cost of manufacture is to be distributed to A & B in the ratio of 6733 : 3267

Statement showing Cost of Production of A and B

Elements of cost	Joint Cost		Subsequent Cost		Total Cost	
	A	B	A	B	A	B
Material	3,367	1,633	3,000	1,500	6,367	3,133
Labour	2,020	980	1,400	1,000	3,420	1,980
Overheads	1,346	654	600	500	1,946	1,154
				Cost of production	11,733	6,267

Working Note:

Calculation of Selling and Distribution Expenses

Particulars	(₹)
Total Sales Revenue (₹ 16,000 + ₹ 8,000)	24,000
Less: Estimated Profit (₹ 4,000 + ₹ 1,600)	(5,600)
Cost of Sales	18,400
Less: Cost of production:	
- Joint Costs	(10,000)
- Subsequent costs (₹ 5,000 + ₹ 3,000)	(8,000)
Selling and Distribution expenses (Balancing figure)	400

Q.11 Allocate Cost | MTP Dec 21(2)

A factory produces two products, 'Ghee' and 'Cream' from a single process. The joint processing costs during a particular month are:

Direct Material	₹ 60,000
Direct Labour	₹ 19,200
Variable Overheads	₹ 24,000
Fixed Overheads	₹ 64,000

Sales: Ghee - 200 litre @ ₹ 600 per litre; Cream – 240 litre @ ₹ 200 per litre.

REQUIRED:

I. Apportion joints costs on the basis of:
   (i) Physical Quantity of each product.
   (ii) Contribution Margin method, and

II. Determine Profit or Loss under both the methods.

Ans. **Total Joint Cost**

Particulars	Amount (₹)
Direct Material	60,000
Direct Labour	19,200
Variable Overheads	24,000
Total Variable Cost	1,03,200
Fixed Overheads	64,000
Total joint cost	1,67,200

Apportionment of Joint Costs:

			Product-Ghee	Product-Cream
I.	(i)	Apportionment of Joint Cost on the basis of 'Physical Quantity'	₹ **76,000** $\left(\frac{167200}{200+240 \text{ litre}} \times 200\right)$	₹ **91,200** $\left(\frac{167200}{200+240 \text{ litre}} \times 240\right)$
	(ii)	Apportionment of Joint Cost on the basis of 'Contribution Margin Method':		
		- Variable Costs (on basis of physical units)	₹ **46,909** $\left(\frac{103200}{200+240 \text{ litre}} 200\right)$	₹ **56,291** $\left(\frac{103200}{200+240 \text{ litre}} \times 240\right)$
		Contribution Margin	**73,091** (₹600×200 - 46,909)	**- 8,291** (₹200×240 - 56,291)
		Fixed Costs*	₹ 64,000	
		Total apportioned cost	₹ 1,10,909	₹ 56,291
II.	(iii)	**Profit or Loss:**		
	When Joint cost apportioned on basis of physical units			
	A.	Sales Value	₹ 1,20,000	₹ 48,000

	B.	Apportioned joint cost on basis of 'Physical Quantity':	₹ 76,000	₹ 91,200
	A-B	**Profit or (Loss)**	**44,000**	**(43,200)**
		When Joint cost apportioned on basis of 'Contribution Margin Method'		
	C	Apportioned joint cost on basis of 'Contribution Margin Method'	₹ 1,10,909	₹ 56,291
	A-C	**Profit or (Loss)**	₹ 9,091	₹ (8,291)

* The fixed cost of ₹ 64,000 is to be apportioned over the joint products- Ghee and Cream in the ratio of their contribution margin but contribution margin of Product- Cream is Negative so fixed cost will be charged to Product- Ghee only.

Q.12 Further Processing | PY Jul 21

The following data are available from the books and records of Q Ltd. for the month of April 2020:

Direct Labour Cost = ₹ 1,20,000 (120% of Factory Overheads)
Cost of Sales = ₹ 4,00,000
Sales = ₹ 5,00,000

Accounts show the following figures:

	1st April, 2020 (₹)	30th April, 2020 (₹)
Inventory:		
Raw material	20,000	25,000
Work-in-progress	20,000	30,000
Finished goods	50,000	60,000
Other details:		
Selling expenses		22,000
General & Admin. expenses		18,000

You are required to prepare a cost sheet for the month of April 2020 showing:
(i) Prime Cost
(ii) Works Cost
(iii) Cost of Production
(iv) Cost of Goods sold
(v) Cost of Sales and Profit earned.

Ans. **Cost Sheet for the Month of April 2020**

Particulars	**(₹)**
Opening stock of Raw Material	20,000
Add: Purchases [Refer Working Note-2]	1,65,000
Less: Closing stock of Raw Material	(25,000)
Raw material consumed	1,60,000
Add: Direct labour cost	1,20,000
Prime cost	**2,80,000**
Add: Factory overheads	1,00,000
Gross Works cost	**3,80,000**

Add: Opening work-in-progress	20,000
Less: Closing work-in-progress	(30,000)
Works Cost	**3,70,000**
Cost of Production	**3,70,000**
Add: Opening stock of finished goods	50,000
Less: Closing stock of finished goods	(60,000)
Cost of goods sold	**3,60,000**
Add: General and administration expenses*	18,000
Add: Selling expenses	22,000
Cost of sales	**4,00,000**
Profit {Balancing figure (₹ 5,00,000 – ₹ 4,00,000)}	1,00,000
Sales	5,00,000

*General and administration expenses have been assumed as not relating to the production activity.
Working Note:

1. **Computation of the raw material consumed**

Particulars	(₹)
Cost of Sales	4,00,000
Less: General and administration expenses	(18,000)
Less: Selling expenses	(22,000)
Cost of goods sold	3,60,000
Add: Closing stock of finished goods	60,000
Less: Opening stock of finished goods	(50,000)
Cost of production/Gross works cost	3,70,000
Add: Closing stock of work-in-progress	30,000
Less: Opening stock of work-in-progress	(20,000)
Works cost	3,80,000
Less: Factory overheads $\left(\frac{120000}{120} x100\right)$	(1,00,000)
Prime cost	2,80,000
Less: Direct labour	(1,20,000)
Raw material consumed	1,60,000

2. **Computation of the raw material purchased**

Particulars	(₹)
Closing stock of Raw Material	25,000
Add: Raw Material consumed	1,60,000
Less: Opening stock of Raw Material	(20,000)
Raw Material purchased	1,65,000

Q.13 Further Processing | PY May 22

RST Limited produces three joint products X, Y and Z. The products are processed further. Pre-separation costs are apportioned on the basis of weight of output of each joint product. The following data are provided for the month of April, 2022.

Cost incurred up to separation point: ₹ 10,000

	Product X	Product Y	Product Z
Output (in Litre)	100	70	80
	₹	₹	₹
Cost incurred after separation point	2,000	1,200	800
Selling Price per Litre:			
After further processing	50	80	60
At pre-separation point (estimated)	25	70	45

You are required to:

(i) Prepare a statement showing profit or loss made by each product after further processing using the presently adopted method of apportionment of pre-separation cost.

(ii) Advise the management whether, on purely financial consideration, the three products are to be processed further or not.

Ans.

(i) Statement showing profit/loss by each product after further processing products

	Product X (in ₹)	Product Y (in ₹)	Product Z (in ₹)
Sales value after further processing	5,000	5,600	4,800
Less: Further processing cost	2,000	1,200	800
Less: Joint Cost* (as apportioned)	4,000	2,800	3,200
Profit/(loss)	(1,000)	1,600	800

* Statement showing apportionment of joint cost on the basis of physical units

	Product X (in ₹)	Product Y (in ₹)	Product Z (in ₹)	Total (₹)
Output (in litre)	100	70	80	250
Weight	0.4(100/250)	0.28(70/250)	0.32(80/250)	
Joint cost apportioned	4,000	2,800	3,200	

(ii) Decision whether to process further or not

	Product X (in ₹)	Product Y (in ₹)	Product Z (in ₹)
Incremental Revenue	2,500[(50-25) × 100]	700[(80-70) × 70]	1,200 [(60-45) × 80]
Less: Further processing cost	2,000	1,200	800
Incremental profit /(loss)	**500**	**(500)**	**400**

	Product X (in ₹)	Product Y (in ₹)	Product Z (in ₹)	Total
Sales	2500	4900	3600	11000
Pre separation costs	4000	2800	3200	10000
Profit/(Loss)	(1500)	2100	400	1000

It is advisable to further process only product X and Z and to sale product Y at the point of separation.

Q.14 Further Processing | RTP Nov 18

In an Oil Mill four products emerge from a refining process. The total cost of input during the quarter ending March 20X8 is ₹1,48,000. The output, sales and additional processing costs are as under:

Products	Output in Litres	Additional processing cost after split off (₹)	Sales value (₹)
ACH	8,000	43,000	1,72,500
BCH	4,000	9,000	15,000
CSH	2,000	–	6,000
DSH	4,000	1,500	45,000

In case these products were disposed-off at the split off point that is before further processing, the selling price per litre would have been:

ACH (₹)	BCH (₹)	CSH (₹)	DSH (₹)
15.00	6.00	3.00	7.50

PRODUCE a statement of profitability based on:

(i) If the products are sold after further processing is carried out in the mill.

(ii) If they are sold at the split off point.

Ans.

(i) Statement of profitability of the Oil Mill (after carrying out further processing) for the quarter ending 31st March 20X8.

Products	Sales Value After further processing	Share of Joint cost	Additional processing cost	Total cost after processing	Profit (loss)
ACH	1,72,500	98,667	43,000	1,41,667	30,833
BCH	15,000	19,733	9,000	28,733	(13,733)
CSH	6,000	4,933	--	4,933	1,067
DSH	45,000	24,667	1,500	26,167	18,833
	2,38,500	1,48,000	53,500	2,01,500	37,000

(ii) Statement of profitability at the split off point

Products	Selling price of split off	Output in units	Sales value at split off point	share of joint cost	profit at split off point
ACH	15.00	8,000	1,20,000	98,667	21,333
BCH	6.00	4,000	24,000	19,733	4,267
CSH	3.00	2,000	6,000	4,933	1,067
DSH	7.50	4,000	30,000	24,667	5,333
			1,80,000	1,48,000	32,000

Note: Share of Joint Cost has been arrived at by considering the sales value at split off point.

Q.15 Further Processing | RTP May 23

Key Pee Limited produces and sells the following products:

Products	Units	Selling price at split-off point (₹)	Selling price after further processing (₹)
A	500000	42.5	62.5
B	75000	32.5	42.5
C	62500	20	30
D	50000	25	-
E	187500	35	50

Cost of raw material ₹ 89,75,000 and other manufacturing ex-penses cost ₹13,67,500 in the manufacturing process which are absorbed on the products on the basis of their 'Net realisable value'. The further processing costs of A, B, C and E are ₹31,25,000; ₹ 3,75,000; ₹1,25,000 and ₹3,75,000 respectively. Fixed costs are ₹11,82,500.

You are required to PREPARE the following in respect of the coming year:

(a) Statement showing income forecast of the company assuming that none of its products are to be further processed.

(b) Statement showing income forecast of the company assuming that products A, B, C and E are to be processed further.

Ans.

Working Note:

Apportionment of joint costs on the basis of Net Realisable Value method

Products	Sales Value (₹)	Post separation Cost (₹)	Net Realisable Value (₹)	Apportioned Cost (₹)
A	3,12,50,000 (5,00,000 units x ₹ 62.50)	31,25,000	2,81,25,000	67,74,563
B	31,87,500 (75,000 units x ₹ 42.5)	3,75,000	28,12,500	6,77,456
C	18,75,000 (62,500 units x ₹ 30)	1,25,000	17,50,000	4,21,528
D	12,50,000 (50,000 units x ₹ 25)	---	12,50,000	3,01,092
E	93,75,000 (1,87,500 units x ₹ 50)	3,75,000	90,00,000	21,67,860
			4,29,37,500	1,03,42,500

Total joint cost =Raw material costs + Manufacturing expenses = ₹89,75,000 + ₹13,67,500 = ₹1,03,42,500

Apportioned joint cost = (Total Joint Cost/ Total Net Realisable value of each X Net Realisable value of each product)

Apportioned joint cost for Product A = (1,03,42,500 / 4,29,37,500 X 2,81,25,000) = ₹67,74,563.32

Similarly, the apportioned joint cost for products B, C, D and E are ₹6,77,456, ₹4,21,528, ₹3,01,092 and ₹21,67,860 respectively.

(a) Statement showing income forecast of the company assum-ing that none of its products are further processed.

	Products	

	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)	Total (₹)
Sales revenue	2,12,50,000 (₹42.5 × 5,00,000)	24,37,500 (₹ 32.5 × 75,000)	12,50,000 (₹ 20 × 62,500)	12,50,000 (₹ 25 × 50,000)	65,62,500 (₹ 35 × 1,87,500)	3,27,50,000
Less: Apportioned Costs (Refer Working note)	67,74,563	6,77,456	4,21,528	3,01,092	21,67,860	1,03,42,500
	1,44,75,437	17,60,044	8,28,472	9,48,908	43,94,640	2,24,07,500
Less: Fixed Cost						11,82,500
Profit						2,12,25,000

(b) Statement showing income forecast of the company: assuming that products A, B, C and E are further processed (Refer to working note)

	Products					
	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)	Total (₹)
A. Sales revenue	3,12,50,000	31,87,500	18,75,000	12,50,000	93,75,000	4,69,37,500
B. Apportioned Costs	67,74,563	6,77,456	4,21,528	3,01,092	21,67,860	1,03,42,500
C. Further processing cost	31,25,000	3,75,000	1,25,000	-	3,75,000	40,00,000
D. Total processing cost (B+ C)	98,99,563	10,52,456	5,46,528	3,01,092	25,42,860	1,43,42,500
E. Excess of sales revenue (A-D)	2,13,50,437	21,35,044	13,28,472	9,48,908	68,32,140	3,25,95,000
F. Fixed Cost						11,82,500
G. Profit (E - F)						3,14,12,500

Q.16 Further Processing | MTP May 18

SV chemicals Limited processes 9,00,000 kgs. of raw material in a month purchased at ₹ 95 per kg in department X. The input output ratio of department X is 100 : 90. Processing of the material results in two joint products being produced 'P1' and 'P2' in the ratio of 60 : 40. Product 'P1' can be sold at split off stage or can be further processed in department Y and sold as a new product 'YP1'. The input output ratio of department Y is 100 : 95. Department Y is utilized only for further processing of product 'P1' to product 'YP1'. Individual departmental expenses are as follows:

	Dept. X (₹ lakhs)	Dept. Y (₹ lakhs)
Direct Materials	95.00	14.00
Direct Wages	80.00	27.00
Variable Overheads	100.00	35.00
Fixed Overheads	75.00	52.00
Total	350.00	128.00

Further, selling expenses to be incurred on three products are:

Particulars	Amount (₹ in lakhs)

Product 'P1'	28.38
Product 'P2'	25.00
Product 'YP1'	19.00

Selling price of the products 'P1' and 'P2' at split off point is ₹ 110 per kg and ₹ 325 per kg respectively. Selling price of new product 'YP1' is ₹ 150 per kg.

You are required to:

(i) PREPARE a statement showing apportionment of joint costs, in the ratio of value of sales, net of selling expenses.

(ii) PREPARE a Statement showing profitability at split off point.

(iii) PREPARE a Statement of profitability of 'YP1'.

(iv) DETERMINE that would you recommend further processing of P1?

Ans.

Working Notes:

Input output ratio of material processed in Department X = 100:90

Particulars	Quantity (Kg)
Material input	9,00,000
Less: Loss of material in process @ 10% of 9,00,000 kgs	(90,000)
Output	8,10,000

Output of department X is product 'P1' and 'P2' in the ratio of 60 : 40.

Output 'P1' = $\frac{60 \times 810000}{100}$ = 4,86,000 kgs.

Output 'P2' = $\frac{40 \times 810000}{100}$ = 3,24,000 kgs.

Statement showing ratio of net sales

Product	P1	P2	Total
Quantity (kgs)	4,86,000	3,24,000	8,10,000
Selling price per kg (₹)	110.00	325.00	
Sales Value (₹ in lakhs)	534.60	1,053.00	1587.60
Less: Selling Expenses (₹ in lakhs)	(28.38)	(25.00)	(53.38)
Net Sales (₹ in lakhs)	506.22	1,028.00	1,534.22
Ratio	33%	67%	100.00

Computation of Joint Costs

Particulars	Amount (₹ Lakhs)
Raw Material input 9,00,000 kgs @ ₹ 95 per kg	855.00
Direct Materials	95.00
Direct Wages	80.00
Variable Overheads	100.00
Fixed Overheads	75.00
Total	1,205.00

(i) Statement showing apportionment of joint costs in the ratio of net sales

Particulars	Amount (₹ in lakhs)

Joint cost of P1 – 33% of ₹1,205 lakhs	397.65
Joint cost of P2 – 67% of ₹1,205 lakhs	807.35
Total	1,205.00

(ii) Statement showing profitability at split off point

Product	P1	P2	Total
Net Sales Value (₹ in lakhs) – [A]	506.22	1,028.00	1,534.22
Less: Joint costs (₹ in lakhs)	(397.65)	(807.35)	(1,205.00)
Profit (₹ in lakhs) [A] – [B]	108.57	220.65	329.22

Alternative Presentation

Product	P1	P2	Total
Sales Value (₹ in lakhs) – [A]	534.60	1,053.00	1,587.60
Less: Joint costs (₹ in lakhs)	397.65	807.35	1,205.00
Selling Expenses	28.38	25.00	53.38
Total Cost [B]	426.03	832.35	1,258.38
Profit (₹ in lakhs) [A] – [B]	108.57	220.65	329.22

(iii) Statement of profitability of product 'YP1'

Particulars		YP1
Sales Value (₹ in lakhs) (Refer working note) [A]		629.55
Less: Cost of P1	397.65	
Cost of Department Y	128.00	
Selling Expenses of Product 'YP1'	19.00	
Total Costs [B]		544.65
Profit (₹ in lakhs) [A] – [B]		84.90

Working Note:
Computation of product 'YP1'
Quantity of product P1 input used = 4,86,000 kgs
Input output ratio of material processed in Department Y = 100 : 95

Particulars	Quantity (Kg)
Material input	4,86,000
Less: Loss of material in process @ 5% of 4,86,000	(24,300)
Output	4,61,700

Sales Value of YP1 = 4,61,700 kgs @ ₹ 150 per kg = ₹ 692.55 lakhs

(iv) Determination of profitability after further processing of product P1 into product YP1:

Particulars	(₹ in lakhs)
Profit of Product 'P1' {refer (ii) above}	108.57
Profit of Product 'YP1'{refer (iii) above}	84.90
Decrease in profit after further processing	23.67

Based on the above profitability statement, further processing of product P1 into YP1 should not be recommended.

Q.17 Further Processing | MTP Nov 19

In an Oil Mill, four products emerge from a refining process. The total cost of input during the quarter ending March 2019 is Rs.22,20,000. The output, sales and additional processing costs are as under:

Products	Output in Litres	Additional processing cost after split off (Rs.)	Sales value (Rs.)
A	8,000	6,45,000	25,87,500
B	4,000	1,35,000	2,25,000
C	2,000	–	90,000
D	4,000	22,500	6,75,000

In case these products were disposed-off at the split off point that is before further processing, the selling price per litre would have been:

A (Rs.)	B (Rs.)	C (Rs.)	D (Rs.)
225.00	90.00	45.00	112.50

PREPARE a statement of profitability based on:
(i) If the products are sold after further processing is carried out in the mill.
(ii) If they are sold at the split off point.

Ans.

(i) Statement of profitability of an Oil Mill (after carrying out further processing) for the quarter ending 31st March 2019.

Products	Sales Value after further processing	Share of Joint cost	Additional processing cost	Total cost after processing	Profit (loss)
A	25,87,500	14,80,000	6,45,000	21,25,000	4,62,500
B	2,25,000	2,96,000	1,35,000	4,31,000	(2,06,000)
C	90,000	74,000	–	74,000	16,000
D	6,75,000	3,70,000	22,500	3,92,500	2,82,500
	35,77,500	22,20,000	8,02,500	30,22,500	5,55,000

(ii) Statement of profitability at the split off point

Products	Selling price of split off	Output in units	Sales value at split off point	Share of joint cost	Profit at split off point
A	225.00	8,000	18,00,000	14,80,000	3,20,000
B	90.00	4,000	3,60,000	2,96,000	64,000
C	45.00	2,000	90,000	74,000	16,000
D	112.50	4,000	4,50,000	3,70,000	80,000
			27,00,000	22,20,000	4,80,000

Note: Share of Joint Cost has been arrived at by considering the sales value at split off point.

Q.18 Joint Product Cost | MTP May 22(1)

Mili Ltd., a manufacturing company, produces two main products and a by-product out of a joint process. The ratio of output quantities to input quantities of direct material used in the joint process remains consistent on yearly basis.

Company has employed the physical volume method to allocate joint production costs to the main products. The net realizable value of the by-product is used to reduce the joint production costs before the joint costs are allocated to the main products.

During a month, company incurred joint production costs of ₹ 15,00,000. The main products are not marketable at the split off point and thus have to be processed further. Details of company's operation are given in the table below.

Particulars	Product-Q	Product-R	By product
Monthly output in kg.	90,000	1,80,000	75,000
Selling price per kg.	₹ 50	₹ 30	₹ 5
Process costs	₹ 3,00,000	₹ 4,50,000	

FIND OUT the amount of joint product cost that Mili Ltd. would allocate to product-R by using the physical volume method to allocate joint production costs?

Ans. **Calculation of Net joint costs to be allocated:**

Particulars	Amount (₹)
Joint Costs	15,00,000
Less: Net Realizable value of by-product (75,000 × 5) Net joint costs to be allocated	3,75,000
	11,25,000

Therefore, amount of joint product cost that Mili Ltd. would allocate to the product -R by using the physical volume method to allocate joint production costs:

$$= \frac{\text{Physical quantity of Product} - R}{\text{Total Quantity}} \text{Net joint costs to be allocated}$$

$$= \frac{180000 units}{270000 units} x1125000 = 750000$$

Q.19 Joint Product Cost | MTP May 22(2)

Following information is available for A Ltd.:

Sales-

P: 200 kg @ ₹ 120 per kg.

Q: 240 kg @ ₹ 60 per kg.

Joint costs-

Marginal cost ₹ 17,600

Fixed cost ₹ 15,600

You are required to FIND OUT the cost of joint products P and Q using contribution margin method.

Ans. The marginal cost (variable cost) of ₹ 17,600 is apportioned over the joint products P and Q in the ratio of their physical quantity i.e. 200 : 240

Marginal cost for Product P : ₹ 17,600 ×= $\frac{200}{440}$ ₹ 8,000

Marginal cost for Product Q : ₹ 17,600 ×= $\frac{240}{440}$ ₹ 9,600

The fixed cost of ₹ 15,600 is apportioned over the joint products P and Q in the ratio of their contribution margin i.e. 160 : 48 (Refer to working note)

Product P : ₹ 15,600 × 160/208 = ₹ 12,000

Product Q : ₹ 15,600 × 48/208 = ₹ 3,600

Working Note:

Computation of contribution margin ratio

Products	Sales revenue (₹)	Marginal cost (₹)	Contribution (₹)
P	24,000	8,000	16,000
Q	14,400	9,600 (Refer to above)	4,800

Contribution ratio is 160 : 48

Q.20 Joint Product Cost | MTP Nov 22(1)

A manufacturing process yields the following products out of the raw materials introduced in the process:

Main Product X 60% of Raw Materials

By-Product Y 15% of Raw Materials

By Product Z 20% of Raw Materials

Wastage 5% of Raw Materials

Other information is as follows:

a. Total Cost: Raw Materials 1,000 units of ₹ 9,200; Labour ₹ 8,200; Overheads ₹ 12,000

b. One unit of product z requires ½ the raw materials required for one unit of product Y, one unit of product X requires1½ times the raw materials required for product Y.

c. Product X required double the time needed for production of one unit of Y and one unit of Z.

d. Product Z requires ½ the time required for the production of one unit of product Y.

e. Overheads are to be apportioned in the ratio of 6:1:1.

You are required to CALCULATE the total and per unit of cost of each of the products.

Ans. **Statement of Distribution of Costs**

Cost Elements	Basis	Total Cost	Main Product X (600 Units)		By-Product Y (150 Units)		By-Product Z (200 Units)	
			Total	Per Unit	Total	Per Unit	Total	Per Unit
Raw Materials	18:3:2	9,200	7,200	12	1,200	8	800	4
Labour	36:3:2	8,200	7,200	12	600	4	400	2
Overheads	6:1:1	12,000	9,000	15	1,500	10	1,500	7.50
Total		**29,400**	**23,400**	**39**	**3,300**	**22**	**2,700**	**13.50**

Working Notes:

1. **Calculation of Units produced:**

Main Product X	60% of Raw Materials	600 Units
By-Product Y	15% of Raw Materials	150 Units
By Product Z	20% of Raw Materials	200 Units
Wastage	5% of Raw Materials	50 Units
		1000 Units

2. **Cost Allocation**

Raw Materials

Let Product Z requires 1 unit of raw materials then, Product Y will require 2 units of raw materials and Product X will require 3 units of raw materials.

Product	X		Y		Z
Individual Unit ratio (a)	3	:	2	:	1
Units (b)	600		150		200
Ratio for Cost Allocation (a*b)	1800	:	300	:	200
Ratio	18	:	3	:	2

Labour:

Let Product Z requires 1 hour of Labour then, Product Y will require 2 hours of Labour and Product X will require 6 hours of Labour.

Product	X		Y		Z
Individual hour ratio (a)	6	:	2	:	1
Units (b)	600		150		200
Ratio for Cost Allocation (a*b)	3600	:	300	:	200
Ratio	36	:	3	:	2

Q.21 NRV Method to apportion cost | RTP Nov 20

ABC Ltd. operates a simple chemical process to convert a single material into three separate items, referred to here as X, Y and Z. All three end products are separated simultaneously at a single split-off point.

Product X and Y are ready for sale immediately upon split off without further processing or any other additional costs. Product Z, however, is processed further before being sold. There is no available market price for Z at the split-off point.

The selling prices quoted here are expected to remain the same in the coming year. During 2019-20, the selling prices of the items and the total amounts sold were:

X – 186 tons sold for ₹3,000 per ton

Y – 527 tons sold for ₹2,250 per ton

Z – 736 tons sold for ₹1,500 per ton

The total joint manufacturing costs for the year were ₹12,50,000. An additional ₹ 6,20,000 was spent to finish product Z.

There were no opening inventories of X, Y or Z at the end of the year. The following inventories of complete units were on hand:

X 180 tons

Y 60 Tons

Z 25 tons

There was no opening or closing work-in-progress.

Required:

COMPUTE the cost of inventories of X, Y and Z and cost of goods sold for year ended March 31, 2020, using Net realizable value (NRV) method of joint cost allocation.

Ans. **(i) (a) Statement of Joint Cost allocation of inventories of X, Y and Z (By using Net Realisable Value Method)**

	Products			Total
	X	Y	Z	
	(₹)	(₹)	(₹)	(₹)
Final sales value of total production (Working Note 1)	10,98,000 (366 × ₹3,000)	13,20,750 (587 × ₹2,250)	11,41,500 (761 × ₹1,500)	35,60,250
Less: Additional cost	--	--	(6,20,000)	(6,20,000)

Net realisable value (at split-off point)	10,98,000	13,20,750	5,21,500	29,40,250
Joint cost allocated (Working Note 2)	4,66,797	5,61,496	2,21,707	12,50,000

Cost of goods sold as on March 31, 2020
(By using Net Realisable Value Method)

	Products			Total
	X	Y	Z	
	(₹)	(₹)	(₹)	(₹)
Allocated Joint cost	4,66,797	5,61,496	2,21,707	12,50,000
Additional costs	--	--	6,20,000	6,20,000
Cost of goods available for sale (CGAS)	4,66,797	5,61,496	8,41,707	18,70,000
Less: Cost of ending inventory (Working Note 1)	2,29,571 (CGAS×49.18%)	57,385 (CGAS × 10.22%)	27,692 (CGAS × 3.29%)	3,14,648
Cost of sold goods	2,37,226	5,04,111	8,14,015	15,55,352

Working Notes

1. Total production of three products for the year 2019-2020

Products	Quantity sold in tones	Quantity of ending inventory in tons	Total production	Ending inventory percentage (%)
(1)	(2)	(3)	(4) = [(2) + (3)}	(5) = (3)/ (4)
X	186	180	366	49.18
Y	527	60	587	10.22
Z	736	25	761	3.29

2. Joint cost apportioned to each product:

$$\frac{\text{Total Joint cost}}{\text{Total Net RealisableValue}} \times \text{Net Realisable Value of each product}$$

$$\text{Totalcost of Product X} = \frac{1250000}{2940250} \times ₹10,98,000 = ₹4,66,797$$

$$\text{Totalcost of Product Y} = \frac{1250000}{2940250} \times ₹13,20,750 = ₹5,61,496$$

$$\text{Totalcost of Product Z} = \frac{1250000}{2940250} \times ₹5,21,500 = ₹2,21,707$$

Q.22 NRV Method to apportion cost | MTP Nov 20

'Buttery Butter' is engaged in the production of Buttermilk, Butter and Ghee. It purchases processed cream and let it through the process of churning until it separates into buttermilk and butter. For the month of January, 2020, 'Buttery Butter' purchased 50 Kilolitre processed cream @ ₹ 100 per 1000 ml. Conversion cost of ₹ 1,00,000 were incurred up-to the split off point, where two saleable products were produced i.e. buttermilk and butter. Butter can be further processed into Ghee.

The January, 2020 production and sales information is as follows:

Products	Production (in Kilolitre/tonne)	Sales Quantity (in Kilolitre/tonne)	Selling price per Litre/Kg (₹)

Buttermilk	28	28	30
Butter	20	—	—
Ghee	16	16	480

All 20 tonne of butter were further processed at an incremental cost of ₹ 1,20,000 to yield 16 Kilolitre of Ghee. There was no opening or closing inventories of buttermilk, butter or ghee in January, 2020.

Required:

(i) SHOW how joint cost would be apportioned between Buttermilk and Butter under Estimated Net Realisable Value method.

(ii) 'Healthy Bones' offers to purchase 20 tonne of butter in February at ₹ 360 per kg. In case 'Buttery Butter' accepts this offer, no Ghee would be produced in February. SUGGEST whether 'Buttery Butter' shall accept the offer affecting its operating income or further process butter to make Ghee itself?

Ans.

(i) Estimated Net Realisable Value Method:

	Buttermilk Amount (₹)	Butter Amount (₹)
Sales Value	8,40,000 (₹ 30 × 28 × 1000)	76,80,000 (₹ 480 × 16 × 1000)
Less: Post split-off cost (Further processing cost)	-	(1,20,000)
Net Realisable Value	8,40,000	75,60,000
Apportionment of Joint Cost of ₹ 51,00,000* in ratio of 1:9	5,10,000	45,90,000

*** [(₹ 100 × 50 × 1000) + ₹ 1,00,000] = ₹ 51,00,000**

(ii) Incremental revenue from further processing of Butter into Ghee
(₹ 480 × 16 × 1000 - ₹ 360 × 20 × 1000) ₹ 4,80,000
Less: Incremental cost of further processingof Butter into Ghee ₹ 1,20,000
Incremental operating income from further processing ₹ 3,60,000

The operating income of 'Buttery Butter' will be reduced by ₹ 3,60,000 in February if it sells 20 tonne of Butter to 'Healthy Bones', instead of further processing of Butter into Ghee for sale. Thus, 'Buttery Butter' is advised not to accept the offer and further process butter to make Ghee itself.

Q.23 NRV Method to apportion cost | MTP May 23(1)

Nero Chemicals Ltd. operates a simple chemical process to convert material RV into three separate items, such as T, U and V. All three end products are separated simultaneously at a single split-off point, at which time Product T and Product U are ready for sale without additional costs. Product V, however, is processed further before being sold. There is no available market price for V at the split-off point.

The selling prices quoted here are expected to remain the same in the coming year.

During 2021-22, the selling prices of the items and the total units sold were:

T – 1,000 tons sold for ₹ 6,000 per ton

U – 2500 tons sold for ₹ 5,000 per ton

V – 3000 tons sold for ₹ 6,500 per ton

The total joint manufacturing costs for the year were ₹62,50,000. An additional ₹9,00,000 was spent to finish product V.

There were no opening inventories of T, U or V at the end of the year. The following inventories of complete units were on hand.

T - 900 tons

U - 300 Tons

V - 125 tons

There was no opening or closing work-in-progress.

Required:

COMPUTE the cost of inventories of T, U and V and cost of goods sold for year ended March 31,2022, using Net realizable value (NRV) method of joint cost allocation.

Ans. Statement of Joint Cost allocation of inventories of X, Y and Z

(By using Net Realisable Value Method)

	Products			Total
	T	U	V	
	(₹)	(₹)	(₹)	(₹)
Final sales value of total production (Working Note 1)	1,14,00,000 (1,900 × ₹ 6,000)	1,40,00,000 (2,800 × ₹5,000)	2,03,12,500 (3,125 × ₹6,500)	4,57,12,500
Less: Additional cost	--	--	(9,00,000)	(9,00,000)
Net realisable value (at split-off point)	1,14,00,000	1,40,00,000	1,94,12,500	4,48,12,500
Joint cost allocated (Working Note 2)	15,89,958	19,52,580	27,07,462	62,50,000

Cost of goods sold as on March 31, 2022

(By using Net Realisable Value Method)

	Products			Total
	T	U	V	
	(₹)	(₹)	(₹)	(₹)
Allocated joint cost	15,89,958	19,52,580	27,07,462	62,50,000
Additional costs	--	--	9,00,000	9,00,000
Cost of goods available for sale (CGAS)	15,89,958	19,52,580	36,07,462	71,50,000
Less: Cost of ending inventory	7,53,138	2,09,205	1,44,298	11,06,642
(Working Note 1)	(CGAS×47.37%)	(CGAS × 10.71%)	(CGAS × 4%)	
Cost of goods sold	8,36,820	17,43,375	34,63,163	60,43,358

Working Note:

1. Total production of three products for the year 2021-2022

Products	Quantity sold in tones	Quantity of ending inventory in tons	Total production	Ending inventory percentage (%)
1	2	3	(4) = [(2) + (3)}	(5) = (3)/ (4)
T	1000	900	1900	47.37
U	2500	300	2800	10.71
V	3000	125	3125	4.00

2. Joint cost apportioned to each product:

$$\frac{\text{Total Joint cost}}{\text{Total Net Realisable Value}} \times \text{Net Realisable Value of each product}$$

Total cost of Product T = $\frac{62,50,000}{4,48,12,500}$ ×1,14,00,000 = 15,89,958

Total cost of Product U = $\frac{62,50,000}{4,48,12,500}$ × 1,40,00,000 = 19,52,580

Total cost of Product V = $\frac{62,50,000}{4,48,12,500}$ × 1,94,12,500 = 27,07,462

Q.24 NRV Method to apportion cost | MTP May 23(2)

ABC Ltd. operates a simple chemical process to convert a single material into three separate items, referred to here as X, Y and Z. All three end products are separated simultaneously at a single split-off point.

Product X and Y are ready for sale immediately upon split off without further processing or any other additional costs. Product Z, however, is processed further before being sold. There is no available market price for Z at the split-off point.

The selling prices quoted here are expected to remain the same in the coming year. During 2022-23, the selling prices of the items and the total amounts sold were:

X – 186 tons sold for ₹3,000 per ton

Y – 527 tons sold for ₹2,250 per ton

Z – 736 tons sold for ₹1,500 per ton

The total joint manufacturing costs for the year were ₹12,50,000. An additional ₹6,20,000 was spent to finish product Z.

There were no opening inventories of X, Y or Z at the end of the year. The following inventories of complete units were on hand:

X 180 tons

Y 60 Tons

Z 25 tons

There was no opening or closing work-in-progress.

Required:

COMPUTE the cost of inventories of X, Y and Z and cost of goods sold for year ended March 31, 2023, using Net realizable value (NRV) method of joint cost allocation.

Ans.

Statement of Joint Cost allocation of inventories of X, Y and Z
(By using Net Realisable Value Method)

	Products			Total
	X	Y	Z	
	(₹)	(₹)	(₹)	(₹)
Final sales value of total production (Working Note 1)	10,98,000 (366 × ₹3,000)	13,20,750 (587 × ₹2,250)	11,41,500 (761 × ₹1,500)	35,60,250
Less: Additional cost	--	--	(6,20,000)	(6,20,000)
Net realisable value (at split-off point)	10,98,000	13,20,750	5,21,500	29,40,250
Joint cost allocated (Working Note 2)	4,66,797	5,61,496	2,21,707	12,50,000

Cost of goods sold as on March 31, 2023
(By using Net Realisable Value Method)

	Products			Total
	X	Y	Z	
	(₹)	(₹)	(₹)	(₹)
Allocated joint cost	4,66,797	5,61,496	2,21,707	12,50,000
Additional costs	--	--	6,20,000	6,20,000
Cost of goods available for sale (CGAS)	4,66,797	5,61,496	8,41,707	18,70,000
Less: Cost of ending inventory (Working Note 1)	2,29,571 (CGAS×49.18%)	57,385 (CGAS × 10.22%)	27,692 (CGAS × 3.29%)	3,14,648
Cost of goods sold	2,37,226	5,04,111	8,14,015	15,55,352

Working Notes

1. **Total production of three products for the year 2022-2023**

Products	Quantity sold in tones	Quantity of ending inventory in tons	Total production	Ending inventory percentage (%)
(1)	(2)	(3)	(4) = [(2) + (3)]	(5) = (3)/ (4)
X	186	180	366	49.18
Y	527	60	587	10.22
Z	736	25	761	3.29

2. **Joint cost apportioned to each product:**

$$\frac{\text{Total Joint cost}}{\text{Total Net Realisable Value}} \times \text{Net Realisable Value of each product}$$

$$\text{Total cost of Product X} = \frac{1250000}{2940250} \times ₹10,98,000 = ₹4,66,797$$

$$\text{Total cost of Product Y} = \frac{1250000}{2940250} \times ₹13,20,750 = ₹5,61,496$$

$$\text{Total cost of Product Z} = \frac{1250000}{2940250} \times ₹5,21,500 = ₹2,21,707$$

Q.25 Reverse Calculation | RTP Nov 22

JP Ltd. uses joint production process that produces three products at the split -off point. Joint production costs during the month of July, 2022 were ₹ 33,60,000.

Product information for the month of July is as follows:

Particulars	Product A	Product B	Product C
Units produced	3,000	6,000	9,000
Sales prices:			
At the split-off	₹ 200		
After further processing	₹ 300	₹ 350	₹ 100
Costs to process after split-off	₹ 6,00,000	₹ 6,00,000	₹ 6,00,000

Other information is as follows:
Product C is a by-product and the company accounts for the by-product at net realizable value as a reduction of joint cost. Further, Product B & C must be processed further before they can be sold. FIND OUT the joint cost allocated to Product A in the month of July if joint cost allocation is based on Net Realizable Value.

Ans.

Product A

As the question says that "Products B and C must be processed further before they can be sold", it means Product A can be sold at the split-off point.

Cost to process Product A after the split-off point = ₹ 6,00,000

Additional revenue to be earned by processing further = ₹ 3,00,000

(₹ 100 increase in selling price per unit x 3,000 units)

Therefore, Product A will not be processed further, and the sales value at split -off for A will be used for allocating the joint costs.

Sales value at the split-off for A = ₹ 6,00,000

(₹ 200 × 3,000 units)

Product B

Since Product B must be processed further, we use its net realizable value for the joint cost allocation.

Net realizable value of Product B = ₹ 15,00,000

[(₹ 350 × 6,000 units) – ₹ 6,00,000 further processing costs]

Product C

Product C, the by-product, must also be processed further to be sold.

Net realizable value of Product C = ₹ 3,00,000

[(₹ 100 × 9,000 units) – ₹ 6,00,000 in further processing costs]

Joint Cost Allocation

Joint production cost = ₹ 33,60,000

Since, by-product C is accounted for as a reduction to the joint costs, the joint costs to be allocated

= ₹ 30,60,000

(₹ 33,60,000 - ₹ 3,00,000 NRV of Product C)

Allocation of joint costs between Product A and B will be on the basis of ₹ 6,00,000:
₹ 15,00,000

$$\text{Joint Cost allocated to Product A} = ₹\ 30,60,000 \times \frac{`\ 6,00,000}{`\ 21,00,000} = `\ 8,74,286$$

Q.26 Reverse Calculation | MTP Nov 18(1)

Three products X,Y and Z alongwith a byproduct B are obtained again in a crude state which require further processing at a cost of Rs. 5 for X; Rs. 4 for Y; and Rs. 2.50 for Z per unit before sale. The byproduct is however saleable as such to a nearby factory. The selling prices for the three main products and byproduct, assuming they should yield a net margin of 25 percent of cost, are fixed at Rs. 13.75 Rs. 8.75 and Rs. 7.50 and Re. 1.00 respectively – all per unit quantity sold.

During a period, the joint input cost including the material cost was Rs. 90,800 and the respective outputs were:

X	8,000 units
Y	6,000 units
Z	4,000 units

B	1,000 units

By product should be credited to the joint cost and only the net joint costs are to be allocated to the main products.
CALCULATE the joint cost per unit of each product and the margin available as a percentage on cost.

Ans. **Working Notes:**

(i) Computation of Allocation Ratio for Joint Costs

	Products		
	X Rs.	Y Rs.	Z. Rs.
Selling Price	13.75	8.75	7.50
Less: Anticipated margin@ 25% on cost or 20% on sales	2.75	1.75	1.50
Cost of sales	11.00	7.00	6.00
Less: Post split off cost	5.00	4.00	2.50
Joint cost per unit	6.00	3.00	3.50
Output (units)	8,000	6,000	4,000
Total output cost	48,000	18,000	14,000
Allocation ratio for joint costs	24	9	7

(ii) Computation of net allocable joint costs

	Rs.	Rs.
Joint input cost including material cost		90,800
Less: Credit for realization from by-product B:Sales revenue (1,000 × Re. 1)	1,000	
Less: profit @ 25% on cost or 20% on sales	200	800
Net joint costs to be allocated		90,000

Determination of joint cost per unit of each product

Product	Net joint costs allocation Rs.	Output (units) Rs.	Joint cost per unit Rs.
X	54,000 (Note : 1)	8,000	6.75
Y	20,250	6,000	3.38
Z	15,750	4,000	3.94
	90,000		

Profit margin available on each product as a percentage on cost

Product	Joint Cost Rs.	Post spilt off cost Rs.	Total Cost Rs.	Selling Price Rs.	Margin Rs.	Margin % on cost Rs.
X	6.75	5.00	11.75	13.75	2.00	17.02
Y	3.38	4.00	7.38	8.75	1.37	18.56
Z	3.94	2.50	6.44	7.50	1.06	16.46

Note: 1

X=	$\frac{24}{40}$ x90000	=54,000
Y=	$\frac{9}{40}$ x90000	=20,250
Z=	$\frac{7}{40}$ x90000	=15,750
		90,000

9 CHAPTER PROCESS COSTING

Q.1 Process a/c and sp calculate | PY May 18

Alpha Ltd. is engaged in the production of a product A which passes through 3 different process - Process P, Process Q and Process R. The following data relating to cost and output is obtained from the books of accounts for the month of April 2017:

Particulars	Process P	Process Q	Process R
Direct Material	38,000	42,500	42,880
Direct Labour	30,000	40,000	50,000

Production overheads of ₹ 90,000 were recovered as percentage of direct labour.

10,000 kg of raw material @ ₹ 5 per kg. was issued to Process P. There was no stock of materials or work in process. The entire output of each process passes directly to the next process and finally to warehouse. There is normal wastage, in processing, of 10 %. The scrap value of wastage is ₹ 1 per kg. The output of each process transferred to next process and finally to warehouse are as under:

Process P = 9,000 kg

Process Q = 8,200 kg

Process R = 7,300 kg

The company fixes selling price of the end product in such a way so as to yield a profit of 25% selling price.

Prepare Process P, Q and R accounts. Also calculate selling price per unit of end product.

Ans.

Process- P Account

Particulars	Kg.	Amount (₹)	Particulars	Kg.	Amount (₹)
To Input	10,000	50,000	By Normal wastage (1,000 kg. × ₹ 1)	1,000	1,000
To Direct Material	---	38,000	By Process- Q (9,000 kg. × ₹ 15.50)	9,000	1,39,500
To Direct Labour	---	30,000			
To Production OH (₹ 90,000 × 3/12)	---	22,500			
	10,000	1,40,500		10,000	1,40,500

$$\text{Cost per unit} = \frac{1,40,500 - 1,000}{10,000kg - 1,000kg.} = 15.50$$

Process- Q Account

Particulars	Kg.	Amount	Particulars	Kg.	Amount

		(₹)			(₹)
To Process-P A/c	9,000	1,39,500	By Normal wastage (900 kg. × ₹ 1)	900	900
To Direct Material	---	42,500	By Process- Q (8,200 kg. × ₹ 31)	8,200	2,54,200
To Direct Labour	---	40,000			
To Production OH (₹ 90,000 × 4/12)	---	30,000			
To Abnormal Gain (100 kg. × ₹ 31)	100	3,100			
	9,100	2,55,100		9,100	2,55,100

$$\text{Cost per unit} = \frac{2,52,000 - 900}{9,000kg - 900} = 31$$

Process- R Account

Particulars	Kg.	Amount (₹)	Particulars	Kg.	Amount (₹)
To Process-Q A/c	8,200	2,54,200	By Normal wastage (820 kg. × Re.1)	820	820
To Direct Material	---	42,880	By Abnormal loss (80 kg. × ₹ 52)	80	4,160
To Direct Labour	---	50,000	By Finished Goods (7,300 kg. × ₹52)	7,300	3,79,600
To Production OH (₹ 90,000 × 5/12)	---	37,500			
	8,200	3,84,580		8,200	3,84,580

$$\text{Cost per unit} = \frac{3,84,584 - 820}{8,200kg - 820kg.} = 52$$

Calculation of Selling price per unit of end product:

Cost per unit	52.00
Add: Profit 25% on selling price i.e. 1/3rd of cost	17.33
Selling price per unit	69.33

Q.2 Find Cost of equivalent units | PY Nov 18

Following details have been provided by M/s AR Enterprises:

(i) Opening works-in-progress - 3000 units (70% complete)

(ii) Units introduced during the year - 17000 units

(iii) Cost of the process (for the period) - ₹ 33,12,720

(iv) Transferred to next process - 15000 units

(v) Closing works-in-progress - 2200 units (80% complete)

(vi) Normal loss is estimated at 12% of total input (including units in process in the beginning). Scraps realise ₹ 50 per unit. Scraps are 100% complete.

Using FIFO method, compute:

(i) Equivalent production

(ii) Cost per equivalent unit

Ans. **Statement of Equivalent Production Units (Under FIFO Method)**

Particulars	Input units	Particulars	Output units	Equivalent Production	
				(%)	Equivalent units
Opening W-I-P	3,000	From opening W-I-P	3,000	30	900
Units introduced	17,000	From fresh inputs	12,000	100	12,000
		Units completed (Transferred to next process)	15,000		
		Normal Loss {12% (3,000 + 17,000 units)}	2,400	--	--
		Closing W-I-P	2,200	80	1760
		Abnormal loss (Balancing figure)	400	100	400
	20,000		11,000		15,060

Computation of cost per equivalent production unit :

Cost of the Process (for the period)	33,12,720
Less: Scrap value of normal loss (₹ 50 × 2,400 units)	(₹ 1,20,000)
Total process cost	31,92,720

Q.3 Process Cost a/c & FG a/c | PY May 19

KT Ltd. produces a product EMM which passes through two processes before it is completed and transferred to finished stock. The following data relate to May 2019:

Particulars	*Process*		*Finished stock*
	A (₹)	*B* (₹)	(₹)
Opening Stock	*5,000*	*5,500*	*10,000*
Direct Materials	*9,000*	*9,500*	
Direct Wages	*5,000*	*6,000*	
Factory Overheads	*4,600*	*2,030*	
Closing Stock	*2,000*	*2,490*	*5,000*
Inter-process profit included in opening stock		*1,000*	*4,000*

Output of Process A is transferred to Process B at 25% profit on the transfer price and output of Process B is transferred to finished stock at 20% profit on the transfer price. Stock in process is valued at prime cost. Finished stock is valued at the price at which it is received from Process B. Sales during the period are ₹ 75,000. Prepare the Process cost accounts and Finished stock account showing the profit element at each stage.

Ans.

Process-A A/c

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	5,000	5,000	_	Process B A/c	**28,800**	**21,600**	**7,200**
Direct materials	9,000	9,000	_				
Direct wages	5,000	5,000	_				
	19,000	19,000	_				
Less: Closing stock	(2,000)	(2,000)	_				
Prime Cost	17,000	17,000	_				
Overheads	4,600	4,600	_				
Process Cost	**21,600**	**21,600**	_				
Profit (33.33% of total cost)	**7,200**	-	**7,200**				
	28,800	**21,600**	**7,200**		28,800	21,600	7,200

Process-B A/c

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	5,500	4,500	1,000	Finished stock A/c	**61,675**	**41,550**	**20,125**
Process A A/c	28,800	21,600	7,200				
Direct materials	9,500	9,500	_				
Direct wages	6,000	6,000	_				
	49,800	41,600	8,200				
Less: Closing stock	**(2,490)**	**(2,080)**	**(410)**				
Prime Cost	**47,310**	**39,520**	7,790				
Overheads	2,030	2,030	_				
Process Cost	49,340	41,550	7,790				
Profit (25% of total cost)	**12,335**	-	**12,335**				
	61,675	41,550	20,125		61,675	41,550	20,125

Finished Stock A/c

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	10,000	6,000	4,000	Costing P&L A/c	**75,000**	**44,181**	**30,819**
Process B A/c	61,675	41,550	20,125				
	71,675	47,550	24,125				
Less: Closing stock	**(5,000)**	**(3,369)**	**(1,631)**				
COGS	66,675	44,181	22,494				
Profit	**8,325**	-	**8,325**				
	75,000	44,181	30,819		75,000	44,181	30,819

Q.4 Process 1-2 a/c PY Nov 19

A product passes through two distinct processes before completion. Following information are available in this respect :

	Process-1	**Process-2**
Raw materials used	10,000 units	-
Raw material cost (per unit)	₹ 75	-
Transfer to next process/Finished good	9,000 units	8,200 units
Normal loss (on inputs)	5%	10%
Direct wages	₹ 3,00,000	₹ 5,60,000
Direct expenses	50% of direct wages	5% of direct wages
Manufacturing overheads	25% of direct wages	15% of direct wages
Realisable value of scrap (per unit)	₹ 13.50	₹ 145

8,000 units of finished goods were sold at a profit of 15% on cost. There was no opening and closing stock of work-in-progress.

Prepare:

(i) Process-1 and Process-2 Account
(ii) Finished goods Account
(iii) Normal Loss Account
(iv) Abnormal Loss Account
(v) Abnormal Gain Account.

Ans. **(i) Process-1 Account**

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)

To	Raw Material Consumed	10,000	7,50,000	By	Normal Loss A/c @ 13.5	500	6,750
"	Direct Wages	--	3,00,000	"	Process 2 @ 133.5	9,000	12,01,500
"	Direct	--	1,50,000	"	By Abnormal	500	66,750
	Expenses				Loss @ 133.5		
"	Manufacturing Overheads		75,000				
		10,000	12,75,000			10,000	12,75,000

Cost per unit of completed units and abnormal loss:

$$= \frac{12,75,000 - 6,750}{10,000 units - 500 units} = 133.5$$

(ii) Dr. **Process-2 Account** Cr.

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Process-I A/c	9,000	12,01500	By	Normal Loss A/c@ 145	900	1,30,500
"	To Direct Wages	--	5,60,000	"	By Finished StockA/c [bal fig]	8,200	21,04,667
"	Direct Expenses	--	3,64,000				
"	Manufacturing Overheads	--	84,000				
"	To Abnormalgain (₹ 256.67 × 100 units)	100	25,667				
		9,100	22,35,167			9,100	22,35,167

Cost per unit of completed units and abnormal gain:

$$\frac{22,09,500 - 130500}{8,100 units} = 256.67$$

Dr. Finished Goods A/c Cr.

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Process II A/c	8,200	21,04,667	By	By Cost of Sales	8,000	20,53,333
				"	By Balance c/d	200	51,334
		8,200	**21,04,667**			**8,200**	**21,04,667**

(iii) **Normal Loss A/c**

Dr. Cr.

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Process I	500	6,750	By	By abnormal Gain II	100	14,500
	Process II	900	1,30,500		By Cash	500	6,750
					By Cash	800	1,16,000

		1400	1,37,250			1400	1,37,250

(iv) **Abnormal Loss A/c**

Dr. Cr.

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Process I	500	66,750	By	By Cost Ledger Control A/c	500	6,750
					By Costing P& L A/C (Abnormal Loss)		60,000
			66,750				66,750

(v) **Abnormal Gain A/c**

Dr. Cr.

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Normal Loss A/c @ 145	100	14,500	By	Process II	100	25,667
To	Costing P & L A/C		11,167				
		100	25,667			100	25,667

Q.5 Process 1-2 a/c | PY Nov 20

Following details are related to the work done in Process-I by ABC Ltd. during the month of May 2019 :

	(₹)
Opening work in process (3,000 units)	
Materials	*1,80,500*
Labour	*32,400*
Overheads	*90,000*
Materials introduced in Process-I (42,000 units)	*36,04,000*
Labour	*4,50,000*
Overheads	*15,18,000*

Units Scrapped
Degree of completion Materials
Labour & overhead Closing Work-in-process
Degree of completion Materials
Labour & overhead
Units finished and transferred to Process-II : 36,000 units Normal loss:
4% of total input including opening work-in-process Scrapped units fetch ₹ 62.50 per piece.

Prepare:
(i) Statement of equivalent production.
(ii) Statement of cost per equivalent unit.
(iii) Process-I A/c
(iv) Normal Loss Account and
(v) Abnormal Loss Account

Ans. **(i) Statement of Equivalent Production (Weighted Average method)**

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & O.H.	
				%	Units	%	Units
Opening WIP	3,000	Completed and transferred to Process-II	36,000	100	36,000	100	36,000
Units introduced	42,000	Normal Loss (4% of 45,000 units)	1,800	--	--	--	--
		Abnormal loss (Balancing figure)	3,000	100	3,000	70	2,100
		Closing WIP	4,200	100	4,200	50	2,100
	45,000		45,000		**43,200**		**40,200**

(ii) Statement showing cost for each element

Particulars	Materials (₹)	Labour (₹)	Overhead (₹)	Total (₹)
Cost of opening work-in-process	1,80,500	32,400	90,000	3,02,900
Cost incurred duringthe month	36,04,000	4,50,000	15,18,000	55,72,000
Less: Realisable Value of normal scrap (₹ 62.50 × 1,800 units)	(1,12,500)	--	--	(1,12,500)
Total cost: (A)	**36,72,000**	**4,82,400**	**16,08,000**	57,62,400
Equivalent units: (B)	43,200	40,200	40,200	
Cost per equivalent unit: (C) = (A ÷ B)	**85.00**	**12.00**	**40.00**	137.00

Statement of Distribution of cost

Particulars	Amount (₹)	Amount (₹)
1. Value of units completed and transferred: (36,000 units × ₹ 137)		49,32,000
2. Value of Abnormal Loss:		
- Materials (3,000 units × ₹ 85)	2,55,000	
- Labour (2,100 units × ₹ 12)	25,200	
- Overheads (2,100 units × ₹ 40)	84,000	3,64,200
3. Value of Closing W-I-P:		
- Materials (4,200 units × ₹ 85)	3,57,000	
- Labour (2,100 units × ₹ 12)	25,200	
- Overheads (2,100 units × ₹ 40)	84,000	4,66,200

(iii) **Process-I A/c**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W.I.P:					
– Materials	3,000	1,80,500	By Normal Loss(₹ 62.5 × 1,800 units)	1,800	1,12,500
– Labour	--	32,400			
– Overheads	--	90,000			
To Materials introduced	42,000	36,04,000	By Abnormal loss	3,000	**3,64,200**
To Labour		4,50,000	By Process-I A/c	36,000	49,32,000
To Overheads		15,18,000	By Closing WIP	4,200	**4,66,200**
	45,000	**58,74,900**		45,000	**58,74,900**

(iv) **Normal Loss A/c**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	1,800	1,12,500	By Cost Ledger Control A/c	1,800	1,12,500
	1,800	**1,12,500**		1,800	**1,12,500**

(v) **Abnormal Loss A/c**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	3,000	3,64,200	By Cost Ledger Control A/c (₹ 62.5 × 3,000 units)	3,000	**1,87,500**
			By Costing Profit & Loss A/c (Bal. Figure)		**1,76,700**
	3,000	**3,64,200**		3,000	**3,64,200**

Q.6 Abnormal loss a/c prepare | PY Jan 21

MNO Ltd has provided following details:

- Opening work in progress is 10,000 units at ₹ 50,000 (Material 100%, Labour and overheads 70% complete).
- Input of materials is 55,000 units at ₹ 2,20,000. Amount spent on Labour and Overheads is ₹ 26,500 and ₹ 61,500 respectively.
- 9,500 units were scrapped; degree of completion for material 100% and for labour & overheads 60%.
- Closing work in progress is 12,000 units; degree of completion for material 100% and for labour & overheads 90%.
- Finished units transferred to next process are 43,500 units.

Normal loss is 5% of total input including opening work in progress. Scrapped units would fetch ₹ 8.50 per unit.

You are required to prepare using FIFO method:

(i) Statement of Equivalent production

(ii) Abnormal Loss Account

Ans. **Statement of Equivalent Production (Using FIFO method)**

Particulars	Input Units	Particulars	Output Units	Equivalent Production	
				Material	Labour &

						O.H.	
				%	Units	%	Units
Opening WIP	10,000	Completed and transferred to Process-II	10,000	-		30	3,000
Units introduced	55,000	- From opening WIP	33,500	100	33,500	100	33,500
			43,500		33,500		36,500
		- From fresh inputs	3,250	-			-
		Normal Loss {5% (10,000 + 55,000 units)}	6,250	100	6,250	60	3,750
		Abnormal loss (9,500 - 3,250)					
		Closing WIP	12,000	100	12,000	90	10,800
	65,000		65,000		51,750		51,050

(ii) Abnormal Loss A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c (Refer Working Note-2)	6,250	29,698	By Cost Ledger Control A/c (6,250 units × ₹ 8.5)	6,250	53,125
To Costing Profit & Loss A/c	-	23,427			
	6,250	**53,125**		**6,250**	**53,125**

Working Notes:

1. Computation of Cost per unit

Particulars	Materials (₹)	Labour (₹)	Overhead (₹)
Input costs	2,20,000	26,500	61,500
Less: Realisable value of normal scrap (3,250 units x ₹ 8.5)	(27,625)	--	--
Net cost	1,92,375	26,500	61,500
Equivalent Units	51,750	51,050	51,050
Cost Per Unit	**3.7174**	**0.5191**	**1.2047**

Total cost per unit = (37174 + 0.5191 + 1.2047) = 54412

2. Valuation of Abnormal Loss

	(₹)
Materials (6,250 units × ₹ 3.7174)	23,233.75
Labour (3,750 units × ₹ 0.5191)	1,946.63
Overheads (3,750 units × ₹ 1.2047)	4,517.62
	29,698

Q.7 Process a/c prepare | PY July 21

A Manufacturing unit manufactures a product 'XYZ' which passes through three distinct Processes - X, Y and Z. The following data is given:

	Process X	Process Y	Process Z
Material consumed (in ₹)	2,600	2,250	2,000
Direct wages (in ₹)	4,000	3,500	3,000

- The total Production Overhead of ₹ 15,750 was recovered @ 150% of Direct wages.
- 15,000 units at ₹ 2 each were introduced to Process 'X'.
- The output of each process passes to the next process and finally, 12,000 units were transferred to Finished Stock Account from Process 'Z'.
- No stock of materials or work in progress was left at the end.

The following additional information is given:

Process	% of wastage to normal input	Value of Scrap per unit (₹)
X	6%	1.10
Y	?	2.00
Z	5%	1.00

You are required to:

(i) Find out the percentage of wastage in process 'Y', given that the output of Process 'Y' is transferred to Process 'Z' at ₹ 4 per unit.

(ii) Prepare Process accounts for all the three processes X, Y and Z.

Ans. **Process-X Account**

Dr. Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)
To Material introduced	15,000	30,000	By Normal Loss A/c [(6% of 15,000 units) x ₹ 1.1]	900	990
" Additional material	--	2,600	" Process-Y A/c (₹ 2.951* × 14,100 units)	14,100	41,610
" Direct wages	--	4,000			
" Production OH	--	6,000			
	15,000	42,600		15,000	42,600

***Cost per unit of completed units**

$$= \frac{Total\ cost - Realisable\ value\ from\ normal\ loss}{Input\ units\text{-}Normal\ loss\ units} = \frac{42,600 - 990}{15,000\ units - 900\ units} = 2.951$$

Dr. **Process-Y Account** Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-X A/c	14,100	41,610	By Normal Loss A/c	1,895	3,790
" Additional material	--	2,250	[(#13.44% of 14,100 units) x ₹2]	12,205	48,820
" Direct wages	--	3,500	" Process-Z A/c(₹ 4 × 12,205		
" Production OH	--	5,250			

	14,100	52,610	units)	14,100	52,610

*Calculation for % of wastage in process 'Y':

Let's consider number of units lost under process 'Y' = A

Now, $\frac{Total\ cost - Realisable\ value\ from\ normal\ loss}{Input\ units\text{-}Normal\ loss\ units} = 4$

$\frac{52,610 - 2A}{14,100units - A} = 4$

2A = 3,790 => A = 1,895 units

% of wastage = $\frac{1,895units}{14,100units} = 13.44\%$

Dr. **Process-Z Account** Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-Y A/c	12,205	48,820	By Normal Loss A/c [(5% of 12,205 units) x ₹ 1]	610	610
" Additional material	--	2,000	" Finished Stock A/c (₹ 4.9771$ × 12,000 units)	12,000	59,726
" Direct wages	--	3,000			
" Production OH	--	4,500			
" Abnormal gain (₹ 4.9771$ × 405 units)	405	2,016			
	12,610	60,336		12,610	60,336

Cost per unit of completed units

$= \frac{Total\ cost - Realisable\ value\ from\ normal\ loss}{Input\ units\text{-}Normal\ loss\ units} = \frac{58,320 - 610}{12,205units - 610units} = 4.9771$

Alternative Solution

Dr. **Process-X Account** Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)
To Material introduced	15,000	30,000	By Normal Loss A/c [(6% of 15,000 units) x ₹1.1]	900	990
" Additional material	--	2,600	" Process-Y A/c (₹ 2.951* × 14,100 units)	14,100	41,610
" Direct wages	--	4,000			
" Production OH	--	6,000			
	15,000	42,600		15,000	42,600

*Cost per unit of completed units

$\frac{Total\ cost - Realisable\ value\ from\ normal\ loss}{Inputs\ units\text{-}Normal\ loss\ units} = \frac{42,600 - 990}{15,000units - 900units} = 2.951$

Dr. **Process-Y Account** Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)

To Process-X A/c	14,100	41,610	By Normal Loss A/c [(#13.44% of 14,100 units) x ₹2]	1,895	3,790
" Additional material	--	2,250		12,631	50,524
" Direct wages	--	3,500	" Process-Z A/c (₹4 × 12,631@ units)		
" Production OH	--	5,250			
" Abnormal gain (₹4 × 426 units)	426	1,704			
	14,526	54,314		14,526	54,314

Working Notes:

1. Units Transferred from Process Z Account to Finished Stock = 12,000 Units i.e 95% of Inputs.
   So, Input of Z or Output of Y is 12,000 x 100/95 = 12,631 Units and Normal Loss (5%) is 631 units.
2. Let's consider number of units lost under process 'Y' as:
   For Normal loss = A
   For Abnormal loss = B
   Now, A + B = 1,469 [i.e. 14,100 – 12,631] ...(I)
   (A x ₹ 2 per unit) + (B x ₹ 4 per unit) = [52,610 – 50,524]
   2A + 4B = 2,086 ...(II)
   Now, putting the values of (I) in (II), we get, 2(1,469 – B) + 4B = 2,086

   2938 – 2B + 4B = 2,086
   2B = - 852 => B = - 426 units
   Since, the figure of B is in negative, it is an abnormal gain of 426 units. Further, A (i.e. normal loss) = 1,469 + 426 = 1,895 units
3. % of wastage in Process Y Account = $\frac{1,895}{14,100 units} = 13.44\%$

Dr. **Process-Z Account** Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-Y A/c	12,631	50,524	By Normal Loss A/c [(5% of 12,631 units) x ₹ 1]	631	631
" Additional material	--	2,000			
" Direct wages	--	3,000			
" Production OH	--	4,500		12,000	59,393
	12,631	60,024	" Finished Stock A/c (₹ 4.9494$ × 12,000 units)	12,631	60,024

Cost per unit of completed units = $\frac{\text{Total cost-Realisable value from normal loss}}{\text{Input units-Normal loss units}} = \frac{60,024 - 631}{12,631 units - 631 units} = 4.9494$

Q.8 Process a/c & abnormal gain | PY Dec 21

A product passes through Process-I and Process-II. Particulars pertaining to the Process-I are:
Materials issued to Process-I amounted to ₹ 80,000, Wages ₹ 60,000 and manufacturing overheads were ₹ 52,500. Normal Loss anticipated was 5% of input, 9,650 units of output were produced and transferred out from Process-I to Process-II. Input raw materials issued to Process-I were 10,000 units.
There were no opening stocks.
Scrap has realizable value of ₹ 5 per unit.
You are required to prepare:
(i) Process-I Account
(ii) Abnormal Gain/Loss Account

Ans.

(i) Process - I Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Materials	10,000	80,000	By Normal loss (5%of 10,000)	500	2,500
To Wages	-	60,000	By Process-II A/c (₹20*×9,650units)	9,650	1,93,000
To Manufacturing OH		52,500			
To Abnormal Gain A/c (₹20*×150units)	150	3,000			
	10,150	1,95,500		10,150	1,95,500

$$\frac{*\ (80,000 + 60,000 + 52,500) - 2,500}{10,000 - 500} = 20$$

(ii) Abnormal Gain - Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Normal loss A/c	150	750	By Process-I A/c	150	3,000
To Costing P&L A/c	-	2,250			
	150	3,000		150	3,000

Q.9 Diff bet Job & Process Cost | PY May 22

Distinguish between Job costing and Process Costing. (Any five points of differences)

Ans.

Job Costing	Process Costing
(i) A Job is carried out or a product is produced by specific orders.	The process of producing the product has a continuous flow and the product produced is homogeneous.
(ii) Costs are determined for each job.	Costs are compiled on time basis i.e., for production of a given accounting period for each process or department.
(iii) Each job is separate and independent of other jobs.	Products lose their individual identity as they are manufactured in a

	continuous flow.
(iv) Each job or order has a number and costs are collected against the same job number.	The unit cost of process is an average cost for the period.
(v) Costs are computed when a job is completed. The cost of a job may be determined by adding all costs against the job.	Costs are calculated at the end of the cost period. The unit cost of a process may be computed by dividing the total cost for the period by the output of the process during that period.
(vi) As production is not continuous and each job may be different, so more managerial attention is required for effective control.	Process of production is usually standardized and is therefore, quite stable. Hence control here is comparatively easier.

Q.10 Process a/c abnormal loss | PY May 22

STG Limited is a manufacturer of Chemical 'GK', which is required for industrial use. The complete production operation requires two processes. The raw material first passes through Process I, where Chemical 'G' is produced. Following data is furnished for the month April 2022:

Particulars	(in kgs.)
Opening work-in-progress quantity (Material 100% and conversion 50% complete)	9,500
Material input quantity	1,05,000
Work Completed quantity	83,000
Closing work-in-progress quantity (Material 100% and conversion 60% complete)	16,500

You are further provided that:

Particulars	(in ₹)
Opening work-in-progress costMaterial cost	
Processing cost	29,500
	14,750
Material input cost	3,34,500
Processing cost	2,53,100

Normal process loss may be estimated to be 10% of material input. It has no realizable value. Any loss over and above normal loss is considered to be 100% complete in material and processing.

The Company transfers 60,000 kgs. of output (Chemical G) from Process I to Process II for producing Chemical 'GK'. Further materials are added in Process II which yield 1.20 kg. of Chemical 'GK' for every kg. of Chemical 'G' introduced. The chemicals transferred to Process II for further processing are then sold as Chemical 'GK' for ₹ 10 per kg. Any quantity of output completed in Process I, are sold as Chemical 'G' @ ₹ 9 per kg.

The monthly costs incurred in Process II (other than the cost of Chemical 'G') are: Input 60,000 kg. of Chemical 'G'

Materials Cost ₹ 85,000

Processing Costs ₹ 50,000 You are required:

(i) Prepare Statement of Equivalent production and determine the cost per kg. of Chemical 'G' in Process I using the weighted average cost method.

(ii) Prepare a statement showing cost of Chemical 'G' transferred to Process II, cost of abnormal loss and cost of closing work-in progress.

(iii) STG is considering the option to sell 60,000 kg. of Chemical 'G' of Process I without processing it further in Process-II. Will it be beneficial for the company over the current pattern of processing 60,000 kg in process-II?

Ans. (i) Statement of Equivalent Production

Particulars	Input quantity	Particulars	Total	Material		Processing Cost	
				%	Units	%	Units
Opening WIP	9,500	Units completed	83,000	100%	83,000	100%	83,000
Material Input	1,05,000	Normal loss (10% of 1,05,000)	10,500	-	-	-	-
		Abnormal loss (Bal. fig.)	4,500	100%	4,500	100%	4,500
		Closing WIP	16,500	100%	16,500	60%	9,900
	1,14,500		1,14,500		1,04,000		97,400

Statement of Cost for each element

Particulars	Material	Processing	Total cost
	(₹)	(₹)	(₹)
Cost of opening WIP	29,500	14,750	44,250
Cost incurred during the month	3,34,500	2,53,100	5,87,600
Total cost (A)	3,64,000	2,67,850	6,31,850
Equivalent production (B)	1,04,000	97,400	
Cost per kg of Chemical 'G' (A/B)	**3.5**	**2.75**	6.25

Alternative Presentation
Statement showing cost per kg of each statement

	(₹)	(₹)
Material	29,500 + 3,34,500 / 1,04,000	3.5
Processing cost	14,750 + 2,53,100 / 97,400	2.75
Total Cost per kg		6.25

(ii) **Statement showing cost of Chemical 'G' transferred to Process II, cost of abnormal loss and cost of closing work-in- progress**

	(₹)
Units transferred (60,000 × 6.25)	**3,75,000**
Abnormal loss (4,500 × 6.25)	**28,125**
Closing work in progress:	

Material (16,500 × 3.5)	**57,750**
Processing cost (9,900 × 2.75)	**27,225**
	84,975

(iii) **Calculation of Incremental Profit / Loss after further processing**

Particulars	**(₹)**	**(₹)**
Sales if further processed (A) (60,000 x 1.20 x ₹ 10)	7,20,000	
Calculation of cost in Process II		
Chemical transferred from Process I	3,75,000	
Add: Material cost	85,000	
Add: Process cost	50,000	
Total cost of finished stock (B)	5,10,000	
Profit, if further processed (C = A – B)		2,10,000
If sold without further processing then,		
Sales (60,000 x ₹ 9)	5,40,000	
Less: Cost of input without further processing	3,75,000	
Profit without further processing (D)		1,65,000
Incremental Profit after further processing (C – D)		45,000
Additional net profit on further processing in Process II is 45,000. Therefore, it is advisable to process further chemical 'G'.		

Alternative Presentation
Calculation of Incremental Profit / Loss after further processing

	(₹)
If 60,000 units are sold @ ₹ 9	5,40,000
If 60,000 units are processed in process II (60,000 × 1.2 × ₹ 10)	7,20,000
Incremental Revenue (A)	**1,80,000**
Incremental Cost: (B)	
Material Cost	85,000
Processing Cost	50,000
	1,35,000
Incremental Profit (A-B)	45,000

Additional net profit on further processing in Process II is 45,000. Therefore, it is advisable to process further chemical 'G'.

Q.11 Process a/c & FG a/c | PY Nov 22

N Ltd. produces a product which passes through two processes – Process – I and Process-II. The company has provided following information related to the Financial Year 2021-22:

	Process-I	**Process -II**
Raw Material @₹ 65 per unit	6,500 units	-
Direct Wages	₹ 1,40,000	₹ 1,30,000
Direct Expenses	30% of Direct	35% of Direct

	Wages	Wages
Manufacturing Overheads	₹ 21,500	₹ 24,500
Realisable value of scrap per unit	₹ 4.00	₹ 16.00
Normal Loss	250 units	500 units
Units transferred to Process-II / finished stock	6,000 units	5,500 units
Sales	-	5,000 units

There was no opening or closing stock of work-in progress. You are required to prepare:

(i) Process-I Account

(ii) Process -II Account

(iii) Finished Stock Account

Ans.

Process-I A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Raw material used (₹ 65 × 6,500 units)	6,500	4,22,500	By Normal loss (250 units × ₹ 4)	250	1,000
To Direct wages	--	1,40,000	By Process- II A/c (₹ 100 × 6,000 units)	6,000	6,00,000
To Direct expenses (30% of ₹ 1,40,000)	--	42,000	By Abnormal loss (₹ 100 × 250 units)	250	25,000
To Manufacturing overhead		21,500			
	6,500	6,26,000		6,500	6,26,000

Cost per unit of completed units and abnormal loss: $\frac{Total\ cost - Realisable\ value\ from\ normal\ loss}{Input\ Units\text{-}Normal\ loss\ units}$

$= \frac{6,26,000 - 1,000}{6,500 units - 250 units}$

$= \frac{6,25,000}{6,250\ units} = 100$

Process- II A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process - I A/c	6,000	6,00,000	By Normal loss (500 units × ₹16)	500	**8,000**
To Direct wages	--	1,30,000	By Finished Stock A/c (₹144 × 5,500 units)	5,500	7,92,000
To Direct expenses (35% of ₹ 1,30,000)	--	45,500			
To Manufacturing overhead	--	24,500			
	6,000	8,00,000		6,000	8,00,000

Cost per unit of completed units and abnormal loss:

$= \frac{Total\ cost - Realisable\ value\ from\ normal\ loss}{Input\ units\text{-}Normal\ loss\ units}$

$= \frac{8,00,000 - 8,000}{6,000\ units - 500\ units} = 144$

Finished Goods Stock A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process II A/c	5,500	7,92,000	By Cost of Sales (₹144 × 5,000 units)	5,000	7,20,000
			By Balance c/d	500	72,000
	5,500	7,92,000		5,500	7,92,000

Q.12 Process a/c, RM a/c | RTP May 18

Star Ltd. manufactures chemical solutions for the food processing industry. The manufacturing takes place in a number of processes and the company uses FIFO method to value work-in-process and finished goods. At the end of the last month, a fire occurred in the factory and destroyed some of paper containing records of the process operations for the month.

Star Ltd. needs your help to prepare the process accounts for the month during which the fire occurred. You have been able to gather some information about the month's operating activities but some of the information could not be retrieved due to the damage. The following information was salvaged:

- Opening work-in-process at the beginning of the month was 800 litres, 70% complete for labour and 60% complete for overheads. Opening work-in-process was valued at ₹ 26,640.
- Closing work-in-process at the end of the month was 160 litres, 30% complete for labour and 20% complete for overheads.
- Normal loss is 10% of input and total losses during the month were 1,800 litres partly due to the fire damage.
- Output sent to finished goods warehouse was 4,200 litres.
- Losses have a scrap value of ₹15 per litre.
- All raw materials are added at the commencement of the process.
- The cost per equivalent unit (litre) is ₹39 for the month made up as follows:

	(₹)
Raw Material	23
Labour	7
Overheads	9
	39

Required:

(i) CALCULATE the quantity (in litres) of raw material inputs during the month.

(ii) CALCULATE the quantity (in litres) of normal loss expected from the process and the quantity (in litres) of abnormal loss / gain experienced in the month.

(iii) CALCULATE the values of raw material, labour and overheads added to the process during the month.

(iv) PREPARE the process account for the month.

Ans.

(i) Calculation of Raw Material inputs during the month:

Quantities Entering Process	Litres	Quantities Leaving Process	Litres
Opening WIP	800	Transfer to Finished Goods	4,200
Raw material input (balancing figure)	5,360	Process Losses	1,800
		Closing WIP	160

	6,160		6,160

(ii) Calculation of Normal Loss and Abnormal Loss/Gain

	Litres
Total process losses for month	1,800
Normal Loss (10% input)	536
Abnormal Loss (balancing figure)	1,264

(iii) Calculation of values of Raw Material, Labour and Overheads added to the process:

	Material	Labour	Overheads
Cost per equivalent unit	₹23.00	₹7.00	₹9.00
Equivalent units (litre) (refer the working note)	4,824	4,952	5,016
Cost of equivalent units	₹1,10,952	₹34,664	₹45,144
Add: Scrap value of normal loss (536 units × ₹ 15)	₹8,040	--	--
Total value added	₹1,18,992	₹34,664	₹45,144

Workings:

Statement of Equivalent Units (litre):

Input Details	Units	Output details	Units	Equivalent Production					
				Material		Labour		Overhead s	
				Units	(%)	Units	(%)	Units	(%)
Opening WIP	800	Units completed:							
Units introduced	5,360	- Opening WIP	800	--	--	240	30	320	40
		- Fresh inputs	3,400	3,400	100	3,400	100	3,400	100
		Normal loss	536	--	--	--	--	--	--
		Abnormal loss	1,264	1,264	100	1,264	100	1,264	100
		Closing WIP	160	160	100	48	30	32	20
	6,160		6,160	4,824		4,952		5,016	

(iv) Process Account for Month

	Litres	Amount (₹)		Litres	Amount (₹)
To Opening WIP	800	26,640	By Finished goods	4,200	1,63,800
To Raw Materials	5,360	1,18,992	By Normal loss	536	8,040
To Wages	--	34,664	By Abnormal loss	1,264	49,296
To Overheads	--	45,144	By Closing WIP	160	4,304
	6,160	2,25,440		6,160	2,25,440

Q.13 Process iii a/c | RTP Nov 18

From the following information for the month of January, 20X9, PREPARE Process-III cost accounts.

Opening WIP in Process-III	1,600 units at ₹ 24,000
Transfer from Process-II	55,400 units at ₹ 6,23,250
Transferred to warehouse	52,200 units
Closing WIP of Process-III	4,200 units
Units Scrapped	600 units
Direct material added in Process-III	₹ 2,12,400
Direct wages	₹ 96,420
Production overheads	₹ 56,400

Degree of completion:

	Opening Stock	Closing Stock	Scrap
Material	80%	70%	100%
Labour	60%	50%	70%
Overheads	60%	50%	70%

The normal loss in the process was 5% of the production and scrap was sold @ ₹ 5 per unit.

(Students may treat material transferred from Process – II as Material – A and fresh material used in Process – III as Material B)

Ans.

Statement of Equivalent Production
Process III

Input Details	Units	Output Particulars	Units	Equivalent Production					
				Material-A		Material-B		Labour & Overhead	
				%	Units	%	Units	%	Units
Opening WIP	1,600	Work on Op. WIP	1,600	-	-	20	320	40	640
Process-II Transfer	55,400	Introduced & completed during the month	50,600	100	50,600	100	50,600	100	50,600
		Normal loss (5% of 52,800 units)	2,640	-	-	-	-	-	-
		Closing WIP	4,200	100	4,200	70	2,940	50	2,100
		Abnormal Gain	(2,040)	100	(2,040)	100	(2,040)	100	(2,040)
	57,000		57,000		52,760		51,820		51,300

Working note:

Production units = Opening units + Units transferred from Process-II – Closing Units

= 1,600 units + 55,400 units – 4,200 units

= 52,800 units

Statement of Cost

	Cost (₹)	Equivalet units	Cost per equivalet units (₹)
Material A (Transferred from previous process)	6,23,250		
Less: Scrap value of normal loss (2,640 units × ₹ 5)	(13,200)		
	6,10,050	52,760	11.5627
Material B	2,12,400	51,820	4.0988
Labour	96,420	51,300	1.8795
Overheads	56,400	51,300	1.0994
	9,75,270		18.6404

		Amount (₹)	Amount (₹)
Opening WIP	Material A		24,000
Completed opening WIP units-1600	Material B (320 units × ₹ 4.0988)	1311.62	
	Wages (640 units × ₹ 1.8795)	1202.88	
	Overheads (640 units × ₹ 1.0994)	703.62	3,218.12
Introduced & Completed-units 50,600	50,600 units × ₹ 18.6404		9,43,204.24
Total cost of 52,200 finished goods units			9,70,422.36
Closing WIP units-4,200	Material A (4,200 units × ₹ 11.5627)		48,563.34
	Material B (2,940 units × ₹ 4.0988)		12,050.47
	Wages (2,100 units × ₹ 1.8795)		3,946.95
	Overheads (2,100 units × ₹ 1.0994)		2,308.74
			66,869.50
Abnormal gain units - 2,040	(2,040 units × ₹ 18.6404)		38026.42

Process III A/c

Particulars		Units	Amount (₹)	Particulars		Units	Amount (₹)
To	Balance b/d	1,600	24,000	By	Normal loss	2,640	13,200
To	Process II A/c	55,400	6,23,250	By	Finished goods	52,200	9,70,422.36
To	Direct		2,12,400	By	Closing WIP	4,200	66,874.06*

	material					
To	Direct wages		96,420			
To	Production overheads		56,400			
To	Abnormal gain	2,040	38,026.42			
		59,040	10,50,496.42		59,040	10,50,496.42

* Difference in figure due to rounding off has been adjusted with closing WIP

Q.14 Eq Prod, Process I a/c & Cos | RTP May 19

A factory uses job costing. The following data are obtained from its books for the year ended 31st March, 2018:

	Amount (₹)
Direct materials	9,00,000
Direct wages	7,50,000
Selling and distribution overheads	5,25,000
Administration overheads	4,20,000
Factory overheads	4,50,000
Profit	6,09,000

Required:

(i) PREPARE a Job Cost sheet indicating the Prime cost, Cost of Production, Cost of sales and the Sales value.

(ii) In 2018-19, the factory received an order for a job. It is estimated that direct materials required will be ₹ 2,40,000 and direct labour will cost ₹ 1,50,000. DETERMINE what should be the price for the job if factory intends to earn the same rate of profit on sales assuming that the selling and distribution overheads have gone up by 15%. The factory overheads is recovered as percentage of wages paid, whereas, other overheads as a percentage of cost of production, based on cost rates prevailing in the previous year.

Ans. (i) Production Statement

For the year ended 31st March, 2018

		Amount (₹)
Direct materials		9,00,000
Direct wages		7,50,000
	Prime Cost	16,50,000
Factory overheads		4,50,000
	Cost of Production	21,00,000
Administration overheads		4,20,000
Selling and distribution overheads		5,25,000
	Cost of Sales	30,45,000
Profit		6,09,000
	Sales value	36,54,000

Calculation of Rates:

1 Percentage of factory overheads to direct wages = $\frac{4,50,000}{7,50,000} \times 100 = 60\%$

2 Percentage of administration overheads to Cost of production

$= \frac{4,20,000}{21,00,000} x100 = 20\%$

3 Selling and distribution overheads = ₹ 5,25,000 × 115% = ₹ 6,03,750
Selling and distribution overhead % to Cost of production

$= \frac{6,03,750}{21,00,000} x100 = 28.75\%$

4 Percentage of profit to sales = $\frac{6,09,000}{36,54,000} x100 = 16.67\%$

(ii) Calculation of price for the job received in 2018-19

	Amount (₹)
Direct materials	2,40,000
Direct wages	1,50,000
Prime Cost	3,90,000
Factory overheads (60% of ₹1,50,000)	90,000
Cost of Production	4,80,000
Administration overheads (20% of ₹4,80,000)	96,000
Selling and distribution overheads (28.75% of ₹4,80,000)	1,38,000
Cost of Sales	7,14,000
Profit (20% of ₹7,14,000)	1,42,800
Sales value	8,56,800

Q.15 Eq Prod, unit t/f to II | RTP Nov 19

A product is manufactured in two sequential processes, namely Process-1 and Process-2. The following information relates to Process-1. At the beginning of June 2019, there were 1,000 WIP goods (60% completed in terms of conversion cost) in the inventory, which are valued at ₹2,86,020 (Material cost: ₹2,55,000 and Conversion cost: ₹31,020). Other information relating to Process-1 for the month of June 2019 is as follows;

Cost of materials introduced- 40,000 units (₹)	96,80,000
Conversion cost added (₹)	18,42,000
Transferred to Process-2 (Units)	35,000
Closing WIP (Units) (60% completed in terms of conversion cost)	1,500

100% of materials are introduced to Process-1 at the beginning. Normal loss is estimated at 10% of input materials (excluding opening WIP).

Required:
(i) PREPARE a statement of equivalent units using the weighted average cost method and thereby calculate the following:
(ii) CALCULATE the value of output transferred to Process-2 and closing WIP.

Ans. **(i) Statement of Equivalent Production**

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Conversion cost	
				%	Units	%	Units

Opening WIP	1,000	Completed and transfer r ed to Process-2	35,000	100	35,000	100	35,000
Units introdu ced	40,000	Normal Loss (10% of 40,000)	4,000	--	--	--	--
		Abnormal loss (Balancing figure)	500	100	500	60	300
		Closing WIP	1,500	100	1,500	60	900
	41,000		41,000		37,000		36,200

(ii) Calculation of value of output transferred to Process-2 & Closing WIP

		Amount (₹)	Amount (₹)
1.	Value of units completed and transferred (35,000 units × ₹ 320.25) (Refer working note)		1,12,08,750
3.	Value of Closing W-I-P:		
-	Materials (1,500 units × ₹ 268.51)	4,02,765	
-	Conversion cost (900 units × ₹ 51.74)	46,566	4,49,331

Workings:

Cost for each element

Particulars	Materials (₹)	Conversion (₹)	Total (₹)
Cost of opening work-in-process	2,55,000	31,020	2,86,020
Cost incurred during the month	96,80,000	18,42,000	1,15,22,000
Total cost: (A)	99,35,000	18,73,020	1,18,08,020
Equivalent units: (B)	37,000	36,200	
Cost per equivalent unit: (C) = (A ÷ B)	268.51	51.74	320.25

Q.16 Process I /II/II account | RTP Nov 20

M Ltd. produces a product-X, which passes through three processes, I, II and III. In Process-III a by-product arises, which after further processing at a cost of ₹85 per unit, product Z is produced. The information related for the month of August 2020 is as follows:

	Process-I	Process-II	Process-III
Normal loss	5%	10%	5%
Materials introduced (7,000 units)	1,40,000	-	-
Other materials added	62,000	1,36,000	84,200
Direct wages	42,000	54,000	48,000
Direct expenses	14,000	16,000	14,000

Production overhead for the month is ₹2,88,000, which is absorbed as a percentage of direct wages.

The scrapes are sold at ₹10 per unit

Product-Z can be sold at ₹135 per unit with a selling cost of ₹15 per unit No. of units produced:

Process-I- 6,600; Process-II- 5,200, Process-III- 4,800 and Product-Z- 600

There is not stock at the beginning and end of the month.

You are required to PREPARE accounts for:

(i) Process-I, II and III
(ii) By-product process.

Ans. **(i) Process-I A/c**

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Materials	7,000	1,40,000	By Normal loss (5% of 7,000)	350	3,500
To Other materials	-	62,000	By Process-II*	6,600	3,35,955
To Direct wages	-	42,000	By Abnormal loss*	50	2,545
To Direct expenses	-	14,000			
To Production OH (200% of ₹42,000)	-	84,000			
	7,000	3,42,000		7,000	3,42,000

$$*\frac{(3,42,000-3,500)}{(7,000-350)units}=50.9022$$

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Process-I A/c	6,600	3,35,955	By Normal loss (10% of 6,600)	660	6,600
To Other materials	-	1,36,000	By Process-III**	5,200	5,63,206
To Direct wages	-	54,000	By Abnormal loss**	740	80,149
To Direct expenses	-	16,000			
To Production OH (200% of ₹54,000)	-	1,08,000			
	6,600	6,49,955		6,600	6,49,955

$$**\frac{(6,49,955-6,600)}{(6,600-660)units}=180.1396$$

 # Realisable value = ₹135 – (85+15) = ₹35

(ii) By-Product Process A/c

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Process-III A/c	600	21,000	By Product-Z	600	81,000
To Processing cost	-	51,000			
To Selling expenses	-	9,000			
				600	81000
	600	81,000		600	81,000

Q.17 Process I & eq production | RTP July 21

A company produces a component, which passes through two processes. During the month of November, 2020, materials for 40,000 components were put into Process- I of which 30,000 were completed and transferred to Process- II. Those not transferred to Process- II were 100% complete as to materials cost and 50% complete as to labour and overheads cost. The Process- I costs incurred were as follows:

Direct Materials ₹ 3,00,000

Direct Wages ₹ 3,50,000
Factory Overheads ₹ 2,45,000

Of those transferred to Process II, 28,000 units were completed and transferred to finished goods stores. There was a normal loss with no salvage value of 200 units in Process II. There were 1,800 units, remained unfinished in the process with 100% complete as to materials and 25% complete as regard to wages and overheads.

Costs incurred in Process-II are as follows:

Packing Materials ₹ 80,000
Direct Wages ₹ 71,125
Factory Overheads ₹ 85,350

Packing material cost is incurred at the end of the second process as protective packing to the completed units of production.

Required:

(i) PREPARE Statement of Equivalent Production, Cost per unit and Process I A/c.
(ii) PREPARE statement of Equivalent Production, Cost per unit and Process II A/c.

Ans.

Process I

Statement of Equivalent Production and Cost

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%)	Units	(%)	Units	(%)	Units
40,000	Completed	30,000	100	30,000	100	30,000	100	30,000
	Closing WIP	10,000	100	10,000	50	5,000	50	5,000
40,000		40,000		40,000		35,000		35,000

Particulars	Materials	Labour	Overhead	Total
Cost incurred (₹)	3,00,000	3,50,000	2,45,000	8,95,000
Equivalent units	40,000	35,000	35,000	
Cost per equivalent unit (₹)	7.50	10.00	7.00	24.50

Process-I Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Materials	40,000	3,00,000	By Process-II A/c (30,000 units × ₹24.5)	30,000	7,35,000
To Labour		3,50,000	By Closing WIP*	10,000	1,60,000
To Overhead		2,45,000			
	40,000	8,95,000		40,000	8,95,000

* (Material 10,000 units × ₹ 7.5) + (Labour 5,000 units × ₹ 10) + (Overheads 5,000 units × ₹7)
= ₹ 75,000 + ₹ 50,000 + ₹ 35,000 = ₹ 1,60,000

Process II

Statement of Equivalent Production and Cost

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%)	Units	(%)	Units	(%)	Units
30,000	Completed	28,000	100	28,000	100	28,000	100	28,000
	Normal loss	200		--		--		--
	Closing WIP	1,800	100	1,800	25	450	25	450
30,000		30,000		29,800		28,450		28,450

Particulars	Materials	Labour	Overhead	Total
Process-I Cost	7,35,000	--	--	7,35,000
Cost incurred (₹)	--	71,125	85,350	1,56,475
Equivalent units	29,800	28,450	28,450	--
Cost per equivalent unit (₹)	24.6644	2.5000	3.0000	30.1644

Process-II Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	30,000	7,35,000	By Normal loss A/c	200	--
To Packing Material	--	80,000	By Finished Goods Stock A/c	28,000*	9,24,604
To Direct Wages	--	71,125	By Closing WIP	1,800**	46,871
To Factory Overhead	--	85,350			
	30,000	9,71,475		30,000	9,71,475

* 28,000 × ₹ 30.1644 = ₹ 8,44,603 + ₹ 80,000 (Packing Material Cost) = ₹ 9,24,604

** 1,800 units × ₹ 24.6644 + 450 units × (₹ 2.5 + ₹3) = ₹ 46,871

Q.18 Process a/c I/II/III | RTP Dec 21

Following information is available regarding Process-I of a manufacturing company for the month of February:

Production Record:

Units in process as on 1st February	
(All materials used, 1/4th complete for labour and overhead)	8,000
New units introduced	32,000
Units completed	28,000
Units in process as on 28th February	
(All materials used, 1/3rd complete for labour and overhead)	12,000

Cost Records:	(₹)
Work-in-process as on 1st February	
Materials	1,20,000
Labour	20,000
Overhead	20,000

1,60,000	
Cost during the month:	
Materials	5,12,000
Labour	3,00,000
Overhead	3,00,000
	11,12,000

Presuming that average method of inventory is used, PREPARE the following:
(i) Statement of equivalent production.
(ii) Statement showing cost for each element.
(iii)Statement of apportionment of cost.
(iv) Process cost account for Process-I

Ans. (i) Statement of equivalent production (Average cost method)

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & O.H.	
				%	Units	%	Units
Opening WIP	8,000	Completed and transferred	28,000	100	28,000	100	28,000
Units introduced	32,000	Closing WIP	12,000	100	12,000	1/3rd	4,000
	40,000		40,000		40,000		32,000

(ii) Statement showing cost for each element

Particulars	Materials (₹)	Labour (₹)	Overhead (₹)	Total (₹)
Cost of opening work-in-process	1,20,000	20,000	20,000	1,60,000
Cost incurred during the month	5,12,000	3,00,000	3,00,000	11,12,000
Total cost: (A)	6,32,000	3,20,000	3,20,000	12,72,000
Equivalent units: (B)	40,000	32,000	32,000	
Cost per equivalent unit: (C) =(A ÷ B)	15.8	10	10	35.8

(iii) Statement of apportionment of cost

Particulars	Amount (₹)	Amount (₹)
1. Value of units completed and transferred(28,000 units × ₹ 35.8)		10,02,400
2. Value of Closing W-I-P:		
- Materials (12,000 units × ₹ 15.8)	1,89,600	
- Labour (4,000 units × ₹ 10)	40,000	
- Overheads (4,000 units × ₹ 10)	40,000	2,69,600

(iv) Process-I Cost Account

Particulars	Units	(₹)	Particulars	Units	(₹)

To Opening W-I-P	8,000	1,60,000	By Completed units	28,000	10,02,400
To Materials	32,000	5,12,000	By Closing W-I-P	12,000	2,69,600
To Labour	--	3,00,000			
To Overhead	--	3,00,000			
	40,000	12,72,000		40,000	12,72,000

Q.19 Eq Production, Process I a/c | RTP May 22

A company produces a component, which passes through two processes. During the month of December, 2021, materials for 40,000 components were put into Process-I of which 30,000 were completed and transferred to Process-II. Those not transferred to Process- II were 100% complete as to materials cost and 50% complete as to labour and overheads cost. The Process- I costs incurred were as follows:

Direct Materials ₹ 6,00,000

Direct Wages ₹ 7,00,000

Factory Overheads ₹ 4,90,000

Of those transferred to Process II, 28,000 units were completed and transferred to finished goods stores. There was a normal loss with no salvage value of 200 units in Process II. There were 1,800 units, remained unfinished in the process with 100% complete as to materials and 25% complete as regard to wages and overheads.

Costs incurred in Process-II are as follows:

Packing Materials ₹ 1,60,000

Direct Wages ₹ 1,42,250

Factory Overheads ₹ 1,70,700

Packing material cost is incurred at the end of the second process as protective packing to the completed units of production.

Required:

(i) PREPARE Statement of Equivalent Production, Cost per unit and Process I A/c.

(ii) PREPARE statement of Equivalent Production, Cost per unit and Process II A/c.

Ans.

Process I

Statement of Equivalent Production and Cost

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%)	Units	(%)	Units	(%)	Units
40,000	Completed	30,000	100	30,000	100	30,000	100	30,000
	Closing WIP	10,000	100	10,000	50	5,000	50	5,000
40,000		40,000		40,000		35,000		35,000

Particulars	Materials	Labour	Overhead	Total
Cost incurred (₹)	6,00,000	7,00,000	4,90,000	17,90,000
Equivalent units	40,000	35,000	35,000	
Cost per equivalent unit (₹)	15	20	14	49

Process-I Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Materials	40,000	6,00,000	By Process-II A/c (30,000 units × ₹49)	30,000	14,70,000
To Labour		7,00,000	By Closing WIP*	10,000	3,20,000
To Overhead		4,90,000			
	40,000	17,90,000		40,000	17,90,000

* (Material 10,000 units × ₹ 15) + (Labour 5,000 units × ₹ 20) + (Overheads 5,000 units × ₹ 14)
= ₹ 1,50,000 + ₹ 1,00,000 + ₹ 70,000 = ₹ 3,20,000

(ii) Process II

Statement of Equivalent Production and Cost

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%)	Units	(%)	Units	(%)	Units
30,000	Completed	28,000	100	28,000	100	28,000	100	28,000
	Normal loss	200		--		--		--
	Closing WIP	1,800	100	1,800	25	450	25	450
30,000		30,000		29,800		28,450		28,450

Particulars	Materials	Labour	Overhead	Total
Process-I Cost	14,70,000	--	--	14,70,000
Cost incurred (₹)	--	1,42,250	1,70,700	3,12,950
Equivalent units	29,800	28,450	28,450	--
Cost per equivalent unit (₹)	49.3289	5.00	6.00	60.3289

Process-II Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	30,000	14,70,000	By Normal loss A/c	200	--
To PackingMaterial	--	1,60,000	By Finished Goods Stock A/c	28,000*	18,49,209
To Direct Wages	--	1,42,250	By Closing WIP	1,800**	93,741
To Factory Overhead	--	1,70,700			
	30,000	19,42,950		30,000	19,42,950

* 28,000 × ₹ 60.3289 = ₹ 16,89,209 + ₹1,60,000 (Packing Material Cost)
= ₹ 18,49,209
** 1,800 units × ₹ 49.3289 + 450 units × (₹ 5 + ₹6) = ₹ 93,741

Q.20 Eq Production, WIP & units | RTP Nov 22

SM Pvt. Ltd. manufactures their products in three consecutive processes. The details are as below:

Process A	Process B	Process C	Transferred to next Process	Transferred to warehouse for sale
60%	50%	40%	50%	100%

In each process, there is a weight loss of 2% and scrap of 8% of input of each process. The realizable value of scrap of each process is as below:
Process A @ ₹ 2 per ton
Process B @ ₹ 4 per ton
Process C @ ₹ 6 per ton.
The following particulars relate to April, 2022:

	Process A	Process B	Process C
Materials used (in Tons)	1,000	260	140
Rate per ton	₹ 20	₹ 15	₹ 10
Direct Wages	₹ 4,000	₹ 3,000	₹ 2,000
Direct Expenses	₹ 3,160	₹ 2,356	₹ 1,340

PREPARE Process Accounts- A, B and C & calculate cost per ton at each process.

Ans.

Process A Account

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Materials	1,000	20,000	By Weight Loss	20	--
To Wages		4,000	By Scrap	80	-
To Direct Expenses		3,160	By Process B	540	160
			By Warehouse	360	16,200
					10,800
Total	**1,000**	**27,160**	**Total**	**1,000**	**27,160**

$$\text{Cost per Tonne} = \frac{27,160 - 160}{1,000 - 20 - 80}$$

$$= \frac{27,000}{900}$$

= 30 per ton

Process B Account

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Process A	540	16,200	By Weight Loss	16	--
To Materials	260	3,900	By Scrap	64	-
To Wages		3,000	By Process C	360	25
To Direct Expenses		2,356	By Warehouse	360	6
					12,600
					12,600
Total	**800**	**25,456**	**Total**	**800**	**25,456**

$$\text{Cost per Tonne} = \frac{25,456 - 256}{800 - 16 - 64}$$

$$= \frac{25,200}{720}$$

= 35 per ton

Process C Account

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)

To Process BTo	360	12,600	By Weight LossBy	10	---
Materials To	140	1,400	Scrap	40	240
Wages		2,000	By Warehouse	450	17,100
To Direct Expenses		1,340			
Total	500	17,340	Total	500	17,340

$$\text{Cost per Tonne} = \frac{17,340 - 240}{500 - 10 - 40}$$

$$= \frac{17,100}{450}$$

= **38 per ton**

Q.21 Process a/c | MTP May 23

'Dairy Wala Private limited' is engaged in the production of flavoured milk. Its process involve filtration and boiling of milk after that some sugar, flavour, colour is added and then letting it cool to fill the product into clean and sterile bottles. For Producing 10 litre of flavour milk, 100 litre of Raw milk is required, which extracts only 45 litres of standardized milk.

Following information regarding Process - I has been obtained from the manufacturing department of Dairy Wala Private limited for the month of December 2022:

Items	**(₹)**
Opening work-in process (13,500 litre)	
Milk	1,50,000
Labour	45,000
Overheads	1,35,000
Milk introduced for filtration and boiling (3,00,000 litre)	15,00,000
Direct Labour	6,00,000
Overheads	18,00,000
Abnormal Loss: 3,000 litres	
Degree of completion:	
Milk	100%
Labour and overheads	80%
Closing work-in process: 27,000 litres	
Degree of completion:	
Milk	100%
Labour and overheads	80%
Milk transferred for Packing: 1,18,500 litres	
You are required to PREPARE using average method:	
(i) Statement of equivalent production,	
(ii) Statement of cost,	
(iii) Statement of distribution cost, and	
(iv) Process-I Account.	

Ans. **(i) Statement of Equivalent Production**

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Milk		Labour & O.H.	
				%	Units	%	Units
Opening WIP	13,500	Completed and transferred to Process-II	1,18,500	100	1,18,500	100	1,18,500
Units introduced	3,00,000	Normal Loss (55%* of 3,00,000)	1,65,000	--	--	--	--
		Abnormal loss	3,000	100	3,000	80	2400
		Closing WIP	27,000	100	27,000	80	21,600
	3,13,500		3,13,500		1,48,500		1,42,500
* 100 litre of milk extracts only 45 litre of standardized milk. Thus, normal loss = 100 - 45 = 55%							

(ii) Statement showing cost for each element

Particulars	Milk (₹)	Labour (₹)	Overhead (₹)	Total (₹)
Cost of opening work-in-process	1,50,000	45,000	1,35,000	3,30,000
Cost incurred during the month	15,00,000	6,00,000	18,00,000	39,00,000
Total cost: (A)	16,50,000	6,45,000	19,35,000	42,30,000
Equivalent units: (B)	1,48,500	1,42,500	1,42,500	
Cost per equivalent unit: (C) = (A ÷ B)	11.111	4.526	13.578	29.216

(iii) Statement of Distribution of cost

	(₹)	(₹)
1. Value of units completed and transferred (1,18,500units × ₹ 29.216)		34,62,096
2. Value of Abnormal Loss: -		
Milk (3,000 units × ₹11.111)	33,333	
Labour (2400 units × ₹4.526)	10,863	
Overheads (2400 units × ₹13.579)	32,590	76,786
3. Value of Closing W-I-P:		
Milk (27,000 units × ₹11.111)	299997	
Labour (21,600 units × ₹4.526)	97,762	
Overheads (21,600 units × ₹13.579)	2,93,306	6,91,065

(iv) Process-I A/c

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Opening W.I.P:			By Normal Loss	1,65,000	--
Milk	13,500	1,50,000	By Abnormal Loss (₹.44 difference due to approximation)	3,000	76,839
Labour	--	45,000	By Process-II A/c	1,18,500	34,62,096

Overheads	--	1,35,000	By Closing WIP	27,000	6,91,065
To Milk introduced	3,00,000	15,00,000			
To Direct Labour		6,00,000			
To Overheads		18,00,000			
	3,13,500	42,30,000		3,13,500	42,30,000

Q.22 Equ Production/Cost per unit | MTP Nov 23

The following information is furnished by ABC Company for Process - II of its manufacturing activity for the month of April 2023:

(i) Opening Work-in-Progress – Nil

(ii) Units transferred from Process I – 55,000 units at ₹ 3,27,800

(iii) Expenditure debited to Process – II: Consumables ₹ 1,57,200

Labour ₹ 1,04,000

Overhead ₹ 52,000

(iv) Units transferred to Process III – 51,000 units

(v) Closing WIP – 2,000 units (Degree of completion): Consumables 80%

Labour 60%

Overhead 60%

(vi) Units scrapped – 2,000 units, scrapped units were sold at ₹ 5 per unit

(vii) Normal loss – 4% of units introduced

You are required to:

(i) Prepare a Statement of Equivalent Production.

(ii) Determine the cost per unit

(iii) Determine the value of Work-in-Process and units transferred to Process – III

Ans. **(i) Statement of Equivalent Production**

Input Details	Units	Output Particulars	Units	Equivalent Production					
				Material-A*		Consumables		Labour & Overheads	
				%	Units	%	Units	%	Units
Units transferred from Process-I	55,000	Units transferred to Process-III	51,000	100	51,000	100	51,000	100	51,000
		Normal loss (4% of 55,000)	2,200	-	-	-	-	-	-
		Closing W-I-P	2,000	100	2,000	80	1,600	60	1,200
		Abnormal Gain	(200)	100	(200)	100	(200)	100	(200)
	55,000		55,000		52,800		52,400		52,000

***Material A represent transferred-in units from process-I**

(ii) Determination of Cost per Unit

Particulars	Amount (₹)	Units	Per Unit (₹)
(i) Direct Material (Consumables) :			
Value of units transferred from Process-I	3,27,800		
Less: Value of normal loss (2,200 units × ₹ 5)	(11,000)		
	3,16,800	52,800	6.00
(ii) Consumables added in Process-II	1,57,200	52,400	3.00
(iii) Labour	1,04,000	52,000	2.00
(iii) Overhead	52,000	52,000	1.00
Total Cost per equivalent unit			12.00

(iii) Determination of value of Work-in-Process and units transferred to Process-III

Particulars	Units	Rate (₹)	Amount (₹)
Value of Closing W-I-P:			
Material from Process-I	2,000	6.00	12,000
Consumables	1,600	3.00	4,800
Labour	1,200	2.00	2,400
Overhead	1,200	1.00	1,200
			20,400
Value of units transferred to Process-III	51,000	12.00	6,12,000

Q.23 Process A/c | MTP May 18

The following are the details in respect of Process A and Process B of a processing factory:

	Process A (₹)	Process B (₹)
Materials	40,000	--
Labour	40,000	56,000
Overheads	16,000	40,000

The output of Process A is transferred to Process B at a price calculated to give a profit of 20% on the transfer price and the output of Process B is charged to finished stock at a profit of 25% on the transfer price. The finished stock department realized ₹ 4,00,000 for the finished goods received from Process B.

PREPARE process accounts and CALCULATE total profit, assuming that there was no opening or closing work-in-progress.

Ans.

Dr. Cr.

	₹		₹
To Materials	40,000	By Process B A/c (Transfer to Process B)	1,20,000
To Labour	40,000		
To Overheads	16,000		
	96,000		

To Profit (20% of transfer price, i.e., 25% of cost)	24,000		
	1,20,000		1,20,000

Dr. **Cr.**

	₹		₹
To Process A A/c (Transferred from Process A)	1,20,000	By Finished Stock A/c (Transfer to finished stock)	2,88,000
To Labour	56,000		
To Overhead	40,000		
	2,16,000		
To Profit (25% of transfer price i.e., 33.33% of cost)	72,000		
	2,88,000		2,88,000

Statement of Total Profit

	₹
Profit from Process A	24,000
Profit from Process B	72,000
Profit on Sales (₹ 4,00,000 - ₹ 2,88,000)	1,12,000
Total Profit	2,08,000

Q.24 Equiv Prod/ Cost Per Unit | MTP May 19(1)

The following information relate to Process A:

(i)	Opening Work-in-Process	8,000 units at Rs.15,00,000
	Degree of Completion: Material	100%
	Labour and Overhead	60%
(ii)	Input 1,82,000 units at	Rs.1,47,50,000
(iii)	Wages paid	Rs.68,12,000
(iv)	Overheads paid	Rs.34,06,000
(v)	Units scrapped	14,000
	Degree of Completion: Material	100%
	Wages and Overheads	80%
(vi)	Closing Work - in- Process	18,000 units
	Degree of Completion: Material	100%
	Wages and Overheads	70%
(vii)	Units completed and transferred to next process 1,58,000 units	
(viii)	Normal loss 10% of total input including opening WIP	
(ix)	Scrap value is Rs.15 per unit to be adjusted out of direct material cost	

You are required to COMPUTE on the basis of FIFO

(i) Equivalent Production

(ii) Cost per unit

(iii) Value of units transferred to next process.

Ans. **(i) Statement of Equivalent Production (FIFO Method)**

(FIFO Method)

Input		Output		Equivalent Production			
Particulars	Units	Particulars	Units	Material		Labour & Overheads	
				(%)	Units	(%)	Units
Opening WIP	8,000	Transfer to next Process:					
Introduced	1,82,000	Opening WIP completed	8,000	--	--	40	3,200
		Introduced & completed	1,50,000	100	1,50,000	100	1,50,000
		Normal loss 10% (8,000 + 182,000)	19,000	--	--	--	--
		Abnormal gain	(5,000)	100	(5,000)	100	(5,000)
		Closing WIP	18,000	100	18,000	70	12,600
	1,90,000		1,90,000		1,63,000		1,60,800

(ii) Computation of Cost per unit

Particulars	Materials (Rs.)	Labour (Rs.)	Overhead (Rs.)
Input of Materials	1,47,50,000	--	--
Expenses	--	68,12,000	34,06,000
Total	1,47,50,000	68,12,000	34,06,000
Less: Sale of Scrap (19,000 units × Rs.15)	(2,85,000)	--	--
Net cost	1,44,65,000	68,12,000	34,06,000
Equivalent Units	1,63,000	1,60,800	1,60,800
Cost Per Unit	88.7423	42.3632	21.1816

Total cost per unit = Rs. (88.7423+42.3632+21.1816) = Rs.152.2871

(iii) Value of units transferred to next process:

	Amount (Rs.)	Amount (Rs.)
Opening W-I-P	15,00,000.00	
Add: Labour (3,200 units × Rs. 42.3632)	1,35,562.24	
Overhead (3,200 units × Rs. 21.1816)	67,781.12	17,03,343.36
New introduced (1,50,000 units × Rs. 152.2871)		2,28,43,065.00
		2,45,46,408.36

Q.25 Process I/II/Abnormal Loss | MTP May 19(1)

Aditya Agro Ltd. mixes powdered ingredients in two different processes to produce one product. The output of Process- I becomes the input of Process-II and the output of Process-II is transferred to the Packing department.

From the information given below, you are required to PREPARE accounts for Process-I, Process-II and Abnormal loss/ gain A/c to record the transactions for the month of February 20X9.

Process-I

Input:	
Material A	6,000 kilograms at Rs. 50 per kilogram
Material B	4,000 kilograms at Rs. 100 per kilogram
Labour	430 hours at Rs. 50 per hour
Normal loss	5% of inputs. Scrap are disposed off at Rs.16 per kilogram
Output	9,200 kilograms.

There is no work- in- process at the beginning or end of the month.

Process-II

Input:	
Material C	6,600 kilograms at Rs. 125 per kilogram
Material D	4,200 kilograms at Rs. 75 per kilogram
Flavouring Essence	Rs. 3,300
Labour	370 hours at Rs.50 per hour
Normal loss	5% of inputs with no disposal value
Output	18,000 kilograms.

There is no work-in-process at the beginning of the month but 1,000 kilograms in process at the end of the month and estimated to be only 50% complete so far as labour and overhead were concerned. Overhead of Rs. 92,000 incurred to be absorbed on the basis of labour hours.

Ans.

Particulars	Qty. (kgs)	Amount)	Particulars	Qty. (kgs)	Amount (Rs.)
To Material A	6,000	3,00,000	By Normal loss	500	8,000
To Material B	4,000	4,00,000	By Process-II A/c	9,200	7,38,857
To Labour	--	21,500	By Abnormal loss A/c	300	24,093
To Overhead $\left(\frac{92,000 x 430 hrs}{800 hrs}\right)$	--	49,450			
	10,000	7,70,950		10,000	7,70,950

$$\frac{*\{(3,00,000+4,00,000+21,500+49,450)-8,000\}}{(10,000-500)units} = \frac{7,70,950-8,000}{9,500units} = 80,3105$$

Particulars	Qty.	Amount (Rs.)	Particulars	Qty. (kgs)	Amount (Rs.)

	(kgs)				
To Process-I A/c	9,200	7,38,857	By Normal loss	1,000	--
To Material C	6,600	8,25,000	By Packing Dept. A/c (See the working notes)	18,000	18,42,496
To Material D	4,200	3,15,000	By WIP A/c (See the working notes)	1,000	1,00,711
To Flavouring essence	--	3,300			
To Labour	--	18,500			
To Overheads $\left(\frac{92,000 x 370 hrs}{800 hrs}\right)$	--	42,550			
	20,000	19,43,207		20,000	19,43,207

Abnormal loss A/c

Particulars	Qty. (kgs)	Amount (Rs.)	Particulars	Qty. (kgs)	Amount (Rs.)
To Process-I A/c	300	24,093	By Bank	300	4,800
			By Costing Profit & Loss A/c	--	19,293
	300	24,093		300	24,093

Working Notes:

Calculation of Equivalent Production units

Input	Units	Output	Units	Process-I		Mat-C & D		Labour & OH	
				(%)	Units	(%)	Units	(%)	Units
	9,200	Transferred to Packing.	18,000	100	18,000	100	18,000	100	18,000
Mat-C	6,600	Closing WIP	1,000	100	1,000	100	1,000	50	500
Mat-D	4,200	Normal loss	1,000	--	--	--	--	--	--
	20,000		20,000		19,000		19,000		18,500

Calculation of Unit cost

Cost component	Amount (Rs.)	Equivalent units	Cost per unit (Rs.)
Transferred-in	7,38,857	19,000	38.8872
Material-C	8,25,000	19,000	43.4211
Material-D	3,15,000	19,000	16.5789
Flavouring essence	3,300	19,000	0.1737

Total Material Cost	18,82,157	19,000	99.0609
Labour	18,500	18,500	1.0000
Overheads	42,550	18,500	2.3000
Total Cost	19,43,207		102.3609

Value of Materials transferred to Packing Department
= 18,000 unit × Rs.102.3609 = 18,42,496
Value of WIP : For Materials- 1,000 units × Rs.99.0609 = Rs.99,061 For Labour & Overheads 500 units × Rs.3.30 = Rs.1,650
Rs.1,00,711

Q.26 Eq. Production / Cost Per unit | MTP May 19(2)

The following data are available in respect of Process-I for January 20X9:
(1) Opening stock of work in process: 600 units at a total cost of Rs. 4,20,000.
(2) Degree of completion of opening work in process: Material 100%
Labour 60%
Overheads 60%
(3) Input of materials at a total cost of Rs.55,20,000 for 9,200 units.
(4) Direct wages incurred Rs.18,60,000
(5) Production overhead Rs.8,63,000.
(6) Units scrapped 200 units. The stage of completion of these units was: Materials 100%
Labour 80%
Overheads 80%
(7) Closing work in process; 700 units. The stage of completion of these units was: Material 100%
Labour 70%
Overheads 70%
(8) 8,900 units were completed and transferred to the next process.
(9) Normal loss is 4% of the total input (opening stock plus units put in)
(10) Scrap value is Rs.60 per unit. You are required to:
(i) COMPUTE equivalent production,
(ii) CALCULATE the cost per equivalent unit for each element.
(iii) CALCULATE the cost of abnormal loss (or gain), closing work in process and the units transferred to the next process using the FIFO method.

Ans. **(i) Statement of Equivalent Production (FIFO Method)**

Input		Output		Equivalent Production					
				Materials		Labour		Production Overhead	
Details	Units	Details	Units	%	Units	%	Units	%	Units
Opening Stock	600	From opening stock	600	-	-	40	240	40	240
		- From fresh materials	8,300	100	8,300	100	8,300	100	8,300
		Closing W-I-P	700	100	700	70	490	70	490
Fresh inputs	9,200	Normal loss	392	-	-	-	-	-	-
			9,992		9,000		9,030		9,030

		Less: Abnormal Gain	(192)	100	(192)	100	(192)	100	(192)
	9,800		9,800		8,808		8,838		8,838

(ii) Statement of Cost per equivalent units

Elements	(Rs.)	Cost (Rs.)	Equivalent units (EU)	Cost per EU (Rs.)
Material Cost	55,20,000			
Less: Scrap realisation 392units @ Rs. 60/- p.u.	(2,3520)	54,96,480	8,808	624.03
Labour cost		18,60,000	8,838	210.45
Production OH Cost		8,63,000	8,838	97.65
Total Cost		82,19,480		932.13

(iii) Cost of Abnormal Gain – 192 Units

	(Rs.)	(Rs.)
Material cost of 192 units @ Rs. 624.03 p.u.	1,19,813.76	
Labour cost of 192 units @ Rs. 210.45 p.u.	40,406.40	
Production OH cost of 192 units @ Rs. 97.65 p.u.	18,748.80	1,78,968.96

Cost of closing WIP – 700 Units

Material cost of 700 equivalent units @ Rs. 624.03p.u.	4,36,821.00	
Labour cost of 490 equivalent units @ Rs. 210.45 p.u.	1,03,120.50	
Production OH cost of 490 equivalent @ Rs. 97.65p.u.	47,848.50	5,87,790.00

Cost of 8,900 units transferred to next process

(i) Cost of opening W-I-P Stock b/f – 600 units 4,20,000.00

(ii) Cost incurred on opening W-I-P stock

Material cost —

Labour cost 240 equivalent units @ Rs. 210.45 p.u. 50,508.00

Production OH cost 240 equivalent units @ Rs 97.65 p.u . 23,436.00

4,93,944.00

(iii) Cost of 8,300 completed units

8,300 units @ Rs. 932.13 p.u. 77,36,679.00

Total cost [(i) + (ii) + (iii))] 86,50,623.00

Q.27 Process I/II/III & Costing PL | MTP May 20

G K Ltd. produces a product "XYZ" which passes through two processes, viz. Process-A and Process-B.The details for the year ending 31st March, 2020 are as follows:

	Process A	Process - B
40,000 units introduced at a cost of	Rs. 3,60,000	-
Material consumed	Rs. 2,42,000	2,25,000
Direct wages	Rs. 2,58,000	1,90,000
Manufacturing expenses	Rs. 1,96,000	1,23,720
Output in units	37,000	27,000
Normal wastage of inputs	5%	10%
Scrap value (per unit)	Rs. 15	20
Selling price (per unit)	Rs. 37	61

Additional Information:

(a) 80% 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.

(b) Indirect expenses for the year was Rs. 4,48,080.

(c) It is assumed that Process-A and Process-B are not responsibility centre.

Required:

(i) PREPARE Process-A and Process-B Account.

(ii) PREPARE Costing Profit & Loss Account showing the net profit/ net loss for the year.

Ans. (i) Process- A Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Inputs	40,000	3,60,000	By Normal wastage (2,000 units × Rs.15)	2,000	30,000
To Material	---	2,42,000	By Abnormal loss A/c (1,000 units × Rs.27)	1,000	27,000
To Direct wages	---	2,58,000	By Process- B (29,600 units × Rs.27)	29,600	7,99,200
To Manufacturing Exp.	---	1,96,000	By Profit & Loss A/c (7,400 units × Rs.27)	7,400	1,99,800
	40,000	10,56,000		40,000	10,56,000

$$\text{Cost per unit} = \frac{10,56,000 - 30,000}{40,000 units - 2,000 units} = \mathbf{27} \text{ per unit}$$

Normal wastage = 40,000 units × 5% = 2,000 units

Abnormal loss = 40,000 units- (37,000 units + 2,000 units) = 1,000 units

Transfer to Process- B = 37,000 units x 80% = 29,600 units

Sale = 37,000 units × 20% = 7,400 units

Process- B Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process- A A/c	29,600	7,99,200		2,960	59,200

To Material	---	2,25,000	By Normal wastage (2,960 units × Rs. 20) By Profit & Loss A/c (27,000 units × Rs. 48)	27,000	12,96,000
To Direct Wages	---	1,90,000			
To Manufacturing Exp.	---	1,23,720			
To Abnormal Gain A/c (360 units × Rs. 48)	360	17,280			
	29,960	13,55,200		29,960	13,55,200

$$\text{Cost per unit} = \frac{13,37,920 - 59,200}{29,600 units - 2,960 units} = 48 \text{ per unit}$$

Normal wastage = 29,600 units × 10% = 2,960 units

Abnormal gain = (27,000 units + 2,960 units) – 29,600 units = 360 units

(ii) Costing Profit & Loss Account

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Process- A A/c	1,99,800	By Sales:	
To Process- B A/c	12,96,000	- Process-A (7,400 units × Rs. 37)	2,73,800
To Abnormal loss A/c	12,000	- Process- B (27,000 units × Rs. 61)	16,47,000
To Indirect Expenses	4,48,080	By Abnormal gain	10,080
		By Net loss	25,000
	19,55,880		19,55,880

Working Notes:

Normal wastage (Loss) Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process- A A/c	2,000	30,000	By Abnormal Gain A/c (360 units × Rs. 20)	360	7,200
To Process- B A/c	2,960	59,200	By Bank (Sales)	4,600	82,000
	4,960	89,200		4,960	89,200

Abnormal Loss Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process- A A/c	1,000	27,000	By Bank A/c (1,000 units × Rs. 15)	1,000	15,000
			By Profit & Loss A/c	---	12,000
	1,000	27,000		1,000	27,000

Abnormal Gain Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Normal loss A/c (360 units × Rs.	360	7,200	By Process- B A/c	360	17,280
		10,080			

20) To Profit & Loss A/c	360	17,280		360	17,280

Q.28 Process I, Eq Prod, apportion | MTP Nov 20

'Healthy Sweets' is engaged in the manufacturing of jaggery. Its process involve sugarcane crushing for juice extraction, then filtration and boiling of juice along with some chemicals and then letting it cool to cut solidified jaggery blocks.

The main process of juice extraction (Process – I) is done in conventional crusher, which is then filtered and boiled (Process – II) in iron pots. The solidified jaggery blocks are then cut, packed and dispatched. For manufacturing 10 kg of jaggery, 100 kg of sugarcane is required, which extracts only 45 litre of juice. Following information regarding Process – I has been obtained from the manufacturing department of Healthy Sweets for the month of January, 2020:

Opening work-in process (4,500 litre)

	(₹)
Sugarcane	50,000
Labour	15,000
Overheads	45,000

Sugarcane introduced for juice extraction (1,00,000 kg) 5,00,000

Direct Labour	2,00,000
Overheads	6,00,000

Abnormal Loss: 1,000 kg

Degree of completion:

Sugarcane	100% Labour and overheads
80%	

Closing work-in process: 9,000 litre

Degree of completion:

Sugarcane	100% Labour and overheads
80%	

Extracted juice transferred for filtering and boiling: 39,500 litre

(Consider mass of 1 litre of juice equivalent to 1 kg) You are required to PREPARE using average method:

(i) Statement of equivalent production,
(ii) Statement of cost,
(iii) Statement of distribution cost, and
(iv) Process-I Account.

Ans. (i) Statement of Equivalent Production

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Sugarcane		Labour & O.H.	
				%	Units	%	Units
Opening WIP	4,500	Completed and transferred to Process - II	39,500	100	39,500	100	39,500
Units introduced	1,00,000	Normal Loss (55%* of 1,00,000)	55,000	--	--	--	--
		Abnormal loss	1,000	100	1,000	80	800
		Closing WIP	9,000	100	9,000	80	7,200
	1,04,500		1,04,500		49,500		47,500

* 100 kg of sugarcane extracts only 45 litre of juice. Thus, normal loss = 100 – 45 = 55%

(ii) Statement showing cost for each element

Particulars	Sugarcane (₹)	Labour (₹)	Overhead (₹)	Total (₹)
Cost of opening work-in-process	50,000	15,000	45,000	1,10,000
Cost incurred during the month	5,00,000	2,00,000	6,00,000	13,00,000
Total cost: (A)	5,50,000	2,15,000	6,45,000	14,10,000
Equivalent units: (B)	49,500	47,500	47,500	
Cost per equivalent unit: (C) = (A ÷ B)	11.111	4.526	13.579	29.216

(iii) Statement of Distribution of cost

	Amount (₹)	Amount (₹)
1. Value of units completed and transferred (39,500 units × ₹ 29.216)		11,54,032
2. Value of Abnormal Loss:		
- Sugarcane (1,000 units × ₹ 11.111)	11,111	
- Labour (800 units × ₹ 4.526)	3,621	
- Overheads (800 units × ₹ 13.579)	10,863	25,595
3. Value of Closing W-I-P:		
- Sugarcane (9,000 units × ₹ 11.111)	99,999	
- Labour (7,200 units × ₹ 4.526)	32,587	
- Overheads (7,200 units × ₹ 13.579)	97,769	2,30,355

(iv) Process-I A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W.I.P:			By Normal Loss	55,000	--

Sugarcane 4,500		50,000	By Abnormal loss (₹25,595 + ₹18 (difference due to approximation))	1,000	25,613
- Labour	--	15,000	By Process-II A/c	39,500	11,54,032
- Overheads	--	45,000	By Closing WIP	9,000	2,30,355
To Sugarcane introduced	100,000	5,00,000			
To Direct Labour		2,00,000			
To Overheads		6,00,000			
	104,500	14,10,000		104,500	14,10,000

Q.29 Process a/c & By Product A/c | MTP May 21

MP Ltd. produces a Product-X, which passes through three processes, I, II and III. In Process -III a by-product arises, which after further processing at a cost of Rs. 85 per unit, product Z is produced. The information related for the month of September 2020 is as follows:

	Process-I	Process-II	Process-III
Normal loss	5%	10%	5%
Materials introduced (7,000 units)	1,40,000	-	-
Materials added	62,000	1,36,000	84,200
Direct wages	42,000	54,000	48,000
Direct expenses	14,000	16,000	14,000

Production overhead for the month is Rs. 2,88,000, which is absorbed as a percentage of direct wages.

The scraps are sold at Rs. 10 per unit

Product-Z can be sold at Rs. 135 per unit with a selling cost of Rs. 15 per unit

No. of units produced:

Process-I- 6,600; Process-II- 5,200, Process-III- 4,800 and Product-Z- 600

There is no stock at the beginning and end of the month. You are required to PREPARE accounts for:

(i) Process-I, II and III
(ii) By-product-Z

Ans. **(a)** Total direct wages

= Rs. 42,000 + Rs. 54,000 + Rs. 48,000 = Rs. 1,44,000

Percentage absorption of production overhead on the basis of direct wages

$$= \frac{2,88,000}{1,44,000} x100 = 200\%$$

(i) Process-I A/c

Particulars	Units	Amt. (Rs.)	Particulars	Units	Amt. (Rs.)
To Materials	7,000	1,40,000	By Normal loss (5% of 7,000	350	3,500
To Other materials	-	62,000		6,600	3,35,955
To Direct wages	-	42,000		50	2,545
To Direct expenses	-	14,000			

To Production OH (200% of Rs.42,000)	-	84,000	units) By Process-II*		
	7,000	3,42,000	By Abnormal loss*	7,000	3,42,000

***Cost per unit** = $\frac{(3,42,000-3500)}{(7000-350)units}$ = 50.9022

Process-II A/c

Particulars	Units	Amt.(Rs.)	Particulars	Units	Amt.(Rs.)
To Process-I A/c	6,600	3,35,955	By Normal loss	660	6,600
To Other materials	-	1,36,000	(10% of 6,600	5,200	5,63,206
To Direct wages	-	54,000	units) By Process-	740	80,149
To Direct expenses	-	16,000	III**		
To Production OH (200% of Rs.54,000)	-	1,08,000	By Abnormal loss**		
	6,600	6,49,955		6,600	6,49,955

** Cost per unit = $\frac{(6,49,955-6,600)}{(6,600-660)units}$ = 108.3089

Process-III A/c

Particulars	Units	Amt. (Rs.)	Particulars	Units	Amt. (Rs.)
To Process-I A/c	5,200	5,63,206	By Normal loss	260	2,600
To Other materials	-	84,200	By Product-X***	4,800	8,64,670
To Direct wages	-	48,000			
To Direct expenses	-	14,000	By Product-Z# (Rs.35 × 600 units)	600	21,000
To Production OH	-	96,000			
To Abnormal gain***	460	82,864			
	5,660	8,88,270		5,660	8,88,270

*** Cost per unit = $\frac{(8,05,406-2,600-21,000)}{(5,200-260-600)units}$ = 180.1396

Realisable value = Rs. 135 – (85+15) = Rs. 35

(ii) **By-Product Process A/c**

Particulars	Units	Amt. (Rs.)	Particulars	Units	Amt. (Rs.)
To Process-III A/c	600	21,000	By Product-Z	600	81,000
To Processing cost	-	51,000			

To Selling expenses	-	9,000			
	600	81,000		600	81,000

Q.30 Eq Cost of Production | MTP May 22(1)

Chill Ltd. uses process costing to manufacture water density sensor for hydro sector. The following information pertains to operations for the month of February:

Particulars	Units
Beginning WIP, February 1	22,400
Started in production during	1,40,000
February Completed production	1,28,800
during February Ending work in	33,600
progress, February 28	

The beginning work in progress was 50% complete for materials and 30% complete for conversion costs. The ending inventory was 80% complete for material and 30% complete for conversion costs.

Costs pertaining to the month of February are as follows:

Beginning inventory costs are material ₹ 1,38,350, direct labour ₹ 1,50,600 and factory overhead

₹ 63,600

Cost incurred during February are material ₹ 23,95,000, direct labour ₹ 9,14,400, factory overheads ₹ 19,55,800.

CALCULATE:

(i) Using the FIFO method, the equivalent units of production for material.
(ii) Cost per equivalent unit for conversion cost.

Ans. **(i) Calculation of equivalent units of production:**

Input Details	Units	Output Particulars	Units	Equivalent Units			
				Material		Conversion cost	
				%	Units	%	Units
Beginning WIP	22,400	From beginning WIP	22,400	50	11,200	70	15,680
Unit Introduced	1,40,000	Completed output	1,06,400	100	1,06,400	100	1,06,400
		Closing W-I-P	33,600	80	26,880	30	10,080
Total	1,62,400	Total	1,62,400		1,44,480		1,32,160

(ii) Calculation of cost per equivalent unit for conversion costs

Particulars	
Direct labour	₹ 9,14,400
Factory overheads	₹ 19,55,800
Total	₹ 28,70,200

Equivalent units	1,32,160 units
Cost per equivalent unit	**₹ 21.72**

Q.31 Process A/c, Wastage A/c | MTP May 22(2)

A Manufacturing unit manufactures a product which passes through three distinct Processes - A, B and C. The following data is given:

	Process A	Process B	Process C
Material consumed (in ₹)	36,400	31,500	28,000
Direct wages (in ₹)	56,000	49,000	42,000

The total Production Overhead of ₹ 2,20,500 was recovered @ 150% of Direct wages.

- 15,000 units at ₹ 28 each were introduced to Process 'A'.
- The output of each process passes to the next process and finally, 12,000 units were transferred to Finished Stock Account from Process 'C'.
- No stock of materials or work in progress was left at the end.

The following additional information is given:

Process	% of wastage to normal input	Value of Scrap per unit (₹)
A	6%	15.40
B	?	28.00
C	5%	14.00

You are required to:

(i) FIND OUT the percentage of wastage in process 'B', given that the output of Process 'B' is transferred to Process 'C' at ₹ 56 per unit.

(ii) PREPARE Process accounts for all the three processes A, B and C.

Ans.

Dr. Process-A Account Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)
To Material introduced	15,000	4,20,000	By Normal Loss A/c [(6% of 15,000 units) x ₹ 15.40]	900	13,860
" Additional material	--	36,400	" Process-B A/c (₹ 41.31* × 14,100 units)	14,100	5,82,540
" Direct wages	--	56,000			
" Production OH	--	84,000			
	15,000	5,96,400		15,000	5,96,400

***Cost per unit of completed units**

$$= \frac{Total\ costs - Realisable\ value\ from\ normal\ loss}{Input\ units\text{-}Normal\ loss\ units} = \frac{5,96,400 - 13,860}{15,000units - 900units} = 41.31$$

Process-B Account

Dr. Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-A A/c 14,100		5,82,540	By Normal Loss A/c [(#13.44% of 14,100 units) x ₹ 28]	1,895	53,060
" Additional material --		31,500	" Process-C A/c (₹ 56 × 12,205 units)	12,205	6,83,480
" Direct wages --		49,000			
" Production OH --		73,500			
	14,100	7,36,540		14,100	7,36,540

#Calculation for % of wastage in process 'B':

Let's consider number of units lost under process 'B' = b

Now, $\frac{Total\ cost - Realisable\ value\ from\ normal\ loss}{Input\ units\text{-}Normal\ loss\ units} = 56$

$\frac{7,36,540 - 28b}{14,100units - b} = 56$

7,36,540-28b = 7,89,600-56b

28b = 53,060 => b= 1,895 units

% of wastage = $\frac{1,895units}{14,100units} = 13.44\%$

Dr. Process-C Account Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-B A/c 12,205		6,83,480	By Normal Loss A/c [(5% of 12,205 units) x ₹ 14]	610	8,540
" Additional material --		28,000	" Finished Stock A/c (₹ 69.68$ × 12,000 units)	12,000	8,36,160
" Direct wages --		42,000			
" Production OH --		63,000			
" Abnormal gain 405 (₹ 69.68$ × 405 units)		28,220			

12,610	8,44,700	12,610	8,44,700

Cost per unit of completed units

$$= \frac{\text{Total units} - \text{Realisable value from normal loss}}{\text{Input units-Normal loss units}} = \frac{8,16,480 - 8,540}{12,205 units - 610 units} = 69.68$$

Q.32 Stat of eq prod/ Process I/II | MTP Nov 22(1)

XYZ Ltd. is manufacturer of medicines. It carries on production operation in two processes. The material first passes through Process I, where Medicine 'X' is produced. Following data are given for the month October, 2022:

Opening work-in-progress quantity (Material 100% and conversion 50% complete)	(in Liter)	12,000
Material input quantity	(in Liter)	60,000
Work completed quantity	(in Liter)	40,000
Closing work-in-progress quantity (Material 100% and conversion 80% complete)	(in Liter)	15,000
Opening work-in-progress cost		
Material cost	(in ₹)	1,75,000
Processing cost	(in ₹)	1,40,000
Material input cost	(in ₹)	7,70,000
Processing cost	(in ₹)	8,35,000

Normal process loss is 15% of material input. It has no realizable value.

Any quantity of Medicine 'X' can be sold for ₹ 42.50 per Liter. Alternatively, it can be transferred to Process II for further processing and then sold as Medicine ' XYZ' for ₹ 50 per Liter. Further materials are added in Process II, which yield 1.25 Liter of Medicine 'XYZ' for every Liter of Medicine 'X' of Process I. Out of the 40,000 Liter of work completed in Process I, 10,000 Liter are sold as Medicine 'X' and 30,000 Liter are passed through Process II for sale as Medicine 'XYZ'.

The monthly costs incurred in Process II (other than the cost of Medicine ' X') are:

Input	30,000 Liter of Medicine 'X'
Materials Cost	2,75,000
Processing Costs	2,50,000

You are required to:

(i) PREPARE Statement of Equivalent production and determine the cost per Liter of Medicine 'X' in Process I, using the weighted average cost method.

(ii) Company is mulling over the option to sell the 30,000 Liter of Medicine 'X' at Process-I without processing it further in Process-II. WILL IT BE beneficial for the company over the current pattern of processing 30,000 Liter in process-II?

Ans. **(i) Process I Statement of Equivalent Production (Under Weighted Average Method)**

Particulars		Particulars		Equivalent Production

	Input units (in Liter)		Output units (in Liter)	Material (%)	Material Equivalent units (in Liter)	Conversion (%)	Conversion Equivalent units (in Liter)
Opening WIP	12,000	Units introduced and completed	40,000	100	40,000	100	40,000
New Material Introduced	60,000	Normal Loss (15% of 60,000 liters)	9,000	-	-	-	-
		Closing WIP	15,000	100	15,000	80	12,000
		Abnormal Loss (Bal. fig.)	8,000	100	8,000	100	8,000
	72,000		72,000		**63,000**		**60,000**

Statement of Cost for Each Element

Elements of Costs	Material (₹)	Conversion Cost (₹)
Costs of Opening WIP	1,75,000	1,40,000
Cost of the Process (for the period)	7,70,000	8,35,000
Total Cost	**9,45,000**	**9,75,000**
Equivalent Units (in liter)	63,000	60,000
Cost Per equivalent Units (in liter)	**₹ 15**	**₹ 16.25**

Therefore, Cost of Medicine 'X' is ₹ 31.25 per liter (₹ 15 + ₹ 16.25)

(ii) Statement showing comparative data to decide whether 30,000 Liters of Medicine 'X' should be further processed into 'XYZ'

	Alternative 1	Alternative 2
	Sell medicine 'X' after Process I (₹)	**Process further into 'XYZ' (₹)**
Sales	**12,75,000 (30,000 liters x ₹ 42.50)**	**18,75,000 (37,500 liters x ₹ 50)**
Less: Costs:		
Process I - Costs (30,000 liters x ₹ 31.25)	9,37,500	9,37,500

Material in Process II	-	2,75,000
Conversion cost in Process II	-	2,50,000
Total Cost	**9,37,500**	**14,62,500**
Profit	**3,37,500**	**4,12,500**

Hence, company should process further as it will increase profit further by ₹ 75,000 (₹ 4,12,500 – ₹ 3,37,500)

Q.33 Stat of eq Production | MTP Nov 22(2)

The following data are available in respect of Process-I for January 2022:

(1) Opening stock of work in process: 600 units at a total cost of ₹ 8,40,000.

(2) Degree of completion of opening work in process:

Material 100%
Labour 60%
Overheads 60%

(3) Input of materials at a total cost of ₹1,10,40,000 for 9,200 units.

(4) Direct wages incurred ₹37,20,000

(5) Production overhead ₹17,26,000.

(6) Units scrapped 200 units. The stage of completion of these units was:

Materials 100%
Labour 80% Overheads 80%

(7) Closing work in process; 700 units. The stage of completion of these units was:

Material 100%
Labour 70% Overheads 70%

(8) 8,900 units were completed and transferred to the next process.

(9) Normal loss is 4% of the total input (opening stock plus units put in) (10) Scrap value is ₹600 per unit.

You are required to:

(i) COMPUTE equivalent production,

(ii) CALCULATE the cost per equivalent unit for each element.

Ans.

(i) Statement of Equivalent Production (FIFO Method)

Input		Output		Equivalent Production					
				Materials		Labour		Production Overhead	
Details	**Units**	**Details**	**Units**	**%**	**Units**	**%**	**Units**	**%**	**Units**
Opening Stock	600	From opening stock	600	-	-	40	240	40	240
		- From fresh materials	8,300	100	8,300	100	8,300	100	8,300
		Closing W-I-P	700	100	700	70	490	70	490
Fresh inputs	9,200	Normal loss	392	-	-	-	-	-	-

			9,992		9,000		9,030		9,030
		Less: Abnormal Gain	(192)	100	(192)	100	(192)	100	(192)
	9,800		9,800		8,808		8,838		8,838

(ii) Statement of Cost per equivalent units

Elements	(Rs.)	Cost (Rs.)	Equivalent units (EU)	Cost per EU (Rs.)
Material Cost	1,10,40,000			
Less: Scrap realisation 392 units @ Rs. 600/- p.u.	(2,35,200)	1,08,04,800	8,808	1,226.70
Labour cost		37,20,000	8,838	420.91
Production OH Cost		17,26,000	8,838	195.29
Total Cost		1,62,50,800		1,842.90

(iii) Cost of Abnormal Gain – 192 Units

	(Rs.)	(Rs.)
Material cost of 192 units @ Rs. 1,226.70 p.u.	2,35,526.40	
Labour cost of 192 units @ Rs. 420.91 p.u.	80,814.72	
Production OH cost of 192 units @ Rs. 195.29 p.u.	37,495.68	3,53,836.80

Cost of closing WIP – 700 Units

Material cost of 700 equivalent units @ Rs.	8,58,690.00	
Labour cost of 490 equivalent units @ Rs. 420.91 p.u.	2,06,245.90	
Production OH cost of 490 equivalent @ Rs.	95,692.10	11,60,628.00

Cost of 8,900 units transferred to next process

(i) Cost of opening W-I-P Stock b/f – 600 units 8,40,000.00

(ii) Cost incurred on opening W-I-P stock

Material cost —

Labour cost 240 equivalent units @ Rs. 420.91 p.u. 1,01,018.40

Production OH cost 240 equivalent units @ Rs197.29 p.u. 47,349.60

(iii) Cost of 8,300 completed units

8,300 units @ Rs. 1,842.90 p.u.	1,52,96,070.00
Total cost [(i) + (ii) + (iii))]	1,62,84,438.00

(b) Working note:

1. Computation of revenues (at listed price), discount, cost of goods sold and customer level operating activities costs:

	Customers				
	A	**B**	**C**	**D**	**E**
Units sold: (a)	4,500	6,000	9,500	7,500	12,750
Revenues (at listed price) (Rs.): (b) {(a) ×Rs.6,480)}	2,91,60,000	3,88,80,000	6,15,60,000	4,86,00,000	8,26,20,000
Revenues (at listed price) (Rs.): (c) {(a) ×Actual selling price)}	2,91,60,000 (4,500×6,480)	3,82,32,000 (6,000×6,372)	5,64,30,000 (9,500×5,940)	4,69,80,000 (7,500×6,264)	7,43,58,000 (12,750×5,832)
Discount (Rs.) (d) {(b) – (c)}	0	6,48,000	51,30,000	16,20,000	82,62,000
Cost of goods sold (Rs.) : (d) {(a) x Rs.5,400}	2,43,00,000	3,24,00,000	5,13,00,000	4,05,00,000	6,88,50,000
Customer level operating activities costs					
Order taking costs (Rs.): (No. of purchase orders × Rs. 4,500)	67,500	1,12,500	1,35,000	1,12,500	1,35,000
Customer visits costs (Rs.) (No. of customer visits x Rs. 3,600)	7,200	10,800	21,600	7,200	10,800
Delivery vehicles travel costs (Rs.) (Kms travelled by delivery vehicles x Rs. 7.50 per km.)	1,500	1,350	2,250	3,000	4,500
Product handling costs (Rs.) {(a) x Rs. 22.50}	1,01,250	1,35,000	2,13,750	1,68,750	2,86,875
Cost of expediting deliveries (Rs.)	-	-	-	-	13,500

{No. of expedited deliveries x Rs. 13,500}					
Total cost of customer level operating activities (Rs.)	1,77,450	2,59,650	3,72,600	2,91,450	4,50,675

(i) Computation of Customer level operating income

	Customers				
	A	B	C	D	E
	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Revenues (At list price) (Refer to working note)	2,91,60,000	3,82,32,000	5,64,30,000	4,69,80,000	7,43,58,000
Less: Cost of goods sold (Refer to working note)	(2,43,00,000)	(3,24,00,000)	(5,13,00,000)	(4,05,00,000)	(6,88,50,000)
Gross margin	48,60,000	58,32,000	51,30,000	64,80,000	55,08,000
Less: Customer level operating activities costs (Refer to working note)	(1,77,450)	(2,59,650)	(3,72,600)	(2,91,450)	(4,50,675)
Customer level operating income	46,82,550	55,72,350	47,57,400	61,88,550	50,57,325

Q.34 Process I/II/III a/c | MTP May 23(1)

SM Pvt. Ltd. manufactures their products in three consecutive processes. The details are as below:

	Process X	Process Y	Process Z
Transferred to next Process	60%	50%	
Transferred to warehouse for sale	40%	50%	100%

In each process, there is a weight loss of 2% and scrap of 4% of input of each process. The realizable value of scrap of each process is as below:

Process X @ ₹ 3 per ton Process Y @ ₹ 5 per ton Process Z @ ₹ 7 per ton.

The following particulars relate to January 2023:

	Process X	Process Y	Process Z

Materials used (in Tons)	1,500	454	189
Rate per ton	₹ 21.5	₹ 14	₹ 12
Direct Wages	₹ 5,000	₹ 3,260	₹ 2,540
Direct Expenses	₹ 3,820	₹ 2,775	₹ 1,900

PREPARE Process Accounts- X, Y and Z & calculate cost per ton at each process.

Ans.

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Materials	1,500	32,250	By Weight Loss	30	---
To Wages		5,000	By Scrap	60	180
To Direct Expenses		3,820	By Process Y	846	24,534
			By Warehouse	564	16,356
Total	**1,500**	**41,070**	**Total**	**1,500**	**41,070**

Cost per Ton = (41,070 - 180)/(1,500-30-60) = ₹ 29 per ton

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Process X	846	24,534	By Weight Loss	26	---
To Materials	454	6,356	By Scrap	52	260
To Wages		3,260	By Process Z	611	18,332.5
To Direct Expenses		2,775	By Warehouse	611	18,332.5
Total	**1300**	**36,925**	**Total**	**1300**	**36,925**

Cost per Ton = (36,925-260)/(1,300-26-52)= ₹30 per ton

Process Z Accounts

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Process Y	611	18332.5	By Weight Loss	16	---
To Materials	189	2,268	By Scrap	32	224
To Wages		2,540	By Warehouse	752	24,817
To Direct Expenses		1,900			
Total	**800**	**25,041**	**Total**	**800**	**25041**

Cost per Ton = (25,041-224)/(800-16-32) = ₹ 33 per ton

Q.35 Allocate cost to service dep | MTP May 23

KV Ltd. manufactures luggage trolleys for airports. The factory, in whic h the company undertakes all of its production, has two production departments- 'Fabrication' and 'Assembly', and two service departments- 'Stores' and 'Maintenance'.

The following information have been extracted from the company's budget for the financial year ended 31st March, 2023:

Particulars	₹
Allocated Overhead Costs	
Fabrication Department	15,52,000
Assembly Department	7,44,000
Stores Department	2,36,000
Maintenance Department	1,96,000
Other Overheads	
Factory rent	15,28,000
Factory building insurance Plant	1,72,000
& machinery insurance Plant &	1,96,000
Machinery Depreciation	2,65,000
Subsidy for staffs' canteen	4,48,000

Direct Costs	₹	₹
Fabrication Department:		
Material	63,26,000	
Labour	8,62,000	71,88,000
Assembly Department:		
Material	1,42,000	
Labour	13,06,000	14,48,000

The following additional information is also provided:

	Fabrication Department	Assembly Department	Stores Department	Maintenance Department
Floor area (square meters)	24,000	10,000	2,500	3,500
Value of plant & machinery (₹)	16,50,000	7,50,000	75,000	1,75,000
No. of stores requisitions	3,600	1,400	---	---
Maintenance hours required	2,800	2,300	400	---
No. of employees	120	80	38	12
Machine hours	30,00,000	60,000		
Labour hours	70,000	26,00,000		

Required:

(i) PREPARE a table showing the distribution of overhead costs of the two service departments to the two production departments using step method; and

(ii) CALCULATE the most appropriate overhead recovery rate for each department.

Ans.

Particulars	Basis of Apportionment	Total Amount	Production Department	Service Departments

			Fabrication	Assembly	Stores	Maintenance
Overheads		27,28,000	15,52,000	7,44,000	2,36,000	1,96,000
Allocated Direct Costs	Actual	86,36,000	71,88,000	14,48,000	---	---
Other Overheads:						
Factory rent	Floor Area (48:20:5:7)	15,28,000	9,16,800	3,82,000	95,500	1,33,700
Factory building insurance	Floor Area (48:20:5:7)	1,72,000	1,03,200	43,000	10,750	15,050
Plant & Machinery insurance	Value of Plant & Machinery	1,96,000	1,22,038	55,472	5,547	12,943
Plant & Machinery Depreciation	Value of Plant & Machinery (66:30:3:7)	2,65,000	1,65,000	75,000	7,500	17,500
Canteen Subsidy	No. of employees (60:40:19:6)	4,48,000	2,15,040	1,43,360	68,096	21,504
		1,39,73,000	1,02,62,078	28,90,832	4,23,393	3,96,697

Particulars	Basis of Apportionment	Production Department		Service Departments	
		Fabrication	Assembly	Stores	Maintenance
Overheads as per Primary distribution	As per Primary distribution	1,02,62,078	28,90,832	4,23,393	3,96,697
Maintenance Department Cost	Maintenance Hours (28:23:4:-)	2,01,955	1,65,891	28,851	(3,96,697)
		1,04,64,033	30,56,723	4,52,244	---
Stores Department	No. of Stores Requisition (18:7:-:-)	3,25,616	1,26,628	(4,52,244)	

		1,07,89,649	31,83,351	---	---

(ii) Overhead Recovery Rate

Department	Apportioned Overhead (₹) (I)	Basis of Overhead Recovery Rate (II)	Overhead Recovery Rate (₹) [(I) ÷ (II)]
Fabrication	1,07,89,649	30,00,000 Machine	3.60 per Machine Hour
Assembly	31,83,351	26,00,000 Labour	1.22 per Labour Hour

10 CHAPTER BUDGET AND BUDGETORY CONTROL

Q.1 Theory Ques | PY May 18

Why is 'Zero Base Budgeting' (ZBB) considered superior to 'Traditional Budgeting'? Explain.

Ans.

Zero based budgeting is superior to traditional budgeting: Zero based budgeting is superior to traditional budgeting in the following manner:

- It provides a systematic approach for evaluation of different activities.
- It ensures that the function undertaken are critical for the achievement of the objectives.
- It provides an opportunity for management to allocate resources to various activi ties after a thorough – cost benefit analysis.
- It helps in the identification of wasteful expenditure and then their elimination. If facilitates the close linkage of departmental budgets with corporate objectives.
- It helps in the introduction of a system of Management by Objectives

Q.2 Production & Purchase Budge | PY Nov 18

An electronic gadget manufacturer has prepared sales budget for the next few months. In this respect, following figures are available:

Months	Electronic gadgets' sales
January	5000 units
February	6000 units
March	7000 units
April	7500 units
May	8000 units

To manufacture an electronic gadget, a standard cost of ₹ 1,500 is incurred and it is sold through dealers at an uniform price of ₹ 2,000 per gadget to customers. Dealers are given a discount of 15% on selling price.
Apart from other materials, two units of batteries are required to manufacture a gadget. The company wants to hold stock of batteries at the end of each month to cover 30% of next month's production and to hold stock of manufactured gadgets to cover 25% of the next month's sale.
3250 units of batteries and 1200 units of manufactured gadgets were in stock on 1st January.
Required:

(i) Prepare production budget (in units) for the month of January, February, March and April.

(ii) Prepare purchase budget for batteries (in units) for the month of January, February and March and calculate profit for the quarter ending on March.

Ans.

(i) Preparation of Production Budget (in Units)

	January	February	March	April	May
Sales	5,000	6,000	7,000	7,500	8,000
Add: Closing stock (25% of next month's sales)	1,500	1,750	1,875	2,000	
Less: Opening Stock	(1200)	(1500)	(1750)	(1875)	
Production of electronic	5,300	6,250	7,125	7,625	

Gadgets					

(ii) Preparation of Purchase budget

	January	February	March	April
Consumption/production of Batteries (@ 2 per Gadget)	10,600	12,500	14,250	15,250
Add: Closing Stock (30% of next month's production)	3750	4275	4575	
Less: Opening Stock	3,250	3,750	4275	
Purchase of Batteries	11,100	13,025	14,550	

Statement Showing Profit

	Jan.	Feb.	March	Total
Sales (A)	5,000	6,000	7,000	18,000
Selling Price per unit*	₹. 2,000	₹. 2,000	₹. 2,000	₹. 2,000
Less: Discount @15% of selling price	300	300	300	300
Less: Standard cost of Manufacturing per gadget Cost	1500	1500	1500	1500
Profit (B) (selling Price-discount- cost)	200	200	200	200
Total Profit (A × B)	₹.10,00,000	₹.12,00,000	₹.14,00,000	₹.36,00,000

Q.3 Budget Ratio | PY May 19

Following data is available for ABC Ltd.:

Standard working hours	8 hours per day of 5 days per week
Maximum Capacity	60 employees
Actual working	50 employees
Actual hours expected to be worked per four week	8,000 hours
Standard hours expected to be earned per four week	9,600 hours
Actual hours worked in the four week period	7,500 hours
Standard hours earned in the four week period	8,800 hours

The related period is of four weeks. Calculate the following Ratios :

(i) Efficiency Ratio
(ii) Activity Ratio
(iii) Standard Capacity Usage Ratio
(iv) Actual Capacity Usage Ratio
(v) Actual Usage of Budgeted Capacity Ratio

Ans.

(i) Efficiency Ratio:

$$= \frac{\text{Standard Hrs}}{\text{Actual Hrs}} \times 100 \qquad = \frac{8800 \text{ hours}}{7500 \text{ hours}} \times 100 \qquad = \mathbf{117.33\%}$$

(ii) Activity Ratio:

$$= \frac{\text{Standard Hrs}}{\text{Budgeted Hrs}} \times 100 \qquad = \frac{8800 \text{ hours}}{8000 \text{ hours}} \times 100 \qquad = \mathbf{110\%}$$

(iii) Standard Capacity Usage Ratio:

$$= \frac{\text{Budgeted Hours}}{\text{Max. possible hours in the budgeted period}} \times 100$$

$$= \frac{8000 \text{ hours}}{9600 \text{ hours}} \times 100 = 83.33\%$$

(iv) Actual Capacity Usage Ratio:

$$= \frac{\text{Actual Hours worked}}{\text{Max. possible working hours in a period}}$$

$$= \frac{7500 \text{hours}}{9600 \text{hours}} \times 100 = \mathbf{78.125\%}$$

(v) Actual Usage of Budgeted Capacity Ratio:

$$= \frac{\text{Actual working Hours}}{\text{Budgeted Hours}} \times 100 \qquad = \frac{7500 \text{hours}}{8000 \text{hours}} \times 100 = \mathbf{93.75\%}$$

Working Notes:

1. Maximum Capacity in a budget period
   = 60 Employees × 8 Hrs. × 5 Days × 4 Weeks = 9,600 Hrs.
2. Budgeted Hours (Hrs)
   = 50 Employees × 8 Hrs. × 5 Days × 4 Weeks = 8,000 Hrs.
3. Actual Hrs. = 7,500 Hrs. (given)
4. Standard Hrs. for Actual Output = 8,800 Hrs.

Q.4 Flexible Budget | PY Nov 20

G Ltd. manufactures a single product for which market demand exists for additional quantity. Present sales of ₹ 6,00,000 utilises only 60% capacity of the plant. The following data are available:

(1) Selling price: ₹ 100 per unit
(2) Variable cost: ₹ 30 per unit
(3) Semi-variable expenses: ₹ 60,000 fixed + ₹ 5 per unit
(4) Fixed expenses: ₹ 1,00,000 at present level, estimated to increase by 25% at and above 80% capacity.

You are required to prepare a flexible budget so as to arrive at the operating profit at 60%, 80% and 100% levels.

Ans. **Flexible Budget**

Activity Level	**60%**	**80%**	**100%**
Production (units)	**6,000**	**8,000**	**10,000**
	(₹)	**(₹)**	**(₹)**
Sales @ ₹ 100 per unit	6,00,000	**8,00,000**	**10,00,000**
Variable Cost (@ ₹ 35 (₹ 30 + ₹ 5) per unit)	2,10,000	2,80,000	3,50,000
Contribution (A)	3,90,000	5,20,000	6,50,000
Fixed Cost (part of semi-variable cost)	60,000	60,000	60,000
Other Fixed Cost	1,00,000	**1,25,000**	**1,25,000**
Total Fixed Cost (B)	1,60,000	1,85,000	1,85,000
Operating Profit (A – B)	**2,30,000**	**3,35,000**	**4,65,000**

Q.5 Sales/ Production/ Rm budget | PY July 21

PSV Ltd. manufactures and sells a single product and estimated the following related information for the period November, 2020 to March, 2021.

Particulars	November, 2020	Decembe, 2020	January, 2021	February, 2021	March, 2021
Opening Stock of Finished Goods (in Units)	7,500	3,000	9,000	8,000	6,000
Sales (in Units)	30,000	35,000	38,000	25,000	40,000
Selling Price per unit (in ₹)	10	12	15	15	20

Additional Information:

- Closing stock of finished goods at the end of March, 2021 is 10,000 units.
- Each unit of finished output requires 2 kg of Raw Material 'A' and 3 kg of Raw Material 'B'.

You are required to prepare the following budgets for the period November, 2020 to March, 2021 on monthly basis:

(i) Sales Budget (in ₹)
(ii) Production budget (in units) and
(iii) Raw material Budget for Raw material 'A' and 'B' separately (in units)

Ans.

(i) Sales Budget **(in ₹)**

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Sales (in Units)	30,000	35,000	38,000	25,000	40,000	1,68,000
Selling Price per unit (₹)	10	12	15	15	20	-
Total Sales (₹)	3,00,000	4,20,000	5,70,000	3,75,000	8,00,000	24,65,000

(ii) Production Budget (in units)

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Sales	30,000	35,000	38,000	25,000	40,000	1,68,000
Add: Closing stock of finished goods	3,000	9,000	8,000	6,000	10,000	36,000
Total quantity required	33,000	44,000	46,000	31,000	50,000	2,04,000
Less: Opening stock of finished goods	7,500	3,000	9,000	8,000	6,000	33,500
Units to be produced	**25,500**	**41,000**	**37,000**	**23,000**	**44,000**	1,70,500

(iii) Raw material budget (in units) For Raw material 'A'

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Units to be produced: (a)	25,500	41,000	37,000	23,000	44,000	1,70,500
Raw material consumption p.u. (kg.): (b)	2	2	2	2	2	-
Total raw material consumption (Kg.): (a × b)	51,000	82,000	74,000	46,000	88,000	3,41,000

For Raw material 'B'

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Units to be produced: (a)	25,500	41,000	37,000	23,000	44,000	1,70,500
Raw material consumption p.u. (kg.): (b)	3	3	3	3	3	-
Total raw material consumption (Kg.): (a × b)	**76,500**	**1,23,000**	**1,11,000**	**69,000**	**1,32,000**	5,11,500

Q.6 Flexible budget | PY Dec 21

The Accountant of KPMR Ltd. has prepared the following budget for the coming year 2022 for its two products 'AYE' and 'ZYE':

Particulars	Product 'AYE'	Product 'ZYE'
Production and Sales (in Units)	4,000	3,000
	Amount (in ₹)	Amount (in ₹)
Selling Price per unit	200	180
Direct Material per unit	80	70
Direct Labour per unit	40	35
Variable Overhead per unit	20	25
Fixed Overhead per unit	10	10

After reviewing the above budget, the management has called the marketing team for suggesting some measures for increasing the sales. The marketing team has suggested that by promoting the products on social media, the sales quantity of both the products can be increased by 5%. Also, the selling price per unit will go up by 10%. But this will result in increase in expenditure on variable overhead and fixed overhead by 20% and 5% respectively for both the products.

You are required to prepare flexible budget for both the products:

(i) Before promotion on social media,

(ii) After promotion on social media.

Ans. (i) Flexible Budget (before promotion)

	Particulars	Product 'AYE'	Product 'ZYE'	Total
	Production & Sales (units)	4,000	3,000	
		Amount (₹)	Amount (₹)	Amount (₹)
A.	Sales Value	8,00,000 (₹ 200×4,000)	5,40,000 (₹ 180×3,000)	13,40,000
B.	Direct Materials	3,20,000 (₹ 80 × 4,000)	2,10,000 (₹70 × 3,000)	5,30,000
C.	Direct labour	1,60,000 (₹ 40 × 4,000)	1,05,000 (₹ 35 × 3,000)	2,65,000
D.	Variable Overheads	80,000 (₹ 20 × 4,000)	75,000 (₹ 25 × 3,000)	1,55,000
E.	Total Variable Cost (B+C+D)	5,60,000	3,90,000	9,50,000
F.	Contribution (A-E)	2,40,000	1,50,000	3,90,000
G.	Fixed Overhead	40,000 (₹10 × 4,000)	30,000 (₹10 × 3,000)	70,000
H.	Profit (F-G)	2,00,000	1,20,000	3,20,000
	Profit per unit	50	40	

(ii) Flexible Budget (after promotion)

	Particulars	Product 'AYE'	Product 'ZYE'	Total
	Production & Sales (units)	4,200	3,150	

		(4,000×105%)	(3,000×105%)	
		Amount (₹)	Amount (₹)	Amount (₹)
A.	Sales Value	9,24,000 (₹ 220 × 4,200)	6,23,700 (₹ 198 × 3,150)	15,47,700
B.	Direct Materials	3,36,000 (₹ 80 × 4,200)	2,20,500 (₹ 70 × 3,150)	5,56,500
C.	Direct labour	1,68,000 (₹ 40 × 4,200)	1,10,250 (₹ 35 × 3,150)	2,78,250
D.	Variable Overheads	1,00,800 (₹ 24 × 4,200)	94,500 (₹ 30 × 3,150)	1,95,300
E.	Total Variable Cost (B+C+D)	6,04,800	4,25,250	10,30,050
F.	Contribution (A-E)	3,19,200	1,98,450	5,17,650
G.	Fixed Overhead	42,000 (₹ 40,000 × 105%)	31,500 (₹ 30,000 × 105%)	73,500
H.	Profit (F-G)	2,77,200	1,66,950	4,44,150
	Profit per unit	66	53	

Q.7 Sales & Prodn Budget | PY May 22

SR Ltd. is a manufacturer of Garments. For the first three months of financial year 2022-23 commencing on 1st April 2022, production will be constrained by direct labour. It is estimated that only 12,000 hours of direct labour hours will be available in each month.

For market reasons, production of either of the two garments must be at least 25% of the production of the other. Estimated cost and revenue per garment are as follows:

	Shirt (₹)	Short (₹)
Sales price	60	44
Raw Materials		
Fabric @12 per metre	24	12
Dyes and cotton	6	4
Direct labour @ 8 per hour	8	4
Fixed Overhead @ 4 per hour	4	2
Profit	18	22

From the month of July 2022 direct labour will no longer be a constraint. The company expects to be able to sell 15,000 shirts and 20,000 shorts in July, 2022. There will be no opening stock at the beginning of July 2022. Sales volumes are expected to grow at 10% per month cumulatively thereafter throughout the year. Following additional information is available:

- The company intends to carry stock of finished garments sufficient to meet 40% of the next month's sale from July 2022 onwards.
- The estimated selling price will be same as above. Required:

I. Calculate the number of shirts and shorts to be produced per month in the first quarter of financial year 2022-2023 to maximize company's profit.

II. Prepare the following budgets on a monthly basis for July, August and September 2022:

(i) Sales budget showing sales units and sales revenue for each product.
(ii) Production budget (in units) for each product.

Ans.

I. Calculation of number of shirts & shorts to be produced per month:

Contribution per labour hour:

		Shirts (₹)	Shorts (₹)
A	Sales Price per unit	60	44
B	Variable Cost:		
	- Raw materials	30	16
	- Direct labour	8	4
		38	20
C	Contribution per unit [A-B]	22	24
D	Labour hour per unit	1 hour	0.5 hour
E	Contribution per labour hour [C÷D]	**22**	**48**

Production plan for the first three months:

Since, Shorts has the higher Contribution per labour hour, it will be made first. Shirts will be 25% of Shorts. The quantity will be determined as below:

Let the Quantity of Shorts be X and Shirts will be 0.25 X, then

(Qty. of Shorts × labour hour per unit) + (Qty. of Shirts × labour hour per unit) = Total labour hours available

Or, (X × 0.5 hour) + (0.25X × 1 hour) = 12,000 hours

Or, 0.5X + 0.25X = 12,000 Or, 0.75X = 12,000

Or, X = 12,000÷0.75

= 16,000 units of Shorts

Therefore, for Shirts = 25% of 16,000 units

= 4,000 units

Production per month for the first quarter will be:

Shorts- 16,000 units & Shirts- 4,000 units

II. (i) Sales Budget for the month of July, August & September 2022:

		July 2022		August 2022		September 2022	
		Shirts	Shorts	Shirts	Shorts	Shirts	Shorts
A	Sales demand	15,000	20,000	16,500	22,000	18,150	24,200
B	Selling price per unit(₹)	60	44	60	44	60	44
C	Sales Revenue (₹)	9,00,000	8,80,000	9,90,000	9,68,000	10,89,000	10,64,800

(ii) Production budget for the month of July, August & September 2022:

		July 2022		August 2022		September 2022		October 2022	
		Shirts	Shorts	Shirts	Shorts	Shirts	Shorts	Shirts	Shorts
A	Opening stock	0	0	6,600	8,800	7,260	9,680		
B	Sales demand	15,000	20,000	16,500	22,000	18,150	24,200	19,965	26,620
C	Closing stock	6,600	8,800	7,260	9,680	7,986	10,648		
D	Production [B+C-A]	21,600	28,800	17,160	22,880	18,876	25,168		

Q.8 Current Year & next year | PY May 23

PQR Limited manufactures three products - Product X, Product Y and Product Z. The output for the current year is 2,50,000 units of Product X, 2,80,000 units of Product Y and 3,20,000 units of Product Z respectively. Selling price of Product X is 1.25 times of Product Z whereas Product Y can be sold at double the price at which product Z can be sold. Product Z can be sold at a profit of 20% on its marginal cost.

Other information are as follows:

	Product X	Product Y	Product Z
Direct Material Cost (Per unit)	₹ 20	₹ 20	₹ 20
Direct Wages Cost (per unit)	₹ 16	₹ 24	₹ 16

Raw material used for manufacturing all the three products is the same. Direct Wages are paid @ ₹ 4 per labour hour, Total overhead cost of the company is ₹ 52,80,000 for the year, out of which ₹ 1 per labour hour is variable and the rest is fixed.

In the next year it is expected that sales of product X and product Z will increase by 12% and 15% respectively and sale of product Y will decline by 5%. The total overhead cost of the company for the next year is estimated at ₹ 55,08,000. The variable cost of ₹ 1 per labour hour remains unchanged.

It is anticipated that all other costs will remain same for the next year and there is opening and closing stock. Selling Price per unit of each product will remain unchanged in the next year.

Required:

Prepare a budget showing the current position and the position for the next year clearly indicating the total product-wise contribution and profit for the company as a whole.

Ans. **(i) Budget showing current position of total product wise contribution and profitability**

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)
A	Direct material cost (per unit)	20	20	20	
B	Direct wages cost (per unit)	16	24	16	
C	Variable overhead per unit (Refer WN-1)	4	6	4	
D	Total variable cost/ Marginal cost per unit [A+B+C]	40	50	40	
E	Add: Profit [20% of D]	-	-	8	
F	Selling price unit [D+E]	-	-	48	
G	Price weight	1.25	2	1	
H	Selling price per unit [Selling price of Product Z × G]	60	96	48	
I	Contribution per unit [H-D]	20	46	8	
J	Quantity to be sold	2,50,000	2,80,000	3,20,000	
K	Total Contribution [J×I]	50,00,000	1,28,80,000	25,60,000	2,04,40,000
L	Fixed Overheads [Refer WN-1]				13,20,000
M	Profit				1,91,20,000

Working Notes:

1. Segregation of Overheads into variable and fixed in current year

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)
A	Total overhead cost	-	-	-	52,80,000
B	Labour hour per unit [Direct wages Cost ÷ Re.1]	4	6	4	
C	Quantity produced	2,50,000	2,80,000	3,20,000	
D	Total variableoverhead cost [B×C]	10,00,000	16,80,000	12,80,000	39,60,000
E	Fixed overhead cost[A-D]				13,20,000

(ii) Budget showing next year's position of total product wise contribution and Profitability

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)
A	Selling price per unit	60	96	48	
B	Contribution per unit	20	46	8	
C	Quantity to be sold	2,80,000 [112% of 2,50,000]	2,66,000 [95% of 2,80,000]	3,68,000 [115% of 3,20,000]	
D	Total Contribution [B×C]	56,00,000	1,22,36,000	29,44,000	2,07,80,000
	Fixed Overheads [Refer WN 2]				13,20,000
	Profit				1,94,60,000

Working Notes:

2. Segregation of Overheads into variable and fixed in next year

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)
A	Total overhead cost	-	-	-	55,08,000
B	Labour hour per unit [Direct wages Cost ÷ Re.1]	4	6	4	
C	Quantity produced	2,80,000	2,66,000	3,68,000	
D	Total variableoverhead cost [B×C]	**11,20,000**	**15,96,000**	**14,72,000**	**41,88,000**
E	Fixed overhead cost[A-D]				13,20,000

Q.9 Consumption of Rm & stores | PY May 23

A Limited has furnished the following information for the months from 1 stJanuary to 30th April, 2023:

	January	February	March	April
Number of Working days	25	24	26	25
Production (in units) per working day	50	55	60	52

Raw Material Purchases (% by weights tototal of 4 months)	21%	26%	30%	23%
Purchase price of raw material (per kg)	₹ 10	₹ 12	₹ 13	₹ 11

Quantity of raw material per unit of product: 4 kg.
Opening stock of raw material on 1stJanuary: 6,020 kg. (Cost ₹ 63, 210)
Closing stock of raw material on 30thApril: 5,100 kg.
All the purchases of material are made at the start of each month.

Required:

(i) Calculate the consumption of raw materials (in kgs) month-by- month and in total.
(ii) Calculate the month-wise quantity and value of raw materials purchased.
(iii) Prepare the priced stores ledger for each month using the FIFO method.

Ans.

(i) Calculation of consumption of Raw Material (in kgs) month by month and total

Particulars	Jan	Feb	March	April	Total
No. of working days	25	24	26	25	-
Production (Per day)	50	55	60	52	-
Production	1,250	1,320	1,560	1,300	5,430
Raw Material Consumed (in kgs)	**5,000**	**5,280**	**6,240**	**5,200**	21,720

Calculation of Raw Material Purchased

Purchased	(Kg)
Closing stock on 30th April	5,100
Add: Raw Material consumed	21,720
Less: Opening stock on 1st January	(6,020)
Raw Material purchased	20,800

(ii) Calculation of month wise quantity and value of raw material purchased

	%	Purchased (Kg)	Price (₹)	Value (₹)
January	21	4,368	10	43,680
February	26	5,408	12	64,896
March	30	6,240	13	81,120
April	23	4,784	11	52,624
Total		20,800		2,42,320

(iii) Store Price Ledger by using FIFO method.

Months	Particulars	Receipts			Issue			Balance		
		Qty	Rate	Amount (₹)	Qty	Rate	Amount (₹)	Qty	Rate	Amount (₹)
Jan	Opening							6,020	10.5	63,210
	Purchases	4,368	10	43,680				6,020	10.5	63,210
								4,368	10	43,680
	Consumption				**5,000**	**10.5**	**52,500**	**1,020**	**10.5**	**10,710**
								4,368	**10**	**43,680**
Feb	Purchases	5,408	12	64,896				1,020	10.5	10,710

								4,368	10	43,680
								5,408	12	64,896
	Consumption				1,020	10.5	10,710	108	10	1,080
					4,260	10	42,600	5,408	12	64,896
March	Purchase	6,240	13	81,120				108	10	1,080
								5,408	12	64,896
								6,240	13	81,120
	Consumption				108	10	1,080			
					5,408	12	64,896			
					724	13	9,412	5,516	13	71,708
April	Purchases	4,784	11	52,624				5,516	13	71,708
								4,784	11	52,624
	Consumption				5,200	13	67,600	316	13	4,108
								4,784	11	52,624
										56,732

Q.10 Production & Purchase budge | RTP May 18

G Ltd. manufactures two products called 'M' and 'N'. Both products use a common raw material Z. The raw material Z is purchased @ ₹ 36 per kg from the market. The company has decided to review inventory management policies for the forthcoming year.

The following information has been extracted from departmental estimates for the year ended 31st March 2018 (the budget period):

	Product M	Product N
Sales (units)	28,000	13,000
Finished goods stock increase by year-end	320	160
Post-production rejection rate (%)	4	6
Material Z usage (per completed unit, net of wastage)	5 kg	6 kg
Material Z wastage (%)	10	5

Additional information:

- Usage of raw material Z is expected to be at a constant rate over the period.
- Annual cost of holding one unit of raw material in stock is 11% of the material cost.
- The cost of placing an orders is ₹ 320 per order.
- The management of G Ltd. has decided that there should not be more than 40 orders in a year for the raw material Z.

Required:

(i) PREPARE functional budgets for the year ended 31st March 2018 under the following headings:

(a) Production budget for Products M and N (in units).

(b) Purchases budget for Material Z (in kgs and value).

(ii) CALCULATE the Economic Order Quantity for Material Z (in kgs).

(iii) If there is a sole supplier for the raw material Z in the market and the supplier do not sale more than 4,000 kg. of material Z at a time. Keeping the management purchase policy and production quantity mix into consideration, CALCULATE the maximum number of units of Product M and N that could be produced.

Ans. **(i) (a) Production Budget (in units) for the year ended 31st March 2016**

	Product M	Product N

Budgeted sales (units)	28,000	13,000
Add: Increase in closing stock	320	160
No. good units to be produced	28,320	13,160
Post production rejection rate	4%	6%
No. of units to be produced	29,500 $\left(\frac{28320}{0.96}\right)$	14,000 $\left(\frac{13160}{0.94}\right)$

(b) Purchase budget (in kgs and value) for Material Z

	Product M	Product N
No. of units to be produced	29,500	14,000
Usage of Material Z per unit of production	5 kg.	6 kg.
Material needed for production	1,47,500 kg.	84,000 kg.
Materials to be purchased	1,63,889 kg. $\left(\frac{147500}{0.90}\right)$	88,421 kg. $\left(\frac{84000}{0.95}\right)$
Total quantity to be purchased	2,52,310 kg.	
Rate per kg. of Material Z	₹36	
Total purchase price	₹90,83,160	

(ii) Calculation of Economic Order Quantity for Material Z

$$EOQ = \sqrt{\frac{2x252310kg.x320}{36x11\%}} = \sqrt{\frac{161478400}{3.96}} = 6385.72kg.$$

(iii) Since, the maximum number of order per year can not be more than 40 orders and the maximum quantity per order that can be purchased is 4,000 kg. Hence, the total quantity of Material Z that can be available for production:

= 4,000 kg. × 40 orders = 1,60,000 kg.

	Product M	Product N
Material needed for production to maintain the same production mix	1,03,929 kg. $\left(160000x\frac{163889}{252310}\right)$	56,071 kg. $\left(160000x\frac{88421}{252310}\right)$
Less: Process wastage	10,393 kg.	2,804 kg.
Net Material available forproduction	93,536 kg.	53,267 kg.
Units to be produced	18,707 units $\left(\frac{93536kg.}{5kg.}\right)$	8,878 units $\left(\frac{53267kg.}{6kg.}\right)$

Q.11 Production budget | RTP Nov 18

Gaurav Ltd. is drawing a production plan for its two products Minimax (MM) and Heavyhigh (HH) for the year 20X8-X9. The company's policy is to hold closing stock of finished goods at 25% of the anticipated volume of sales of the succeeding month. The following are the estimated data for two products:

	Minimax (MM)	Heavyhigh (HH)

Budgeted Production units	1,80,000	1,20,000
	(₹)	(₹)
Direct material cost per unit	220	280
Direct labour cost per unit	130	120
Manufacturing overhead	4,00,000	5,00,000

The estimated units to be sold in the first four months of the year 20X8-X9 are as under

	April	May	June	July
Minimax	8,000	10,000	12,000	16,000
Heavyhigh	6,000	8,000	9,000	14,000

PREPARE production budget for the first quarter in month-wise

Ans. **Production budget of Product Minimax and Heavyhigh (in units)**

	April		May		June		Total	
	MM	HH	MM	HH	MM	HH	MM	HH
Sales	8,000	6,000	10,000	8,000	12,000	9,000	30,000	23,000
Add: Closing Stock (25% of next month's sale	2,500	2,000	3,000	2,250	4,000	3,500	9,500	7,750
Less: Opening Stock	2,000*	1,500*	2,500	2,000	3,000	2,250	7,500	5,750
Production units	8,500	6,500	10,500	8,250	13,000	10,250	32,000	25,000

*Opening stock of April is the closing stock of March, which is as per company's policy 25% of next months sale.

Production Cost Budget

Element of cost	Rate (₹)		Amount (₹)	
	MM (32,000 units)	HH (25,000 units)	MM	HH
Direct Material	220	280	70,40,000	70,00,000
Direct Labour	130	120	41,60,000	30,00,000
Manufacturing Overhead				
(4,00,000/ 1,80,000 × 32,000)			71,111	
(5,00,000/ 1,20,000 × 25,000)				1,04,167
			1,12,71,111	1,01,04,167

Q.12 Flexible budget | RTP May 19

S Ltd. has prepared budget for the coming year for its two products A and B.

	Product A (₹)	Product B (₹)
Production & Sales unit	6,000 units	9,000 units
Raw material cost per unit	60.00	42.00

Direct labour cost per unit	30.00	18.00
Variable overhead per unit	12.00	6.00
Fixed overhead per unit	8.00	4.00
Selling price per unit	120.00	78.00

After some marketing efforts, the sales quantity of the Product A & B can be increased by 1,500 units and 500 units respectively but for this purpose the variable overhead and fixed overhead will be increased by 10% and 5% respectively for the both products.

You are required to PREPARE flexible budget for both the products:

(a) Before marketing efforts

(b) After marketing efforts.

Ans.

(a) Flexible Budget before marketing efforts:

	Product A (₹) 6,000 units		Product B (₹) 9,000 units	
	Per unit	Total	Per unit	Total
Sales	120.00	7,20,000	78.00	7,02,000
Raw material cost	60.00	3,60,000	42.00	3,78,000
Direct labour cost per unit	30.00	1,80,000	18.00	1,62,000
Variable overhead per unit	12.00	72,000	6.00	54,000
Fixed overhead per unit	8.00	48,000	4.00	36,000
Total cost	110.00	6,60,000	70.00	6,30,000
Profit	10.00	60,000	8.00	72,000

(b) Flexible Budget after marketing efforts:

	Product A (₹) 7,500 units		Product B (₹) 9,500 units	
	Per unit	Total	Per unit	Total
Sales	120.00	9,00,000	78.00	7,41,000
Raw material cost	60.00	4,50,000	42.00	3,99,000
Direct labour cost per unit	30.00	2,25,000	18.00	1,71,000
Variable overhead per unit	13.20	99,000	6.60	62,700
Fixed overhead per unit	6.72	50,400	3.98	37,800
Total cost	109.92	8,24,400	70.58	6,70,500
Profit	10.08	75,600	7.42	70,500

Q.13 Expense budget | RTP Nov 19

KLM Limited has prepared its expense budget for 50,000 units in its factory for the year 2019-20 as detailed below:

	(₹ per unit)
Direct Materials	125

Direct Labour	50
Variable Overhead	40
Direct Expenses	15
Selling Expenses (20% fixed)	25
Factory Expenses (100% fixed)	15
Administration expenses (100% fixed)	8
Distribution expenses (85% variable)	20
Total	298

PREPARE an expense budget for the production of 35,000 units and 70,000 units.

Ans.

Expense Budget of KLM Ltd.

Particulars	50,000 Units (₹)	35,000 Units (₹)	70,000 Units (₹)
Direct Material	62,50,000 (50,000 x 125)	43,75,000 (35,000 x 125)	87,50,000 (70,000 x 125)
Direct Labour	25,00,000 (50,000 x 50)	17,50,000 (35,000 x 50)	35,00,000 (70,000 x 50)
Variable Overhead	20,00,000 (50,000 x 40)	14,00,000 (35,000 x 40)	28,00,000 (70,000 x 40)
Direct Expenses	7,50,000 (50,000 x 15)	5,25,000 (35,000 x 15)	10,50,000 (70,000 x 15)
Selling Expenses (Variable)*	10,00,000 (50,000 x 20)	7,00,000 (35,000 x 20)	14,00,000 (70,000 x 20)
Selling Expenses (Fixed)* (5 x 50,000)	2,50,000	2,50,000	2,50,000
Factory Expenses (Fixed) (15 x 50,000)	7,50,000	7,50,000	7,50,000
Administration Expenses (Fixed) (8 x 50,000)	4,00,000	4,00,000	4,00,000
Distribution Expenses (Variable)**	8,50,000 (17 x 50,000)	5,95,000 (17 x 35,000)	11,90,000 (17 x 70,000)
Distribution Expenses (Fixed)** (3 x 50,000)	1,50,000	1,50,000	1,50,000
	1,49,00,000	1,08,95,000	2,02,40,000

*Selling Expenses: Fixed cost per unit = ₹25 x 20% = ₹5
Fixed Cost = ₹5 x 50,000 units = ₹2,50,000
Variable Cost Per unit = ₹25 – ₹5 = ₹20
**Distribution Expenses: Fixed cost per unit = ₹20 x 15% = ₹3
Fixed Cost = ₹3 x 50,000 units = ₹1,50,000
Variable cost per unit = ₹20 – ₹3 = ₹17

Q.14 Production/ Purchase budget | RTP May 20

A Vehicle manufacturer has prepared sales budget for the next few months, and the following draft figures are available:

Month	No. of vehicles
October	40,000
November	35,000
December	45,000
January	60,000
February	65,000

To manufacture a vehicle a standard cost of ₹11,42,800 is incurred and sold through dealers at a uniform selling price of ₹17,14,200 to customers. Dealers are paid 15% commission on selling price on sale of a vehicle. Apart from other materials, four units of Part - X are required to manufacture a vehicle. It is a policy of the company to hold stocks of Part-X at the end of each month to cover 40% of next month's production. 48,000 units of Part-X are in stock as on 1st October.

There are 9,500 nos. of completed vehicles in stock as on 1st October and it is policy to have stocks at the end of each month to cover 20% of the next month's sales.

You are required to -

(i) PREPARE Production budget (in nos.) for the month of October, November, December and January.

(ii) PREPARE a Purchase budget for Part-X (in units) for the months of October, November and December.

(iii) CALCULATE the budgeted gross profit for the quarter October to December.

Ans.

(i) Preparation of Production Budget (in units)

	October	November	December	January
Demand for the month (Nos.)	40,000	35,000	45,000	60,000
Add: 20% of next month's demand	7,000	9,000	12,000	13,000
Less: Opening Stock	(9,500)	(7,000)	(9,000)	(12,000)
Vehicles to be produced	37,500	37,000	48,000	61,000

(ii) Preparation of Purchase budget for Part-X

	October	November	December
Production for the month (Nos.)	37,500	37,000	48,000
Add: 40% of next month's production	14,800 (40% of 37,000)	19,200 (40% of 48,000)	24,400 (40% of 61,000)
	52,300	56,200	72,400
No. of units required for production	2,09,200 (52,300 × 4 units)	2,24,800 (56,200 × 4 units)	2,89,600 (72,400 × 4 units)
Less: Opening Stock	(48,000)	(59,200) (14,800 × 4 units)	(76,800) (19,200 × 4 units)
No. of units to be purchased	1,61,200	1,65,600	2,12,800

(iii) Budgeted Gross Profit for the Quarter October to December

	October	November	December	Total
Sales in nos.	40,000	35,000	45,000	1,20,000

Net Selling Price per unit* (₹)	14,57,070	14,57,070	14,57,070	
Sales Revenue (₹ in lakh)	5,82,828	5,09,974.50	6,55,681.50	17,48,484
Less: Cost of Sales (₹ in lakh) (Sales unit × Cost per unit)	4,57,120	3,99,980	5,14,260	13,71,360
Gross Profit (₹ in lakh)	1,25,708	1,09,994.50	1,41,421.50	3,77,124

* Net Selling price unit =₹17,14,200 – 15% commission on ₹17,14,200 = ₹14,57,070.

Q.15 Budget & Productwise profit | RTP Nov 20

The information of Z Ltd. for the year ended 31st March 2020 is as below:

	Amount (₹)
Direct materials	17,50,000
Direct wages	12,50,000
Variable factory overhead	9,50,000
Fixed factory overhead	12,00,000
Other variable costs	6,00,000
Other fixed costs	4,00,000
Profit	8,50,000
Sales	70,00,000

During the year, the company manufactured two products, X and Y, and the output and cost were:

	X	Y
Output (units)	8,000	4,000
Selling price per unit (₹)	600	550
Direct material per unit (₹)	140	157.50
Direct wages per unit (₹)	90	132.50

Variable factory overheads are absorbed as a percentage of direct wages and other variable costs are computed as:
Product X – ₹40 per unit and Product Y- ₹70 per unit.
For the FY 2020-21, due to a pandemic, it is expected that demand for product X and Y will fall by 20% & 10% respectively. It is also expected that direct wages cost will raise by 20% and other fixed costs by 10%. Products will be required to be sold at a discount of 20%.
You are required to:
(i) PREPARE product- wise profitability statement on marginal costing method for the FY 2019-20 and
(ii) PREPARE a budget for the FY 2020-21.

Ans. **(i) Product-wise Profitability Statement for the FY 2019-20:**

Particulars	Product-X (₹)	Product-Y (₹)	Total (₹)
Output (units)	8,000	4,000	
Selling price per unit	600	550	
Sales value	48,00,000	22,00,000	70,00,000
Direct material	11,20,000 (₹140×8,000)	6,30,000 (₹157.50×4,000)	17,50,000

Direct wages	7,20,000 (₹90×8,000)	5,30,000 (₹132.5×4,000)	12,50,000
Variable factory overheads	5,47,200 (76%of 7,20,000)	4,02,800 (76%of 5,30,000)	9,50,000
Other variable costs	3,20,000 (₹40×8,000)	2,80,000 (₹70×4,000)	6,00,000
Contribution	20,92,800	3,57,200	24,50,000
Fixed factory overheads	-	-	12,00,000
Other fixed costs	-	-	4,00,000
Profit			8,50,000

(ii) Preparation of Budget for the FY 2020-21:

Particulars	Product-X (₹)	Product-Y (₹)	Total (₹)
Output (units)	6,400 (8,000×80%)	3,600 (4,000×90%)	
Selling price per unit	480 (600×80%)	440 (550×80%)	
Sales value	30,72,000	15,84,000	46,56,000
Direct material	8,96,000 (₹140×6,400)	5,67,000 (₹157.50×3,600)	14,63,000
Direct wages per unit	6,91,200 (₹108×6,400)	5,72,400 (₹159×3,600)	12,63,600
Variable factory overheads	5,25,312 (76%of 6,91,200)	4,35,024 (76%of 5,72,400)	9,60,336
Other variable costs	2,56,000 (₹40×6,400)	2,52,000 (₹70×3,600)	5,08,000
Contribution	7,03,488	(2,42,424)	4,61,064
Fixed factory overheads	-	-	12,00,000
Other fixed costs (110%of ₹4,00,000)	-	-	4,40,000
Profit/ (Loss)			**(11,78,936)**

Q.16 Production budget/Mat | RTP July 21

RS Ltd manufactures and sells a single product and has estimated sales revenue of ₹ 302.4 lakh during the year based on 20% profit on selling price. Each unit of product requires 6 kg of material A and 3 kg of material B and processing time of 4 hours in machine shop and 2 hours in assembly shop. Factory overheads are absorbed at a blanket rate of 20% of direct labour. Variable selling & distribution overheads are ₹ 60 per unit sold and fixed selling & distribution overheads are estimated to be ₹ 69,12,000.

The other relevant details are as under:

Purchase Price:	Material A	₹ 160 per kg
	Materials B	₹ 100 per kg
Labour Rate:	Machine Shop	₹ 140 per hour
	Assembly Shop	₹ 70 per hour

	Finished Stock	Material A	Material B
Opening Stock	2,500 units	7,500 kg	4,000 kg
Closing Stock	3,000 units	8,000 kg	5,500 kg

Required:

(i) CALCULATE number of units of product proposed to be sold and selling price per unit,

(ii) PREPARE Production Budget in units, and

(iii) PREPARE Material Purchase Budget in units.

Ans. **Workings:**

Statement Showing "Total Variable Cost for the year"

Particulars	Amount (₹)
Estimated Sales Revenue	3,02,40,000
Less: Desired Profit Margin on Sale @ 20%	60,48,000
Estimated Total Cost	2,41,92,000
Less: Fixed Selling and Distribution Overheads	69,12,000
Total Variable Cost	1,72,80,000

Statement Showing "Variable Cost per unit"

Particulars	Variable Cost p.u. (₹)
Direct Materials:	
A: 6 Kg. @ ₹ 160 per kg.	960
B: 3 Kg. @ ₹ 100 per kg.	300
Labour Cost:	
Machine Shop: 4 hrs. @ ₹ 140 per hour	560
Assembly Shop: 2 hrs. @ ₹ 70 per hour	140
Factory Overheads: 20% of (₹ 560 + ₹ 140)	140
Variable Selling & Distribution Expenses	60
Total Variable Cost per unit	2,160

(i) Calculation of number of units of product proposed to be sold and selling price per unit:

Number of Units Sold	=	Total Variable Cost / Variable Cost per unit
	=	₹ 1,72,80,000 / ₹ 2,160
	=	8,000 units
Selling Price per unit	=	Total Sales Value / Number of Units Sold
	=	₹ 3,02,40,000 / 8,000 units
	=	₹ 3,780

(ii) Production Budget (units)

Particulars	Units
Budgeted Sales	8,000
Add: Closing Stock	3,000
Total Requirements	11,000
Less: Opening Stock	(2,500)
Required Production	8,500

(iii) Materials Purchase Budget (Kg.)

Particulars	Material A	Material B
Requirement for Production	51,000 (8,500 units × 6 Kg.)	25,500 (8,500 units × 3 Kg.)
Add: Desired Closing Stock	8,000	5,500
Total Requirements	59,000	31,000
Less: Opening Stock	(7,500)	(4,000)
Quantity to be purchased	51,500	27,000

Q.17 Current r/s New Budget | RTP Dec 21

The accountant of manufacturing company provides you the following details for year 2019- 20:

Particulars	(₹)
Direct materials	28,00,000
Direct Wages	16,00,000
Fixed factory overheads	16,00,000
Variable factory overheads	16,00,000
Other variable costs	12,80,000
Other fixed costs	12,80,000
Profit	18,40,000
Sales	1,20,00,000

During the year, the company manufactured two products A and B and the output and costs were:

Particulars	A	B
Output (units)	2,00,000	1,00,000
Selling price per unit	₹ 32.00	₹ 56.00
Direct materials per unit	₹ 8.00	₹ 12.00
Direct wages per unit	₹ 4.00	₹ 8.00

Variable factory overhead is absorbed as a percentage of direct wages. Other variable costs have been computed as: Product A ₹ 4.00 per unit; and B ₹ 4.80 per unit.

During 2020-21, it is expected that the demand for product A will fall by 25% and for B by 50%. It is decided to manufacture a new product C, the cost for which is estimated as follows:

Particulars	Product C
Output (units)	2,00,000
Selling price per unit	₹ 28.00
Direct materials per unit	₹ 6.40
Direct wages per unit	₹ 4.00

It is anticipated that the other variable costs per unit of Product C will be same as for product A.
PREPARE a budget to present to the management, showing the current position and the position for 2020-21.
COMMENT on the comparative results.

Ans.

Budget Showing Current Position and Position for 2020-21

	Position for 2019-20			Position for 2020-21			
	A	B	Total (A+B)	A	B	C	Total (A+B+C)
Sales (units)	2,00,000	1,00,000	-	1,50,000	50,000	2,00,000	-
	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)
(A) Sales	**64,00,000**	**56,00,000**	**1,20,00,000**	**48,00,000**	**28,00,000**	**56,00,000**	**1,32,00,000**
Direct Material	16,00,000	12,00,000	28,00,000	12,00,000	6,00,000	12,80,000	30,80,000
Direct wages	8,00,000	8,00,000	16,00,000	6,00,000	4,00,000	8,00,000	18,00,000
Factory overhead (variable)	8,00,000	8,00,000	16,00,000	6,00,000	4,00,000	8,00,000	18,00,000
Other variable costs	800,000	4,80,000	12,80,000	6,00,000	240,000	8,00,000	16,40,000
(B) Marginal Cost	40,00,000	32,80,000	72,80,000	30,00,000	16,40,000	36,80,000	83,20,000
(C) Contribution (A-B)	**24,00,000**	**23,20,000**	**47,20,000**	**18,00,000**	**11,60,000**	**19,20,000**	**48,80,000**
Fixed costs							
- Factory			16,00,000				16,00,000
- Others			12,80,000				12,80,000
(D) Total fixed cost			28,80,000				28,80,000
Profit (C – D)			**18,40,000**				**20,00,000**

Comments: Introduction of Product C is likely to increase profit by ₹ 1,60,000 (i.e. from ₹ 18,40,000 to ₹ 20,00,000) in 2020-21 as compared to 2019-20 even if the demand for Product A & B falls. Therefore, introduction of product C is recommended.

Q.18 Flexible Sales Budget | RTP May 22

Maharatna Ltd., a public sector undertaking (PSU), produces product A. The company is in process of preparing its revenue budget for the year 2022. The company has the following information which can be useful in preparing the budget:

(i) It has anticipated 12% growth in sales volume from the year 2021 of 4,20,000 tonnes.
(ii) The sales price of ₹23,000 per tonne will be increased by 10% provided Wholesale Price Index (WPI) increases by 5%.
(iii) To produce one tonne of product A, 2.3 tonnes of raw material are required. The raw material cost is ₹4,500 per tonne. The price of raw material will also increase by 10% if WPI increase by 5%.
(iv) The projected increase in WPI for 2022 is 4%
(v) A total of 6,000 employees works for the company. The company works 26 days in a month.
(vi) 85% of employees of the company are permanent and getting salary as per 5- year wage agreement. The earnings per manshift (means an employee cost for a shift of 8 hours) is ₹ 3,000 (excluding terminal benefits). The new wage agreement will be implemented from 1st July 2022 and it is expected that a 15% increase in pay will be given.
(vii) The casual employees are getting a daily wage of ₹ 850. The wages in linked to Consumer Price Index (CPI). The present CPI is 165.17 points and it is expected to be 173.59 points in year 2022.

(viii) Power cost for the year 2021 is ₹ 42,00,000 for 7,00,000 units (1 unit = 1 Kwh). 60% of power is used for production purpose (directly related to production volume) and remaining are for employee quarters and administrative offices.

(ix) During the year 2021, the company has paid ₹ 60,00,000 for safety and maintenance works. The amount will increase in proportion to the volume of production.

(x) During the year 2021, the company has paid ₹ 1,20,000 for the purchase of diesel to be used in car hired for administrative purposes. The cost of diesel will increase by 15% in year 2022.

(xi) During the year 2021, the company has paid ₹ 6,00,000 for car hire charges (excluding fuel cost). In year 2022, the company has decided to reimburse the diesel cost to the car rental company. Doing this will attract 5% GST on Reverse Charge Mechanism (RCM) basis on which the company will not get GST input credit.

(xii) Depreciation on fixed assets for the year 2021 is ₹ 80,40,00,000 and it will be 15% lower in 2022.

Required:

From the above information PREPARE Revenue (Flexible) budget for the year 2022 and also show the budgeted profit/ loss for the year.

Ans. **Revenue Budget (Flexible Budget) of Maharatna Ltd. for the Year 2022**

	Particulars	PY 2021	CY 2022
A	Sales Volume (Tonnes)	4,20,000	4,70,400 [112%×4,20,000]
B	Selling Price per tonne (₹)	23,000	23,000
		(₹ in lakh)	**(₹ in lakh)**
C	**Sales value [A×B]**	**96,600**	**1,08,192**
D	**Raw material Cost:**		
(i)	Qty. of Material [2.3 tonnes × A] (tonnes)	9,66,000	10,81,920
(ii)	Price per tonne (₹)	4,500	4,500
(iii)	**Total raw material cost (₹ in lakh) [(i)×(ii)]**	**43,470**	**48,686.40**
E	**Wages & Salary Cost:**		
(i)	Wages to casual employees (15% × 6,000 = 900 employees)	2,386.80 [900 × 26 × 12 × ₹ 850]	2,508.47 [900 × 26 × 12 × ₹ 893.33]
(ii)	Salary to permanent employees (85% × 6,000 = 5,100 employees)	47,736 [5100 × 26 × 12 × ₹ 3,000]	51,316.20 [(5100 × 26 × 6 × ₹ 3,000) + (5100 × 26 × 6 × ₹ 3,450)]
(iii)	**Total wages & salary [(i)+(ii)]**	**50,122.80**	**53,824.67**
F	**Power cost:**		
(i)	For production (units)	4,20,000 [60% × 7,00,000]	4,70,400 [112% × 4,20,000]
(ii)	For employees & offices (units) [40% × 7,00.000]	2,80,000	2,80,000
(iii)	Total Power consumption (units) [(i)+(ii)]	7,00,000	7,50,400
(iv)	Power rate per unit (₹) [₹42,00,000 ÷ 7,00,000]	6.00	6.00
(v)	Total power cost [(iii)×(iv)]	**42**	**45.024**
G	**Safety and maintenance Cost**	**60**	**67.20** [112% × 60,00,000]

H	**Diesel cost**	**1.2**	**-**
I	**Car Hire charge:**		
(i)	Car hire charge	6	6
(ii)	Fuel reimbursement cost	-	1.38 [115% × 1.2]
(iii)	GST@5% on RCM basis [5%×(i+ii)]	-	0.369
(iv)	**Total Car hire charge cost [(i)+(ii)+(iii)]**	**6**	**7.749**
J	**Depreciation**	**8,040**	**6,834 [85% × 8040]**
K	**Total Cost [Sum of D to J]**	**1,01,742**	**1,09,465.043**
L	**Profit/ (Loss) [C-L]**	**(5,142)**	**(1273.043)**

Q.19 Various Budget Ratio | RTP Nov 22

Following information is available for DK and Co.:

Standard working hours	9 hours per day of 5 days per week
Maximum capacity	50 employees
Actual working	40 employees
Actual hours expected to be worked per four week	7,200 hours
Std. hours expected to be earned per four weeks	9,000 hours
Actual hours worked in the four- week period	6,750 hours
Standard hours earned in the four- week period	7,875 hours.

The related period is of 4 weeks. In this period there was a one special day holiday due to national event.

You are required to CALCULATE the following ratios:

(i) Efficiency Ratio
(ii) Activity Ratio
(iii) Calendar Ratio
(iv) Standard Capacity Usage Ratio
(v) Actual Capacity Usage Ratio
(vi) Actual Usage of Budgeted Capacity Ratio

Ans.

Maximum Capacity in a budget period
= 50 Employees × 9 Hrs. × 5 Days × 4 Weeks = 9,000 Hrs.
Budgeted Hours
= 40 Employees × 9 Hrs. × 5 Days × 4 Weeks = 7,200 Hrs.
Actual Hrs.
= 6,750 Hrs.
Standard Hrs. for Actual Output
= 7,875 Hrs.
Budget No. of Days
= 20 Days (4 Weeks x 5 Days)
Actual No. of Days
= 20 – 1 = 19 Days

(i) Efficiency Ratio $= \frac{\text{Standard Hrs}}{\text{Actual Hrs}} \times 100 = \frac{7875 \text{ hours}}{6750 \text{ hours}} \times 100 = 116.67\%$

(ii) Activity Ratio $= \frac{\text{Standard Hrs}}{\text{Budgeted Hrs}} \times 100 = \frac{7875 \text{ hours}}{7200 \text{ hours}} \times 100 = 109.375\%$

(iii) Calendar Ratio $= \frac{\text{Available working days}}{\text{Budgeted working days}} \times 100 = \frac{19\text{days}}{20\text{days}} \times 100 = 95\%$

(iv) Standard Capacity Usage Ratio $= \frac{\text{Budgeted Hours}}{\text{Max. possible hours in the budgeted period}} \times 100$

$= \frac{7200 \text{ hours}}{9000 \text{ hours}} \times 100 = 80\%$

(v) Actual Capacity Usage Ratio $= \frac{\text{Actual Hours worked}}{\text{Max. possible working hours in a period}} \times 100$

$= \frac{6750 \text{ hours}}{9000 \text{ hours}} \times 100 = 75\%$

(vi) Actual Usage of Budgeted Capacity Ratio $= \frac{\text{Actual working Hours}}{\text{Budgeted Hours}} \times 100$

$= \frac{6750\text{hours}}{7200\text{hours}} \times 100 = 93.75\%$

Q.20 Material Purchase Budget | RTP May 23

EDF Ltd. produces two products using Skilled labour and two types of materials. Shown below the information for the next month's budget:

	Product- A	Product-B
Budgeted sales (in units)	4,080	6,120
Budgeted material consumption per unit (in kg):		
Material-X	8.5	5.1
Material-Y	6.8	10.2
Standard labour hours allowed per unit of product	5.1	8.5

Material-X and Material-Y cost ₹8 and ₹10 per kg and labours are paid ₹30 per hour. Overtime premium is 75% and is payable, if a worker works for more than 45 hours a week. There are 400 direct workers.
The target efficiency ratio for the productive hours worked by the direct workers in actually manufacturing the products is 85%. In addition the non-productive down-time is budgeted at 15% of the productive hours worked. There are four 6-days weeks in the budgeted period and it is anticipated that sales and production will occur evenly throughout the whole period.
It is anticipated that stock at the beginning of the period will be:

Product-A	550 units
Product-B	350 units
Material-X	1,200 kgs.
Material-Y	600 kgs.

The anticipated closing stocks for budget period are as below:

Product-A	5 days sales
Product-B	5 days sales
Material-X	10 days consumption
Material-Y	5 days consumption

CALCULATE the Material Purchase Budget and the Wages Budget for the direct workers, showing the quantities and values, for the next month.

Ans. Number of days in budget period = 4 weeks × 6 days = 24 days

Number of units to be produced

	Product-A (units)	Product-B (units)
Budgeted Sales	4,080	6,120
Add: Closing stock	850	1275
	$\left(\frac{4080 \text{ units}}{24 \text{ days}} \times 5 \text{ days}\right)$	$\left(\frac{6120 \text{ units}}{24 \text{ days}} \times 5 \text{ days}\right)$
	550	350
Less: Opening stock	4,380	7,045
(i) Material Purchase Budget	**Material-X (Kg.)**	**Material-Y (Kg.)**
Material required:		
Product-A	37,230	
	(4,380 units × 8.5 kg.)	29,784
Product-B	35,930	(4,380 units × 6.8 kg.)
	(7,045 units × 5.1 kg.)	71,859
	73,160	(7,045 units × 10.2 kg.)
Add: Closing stock	30,483	1,01,643
	$\left(\frac{73160 \text{ kgs.}}{24 \text{ days}} \times 10 \text{days}\right)$	21,176
Less: Opening stock Quantity to be purchased Rate	1,200	$\left(\frac{101643 \text{ kgs.}}{24 \text{ days}} \times 5 \text{ days}\right)$
per kg. of Material	1,02,443	600
	8	1,22,219
	8,19,541	10
Total Cost	**Product-A (Hours)**	12,22,186
(ii) Wages Budget	4,380	**Product-B (Hours)**
Units to be produced	5.1	7,045
Standard hours allowed per unit	22,338	8.5
Total Standard Hours allowed		59,883
Productive hours required for production	$\frac{22338 \text{ hours}}{85\%} \times 26280$	$\frac{59883 \text{ hours}}{85\%} \times 70450$
Add: Non-Productive down time hours	3942	10568
	(15% of 26,280 hours)	(15% of 70,450 hours)
Hours to be paid	30,222	81,018
Total Hours to be paid =	1,11,240	
Hours to be paid at normal rate (4 weeks × 45 hours × 400 workers) =	72000	
Hours to be paid at premium rate	39,240	
Total wages to be paid = (72,000 hours × ₹30 + 39,240 hours × ₹ 52.5)	= ₹ 21,60,000 + ₹ 20,60,100 = ₹ 42,20,100	

Q.21 Sales Budget | RTP Nov 23

XY Co. Ltd manufactures two products viz., X and Y and sells them through two divisions, East and West. For the purpose of Sales Budget to the Budget Committee, following information has been made available for the year 2022-23:

Product	Budgeted Sales		Actual Sales	
	East Division	West Division	East Division	West Division
X	400 units at ₹ 9	600 units at ₹ 9	500 units at ₹ 9	700 units at ₹ 9
Y	300 units at ₹ 21	500 units at ₹ 21	200 units at ₹ 21	400 units at ₹ 21

Adequate market studies reveal that product X is popular but underpriced. It is expected that if the price of X is increased by ₹ 1, it will, find a ready market. On the other hand, Y is overpriced and if the price of Y is reduced by ₹ 1 it will have more demand in the market. The company management has agreed for the aforesaid price changes. On the basis of these price changes and the reports of salesmen, following estimates have been prepared by the Divisional Managers:

Percentage increase in sales over budgeted sales

Product	East Division	West Division
X	+ 10%	+ 5%
Y	+ 20%	+ 10%

With the help of intensive advertisement campaign, following additional sales (over and above the above mentioned estimated sales by Divisional Mangers) are possible:

Product	East Division	West Division
X	60 units	70 units
Y	40 units	50 units

You are required to prepare Sales Budget for 2023-24 after incorporating above estimates and also show the Budgeted Sales and Actual Sales of 2022-23.

Ans.

Statement Showing Sales Budget for 2023-24

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	5001	10	5,000	4003	20	8,000	13,000
West	7002	10	7,000	6004	20	12,000	19,000
Total	1,200		12,000	1,000		20,000	32,000

Workings

1. 400 × 110% + 60 = 500 units
2. 600 × 105% + 70 = 700 units
3. 300 × 120% + 40 = 400 units
4. 500 × 110% + 50 = 600 units

Statement Showing Sales Budget for 2022-23

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	400	9	3,600	300	21	6,300	9,900

West	600	9	5,400	500	21	10,500	15,900
Total	1,000		9,000	800		16,800	25,800

Statement Showing Actual Sales for 2022-23

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	500	9	4,500	200	21	4,200	8,700
West	700	9	6,300	400	21	8,400	14,700
Total	1,200		10,800	600		12,600	23,400

Q.22 Expense budget | MTP May 18

R Limited is presently operating at 50% capacity and producing 60,000 units. The entire output is sold at a price of ₹ 200 per unit. The cost structure at the 50% level of activity is as under:

	₹
Direct Material	75 per unit
Direct Wages	25 per unit
Variable Overheads	25 per unit
Direct Expenses	15 per unit
Factory Expenses (25% fixed)	20 per unit
Selling and Distribution Exp. (80% variable)	10 per unit
Office and Administrative Exp. (100% fixed)	5 per unit

The company anticipates that the variable costs will go up by 10% and fixed costs will go up by 15%.
You are required to PREPARE an Expense budget, on the basis of marginal cost for the company at 50% and 60% level of activity and COMPUTE profits at respective levels.

Ans. **Expense Budget of R Ltd. for the period……**

	Per unit (₹)	50% Capacity 60,000 units Amount (₹)	60% Capacity 72,000 units Amount (₹)
Sales **(A)**	200.00	1,20,00,000	1,44,00,000
Less: Variable Costs:			
- Direct Material	82.50	49,50,000	59,40,000
- Direct Wages	27.50	16,50,000	19,80,000
- Variable Overheads	27.50	16,50,000	19,80,000
- Direct Expenses	16.50	9,90,000	11,88,000
- Variable factory expenses (75% of ₹ 20 p.u.)	16.50	9,90,000	11,88,000
- Variable Selling & Dist. exp. (80% of ₹ 10 p.u.)	8.80	5,28,000	6,33,600
Total Variable Cost **(B)**	179.30	1,07,58,000	1,29,09,600

Contribution (C) = (A – B)	20.70	12,42,000	14,90,400
Less: Fixed Costs:			
- Office and Admin. exp. (100%)	--	3,45,000	3,45,000
- Fixed factory exp. (25%)	--	3,45,000	3,45,000
- Fixed Selling & Dist. exp. (20%)	--	1,38,000	1,38,000
Total Fixed Costs (D)	--	8,28,000	8,28,000
(C – D)	--	4,14,000	6,62,400

Q.23 Budget Ratios | MTP May 18

CALCULATE from the following figures:

(i) Efficiency ratio

(ii) Activity ratio and

(iii) Capacity ratio.

Budgeted Production	880 units
Standard Hours per unit	10 hours
Actual Production	750 units
Actual Working Hours	6,000 hours

Ans.

(i) Efficiency Ratio $= \frac{\text{Actual Production in terms of standard hours}}{\text{Actual hours worked}} \times 100$

$= \frac{750 \text{ units} \times 10 \text{ hours}}{6,000} \times 100 = 125\%$

(ii) Activity ratio $= \frac{\text{Actual Production in terms of standard hours}}{\text{Budgeted production in terms of standard hours}} \times 100$

$= \frac{7,500}{880 \times 10} \times 100 = 85.23\%$

(iii) Capacity Ratio $= \frac{\text{Actual hours worked}}{\text{Maximum hours in a budget period}} \times 100$

$= \frac{6,000}{8,800} \times 100 = 68.19\%$

Activity ratio = Efficiency Ratio × Capacity Ratio

Or, 85.23% = 125%× 68.19%

Q.24 Mat Purchase budget & wages | MTP Nov 18

C Ltd. manufactures two products using two types of materials and one grade of labour. Shown below is an extract from the company's working papers for the next month's budget:

	Product-A	Product-B
Budgeted sales (in units)	2,400	3,600

Budgeted material consumption per unit (in kg):		
Material-X	5	3
Material-Y	4	6
Standard labour hours allowed per unit of product	3	5

Material-X and Material-Y cost Rs. 4 and Rs. 6 per kg and labours are paid Rs. 25 per hour. Overtime premium is 50% and is paid, if a worker works for more than 40 hours a week. There are 180 direct workers.
The target productivity ratio (or efficiency ratio) for the productive hours worked by the direct workers in actually manufacturing the products is 80%. In addition, the non-productive down-time is budgeted at 20% of the productive hours worked.
There are four 5-days weeks in the budgeted period and it is anticipated that sales and production will occur evenly throughout the whole period.
It is anticipated that stock at the beginning of the period will be:
Product-A 400 units
Product-B 200 units
Material-X 1,000 kg.
Material-Y 500 kg.
The anticipated closing stocks for budget period are as below:
Product-A 4 days sales
Product-B 5 days sales
Material-X 10 days consumption
Material-Y 6 days consumption
Required:
CALCULATE the Material Purchase Budget and the Wages Budget for the direct workers, showing the quantities and values, for the next month.

Ans.

Number of days in budget period = 4 weeks × 5 days = 20 days

Number of units to be produced

	Product-A (units)	Product-B (units)
Budgeted Sales	2,400	3,600
Add: Closing stock	480	900
	$\left(\frac{2,400 \text{ units}}{20 \text{ days}} \times 4 \text{ days}\right)$	$\left(\frac{3,600 \text{units}}{20 \text{ days}} \times 5 \text{days}\right)$
Less: Opening stock	(400)	(200)
	2,480	4,300

(i) Material Purchase Budget

	Material-X (Kg.)	Material-Y (Kg.)
Material required:		
- Product-A	12,400 (2,480 units × 5 kg.)	9,920 (2,480 units × 4 kg.)
- Product-B	12,900 (4,300 units × 3 kg.)	25,800 (4,300 units × 6 kg.)
	25,300	35,720
Add: Closing stock	12,650	10,716

	$\left(\frac{25,300kgs.}{20days} \times 10days\right)$	$\left(\frac{35,720kgs.}{20days} \times 6days\right)$
Less: Opening stock	(1,000)	(500)
Quantity to be purchased	36,950	45,936
Rate per kg. of Material	Rs. 4	Rs. 6
Total Cost	Rs. 1,47,800	Rs. 2,75,616

(ii) Wages Budget

	Product-A (Hours)	Product-B (Hours)
Units to be produced	2,480 units	4,300 units
Standard hours allowed per unit	3	5
Total Standard Hours allowed	7,440	21,500
Productive hours required for production	$\frac{7,440hours}{80\%}$ =9,300	$\frac{21,500hours}{80\%}$ =26,875
Add: Non-Productive down time	1,860 hours. (20% of 9,300 hours)	5,375 hours. (20% of 26,875 hours)
Hours to be paid	11,160	32,250

Total Hours to be paid = 43,410 hours (11,160 + 32,250)
Hours to be paid at normal rate = 4 weeks × 40 hours × 180 workers = 28,800 hours
Hours to be paid at premium rate = 43,410 hours – 28,800 hours = 14,610 hours
Total wages to be paid = 28,800 hours × Rs. 25 + 14,610 hours × Rs. 37.5
= Rs. 7,20,000 + Rs. 5,47,875
= Rs. 12,67,875

Q.25 Flexible Budget | MTP May 19

S Ltd. has prepared budget for the coming year for its two products A and B.

	Product A (Rs.)	Product B (Rs.)
Production & Sales unit	6,000 units	9,000 units
Raw material cost per unit	60.00	42.00
Direct labour cost per unit	30.00	18.00
Variable overhead per unit	12.00	6.00
Fixed overhead per unit	8.00	4.00
Selling price per unit	120.00	78.00

After some marketing efforts, the sales quantity of the Product A & B can be increased by 1,500 units and 500 units respectively but for this purpose the variable overhead and fixed overhead will be increased by 10% and 5% respectively for the both products.
You are required to PREPARE flexible budget for both the products:
(a) Before marketing efforts
(b) After marketing efforts.

Ans. **(a) Flexible Budget before marketing efforts:**

	Product A (Rs.) 6,000 units		Product B (Rs.) 9,000 units	
	Per unit	Total	Per unit	Total
Sales	120.00	7,20,000	78.00	7,02,000
Raw material cost	60.00	3,60,000	42.00	3,78,000
Direct labour cost per unit	30.00	1,80,000	18.00	1,62,000
Variable overhead per unit	12.00	72,000	6.00	54,000
Fixed overhead per unit	8.00	48,000	4.00	36,000
Total cost	110.00	6,60,000	70.00	6,30,000
Profit	10.00	60,000	8.00	72,000

(b) Flexible Budget after marketing efforts:

	Product A (Rs.) 7,500 units		Product B (Rs.) 9,500 units	
	Per unit	Total	Per unit	Total
Sales	120.00	9,00,000	78.00	7,41,000
Raw material cost	60.00	4,50,000	42.00	3,99,000
Direct labour cost per unit	30.00	2,25,000	18.00	1,71,000
Variable overhead per unit	13.20	99,000	6.60	62,700
Fixed overhead per unit	6.72	50,400	3.98	37,800
Total cost	109.92	8,24,400	70.58	6,70,500
Profit	10.08	75,600	7.42	70,500

Q.26 Production budget/Purchase | MTP May 19

Nakata Ltd a Vehicle manufacturer has prepared sales budget for the next few months, and the following draft figures are available:

Month	No. of vehicles
October	40,000
November	35,000
December	45,000
January	60,000
February	65,000

To manufacture a vehicle a standard cost of Rs.5,71,400 is incurred and sold through dealers at a uniform selling price of Rs.8,57,100 to customers. Dealers are paid 15% commission on selling price on sale of a vehicle.

Apart from other materials four units of Part - X are required to manufacture a vehicle. It is a policy of the company to hold stocks of Part-X at the end of each month to cover 40% of next month's production. 48,000 units of Part-X are in stock as on 1st October.

There are 9,500 nos. of completed vehicles are in stock as on 1st October and it is policy to have stocks at the end of each month to cover 20% of the next month's sales.

You are required to

(i) PREPARE Production budget (in nos.) for the month of October, November, December and January.

(ii) PREPARE a Purchase budget for Part-X (in units) for the months of October, November and December.

(iii) CALCULATE the budgeted gross profit for the quarter October to December.

Ans.

(i) Preparation of Production Budget (in units)

	October	November	December	January
Demand for the month (Nos.)	40,000	35,000	45,000	60,000
Add: 20% of next month's demand	7,000	9,000	12,000	13,000
Less: Opening Stock	(9,500)	(7,000)	(9,000)	(12,000)
Vehicles to be produced	37,500	37,000	48,000	61,000

(ii) Preparation of Purchase budget for Part-X

	October	November	December
Production for the month (Nos.)	37,500	37,000	48,000
Add: 40% of next month's production	14,800 (40% of 37,000)	19,200 (40% of 48,000)	24,400 (40% of 61,000)
	52,300	56,200	72,400
No. of units required for production	2,09,200 (52300 × 4 units)	2,24,800 (56200 × 4 units)	2,89,600 (72,400 × 4 units)
Less: Opening Stock	(48,000)	(59,200) (14800 × 4 units)	(76,800) (19200 × 4 units)
No. of units to be purchased	1,61,200	1,65,600	2,12,800

(iii) Budgeted Gross Profit for the Quarter October to December

	October	November	December	Total
Sales in nos.	40,000	35,000	45,000	1,20,000
Net Selling Price per unit*	7,28,535	7,28,535	7,28,535	
Sales Revenue (Rs. in lakh)	2,91,414	2,54,987.25	3,27,840.75	8,74,242
Less: Cost of Sales (Rs. in lakh) (Sales unit × Cost per unit)	2,28,560	1,99,990.00	2,57,130.00	6,85,680
Gross Profit (Rs. in lakh)	62,854	54,997.25	70,710.75	1,88,562

* Net Selling price unit = Rs. 8,57,100 – 15% commission on Rs. 8,57,100
= Rs.7,28,535

Q.27 Budget ratios | MTP Nov 19

CALCULATE from the following figures:

(i) Efficiency ratio,

(ii) Activity, Ratio and

(iii) Capacity Ratio:

Budgeted Production	88,000 units
Standard Hours per unit	10
Actual Production	75,000 units
Actual Working Hours	6,00,000

Ans.

(i) Efficiency Ratio $= \frac{\text{Standard Hours (for actual production)}}{\text{Actual Hours (worked)}} \times 100$

$= \frac{75,000 \text{ units} \times 10 \text{ hrs.}}{6,00,000 \text{ hrs.}} \times 100$

$= 125\%$

(ii) Activity Ratio $= \frac{\text{Standard Hours (for actual production)}}{\text{Budgeted Hours}} \times 100$

$= \frac{75,000 \text{ units} \times 10 \text{ hrs.}}{88,000 \text{ units} \times 10 \text{ hrs.}}$

$= 85.23\%$

(iii) Capacity Ratio $= \frac{\text{Actual Hours (worked)}}{\text{Budgeted Hours}} \times 100$

$= \frac{6,00,000 \text{ hrs.}}{88,000 \text{ units} \times 10 \text{ hrs.}} \times 100$

$= 68.18\%$

Q.28 Production/Purchase Rm Bud | MTP Nov 19

V Ltd. produces and markets a very popular product called 'X'. The company is interested in presenting its budget for the second quarter of 2019.

The following information are made available for this purpose:

(i) It expects to sell 50,000 bags of 'X' during the second quarter of 2019 at the selling price of Rs. 900 per bag.

(ii) Each bag of 'X' requires 2.5 kgs. of a raw – material called 'Y' and 7.5 kgs. of raw – material called 'Z'.

(iii) Stock levels are planned as follows:

Particulars	Beginning of Quarter	End of Quarter
Finished Bags of 'X' (Nos.)	15,000	11,000
Raw – Material 'Y' (Kgs.)	32,000	26,000
Raw – Material 'Z' (Kgs.)	57,000	47,000
Empty Bag (Nos.)	37,000	28,000

(iv) 'Y' cost Rs.120 per Kg., 'Z' costs Rs.20 per Kg. and 'Empty Bag' costs Rs.80 each.

(v) It requires 9 minutes of direct labour to produce and fill one bag of 'X'. Labour cost is Rs.50 per hour.

(vi) Variable manufacturing costs are Rs.45 per bag. Fixed manufacturing costs Rs.30,00,000 per quarter.

(vii) Variable selling and administration expenses are 5% of sales and fixed administration and selling expenses are Rs.20,50,000 per quarter.

Required

(i) PREPARE a production budget for the said quarter.
(ii) PREPARE a raw – material purchase budget for 'Y', 'Z' and 'Empty Bags' for the said quarter in quantity as well as in rupees.
(iii) COMPUTE the budgeted variable cost to produce one bag of 'X'.
(iv) PREPARE a statement of budgeted net income for the said quarter and show both per unit and total cost data.

Ans.

(i) Production Budget of 'X' for the Second Quarter

Particulars	Bags (Nos.)
Budgeted Sales	50,000
Add: Desired Closing stock	11,000
Total Requirements	61,000
Less: Opening stock	15,000
Required Production	46,000

(ii) Raw-Materials Purchase Budget in Quantity as well as in Rs. for 46,000 Bags of 'X'

Particulars	'Y' Kgs.	'Z' Kgs.	Empty Bags Nos.
Production Requirements Per bag of 'X'	2.5	7.5	1.0
Requirement for Production	1,15,000 (46,000 × 2.5)	3,45,000 (46,000 × 7.5)	46,000 (46,000 × 1)
Add: Desired Closing Stock	26,000	47,000	28,000
Total Requirements	1,41,000	3,92,000	74,000
Less: Opening Stock	32,000	57,000	37,000
Quantity *to be purchased*	1,09,000	3,35,000	37,000
Cost per Kg./Bag	Rs.120	Rs.20	Rs.80
Cost of Purchase (Rs.)	1,30,80,000	67,00,000	29,60,000

(iii) Computation of Budgeted Variable Cost of Production of 1 Bag of 'X'

Particulars	(Rs.)
Raw – Material	
Y 2.5 Kg @120	300.00
Z 7.5 Kg. @20	150.00
Empty Bag	80.00
Direct Labour(Rs.50× 9 minutes / 60 minutes)	7.50
Variable Manufacturing Overheads	45.00
Variable Cost of Production *per bag*	582.50

(iv) Budgeted Net Income for the Second Quarter

Particulars	Per Bag (Rs.)	Total (Rs.)
Sales Value (50,000 Bags)	900.00	4,50,00,000
Less: Variable Cost:		
Production Cost	582.50	2,91,25,000
Admn. & Selling Expenses (5% of Sales Price)	45.00	22,50,000
Budgeted Contribution	272.50	1,36,25,000
Less: Fixed Expenses:		
Manufacturing		30,00,000
Admn. & Selling		20,50,000
Budgeted Net Income		85,75,000

Q.29 Budget ratios | MTP May 20

ZX Ltd. has furnished the following information:

	Budgeted	Actual March 2020
Number of working days	25	27
Production (in units)	20,000	22,000
Fixed Overheads	Rs. 3,00,000	Rs. 3,10,000

Budgeted fixed overhead rate is Rs. 10.00 per hour. In March 2020, the actual hours worked were 31,500. In relation to fixed overheads, CALCULATE:

(i) Efficiency Variance
(ii) Capacity Variance
(iii) Calendar Variance
(iv) Volume Variance
(v) Expenditure Variance

Ans.

(1) Budgeted Hours = $\frac{Rs.3,00,000}{Rs.10 \text{ per hour}}$ = 30,000 hours

(2) Standard Fixed Overhead rate per hour (Standard Rate):

$= \frac{\text{Budgeted fixed overheads}}{\text{Budgeted Hours}} = \frac{Rs.3,00,000}{30,000 hours} = Rs.10.00$

(3) Standard hour per unit of output = $\frac{30,000 hours}{20,000 units}$ = 1.5 hours

(4) Standard hours for Actual Output = 22,000 units × 1.5 hours = 33,000 Hours

(5) Budgeted Overhead per day for budgeted days= $\frac{Rs.3,00,000}{25 \text{ days}}$ = Rs.12, 000

(6) Budgeted Overhead for actual days worked = Rs.12,000 × 27 days = Rs.3,24,000

(7) Budgeted Hours for Actual days worked = $\frac{30,000 hours}{25 \text{ days}}$ = 32,400 hours

Computation of Variances in relation to Fixed Overheads:

(i) Efficiency Variance

= Standard Rate × (Standard hours for actual output – Actual hours worked)
= Rs.10 (33,000 hours – 31,500 hours) = Rs.15,000 (Favourable)

(ii) Capacity Variance

= Standard Rate × (Actual Hours – Budgeted Hours for actual days worked)
= Rs.10 (31,500 hours – 32,400 hours) = Rs.9,000 (Adverse)

(iii) Calendar Variance
= Standard/Budgeted Fixed Overhead Rate per day × (Actual Working days – Budgeted working days)
= Rs.12,000 (27 days – 25 days) = Rs.24,000 (Favourable)

(iv) Volume Variance
= Standard Rate × (Standard hours – Budgeted hours)
= Rs.10 (33,000 hours – 30,000 hours) = Rs.30,000 (Favourable)

(v) Expenditure Variance
= Budgeted Overheads – Actual Overheads
= Rs.3,00,000 – Rs.3,10,000 = Rs.10,000 (Adverse)

Note: Overhead Variances may also be calculated based on output.

Q.30 Expense Budget | MTP May 20

During the FY 2019-20, GP Limited has produced 30,000 units operating at 50% capacity level.
The cost structure at the 50% level of activity is as under:

Particulars	Rs.
Direct Material	150 per unit
Direct Wages	50 per unit
Variable Overheads	50 per unit
Direct Expenses	30 per unit
Factory Expenses (25% fixed)	40 per unit
Selling and Distribution Exp. (80% variable)	20 per unit
Office and Administrative Exp. (100% fixed)	10 per unit

The company anticipates that in FY 2020-21, the variable costs will go up by 10% and fixed costs will go up by15%.
The selling price per unit will remain unchanged at Rs.400.
Required:
(i) CALCULATE the budgeted profit/ loss for the FY 2019-20.
(ii) PREPARE an Expense budget on marginal cost basis for the FY 2020-21 for the company at 50% and 60% level of activity and FIND OUT the profits at respective levels.

Ans. **(i) Calculation of Budgeted profit for the FY 2019-20**

	30,000 units	
	Per unit (Rs.)	Amount (Rs.)
Sales (A)	400.00	1,20,00,000
Less: Variable Costs:		
- Direct Material	150.00	45,00,000
- Direct Wages	50.00	15,00,000
- Variable Overheads	50.00	15,00,000
- Direct Expenses	30.00	9,00,000
- Variable factory expenses	30.00	9,00,000
- Variable Selling & Dist. exp.	16.00	4,80,000

(80% of Rs.20p.u.)			
Total Variable Cost	(B)	326.00	97,80,000
Contribution	(C) = (A – B)	74.00	22,20,000
Less: Fixed Costs:			
- Office and Admin. exp. (100%)		--	3,00,000
- Fixed factory exp. (25%)		--	3,00,000
- Fixed Selling & Dist. exp. (20%)		--	1,20,000
Total Fixed Costs	(D)	--	7,20,000
Profit	(C – D)	--	15,00,000

(ii) Expense Budget of GP Ltd. for the FY 2020-21 at 50% & 60% level

	30,000 units		36,000 units	
	Per unit (Rs.)	Amount (Rs.)	Per unit (Rs.)	Amount (Rs.)
Sales (A)	400.00	1,20,00,000	400.00	1,44,00,000
Less: Variable Costs:				
- Direct Material	165.00	49,50,000	165.00	59,40,000
- Direct Wages	55.00	16,50,000	55.00	19,80,000
- Variable Overheads	55.00	16,50,000	55.00	19,80,000
- Direct Expenses	33.00	9,90,000	33.00	11,88,000
- Variable factory expenses	33.00	9,90,000	33.00	11,88,000
- Variable Selling & Dist. exp.	17.60	5,28,000	17.60	6,33,600
Total Variable Cost (B)	358.60	1,07,58,000	358.60	1,29,09,600
Contribution (C) = (A – B)	41.40	12,42,000	41.40	14,90,400
Less: Fixed Costs:				
- Office and Admin. exp. (100%)	--	3,45,000	--	3,45,000
- Fixed factory exp. (25%)	--	3,45,000	--	3,45,000
- Fixed Selling & Dist. exp. (20%)	--	1,38,000	--	1,38,000
Total Fixed Costs (D)	--	8,28,000	--	8,28,000
Profit (C – D)	--	4,14,000	--	6,62,400

Q.31 Master budget | MTP Nov 20

'Mirror Look', a high gloss wooden manufacturing company, requires you to PREPARE the Master budget for the next year from the following information:

Sales:	
Acrylic finish wooden sheets	₹ 70,00,000
Lacquer finish wooden sheets	₹ 30,00,000
Direct material cost	65% of sales
Direct wages	25 workers @ ₹ 1,500 per month
Factory overheads:	
Indirect labour	

Works manager	₹ 5,500 per month
Foreman	₹ 4,500 per month
Stores and spares	2.5% on sales
Depreciation on machinery	₹ 1,26,000
Light and power (fixed)	₹ 30,000
Repairs and maintenance	₹ 80,000
Others sundries	10% on direct wages
Administration, selling and distribution expenses	₹ 3,99,000 p.a.

Ans. **Master Budget for the year ending __ __**

Particulars	(₹)	(₹)	(₹)
Sales:			
Acrylic finish wooden sheets			70,00,000
Lacquer finish wooden sheets			30,00,000
Total Sales			1,00,00,000
Less: Cost of production:			
Direct materials (65% of ₹ 1,00,00,000)		65,00,000	
Direct wages (25 workers × ₹ 1,500 × 12 months)		4,50,000	
Prime Cost		69,50,000	
Fixed Factory Overhead:			
Works manager's salary (5,500 × 12 months)	66,000		
Foreman's salary (4,500 × 12 months)	54,000		
Depreciation	1,26,000		
Light and power	30,000		
		2,76,000	
Variable Factory Overhead:			
Stores and spares (2.5% of ₹ 1,00,00,000)	2,50,000		
Repairs and maintenance	80,000		
Sundry expenses	45,000	3,75,000	
Works Cost			76,01,000
Gross Profit (Sales – Works cost)			23,99,000
Less: Adm., selling and distribution expenses			3,99,000
Net Profit			20,00,000

Q.32 Profit stat & budget | MTP May 21

The information of Z Ltd. for the year ended 31st March 2021 is as below:

	Amount (Rs.)
Direct materials	17,50,000

Direct wages	12,50,000
Variable factory overhead	9,50,000
Fixed factory overhead	12,00,000
Other variable costs	6,00,000
Other fixed costs	4,00,000
Profit	8,50,000
Sales	70,00,00

During the year, the company manufactured two products, X and Y, and the output and cost were:

	X	Y
Output (units)	8,000	4,000
Selling price per unit (Rs.)	600	550
Direct material per unit (Rs.)	140	157.50
Direct wages per unit (Rs.)	90	132.50

Variable factory overheads are absorbed as a percentage of direct wages and other variable costs are computed as:
Product X – Rs. 40 per unit and Product Y- Rs. 70 per unit.
For the FY 2021-22, it is expected that demand for product X and Y will fall by 20% & 10% respectively. It is also expected that direct wages cost will raise by 20% and other fixed costs by
10%. Products will be required to be sold at a discount of 20%.
You are required to:
(i) PREPARE profitability statement for the FY 2020-21 and
(ii) PREPARE a budget for the FY 2021-22.

Ans. **(i) Product-wise Profitability Statement for the FY 2020-21:**

Particulars	Product-X (Rs.)	Product-Y (Rs.)	Total (Rs.)
Output (units)	8,000	4,000	
Selling price per unit	600	550	
Sales value	48,00,000	22,00,000	70,00,000
Direct material	11,20,000 (Rs.140 × 8,000 units)	6,30,000 (Rs.157.50 × 4,000 units)	17,50,000
Direct wages	7,20,000 (Rs.90 × 8,000 units)	5,30,000 (Rs.132.5 × 4,000 units)	12,50,000
Variable factory overheads*	5,47,200 (76% of Rs. 7,20,000)	4,02,800 (76% of Rs. 5,30,000)	9,50,000
Other variable costs	3,20,000 (Rs.40 × 8,000 units)	2,80,000 (Rs.70 × 4,000 units)	6,00,000
Contribution	20,92,800	3,57,200	24,50,000
Fixed factory overheads	-	-	12,00,000
Other fixed costs	-	-	4,00,000
Profit			**8,50,000**

* Percentage absorption of variable factory overhead on the basis of direct wages

$= \frac{9,50,00\ 0}{12,50,000} \times 100 = 76\%$

(ii) Preparation of Budget for the FY 2021-22:

Particulars	Product-X (Rs.)	Product-Y (Rs.)	Total (Rs.)
Output (units)	6,400 (8,000 units × 80%)	3,600 (4,000 units × 90%)	
Selling price per unit	480 (Rs.600 × 80%)	440 (Rs.550 × 80%)	
Sales value	30,72,000	15,84,000	46,56,000
Direct material	8,96,000 (Rs.140 × 6,400 units)	5,67,000 (Rs.157.50 × 3,600 units)	14,63,000
Direct wages per unit	6,91,200 (Rs.108 × 6,400 units)	5,72,400 (Rs.159 × 3,600 units)	12,63,600
Variable factory overheads	5,25,312 (76% of Rs.6,91,200)	4,35,024 (76% of Rs.5,72,400)	9,60,336
Other variable costs	2,56,000 (Rs.40 × 6,400 units)	2,52,000 (Rs.70 × 3,600 units)	5,08,000
Contribution	7,03,488	(2,42,424)	4,61,064
Fixed factory overheads	-	-	12,00,000
Other fixed costs (110% of Rs.4,00,000)	-	-	4,40,000
Profit/ (Loss)			**(11,78,936)**

Q.33 Production & Mat Purchase | MTP Dec 21

T Ltd manufactures and sells a single product and has estimated sales revenue of ₹1,51,20,000 during the year based on 20% profit on selling price. Each unit of product requires 6 kg of material A and 3 kg of material B and processing time of 4 hours in machine shop and 2 hours in assembly shop. Factory overheads are absorbed at a blanket rate of 20% of direct labour. Variable selling & distribution overheads are ₹30 per unit sold and fixed selling & distribution overheads are estimated to be ₹34,56,000.

The other relevant details are as under:

Purchase Price:	Material A	₹80 per kg
	Materials B	₹50 per kg
Labour Rate:	Machine Shop	₹70 per hour
	Assembly Shop	₹35 per hour

	Finished Stock	Material A	Material B
Opening Stock	2,500 units	7,500 kg	4,000 kg
Closing Stock	3,000 units	8,000 kg	5,500 kg

Required

(i) CALCULATE number of units of product proposed to be sold and selling price per unit,

(ii) PREPARE Production Budget in units and

(iii) PREPARE Material Purchase Budget in units.

Ans.

Workings

Statement Showing "Total Variable Cost for the year"

Particulars	Amount (₹)
Estimated Sales Revenue	1,51,20,000
Less: Desired Profit Margin on Sale @ 20%	30,24,000
Estimated Total Cost	1,20,96,000
Less: Fixed Selling and Distribution Overheads	34,56,000
Total Variable Cost	86,40,000

Statement Showing "Variable Cost per unit"

Particulars	Variable Cost p.u. (₹)
Direct Materials:	
A: 6 Kg. @ ₹80 per kg.	480
B: 3 Kg. @ ₹50 per kg.	150
Labour Cost:	
Machine Shop: 4 hrs. @ ₹70 per hour	280
Assembly Shop: 2 hrs. @ ₹35 per hour	70
Factory Overheads: 20% of (₹280 + ₹70)	70
Variable Selling & Distribution Expenses	30
Total Variable Cost per unit	1,080

(i) Calculation of number of units of product proposed to be sold and selling price per unit:

Number of Units Sold = Total Variable Cost / Variable Cost per unit
= ₹ 86,40,000 / ₹ 1,080
= 8,000 units

Selling Price per unit = Total Sales Value / Number of Units Sold
= ₹ 1,51,20,000 / 8,000 units
= ₹ 1,890

(ii) Production Budget (units)

Particulars	Units
Budgeted Sales	8,000
Add: Closing Stock	3,000
Total Requirements	11,000
Less: Opening Stock	(2,500)
Required Production	8,500

(iii) Materials Purchase Budget (Kg.)

Particulars	Material	Material

	A	B
Requirement for Production	51,000 (8,500 units × 6 Kg.)	25,500 (8,500 units × 3 Kg.)
Add: Desired Closing Stock	8,000	5,500
Total Requirements	59,000	31,000
Less: Opening Stock	(7,500)	(4,000)
Quantity to be purchased	51,500	27,000

Q.34 Master Budget | MTP May 22

F Ltd. requires you to PREPARE the Master budget for the next year from the following information:

Sales	₹ 1,20,00,000
Direct material cost	60% of sales
Direct wages	20 workers @ ₹ 2,250 per month
Factory overheads:	
Indirect labour –	
Works manager	₹ 7,500 per month
Foreman	₹ 6,000 per month
Stores and spares	2.5% on sales
Depreciation on machinery	₹ 1,89,000
Light and power (fixed)	₹ 45,000
Repairs and maintenance	₹ 1,20,000
Other sundries	10% on direct wages
Administration, selling and distribution expenses	₹ 5,40,000 per year

Ans. **Master Budget for the year ending**

Particulars		Amount (₹)	Amount (₹)
Sales			1,20,00,000
Less: Cost of production:			
Direct materials (60% of ₹ 1,20,00,000)		72,00,000	
Direct wages (20 workers × ₹ 2,250 × 12 months)		5,40,000	
Prime Cost		77,40,000	
Fixed Factory Overhead:			
Works manager's salary (7,500 × 12)	90,000		
Foreman's salary (6,000 × 12)	72,000		
Depreciation	1,89,000		
Light and power	45,000	3,96,000	
Variable Factory Overhead:			
Stores and spares (2.5% of ₹ 1,20,00,000)	3,00,000		
Repairs and maintenance	1,20,000		

Sundry expenses (10% of ₹ 5,40,000)	54,000	4,74,000	
Works Cost			86,10,000
Gross Profit (Sales – Works cost)			33,90,000
Less: Adm., selling and distribution expenses			5,40,000
Net Profit			28,50,000

Q.35 Flexible budget | MTP Nov 22

A firm has a total capacity of producing 1,00,000 units of an item. The budgeted expenses at this level of activity are as under:

	Per unit (₹)
Direct Materials	650
Direct Wages	325
Direct Expenses	125
Variable overheads	50
Fixed Production Overheads	25
Selling and Distribution Overheads (20% fixed)	25
Administrative Expenses (100% fixed)	60
Total	1,260

The selling price is ₹ 1,750 per unit and is anticipated to remain constant.
You are required to PREPARE a flexible budget, on the basis of marginal costing, for 60,000 and 75,000 units of output level showing the profit and P/V Ratio.

Ans.

Workings -

1. **Fixed Production overheads (given) = ₹ 25 per unit**
   So, at 1,00,000 units capacity, it will be ₹ 25,00,000 (1,00,000 units x ₹ 25)
2. **Selling and distribution overheads:**
   Given (1,00,000 units x ₹ 25) = ₹ 25,00,000
   So, Fixed component = ₹ 25,00,000 x 20% = ₹ 5,00,000
   Hence, variable component = ₹ 25,00,000 - ₹ 5,00,000 = ₹ 20,00,000
   Variable per unit = ₹ 20,00,000/1,00,000 units
   = ₹ 20 per unit

Flexible Budget

Particulars	Per unit (₹)	Output Level 60,000 units (₹)	Output Level 75,000 units (₹)
Sales (A)	1,750	10,50,00,000	13,12,50,000
Variable costs:			
Direct Material	650	**3,90,00,000**	**4,87,50,000**
Direct Wages	325	**1,95,00,000**	**2,43,75,000**
Direct expenses	125	**75,00,000**	**93,75,000**
Variable overheads	50	**30,00,000**	**37,50,000**

Selling and distribution overheads	20	12,00,000	15,00,000
Total Variable cost **(B)**	1,170	7,02,00,000	8,77,50,000
Contribution (C = A - B)		**3,48,00,000**	**4,35,00,000**
Fixed costs:			
Production overheads		25,00,000	25,00,000
Administrative overheads		60,00,000	60,00,000
Selling and distribution overheads		**5,00,000**	**5,00,000**
Total Fixed cost **(D)**		90,00,000	90,00,000
Profit (C-D)		**2,58,00,000**	**3,45,00,000**

P/V Ratio = (₹ 4,35,00,000/₹ 13,12,50,000) x 100 = 33.143%

OR

P/V Ratio = (₹ 4,35,00,000/₹ 13,12,50,000) x 100 = 33.143%

Q.36 Production budget & Purch | MTP Nov 22

N Ltd a vehicle manufacturer has prepared sales budget for the next few months, and the following draft figures are available:

Month	No. of vehicles
October	40,000
November	35,000
December	45,000
January	60,000
February	65,000

To manufacture a vehicle a standard cost of ₹5,71,400 is incurred and sold through dealers at a uniform selling price of ₹8,57,100 to customers. Dealers are paid 15% commission on selling price on sale of a vehicle.

Apart from other materials four units of Part - X are required to manufacture a vehicle. It is a policy of the company to hold stocks of Part-X at the end of each month to cover 40% of next month's production. 48,000 units of Part-X are in stock as on 1st October.

There are 9,500 nos. of completed vehicles are in stock as on 1st October and it is policy to have stocks at the end of each month to cover 20% of the next month's sales.

You are required to

(i) PREPARE Production budget (in nos.) for the month of October, November, December and January.

(ii) PREPARE a Purchase budget for Part-X (in units) for the months of October, November and December.

(iii) CALCULATE the budgeted gross profit for the quarter October to December.

Ans. **(i) Preparation of Production Budget (in units)**

	October	November	December	January
Demand for the month (Nos.)	40,000	35,000	45,000	60,000
Add: 20% of next month's demand	7,000	9,000	12,000	13,000

Less: Opening Stock	(9,500)	(7,000)	(9,000)	(12,000)
Vehicles to be produced	37,500	37,000	48,000	61,000

(ii) Preparation of Purchase budget for Part-X

	October	November	December
Production for the month (Nos.)	37,500	37,000	48,000
Add: 40% of next month's production	14,800 (40% of 37,000)	19,200 (40% of 48,000)	24,400 (40% of 61,000)
	52,300	56,200	72,400
No. of units required for production	2,09,200 (52300 × 4 units)	2,24,800 (56200 × 4 units)	2,89,600 (72,400 × 4 units)
Less: Opening Stock	(48,000)	(59,200) (14800 × 4 units)	(76,800) (19200 × 4 units)
No. of units to be purchased	1,61,200	1,65,600	2,12,800

(iii) Budgeted Gross Profit for the Quarter October to December

	October	November	December	Total
Sales in nos.	40,000	35,000	45,000	1,20,000
Net Selling Price per unit*	7,28,535	7,28,535	7,28,535	
Sales Revenue (Rs. in lakh)	2,91,414	2,54,987.25	3,27,840.75	8,74,242
Less: Cost of Sales (Rs. in lakh) (Sales unit × Cost per unit)	2,28,560	1,99,990.00	2,57,130.00	6,85,680
Gross Profit (Rs. in lakh)	62,854	54,997.25	70,710.75	1,88,562

* Net Selling price unit = Rs. 8,57,100 – 15% commission on Rs. 8,57,100
= Rs.7,28,535.

Q.37 Budget ratios | MTP May 23

CALCULATE (i) Efficiency ratio (ii) Activity Ratio (iii) Capacity Ratio. The relevant data is as below:
Budgeted Production 1,44,000 units
Standard Hours per unit 12
Actual Production 1,20,000 units
Actual Working Hours 12,00,000

Ans.

(i) Efficiency Ratio $= \frac{\text{Stardard hour (foractual production)}}{\text{Actual hour works}} \times 100$

$= \frac{1,20,000 \text{ units} \times 12\text{hrs}}{12,00,000 \text{ hrs}} \times 100 = 120\%$

(ii) Activity Ratio $= \frac{\text{Stardard Hour (foractual production)}}{\text{Budgeted Hours}} \times 100$

$= \frac{14,40,000}{1,44,000 \text{ units} \times 12\text{hours}} \times 100 = 83.34\%$

(iii) Capacity Ratio $= \frac{\text{Actual Hours (worked)}}{\text{Budgeted Hours}} \times 100$

$= \frac{12,00,000 \text{ hrs}}{1,44,000 \text{ units} \times 12 \text{hours}} \times 100 = 69.45\%$

Q.38 Expense budget | MTP May 23

Soya B Limited is presently operating at 50% capacity and producing 50,000 units. The entire output is sold at a price of Rs. 180 per unit. The cost structure at the 50% level of activity is as under:

	(₹)
Direct Material	60 per unit
Direct Wages Variable	20 per unit
Overheads Direct	20 per unit
Expenses	12 per unit
Factory Expenses (30% fixed)	16 per unit
Selling and Distribution Exp. (85% variable)	10 per unit
Office and Administrative Exp. (100% fixed)	6 per unit

The company anticipates that the variable costs will go up by 20% and fixed costs will go up by 10%.
You are required to prepare an Expense budget, based on marginal cost for the company at 50%,75% and 100% level of activity and find out the profits at respective levels.

Ans. **Expense Budget of SoyaB Ltd. for the period**

	Per unit (₹)	50,000 units Amount (₹)	75,000 units Amount (₹)	1,00,000 units Amount (₹)
Sales **(A)**	180	90,00,000	1,35,00,000	1,80,00,000
Less: Variable Costs:				
- Direct Material	72	36,00,000	54,00,000	72,00,000
- Direct Wages	24	12,00,000	18,00,000	24,00,000
- Variable Overheads	24	12,00,000	18,00,000	24,00,000
- Direct Expenses	14.4	7,20,000	10,80,000	14,40,000
- Variable factory expenses (70% of Rs 16 p.u.)x 120%	13.44	6,72,000	10,08,000	13,44,000
- Variable Selling & Dist. exp. (85% of Rs 10 p.u.)x120%	10.2	5,10,000	7,65,000	10,20,000
Total Variable Cost **(B)**	158.04	79,02,000	1,18,53,000	1,58,04,000
Contribution **(C) = (A – B)**	21.96	10,98,000	16,47,000	21,96,000
Less: Fixed Costs:				
- Office and Admin. exp. (100%)	--	3,30,000	3,30,000	3,30,000
- Fixed factory exp. (30%)	--	2,64,000	2,64,000	2,64,000
- Fixed Selling & Dist. exp. (15%)	--	82,500	82,500	82,500

Total Fixed Costs (D)	--	6,76,500	6,76,500	6,76,500
Profit (C – D)	--	4,21,500	9,70,500	15,19,500

Q.39 Flexible budget | MTP May 23

SP Ltd. has prepared budget for the coming year for its two products A and B.

	Product A (₹)	Product B (₹)
Production & Sales unit	6,000 units	9,000 units
Raw material cost per unit	60.00	42.00
Direct labour cost per unit	30.00	18.00
Variable overhead per unit	12.00	6.00
Fixed overhead per unit	8.00	4.00
Selling price per unit	120.00	78.00

After some marketing efforts, the sales quantity of the Product A & B can be increased by 1,500 units and 500 units respectively but for this purpose the variable overhead and fixed overhead will be increased by 10% and 5% respectively for the both products.

You are required to PREPARE flexible budget for both the products:

(i) Before marketing efforts

(ii) After marketing efforts

Ans.

(i) Flexible Budget before marketing efforts:

	Product A (₹) 6,000 units		Product B (₹) 9,000 units	
	Per unit	Total	Per unit	Total
Sales	120.00	7,20,000	78.00	7,02,000
Raw material cost	60.00	3,60,000	42.00	3,78,000
Direct labour cost per unit	30.00	1,80,000	18.00	1,62,000
Variable overhead per unit	12.00	72,000	6.00	54,000
Fixed overhead per unit	8.00	48,000	4.00	36,000
Total cost	110.00	6,60,000	70.00	6,30,000
Profit	10.00	60,000	8.00	72,000

(ii) Flexible Budget after marketing efforts:

	Product A (₹) 7,500 units		Product B (₹) 9,500 units	
	Per unit	Total	Per unit	Total
Sales	120.00	9,00,000	78.00	7,41,000
Raw material cost	60.00	4,50,000	42.00	3,99,000
Direct labour cost per unit	30.00	2,25,000	18.00	1,71,000

Variable overhead per unit	13.20	99,000	6.60	62,700
Fixed overhead per unit	6.72	50,400	3.98	37,800
Total cost	109.92	8,24,400	70.58	6,70,500
Profit	10.08	75,600	7.42	70,500

Q.40 Production | MTP May 23

JD Ltd. produces and markets a very popular product called 'X'. The company is interested in presenting its budget for the first quarter of 2023.

The following information are made available for this purpose:

(i) It expects to sell 50,000 bags of 'X' during the first quarter of 2023 at the selling price of ₹ 900 per bag.

(ii) Each bag of 'X' requires 2.5 kgs. of a raw – material called 'Y' and 7.5 kgs. of raw – material called 'Z'.

(iii) Stock levels are planned as follows:

Particulars	Beginning of Quarter	End of Quarter
Finished Bags of 'X' (Nos.)	15,000	11,000
Raw – Material 'Y' (Kgs.)	32,000	26,000
Raw – Material 'Z' (Kgs.)	57,000	47,000
Empty Bag (Nos.)	37,000	28,000

(iv) 'Y' cost ₹120 per Kg., 'Z' costs ₹20 per Kg. and 'Empty Bag' costs ₹80 each.

(v) It requires 9 minutes of direct labour to produce and fill one bag of 'X'. Labour cost is ₹50 per hour.

(vi) Variable manufacturing costs are ₹45 bag. Fixed manufacturing costs ₹30,00,000 per quarter.

(vii) Variable selling and administration expenses are 5% of sales and fixed administration and selling expenses are ₹20,50,000 per quarter.

Required

(i) PREPARE a production budget for the said quarter.

(ii) PREPARE a raw – material purchase budget for 'Y', 'Z' and 'Empty Bags' for the said quarter in quantity as well as in rupees.

(iii) COMPUTE the budgeted variable cost to produce one bag of 'X'.

(iv) PREPARE a statement of budgeted net income for the said quarter and show both per unit and total cost data.

Ans.

(i) Production Budget of 'X' for the first Quarter

Particulars	Bags (Nos.)
Budgeted Sales	50,000
Add: Desired Closing stock	11,000
Total Requirements	61,000
Less: Opening stock	15,000
Required Production	46,000

(ii) Raw-Materials Purchase Budget in Quantity as well as in ₹ for 46,000 Bags of 'X'

Particulars	'Y' Kgs.	'Z' Kgs.	Empty Bags Nos.
Production Requirements Per bag of 'X'	2.5	7.5	1.0

Requirement for Production	1,15,000 (46,000 × 2.5)	3,45,000 (46,000 × 7.5)	46,000 (46,000 × 1)
Add: Desired Closing Stock	26,000	47,000	28,000
Total Requirements	1,41,000	3,92,000	74,000
Less: Opening Stock	32,000	57,000	37,000
Quantity *to be purchased*	1,09,000	3,35,000	37,000
Cost per Kg./Bag	₹120	₹20	₹80
Cost of Purchase (₹)	1,30,80,000	67,00,000	29,60,000

(iii) Computation of Budgeted Variable Cost of Production of 1 Bag of 'X'

Particulars	(₹)
Raw – Material	
Y 2.5 Kg @120	300.00
Z 7.5 Kg. @20	150.00
Empty Bag	80.00
Direct Labour(₹50× 9 minutes / 60 minutes)	7.50
Variable Manufacturing Overheads	45.00
Variable Cost of Production *per bag*	582.50

(iv) Budgeted Net Income for the first Quarter

Particulars	Per Bag (₹)	Total (₹)
Sales Value (50,000 Bags)	900.00	4,50,00,000
Less: Variable Cost:		
Production Cost	582.50	2,91,25,000
Admn. & Selling Expenses (5% of Sales Price)	45.00	22,50,000
Budgeted Contribution	272.50	1,36,25,000
Less: Fixed Expenses:		
Manufacturing		30,00,000
Admn. & Selling		20,50,000
Budgeted Net Income		85,75,000

11 CHAPTER SERVICE COSTING

Q.1 Hospital Ques + BEP | PY MAY 18

A group of 'Health Care Services' has decided to establish a Critical Care Unit in a metro city with an investment of ₹ 85 lakhs in hospital equipments. The unit's capacity shall be of 50 beds and 10 more beds, if required, can be added.

Other information for a year are as under:

	(₹)
Building Rent	2,25,000 per month
Manager Salary (Number of Manager-03)	50,000 per month to each one
Nurses Salary (Number of Nurses-24)	18,000 per month to each Nurse
Ward boy's Salary (Number of ward boys' -24)	9,000 per month per person
Food and laundry services (variable)	39,53,000
Medicines to patients (variable)	22,75,000 per year
Administrative Overheads	28,00,000 per year
Depreciation on equipments	15% per annum on original cost

It was reported that for 200 days in a year 50 beds were occupied, for 105 days 30 beds were occupied and for 60 days 20 beds were occupied.

The hospital hired 250 beds at a charge of ₹ 950 per bed to accommodate the flow of patients. However, this never exceeded the normal capacity of 50 beds on any day.

Find out:

(i) Profit per patient day, if hospital charges on an average ₹ 2,500 per day from each patient.

(ii) Break even point per patient day (Make calculation on annual basis)

Ans. Number of Patient Days = (200x50) + (105x30) + (60x20)
=14,350 patient days + 250 = 14,600

Statement Showing Profit

Elements of Cost and Revenue	Total (₹)
A. Revenue (14,600 x ₹ 2,500)	3,65,00,000
B. Variable Costs	
Food and Laundry Service	39,53,000
Medicines to Patients	22,75,000
Doctor's Payment	66,00,000
Hire Charges of Bed (250 x ₹ 950)	2,37,500
Total Variable Cost	1,30,65,500
C. Fixed Costs	

Building Rent	27,00,000
Manager's Salary (₹ 50,000 x 3 x 12)	18,00,000
Nurse's Salary (₹ 18,000 x 12 x 24)	51,84,000
Ward boy's Salary (₹ 9,000 x 12 x 24)	25,92,000
Administrative Overheads	28,00,000
Depreciation on Equipment's	12,75,000
	1,63,51,000
D. Total Cost (B+C)	2,94,16,500
E. Profit (A-D)	70,83,500

Profit per patient day = ₹ 70,83,500/14,600 = ₹ 485.17
(i) Contribution (per patient day) = (₹ 3,65,00,000 – ₹ 1,30,65,500)/ 14,600
= ₹ 1,605.10
BEP = 1,63,51,000/1,605.10 = 10,186.90 or say 10,187 patient days

Notes:
1 Higher Charges for extra beds are a semi variable cost; still, for the sake of convenience it has been considered a variable cost.

2 Assumed, the hospital hired 250 beds at a charge of ₹ 950 per bed to accommodate the flow of patients. However, this never exceeded the 10 beds above the normal capacity of 50 beds on any day.

3. The fees were paid based on the number of patients attended to and the time spent by them, which on an average worked out to ₹ 5,50,000 p.m.

Q.2 Passenger (Bus) Ques Py Nov 18

M/s XY Travels has been given a 25 km. long route to run an air- conditioned Mini Bus.
The cost of bus is ₹ 20,00,000. It has been insured @3% premium per annum while annual road tax amounts to ₹ 36,000. Annual repairs will be ₹ 50,000 and the bus is likely to last for 5 years. The driver's salary will be ₹2,40,000 per annum and the conductor's salary will be ₹ 1,80,000 per annum in addition to 10% of the takings as commission (to be shared by the driver and the conductor equally). Office and administration overheads will be ₹ 18,000 per annum. Diesel and oil will be ₹ 1,500 per 100 km. The bus will make 4 round trips carrying on an average 40 passengers on each trip.
Assuming 25% profit on takings and considering that the bus will run on an average 25 days in a month, you are required to:
(i) prepare operating cost sheet (for the month).
(ii) calculate fare to be charged per passenger km.

Ans. **(i) Statement showing the Operating Cost per Passenger-km.**

	Yearly (₹.)	Monthly (₹.)
(A) Standing Charges:		
Insurance Charge ₹. 20,00,000 × 3%	60,000	5,000
Road Tax	36,000	3,000
Depreciation (20,00,000/5)	4,00,000	33,333.33
Total	4,96,000	41,333.33
(B) Maintenance Charges:		

	Annual Repairs	50,000	4166.67
	Office and administration overheads	3,18,000	26,500
	Total	3,68,000	30666.67
(C)	***Running Cost/Charges:***		
	Driver's Salary	2,40,000	20,000
	Conductor's Salary	1,80,000	15,000
	Diesel & Oil 60,000× 1, 500	9,00,000	75,000
	Total	13,20,00	41,333.33
	Total (A+B+C) Cost before commission and	21,84,00	1,82,000
	Commission (33,60,000 × 10%) (working note	3,36,000	28,000
	Profit (33,60,000 × 25%) (working note 2)	8,40,000	70,000
	Takings (working note 1)	33,60,00	2,80,000

(ii) Fare per Passenger-km. = $\frac{\textit{Total collection / Takings}}{\textit{Total}\text{ Passenger-km(Working note 3)}}$

$= \frac{33,60,000}{24,00,000} = 1.40$

OR

Fare per Passenger-km. (monthly) = $\frac{2,80,000}{2,00,000} = 1.40$

Working note:

1. Cost before commission (10%) and profit (25%) is 21,84,000 which is 65% of total takings. So total takings is (21,84000÷65) ×100=₹ 33,60,000

2. Commission is 10% of ₹ 33,60,000=₹ 3,36,000 and Profit is 25% of ₹ 33,60,000=₹ 8,40,000

3. Total Km is (4 Round Trips × Days in a month × Month = (4×2×25 ×25×12) = 60,000 km

Passenger km is 60,000 km×40 passenger= 24,00,000

Q.3 Lorry Running Ques | PY May 19

X Ltd. distributes' its goods to a regional dealer using single lorry. The dealer premises are 40 kms away by road. The capacity of the lorry is 10 tonnes. The lorry makes the journey twice a day fully loaded on the outward journey and empty on return journey. The following information is available:

Diesel Consumption	8 km per litre
Diesel Cost	₹ 60 per litre
Engine Oil	₹ 200 per week
Driver's Wages (fixed)	₹ 2,500 per week
Repairs	₹ 600 per week
Garage Rent	₹ 800 per week
Cost of Lorry (excluding cost of tyres)	₹ 9,50,000
Life of Lorry	1,60,000 kms
Insurance	₹ 18,200 per annum
Cost of Tyres	₹ 52,500

Life of Tyres	25,000 kms
Estimated sale value of the lorry at end of its life is	₹ 1,50,000
Vehicle License Cost	₹ 7,800 per annum
Other Overhead Cost	₹ 41,600 per annum

The lorry operates on a 5 day week.

Required:

(i) A statement to show the total cost of operating the vehicle for the four week period analysed into Running cost and Fixed cost.

(ii) Calculate the vehicle operating cost per km and per tonne km. (Assume 52 weeks in a year)

Ans. **Working Notes:**

Particulars	For 4 weeks	For 1 week (by dividing by 4)
Total distance travelled (40 k.m × 2 × 2 trips × 5 days × 4 weeks)	3,200 km	800 km
Total tonne km (40 k.m × 10 tonnes × 2 × 5 days × 4 weeks)	16,000 tonne km	4,000 tonne km

(i) Statement showing Operating Cost

	Particulars	For 4 weeks	For 1 week (by dividing by 4)
A.	**Fixed Charges:**		
	Drivers' wages (₹2,500 □ 4 weeks)	10,000	2,500
	Garage rent (₹800 × 4 weeks)	3,200	800
	Insurance {(₹18,200 ÷ 52 weeks) × 4 weeks}	1,400	350
	Vehicle license {(₹7,800 ÷ 52 weeks) × 4 weeks}	600	150
	Other overheads cost {(₹41,600 ÷ 52 weeks) × 4 weeks}	3,200	800
	Total (A)	**18,400**	**4,600**
B.	**Running Cost:**		
	Cost of diesel {(3,200 ÷ 8 kms) × ₹60}	24,000	6,000
	Engine Oil (₹200 × 4 weeks)*	800	200
	Repairs (₹600 × 4 weeks)*	2,400	600
	Depreciation on vehicle $\left(\frac{9,50,000-1,50,000}{1,60,000km} x 3200km\right)$	16,000	4,000

	Depreciation on tyres $\left(\frac{52,500}{25,000km} x 3,200km\right)$	6,720	1,680
	Total (B)	**49,920**	**12,480**
C.	**Total Cost (A + B)**	**68,320**	**17,080**

*Cost of engine oil & repairs may also be treated as fixed cost, as the question relates these with time i.e. in weeks instead of running of vehicle.

(ii) Calculation of vehicle operating cost:

Operating cost per k.m. = $\frac{68,320}{3,200kms}$ **or** $\frac{17,080}{800kms} = 21.35$

Q.4 Hotel Ques (Room rent/day) | PY Nov 19

A hotel is being run in a Hill station with 200 single rooms. The hotel 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 th e year ending 31st March ,2019:

(i) Occupancy during the season is 80% while in the off-season it is 40%.

(ii) Total investment in the hotel is ₹ 300 lakhs of which 80% relates to Buildings and the balance to Furniture and other Equipment.

(iii) Room attendants are paid ₹ 15 per room per day on the basis of occupancy of rooms in a month.

(iv) Expenses:

- Staff salary (excluding that of room attendants) ₹ 8,00,000
- Repairs to Buildings ₹ 3,00,000
- Laundry Charges ₹ 1,40,000
- Interior Charges ₹ 2,50,000
- Miscellaneous Expenses ₹ 2,00,200

(v) Annual Depreciation is to be provided on Buildings @ 5% and 15% on Furniture and other Equipments on straight line method.

(vi) Monthly lighting charges are ₹ 110, except in four months in winter when it is ₹ 30 per room and this cost is on the basis of full occupancy for a month.

Ans.

Working Notes:

(i) Total Room days in a year

Season	Occupancy (Room-days)	Equivalent Full Room charge days
Season – 80% Occupancy	200 Rooms × 80% × 6 months × 30 days in a month = 28,800 Room Days	28,800 Room Days × 100% = 28,800

Off-season – 40% Occupancy	200 Rooms × 40% × 6 months × 30 days in a month = 14,400 Room Days	14,400 Room Days × 50% = 7,200
Total Room Days	28,800 + 14,400 = 43,200 Room Days	36,000 Full Room days

(ii) Lighting Charges:

It is given in the question that lighting charges for 8 months is ₹110 per month and during winter season of 4 months it is ₹30 per month. Further it is also given that peak season is 6 months and off season is 6 months.

It should be noted that – being Hill station, winter season is to be considered as part of Off season. Hence, the non-winter season of 8 months include – Peak season of 6 months and Off season of 2 months.

Accordingly, the lighting charges are calculated as follows:

Season	**Occupancy (Room-days)**
Season & Non-winter – 80%Occupancy	200 Rooms × 80% × 6 months × ₹ 110 per month = ₹ 1,05,600
Off- season & Non-winter – 40% Occupancy (8 – 6 months)	200 Rooms × 40% × 2 months × ₹110 per month = ₹ 17,600
Off- season & -winter – 40%Occupancy months)	200 Rooms × 40% × 4 months × ₹ 30 per month = ₹ 9,600
Total Lighting charges	₹ 1,05,600+ ₹ 17,600 + ₹ 9,600 = ₹ 132,800

Statement of total cost:

	(₹)
Staff salary	8,00,000
Repairs to building	3,00,000
Laundry	1,40,000
Interior	2,50,000
Miscellaneous Expenses	2,00,200
Depreciation on Building (₹ 300 Lakhs × 80% × 5%)	**12,00,000**
Depreciation on Furniture & Equipment (₹ 300 Lakhs × 20% × 15%)	**9,00,000**
Room attendant's wages (₹ 15 per Room Day for 43,200 Room Days)	**6,48,000**
Lighting charges	1,32,800
Total cost	**45,71,000**
Add: Profit Margin (20% on Room rent or 25% on Cost)	11,42,750
Total Rent to be charged	**57,13,750**

Calculation of Room Rent per day:

Total Rent / Equivalent Full Room days = ₹ 57,13,750/ 36,000 = ₹ 158.72

Room Rent during Season = ₹ 158.72

Room Rent during Off season = ₹ 158.72 × 50% = ₹ 79.36

Q.5 Toll Road (BOT) Ques | PY Nov 20

SEZ Ltd. built a 120 km. long highway and now operates a toll road to collect tolls. The company has invested ₹ 900 crore to build the road and has estimated that a total of 120 crore vehicles will be using the highway during the 10 years toll collection tenure. The other costs for the month of "June 2020" are as follows:

(i) Salary:

- Collection personnel (3 shifts and 5 persons per shift) - ₹ 200 per day per person.
- Supervisor (3 shifts and 2 persons per shift) - ₹ 350 per day per person.
- Security personnel (2 shifts and 2 persons per shift) - ₹ 200 per day per person.
- Toll Booth Manager (3 shifts and 1 person per shift) - ₹ 500 per day per person.

(ii) Electricity - ₹ 1,50,000

(iii) Telephone - ₹ 1,00,000

(iv) Maintenance cost - ₹ 50 lakhs

(v) The company needs 30% profit over total cost. Required:

(1) Calculate cost per kilometre.

(2) Calculate the toll rate per vehicle.

Ans. **Statement of Cost**

Particulars		(₹)
A. Apportionment of Capital Cost	(₹ 900crore / (12months x 10 years))	**7,50,00,000**
B. Other Costs		
Salary to Collection Personnel	(3 Shifts × 5 persons per shift × 30 days × ₹ 200 per day)	**90,000**
Salary to Supervisor	(3 Shifts × 2 persons per shift × 30 days × ₹ 350 per day)	**63,000**
Salary to Security Personnel	(2 Shifts × 2 persons per shift × 30 days × ₹ 200 per day)	**24,000**
Salary to Toll Booth Manager	(3 Shifts × 1 person per shift × 30 days × ₹ 500 per day)	**45,000**
Electricity		1,50,000
Telephone		1,00,000
		4,72,000
C. Maintenance cost		50,00,000
Total (A + B + C)		**8,04,72,000**

(1) Calculation of cost per kilometre:

$$\frac{Total\,cost}{Total\,km.} = \frac{8,04,72,000}{120 km.} = 6,70,600$$

(2) Calculation of toll rate per vehicle:

$$\frac{Total\,cost + 25\%\,profit}{Vehicles\text{ per month}} = \frac{8,04,72,000 + 2,41,41,600}{1,00,00,000\text{ vehicles}} = 10.46$$

Working:

$$\text{Vehicles per month} = \frac{Total\ estimated\ \text{vehicles}}{10\text{ years}} x \frac{1\text{ month}}{12 months}$$

$$= \frac{120\text{ crore}}{10 years} x \frac{1\text{ month}}{12 months} = 1\text{ crore vehicles}$$

Q.6 Hospital Ques + BED | PY Jan 21

ABC Health care runs an Intensive Medical Care Unit. For this purpose, it has hired a building at a rent of ₹ 50,000 per month with the agreement to bear the repairs and maintenance charges also.

The unit consists of 100 beds and 5 more beds can comfortably be accommodated when the situation demands. Though the unit is open for patients all the 365 days in a year, scrutiny of accounts for the year 2020 reveals that only for 120 days in the year, the unit had the full capacity of 100 patients per day and for another 80 days, it had, on an average only 40 beds occupied per day. But, there were occasions when the beds were full, extra beds were hired at a charge of ₹ 50 per bed per day. This did not come to more than 5 beds above the normal capacity on any one day. The total hire charges for the extra beds incurred for the whole year amounted to ₹ 20,000.

The unit engaged expert doctors from outside to attend on the patients and the fees were paid on the basis of the number of patients attended and time spent by them which on an average worked out to ₹ 30,000 per month in the year 2020.

The permanent staff expenses and other expenses of the unit were as follows:

	₹
2 Supervisors each at a per month salary of	*5,000*
4 Nurses each at a per month salary of	*3,000*
2 Ward boys each at a per month salary of	*1,500*
Other Expenses for the year were as under:	
Repairs and Maintenance	*28,000*
Food supplied to patients	*4,40,000*
Caretaker and Other services for patients	*1,25,000*
Laundry charges for bed linen	*1,40,000*
Medicines supplied	*2,80,000*
Cost of Oxygen etc. other than directly borne for treatment of patients	*75,000*
General Administration Charges allocated to the unit	*71,000*

Required:

(i) What is the profit per patient day made by the unit in the year 2020, if the unit recovered an overall amount of ₹ 200 per day on an average from each patient.

(ii) The unit wants to work on a budget for the year 2021, but the number of patients requiring medical care is a very uncertain factor. Assuming that same revenue and expenses prevail in the year 2021 in the first instance, work out the number of patient days required by the unit to break even.

Ans.

Workings:

Calculation of number of Patient days

100 Beds × 120 days = 12000

40 Beds × 80 days = 3,200

Extra beds = 400

Total = 15,600

(i) Statement of Profitability

Particulars	Amount (₹)	Amount (₹)
Income for the year (₹ 200 per patient per day × 15,600 patient days)		31,20,000
Variable Costs:		
Doctor Fees (₹ 30,000 per month × 12)	3,60,000	
Food to Patients (Variable)	4,40,000	
Caretaker Other services to patients (Variable)	1,25,000	
Laundry charges (Variable)	1,40,000	
Medicines (Variable)	2,80,000	
Bed Hire Charges (₹ 50 × 400 Beds)	20,000	
Total Variable costs		(13,65,000)
Contribution		17,55,000
Fixed Costs:		
Rent (₹ 50,000 per month × 12)	6,00,000	
Supervisor (2 persons × ₹ 5,000 × 12)	1,20,000	
Nurses (4 persons × ₹ 3,000 × 12)	1,44,000	
Ward Boys (2 persons x ₹ 1500 x12)	36,000	
Repairs (Fixed)	28,000	
Cost of Oxygen	75,000	
Administration expenses allocated	71,000	
Total Fixed Costs		(10,74,000)
Profit		**6,81,000**

Calculation of Contribution and profit per Patient day

Total Contribution = 17,55,000

Total Patient days = 15,600 days

Contribution per Patient day = 17,55,000 / 15,600 days = 112.50

Total Profit = 6,81,000

Total Patient days = 15,600 days

Profit per Patient day = 6,81,000 / 15,600 days = 43.65

(ii) Breakeven Point = Fixed Cost / Contribution per Patient day

= ₹ 10,74,000 / ₹ 112.50

= 9,547 patient days

Q.7 Insurance Co. | PY July 21

MRSL Healthcare Ltd. has incurred the following expenditure during the last year for its newly launched 'COVID-19' Insurance policy:

Office administration cost	*48,00,000*
Claim management cost	*3,80,000*
Employees cost	*16,20,000*
Postage and logistics	*32,40,000*
Policy issuance cost	*29,50,000*
Facilities cost	*46,75,000*
Cost of marketing of the policy	*1,38,90,000*
Policy development cost	*35,00,000*
Policy servicing cost	*96,45,000*
Sales support expenses	*32,00,000*
I.T. Cost	*?*

Number of Policy sold: 2,800

Total insured value of policies - ₹ 3,500 Crores Cost per rupee of insured value - ₹ 0.002

You are required to:

(i) Calculate Total Cost for "COVID-19" Insurance policy segregating the costs into four main activities namely (a) Marketing and Sales support (b) Operations (c) I.T. Cost and (d) Support functions.

(ii) Calculate Cost Per Policy.

Ans. **(i) Calculation of total cost for 'COVID-19' Insurance policy**

	Particulars	Amount (₹)	Amount (₹)
a.	**Marketing and Sales support:**		
	- Policy development cost	35,00,000	
	- Cost of marketing	1,38,90,000	
	- Sales support expenses	32,00,000	**2,05,90,000**
b.	**Operations:**		
	- Policy issuance cost	29,50,000	
	- Policy servicing cost	96,45,000	
	- Claim management cost	3,80,000	**1,29,75,000**

c.	**IT Cost***		**2,21,00,000**
	Support functions		
d.	- Postage and logistics	32,40,000	
	- Facilities cost	46,75,000	
	- Employees cost	16,20,000	
	- Office administration cost	48,00,000	**1,43,35,000**
	Total Cost		**7,00,00,000**

IT cost

= (₹ 3,500 crores x 0.002) – ₹ 4,79,00,000 = ₹ 2,21,00,000

(ii) Calculation of cost per policy = $\frac{Total\,cost}{No\,of\,policies} = \frac{7,00,00,000}{2,800} = 25,000$

Q.8 Passenger (Bus) Ques | PY Dec 21

Paras Travels provides mini buses to an IT company for carrying its employees from home to office and dropping back after office hours. It runs a fleet of 8 mini buses for this purpose. The buses are parked in a garage adjoining the company's premises. Company is operating in two shifts (one shift in the morning and one shift in the afternoon). The distance travelled by each mini bus one way is 30 kms. The company works for 20 days in a month.

The seating capacity of each mini bus is 30 persons. The seating capacity is normally 80% occupied during the year. The details of expenses incurred for a year are as under:

Particulars	
Driver's salary	₹ 20,000 per driver per month
Lady attendant's salary (mandatorily required for each mini bus)	₹ 10,000 per attendant per month
Cleaner's salary (One cleaner for 2 mini buses)	₹ 15,000 per cleaner per month
Diesel (Avg. 8 kms per litre)	₹ 80 per litre
Insurance charges (per annum)	2% of Purchase Price
License fees and taxes	₹ 5,080 per mini bus per month
Garage rent paid	₹ 24,000 per month
Repair & maintenance including engine oil and lubricants (for every 5,760 kms)	₹ 2,856 per mini bus
Purchase Price of mini bus	₹ 15,00,000 each
Residual life of mini bus	8 Years
Scrap value per mini bus at the end of residual life	₹ 3,00,000

Paras Travels charges two types of fare from the employees. Employees coming from a distance of beyond 15 kms away from the office are charged double the fare which is charged from employees coming from a distance of up-to 15 kms. away from the office. 50% of employees travelling in each trip are coming from a distance beyond 15 kms. from the office. The charges are to be based on average cost.

You are required to:

(i) Prepare a statement showing expenses of operating a single mini bus for a year,

(ii) Calculate the average cost per employee per month in respect of:

(a) Employees coming from a distance upto 15 kms. from the office.

(b) Employees coming from a distance beyond 15 kms. from the office.

Ans. **(i) Statement of Expenses of operating a mini bus in a year**

Particulars		Rate (₹)	Per Bus per annum (₹)
(A)	**Standing Charges:**		
	Driver's salary	20,000 p.m	2,40,000
	Lady attendant's salary	10,000 p.m	1,20,000
	Average Cleaner's salary (50%)	15,000 p.m	90,000
	Insurance charge	30,000 p.a.	30,000
	License fee, taxes etc.	5,080 p.m.	60,960
	Average Garage Rent	24,000 p.m	36,000
	Depreciation {(15,00,000 – 3,00,000) ÷ 8}	1,50,000 p.a.	1,50,000
(B)	**Maintenance Charges:**		
	Repairs & maintenance including engine oil and lubricants (Working Note 1)	28,560 p.a.	
(C)	**Operating Charges:**		
	Diesel (Working Note 2)		5,76,000
	Total Cost (A + B + C)		13,31,520
	Cost per month		1,10,960

(ii) Average cost per employee per month:

(a) Employee coming from distance of upto 15 km

$$= \frac{\text{Total cost per month}}{\text{Total no of equivalent employee}} = \frac{1,10,960}{72*} = 1,541.11$$

(b) Employee coming from a distance beyond 15 km

= 1541.11 × 2 = ₹ 3,082.2

* Considering half fare employees as a base

Full fare employees (12 × 2)

Add: Half fare employees (Working Note 3)

Total Equivalent number of employees per month

Total Equivalent number of employees per month (morning + afternoon shift of company)

Working Notes:

1. **Calculation of Repairs and maintenance cost of a bus :**

Distance travelled in a year:

(4 trip × 2 shifts × 30 km. × 20 days × 12 months) Distance travelled p.a.: 57,600 km.

Repairs and maintenance cost per Bus per annum:

2. **Calculation of diesel cost per bus per annum: Distance travelled in a year** = 57,600 km

Diesel cost per Bus per annum:

57,600 km.

3. **Calculation of equivalent number of employees per bus:**

Seating capacity of a bus 30 employees

Occupancy (80% of capacity) 24 employees

Half fare employees (50% of 24 employees) 12 employees

Full fare employees (50% of 24 employees) 12 employee

[Note: Total Equivalent number of employees per month (morning + afternoon shift of company can also be calculated considering full fare employees as a base. In that case the number will be 36. Then fare for employees coming from distance beyond 15km will be

$\frac{1,10,960}{36}$ = 3,082.22 and employees coming from distance upto 15 km will be

3,082.22 / 2 = ₹ 1,541.11]

Q.9 Lorry running Ques/rail run | PY May 22

Coal is transported from two mines X & Y and unloaded at plots in a railway station. X is at distance of 15 kms and Y is at a distance of 20 kms from the rail head plots. A fleet of lorries having carrying capacity of 4 tonnes is used to transport coal from the mines. Records reveal that average speed of the lorries is 40 kms per hour when running and regularly take 15 minutes to unload at the rail head.

At Mine X average loading time is 30 minutes per load, while at mine Y average loading time is 25 minutes per load.

Additional Information:

Drivers' wages, depreciation, insurance and taxes, etc. ₹ 12 per hour Operated Fuel, oil tyres, repairs and maintenance, etc. ₹ 1.60 per km

You are required to prepare a statement showing the cost per tonne kilometre of carrying coal from each mine 'X' and 'Y'.

Ans. **Statement showing the cost per tonne-kilometre of carrying mineral from each mine**

	Mine X (₹)	Mine Y (₹)
Fixed cost per trip: (Refer to working note 1)		
(Driver's wages, depreciation, insurance and taxes)		
X: 1 hour 30 minutes @ ₹ 12 per hour	18.00	
Y: 1 hour 40 minutes @ ₹ 12 per hour		20.00
Running and maintenance cost:		
(Fuel, oil, tyres, repairs and maintenance)		
X: 30 km. ₹ 1.60 per km.	48.00	
Y: 40 km. ₹ 1.60 per km.		64.00
Total cost per trip (₹)	66.00	84.00

Cost per tonne – km (Refer to working note 2)	1.1 $\left(\frac{66}{60 tonne-km}\right)$	1.05 $\left(\frac{84}{80 tonne-km}\right)$

Working notes:

		Mine- X	Mine- Y
(1)	Total operated time taken pertrip		
	Running time to & fro	**45 minutes** $\left(30km.x\frac{60minutes}{40km.}\right)$	**60 minutes** $\left(40km.x\frac{60minutes}{40km.}\right)$
	Un-loading time	15 minutes	15 minutes
	Loading time	30 minutes	25 minutes
	Total operated time	**90 minutes or** 1 hour 30 minutes	**100 minutes or** 1 hour 40 minutes
(2)	Effective tones – km.	60 (4 tonnes × 15 km.)	80 (4 tonnes × 20 km.)

Q.10 Loan Process Ques. PY Nov 22

ABC Bank is having a branch which is engaged in processing of 'Vehicle Loan' and 'Education Loan' applications in addition to other services to customers. 30% of the overhead costs for the branch are estimated to be applicable to the processing of 'Vehicle Loan' applications and 'Education Loan' applications each.

Branch is having four employees at a monthly salary of ₹ 50,000 each, exclusively for processing of Vehicle Loan applications and two employees at a monthly salary of ₹ 70,000 each, exclusively for processing of Education Loan applications.

In addition to above, following expense are incurred by the Branch:

- Branch Manager who supervises all the activities of branch, is paid at ₹ 90,000 per month.
- Legal charges, Printing & stationery and Advertising Expenses are incurred at

  ₹ 30,000, ₹ 12,000 and ₹ 18,000 respectively for a month.
- Other expenses are ₹ 10,000 per month. You are required to:

(i) Compute the cost of processing a Vehicle Loan application on the assumption that 496 Vehicle Loan applications are processed each month.

(ii) Find out the number of Education Loan Applications processed, if the total processing cost per Education Loan Application is same as in the Vehicle Loan Application as computed in (i) above.

Ans.

Particulars	Vehicle loan Applications (₹)	Education loan Application (₹)	Total (₹)

Employee Cost	2,00,000 (₹ 50,000 × 4)	1,40,000 (₹ 70,000 × 2)	3,40,000
Apportionment of Branch manager's salary	27,000	27,000	54,000
Legal charges, Printing & stationery and Advertising expenses	18,000	18,000	36,000
Other expenses	3,000	3,000	6,000
Total cost	2,48,000	1,88,000	4,36,000

(i) Computation of cost of processing a vehicle loan application:

Total Cost ÷ No. of applications

₹ 2,48,000 ÷ 496 = ₹ 500

(ii) Computation of no. of Education loan Processed

Total Cost = No. of applications × Processing cost per application

₹ 1,88,000 = No. of applications × ₹ 500

No. of education loan applications = ₹1,88,000 ÷ ₹500 = 376 applications

Q.11 Toll Plaza Ques | PY May 23

RST Toll Plaza Limited built an 80-kilometre-long highway between two cities and operates a toll plaza to collect tolls from passing vehicles using the highway. The company has estimated that 50,000 light weight, 12,000 medium weight and 10,000 heavy weight vehicles will be using the highway in one month in outward journey and the same number for return journey.

As per government notification, vehicles used for medical emergencies, Members of Parliament, and essential services are exempt from toll charges. It is estimated that 10% of light weight vehicles will pass the highway for such use.

It is the policy of the company that if vehicles return within 24 hours of their outward journey, the toll fare will be reduced by 25 percent automatically. It is estimated that 30% of chargeable light weight vehicles return within the specified time frame.

The toll charges for medium weight vehicles is to be fixed as 2.5 times of the light weight vehicles and that of heavy weight vehicles as 2 times of the medium weight vehicles.

The toll and maintenance cost for a month is ₹ 59,09,090, The company requires a profit of 10% over the total cost to cover interest and other costs.

Required:

(i) Calculate the toll rate for each type of vehicle if concession facilities are not available on the return journey.

(ii) Calculate the toll rate that will be charged from light weight vehicles if a return journey concession facility is available, assuming that the revenue earned from light weight vehicles calculated in option (i) remains the same.

Ans. **Working Notes:**

(1) Calculation of equivalent numbers of Light weight vehicles (when no concession is provided on return journey)

Type of vehicle	Monthly traffic (A)	Return traffic (B)	Ratio (C)	Equivalent light weight [(A + B) × C]
Light weight	45,000*	45,000	1	90,000
Medium weight	12,000	12,000	2.5	60,000
Heavy weight	10,000	10,000	5	1,00,000
				2,50,000

*50,000 light vehicles less 10% exempted vehicles

(2) Calculation of equivalent numbers of Light weight vehicles (when concession is provided on return journey)

Type of vehicle	Monthly traffic (A)	Return traffic (B)	Ratio (C)	Equivalent light weight [(A + B) × C]
Light weight	45,000*	41,625 [45,000- (45,000 × 30% × 25%)]	1	86,625
Medium weight	12,000	12,000	2.5	60,000
Heavy weight	10,000	10,000	5	1,00,000
				2,46,625

(i) Calculation of toll rate for each type of vehicle:

Total cost to cover ÷ Equivalent type of vehicles

(₹ 59,09,090 + 10% of ₹ 59,09,090) ÷ 2,50,000 equivalent vehicles (Refer working note 1)

= 65,00,000 ÷ 2,50,000 = ₹ 26

Toll rate for:

Light weight vehicle = ₹ 26

Medium weight vehicle = ₹ 26 × 2.5 = ₹ 65 Heavy weight vehicle = ₹ 26 × 5 = ₹ 130

(ii) Calculation of toll rate for each type of vehicle:

Revenue earned from Light weight vehicle in (i) above

= 90,000 vehicles × ₹ 26 = ₹ 23,40,000

New toll rate to maintain the same revenue from Light weight vehicle

= ₹ 23,40,000 ÷ 86,625 (Refer working note-2) = ₹ 27.01 Light weight vehicle = ₹ 27.01

Rate to be charged from 13,500 light weight vehicles = 27.01 × 0.75 = 20.26

Alternative presentation

(ii) Toll rate to be charged from light weight vehicles if concession applicable

Revenue share in light vehicles = 90,000 × 26 = ₹ 23,40,000

Suppose rate is x, then outward journey 45,000 x; return journey (45,000 - 30% of 45,000) + 13,500 (x - 0.25)

45,000x + 31,500x + 13500 (0.75x) = ₹ 23,40,000

Toll rate to be charged from light weight vehicles : 86,625x = ₹ 23,40,000 =

₹ 27.01

Rate to be charged from 76,500 light weight vehicles @ 27.01; revenue will be

₹ 20,66,494

Rate to be charged from 13,500 light weight vehicles = 27.01 × 0.75 = 20.26 revenue will be ₹ 2,73,506

Q.12 Students/ School Ques | RTP May 18

AD Higher Secondary School (AHSS) offers courses for 11th & 12th standard in three streams i.e. Arts, Commerce and Science. AHSS runs higher secondary classes along with primary and secondary classes but for accounting purpose it treats higher secondary as a separate responsibility centre. The Managing committee of the school wants to revise its fee structure for higher secondary students. The accountant of the school has provided the following details for a year:

	Amount (₹)
Teachers' salary (15 teachers × ₹35,000 × 12 months)	63,00,000
Principal's salary	14,40,000
Lab attendants' salary (2 attendants × ₹15,000 × 12 months)	3,60,000
Salary to library staff	1,44,000
Salary to peons (4 peons × ₹10,000 × 12 months)	4,80,000
Salary to other staffs	4,80,000
Examinations expenditure	10,80,000
Office & Administration cost	15,20,000
Annual day expenses	4,50,000
Sports expenses	1,20,000

Other information:

(i)

	Standard 11 & 12			Primary & Secondary
	Arts	Commerce	Science	
No. of students	120	360	180	840
Lab classes in a year	0	0	144	156
No. of examinations in a year	2	2	2	2
Time spent at library per student per year	180 hours	120 hours	240 hours	60 hours
Time spent by principal for administration	208 hours	312 hours	480 hours	1,400 hours
Teachers for 11 & 12 standard	4	5	6	-

(ii) One teacher who teaches economics for Arts stream students also teaches commerce stream students. The teacher takes 1,040 classes in a year, it includes 208 classes for commerce students.

(iii) There is another teacher who teaches mathematics for Science stream students also teaches business mathematics to commerce stream students. She takes 1,100 classes a year, it includes 160 classes for commerce students.

(iv) One peon is fully dedicated for higher secondary section. Other peons dedicate their 15% time for higher secondary section.

(v) All school students irrespective of section and age participates in annual functions and sports activities.

Required:

(i) CALCULATE cost per student per annum for all three streams.

(ii) If the management decides to take uniform fee of ₹ 1,000 per month from all higher secondary students, CALCULATE stream wise profitability.

(iii) If management decides to take 10% profit on cost, COMPUTE fee to be charged from the students of all three streams respectively.

Ans. **Calculation of Cost per annum**

Particulars	Arts (₹)	Commerce (₹)	Science (₹)	Total (₹)
Teachers' salary (W.N-1)	16,80,000	21,00,000	25,20,000	63,00,000
R-apportionment of Economics & Mathematics teachers' salary (W.N-2)	(84,000)	1,45,091	(61,091)	-
Principal's salary (W.N-3)	1,24,800	1,87,200	2,88,000	6,00,000
Lab assistants' salary (W.N-4)	-	-	1,72,800	1,72,800
Salary to library staff (W.N-5)	43,200	28,800	57,600	1,29,600
Salary to peons (W.N-6)	31,636	94,909	47,455	1,74,000
Salary to other staffs (W.N-7)	38,400	1,15,200	57,600	2,11,200
Examination expenses (W.N- 8)	86,400	2,59,200	1,29,600	4,75,200
Office & Administration expenses (W.N- 7)	1,21,600	3,64,800	1,82,400	6,68,800
Annual Day expenses (W.N-7)	36,000	1,08,000	54,000	1,98,000
Sports expenses (W.N- 7)	9,600	28,800	14,400	52,800
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400

(i) Calculation of cost per student per annum

Particulars	Arts (₹)	Commerce (₹)	Science (₹)	Total (₹)
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400
No. of students	120	360	180	660
Cost per student per annum	17,397	9,533	19,238	13,610

(ii) **Calculation of profitability**

Particulars	Arts (₹)	Commerce (₹)	Science (₹)	Total (₹)
Total Fees per annum	12,000	12,000	12,000	
Cost per student per annum	17,397	9,533	19,238	
Profit/ (Loss) per student per annum	(5,397)	2,467	(7,238)	
No. of students	120	360	180	
Total Profit/ (Loss)	(6,47,640)	8,88,120	(13,02,840)	(10,62,360)

(iii) Computation of fees to be charged to earn a 10% profit on cost

Particulars	Arts (₹)	Commerce (₹)	Science (₹)
Cost per student per annum	17,397	9,533	19,238
Add: Profit @10%	1,740	953	1,924
Fees per annum	19,137	10,486	21,162
Fees per month	1,595	874	1,764

Working Notes:

(1) Teachers' salary

Particulars	Arts	Commerce	Science
No. of teachers	4	5	6
Salary per annum (₹)	4,20,000	4,20,000	4,20,000
Total salary	16,80,000	21,00,000	25,20,000

(2) Re-apportionment of Economics and Mathematics teachers' salary

	Economics		Mathematics	
Particulars	Arts	Commerce	Science	Commerce
No. of classes	832	208	940	160
Salary re-apportionment (₹)	(84,000)	84,000	(61,091)	61,091
	$\left(\frac{4,20,000}{1,040} x 208\right)$		$\left(\frac{4,20,000}{1,140} x 160\right)$	

Q.13 Insurance Co. RTP Nov 18

Sanziet Lifecare Ltd. operates in life insurance business. Last year it has launched a new term insurance policy for practicing professionals 'Professionals Protection Plus'. The company has incurred the following expenditures during the last year for the policy:

Policy development cost	₹11,25,000
Cost of marketing of the policy	₹45,20,000
Sales support expenses	₹11,45,000
Policy issuance cost	₹10,05,900
Policy servicing cost	₹35,20,700
Claims management cost	₹1,25,600

IT cost	₹74,32,000
Postage and logistics	₹10,25,000
Facilities cost	₹15,24,000
Employees cost	₹ 5,60,000
Office administration cost	₹16,20,400

Number of policy sold- 528

Total insured value of policies- ₹1,320 crore

Required:

(i) CALCULATE total cost for Professionals Protection Plus' policy segregating the costs into four main activities namely (a) Marketing and Sales support, (b) Operations, (c) IT and (d) Support functions.

(ii) CALCULATE cost per policy.

(iii) CACULATE cost per rupee of insured value.

Ans. **Calculation of total cost for 'Professionals Protect Plus' policy**

	Particulars	Amount (₹)	Amount (₹)
1.	**Marketing and Sales support:**		
	- Policy development cost	11,25,000	
	- Cost of marketing	45,20,000	
	- Sales support expenses	11,45,000	67,90,000
2.	**Operations:**		
	- Policy issuance cost	10,05,900	
	- Policy servicing cost	35,20,700	
	- Claims management cost	1,25,600	46,52,200
3.	**IT Cost**		74,32,000
4.	**Support functions**		
	- Postage and logistics	10,25,000	
	- Facilities cost	15,24,000	
	- Employees cost	5,60,000	
			47,29,400
	- Office administration cost	16,20,400	
	Total Cost		2,36,03,600

(ii) **Calculation of cost per policy** = $\frac{Total\,cost}{No\,of\,policies} = \frac{2,36,03,600}{528} =$ 44,703.79

(iii) **Cost per rupee of insured value** = $\frac{Total\,cost}{Total\,insured\,value} = \frac{2.36\,crore}{1,320\,crore} = 0.0018$

Q.14 Hotel Rent Ques | PY May 19

A company runs a holiday home. For this purpose, it has hired a building at a rent of ₹10,00,000 per month alongwith 5% of total taking. It has three types of suites for its customers, viz., single room, double rooms and triple rooms.

Following information is given:

Type of suite	Number	Occupancy percentage
Single room	100	100%
Double rooms	50	80%
Triple rooms	30	60%

The rent of double rooms suite is to be fixed at 2.5 times of the single room suite and that of triple rooms suite as twice of the double rooms suite.

The other expenses for the year 20X9 are as follows:

	(₹)
Staff salaries	14,25,00,000
Room attendants' wages	4,50,00,000
Lighting, heating and power	2,15,00,000
Repairs and renovation	1,23,50,000
Laundry charges	80,50,000
Interior decoration	74,00,000
Sundries	1,53,00,000

Provide profit @ 20% on total taking and assume 360 days in a year.

You are required to CALCULATE the rent to be charged for each type of suite.

Ans.

(i) Total equivalent single room suites

Nature of suite	Occupancy (Room-days)	Equivalent single room suites (Room-days)
Single room suites	36,000 (100 rooms x 360 days x 100%)	36,000 (36,000 x 1)
Double rooms suites	14,400 (50 rooms x 360 days x 80%)	36,000 (14,400 x 2.5)
Triple rooms suites	6,480 (30 rooms x 360 days x 60%)	32,400 (6,480 x 5)
		1,04,400

(ii) Statement of total cost:

	(₹)
Staff salaries	14,25,00,000
Room attendant's wages	4,50,00,000
Lighting, heating and power	2,15,00,000
Repairs and renovation	1,23,50,000
Laundry charges	80,50,000
Interior decoration	74,00,000
Sundries	1,53,00,000
	25,21,00,000

Building rent {(₹10,00,000 □ 12 months) + 5% on total taking}	1,20,00,000+ 5% on total takings
Total cost	26,41,00,000 + 5% on total takings

Profit is 20% of total takings

∴ Total takings = ₹ 26,41,00,000 + 25% (5% +20%) of total takings Let x be rent for single room suite

Then 1,04,400 x = 26,41,00,000 + 0.25 × 1,04,400 x

Or, 1,04,400 x = 26,41,00,000 + 26,100 x

Or, 78,300 x = 26,41,00,000

Or, x = 3,373

(iii) Rent to be charged for single room suite = ₹ 3,373 Rent for double rooms suites ₹ 3,373 x 2.5 = ₹ 8,432.5 Rent for triple rooms suites ₹ 3,373 x 5 = ₹ 16,865

Q.15 Lorry/ Truck Ques | RTP Nov 19

A transport company has a fleet of four trucks of 10 tonne capacity each plying in different directions for transport of customer's goods. The trucks run loaded with goods and return empty. The distance travelled, number of trips made and the load carried per day by each truck are as under:

Truck No.	One way Distance Km	No. of trips per day	Load carried per trip / day tonnes
1	48	4	6
2	120	1	9
3	90	2	8
4	60	4	8

The analysis of maintenance cost and the total distance travelled during the last two years is as under

Year	Total distance travelled	Maintenance Cost ₹
1	1,60,200	1,38,150
2	1,56,700	1,35,525

The following are the details of expenses for the year under review:

Diesel	₹ 60 per litre. Each litre gives 4 km per litre of diesel on an average.
Driver's salary	₹ 22,000 per truck per month
Licence and taxes	₹ 15,000 per annum per truck
Insurance	₹ 80,000 per annum for all the four trucks
Purchase Price pertruck	₹30,00,000, Life 10 years. Scrap value at the end of life is ₹1,00,000.
Oil and sundries	₹ 525 per 100 km run.
General Overhead	₹ 1,10,840 per annum

The trucks operate 24 days per month on an average.

Required

(i) PREPARE an Annual Cost Statement covering the fleet of four trucks.

(ii) CALCULATE the cost per km. run.

(iii) DETERMINE the freight rate per tonne km. to yield a profit of 30% on freight.

Ans. (i) Annual Cost Statement of four vehicles

	(₹)
Diesel {(4,21,632 km. ÷ 4 km) × ₹ 60) (Refer to Working Note 1)	63,24,480
Oil & sundries {(4,21,632 km. ÷ 100 km.) × ₹ 525}	22,13,568
Maintenance {(4,21,632 km. × ₹ 0.75) + ₹ 18,000}(Refer to Working Note 2)	3,34,224
Drivers' salary {(₹22,000 × 12 months) × 4 trucks}	10,56,000
Licence and taxes (₹ 15,000 × 4 trucks)	60,000
Insurance	80,000
Depreciation {(₹29,00,000 ÷ 10 years) × 4 trucks}	11,60,000
General overhead	1,10,840
Total annual cost	**1,13,39,112**

(ii) Cost per km. run

$$\text{Cost per kilometer run} = \frac{\text{Total annual cost of vehicles}}{\text{Total kilometre travelled annually}} \text{ (Refer to Working Note 1)}$$

$$= \frac{1,13,39,112}{4,21,632 kms} = 26.89$$

(iii) Freight rate per tonne km (to yield a profit of 30% on freight)

$$\text{Cost per tonne km} = \frac{\text{Total annual cost of three vehicles}}{\text{Total effectiveness tonnes kms per annum}} = \text{(Refer to Working Note 1)}$$

$$= \frac{1,13,39,112}{16,10,496 kms} = 7.04$$

$$\text{Freight rate per tonne km.} \quad \frac{7.04}{0.7} x1 = 10.06$$

Working Notes:

1. Total kilometre travelled and tonnes kilometre (load carried) by four trucks in one year

Truck number	One way distance in kms	No. of trips	Total distance covered in km per day	Load carried per trip / day in tonnes	Total effective tonnes km
1	48	4	384	6	1,152
2	120	1	240	9	1,080
3	90	2	360	8	1,440
4	60	4	480	8	1,920

Total			1,464		5,592

Total kilometre travelled by four trucks in one year

(1,464 km. × 24 days × 12 months) = 4,21,632

Total effective tonnes kilometre of load carried by four trucks during one year (5,592 tonnes km. × 24 days × 12 months) = 16,10,496

2. Fixed and variable component of maintenance cost:

$$\text{Variable maintenancecost per km} = \frac{Differenceinmaintenancecost}{Differenceindistancetravelled}$$

$$= \frac{1,38,150 - 1,35,525}{1,60,200kms - 1,56,700kms}$$

$$= 0.75$$

Fixed maintenance cost = Total maintenance cost–Variable maintenance cost

= 1,38,150-1,60,200 kms x 0.75 = 18,000

Q.16 Lorry/Transport Co. RTP Nov 20

A transport company has 20 vehicles, the capacities are as follows:

No. of Vehicles	Capacity per vehicle
5	9 MT
6	12 MT
7	15 MT
2	20 MT

The company provides the goods transport service between stations 'A' to station 'B'. Distance between these stations is 100 kilometers. Each vehicle makes one round trip per day on an average. Vehicles are loaded with an average of 90 per cent of capacity at the time of departure from station 'A' to station 'B' and at the time of return back loaded with 70 per cent of capacity. 10 per cent of vehicles are laid up for repairs every day. The following information is related to the month of August, 2020:

Salary of Transport Manager	₹ 60,000
Salary of 30 drivers	₹ 20,000 each driver
Wages of 25 Helpers	₹ 12,000 each helper
Loading and unloading charges	₹ 850 each trip
Consumable stores (depends on running of vehicles)	₹ 1,35,000
Insurance (Annual)	₹ 8,40,000
Road Licence (Annual)	₹ 6,00,000
Cost of Diesel per litre	₹ 78
Kilometres run per litre each vehicle	5 Km.
Lubricant, Oil etc.	₹ 1,15,000
Cost of replacement of Tyres, Tubes, other parts etc. (on running basis)	₹ 4,25,000
Garage rent (Annual)	₹ 9,00,000

Routine mechanical services	₹ 3,00,000
Electricity charges (for office, garage and washing station)	₹ 55,000
Depreciation of vehicles (on time basis)	₹ 6,00,000

There is a workshop attached to transport department which repairs these vehicles and other vehicles also. 40 per cent of transport manager's salary is debited to the workshop. The transport department has been apportioned ₹88,000 by the workshop during the month. During the month operation was for 25 days.

You are required:

(i) CALCULATE per ton-km operating cost.

(ii) DETERMINE the freight to be charged per ton-km, if the company earned a profit of 25 per cent on freight.

Ans.

(i) Operating Cost Sheet for the month of August, 2020

	Particulars	Amount (₹)
A.	**Fixed Charges:**	
	Manager's salary (₹60,000 × 60%)	36,000
	Drivers' Salary (₹20,000 x 30 drivers)	6,00,000
	Helpers' wages (₹12,000 x 25 helpers)	3,00,000
	Insurance (₹8,40,000 ÷ 12 months)	70,000
	Road licence (₹6,00,000 ÷ 12 months)	50,000
	Garage rent (₹9,00,000 ÷ 12 months)	75,000
	Routine mechanical services	3,00,000
	Electricity charges (for office, garage and washing station)	55,000
	Depreciation of vehicles	6,00,000
	Apportioned workshop expenses	88,000
	Total (A)	21,74,000
	Variable Charges:	
	Loading and unloading charges (Working Note 1)	7,65,000
	Consumable Stores	1,35,000
	Cost of diesel (Working Note 2)	14,04,000
	Lubricant, Oil etc.	1,15,000
	Replacement of Tyres, Tubes & other parts	4,25,000
	Total (B)	28,44,000
	Total Cost (A + B)	50,18,000
	Total Ton-Kms. (Working Note 3)	9,43,200
	Cost per ton-km. (C ÷ D)	5.32

(ii) Calculation of Chargeable Freight

Cost per ton-km.	₹ 5.32
Add: Profit @ 25% on freight or 33⅓% on cost	₹ 1.77
Chargeable freight per ton-km.	**₹ 7.09**

Working Notes:

1. Wages paid to loading and unloading labours

Numbers of vehicles available per day × No. of days × trips × wages per trip (20 vehicles × 90%) × 25 days × 2 trips × ₹850

18 × 25 × 2 × 850 = ₹7,65,000

2. **Cost of Diesel:**

Distance covered by each vehicle during August, 2020

= 100 k.m. x 2 x 25 days x 90% = 4,500 km.

$$\text{Consumption of diesel} = \frac{4{,}500 km x 20 vehicles}{5 k.m.} = 18{,}000 litres$$

Cost of diesel = 18,000 litres x 78 = 14,04,000

3. **Calculation of total ton-km:**

Total Ton-Km. = Total Capacity x Distance covered by each vehicle x Average

Capacity Utilisation ratio.

= **[(5 x 9MT) +(6x12MT) + (7x15MT) +(2x20MT)] x** 4,500 k.m. x

$$\frac{(90\% + 70\%)}{2}$$

= (45+72+105+40) x 4,500 k.m. x 80%

= 262 x 4,500 x 80%.

= 9,43,200 ton-km

Q.17 School Bus Ques (Passenger) | RTP July 21

VPS is a public school having 25 buses each plying in different directions for the transport of its school students. In view of large number of students availing of the bus service, the buses work two shifts daily both in the morning and in the afternoon. The buses are garaged in the school. The workload 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 junior students. Similarly, in the afternoon, the first trip takes 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 km. The school works 22 days in a month and remains closed for vacation in May and June. The bus fee, however, 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 – payable for all the 12 in months ₹ 12,000 per month per driver Cleaner's salary payable for all the 12 months ₹ 8,000 per month per cleaner License fees, taxes etc. ₹ 8,400 per bus per annum

Insurance Premium ₹ 15,600 per bus per annum

Repairs and Maintenance ₹ 20,500 per bus per annum

Purchase price of the bus ₹ 20,00,000 each

Life of the bus 16 years

Scrap value ₹ 1,60,000

Diesel Cost ₹ 78. 50 per litre

Each bus gives an average of 5 km. per litre of diesel. The seating capacity of each bus is 40 students.

The school follows differential transportation fees based on distance travelled as under:

Students picked up and dropped within the range of distance from the school	Transportation fee	Percentage of students availing this facility
2 km.	25% of Full	15%
4 km.	50% of Full	30%
8 km.	Full	55%

Due to a pandemic, lockdown imposed on schools and the school remained closed from April 2020 to December 2020. Drivers and cleaners were paid 75% of their salary during the lockdown period. Repairing cost reduced to 75% for the year 2020.

Ignore the interest cost. Required:

(i) PREPARE a statement showing the expenses of operating a single bus and the fleet of 25 buses for a year.

(ii) FIND OUT transportation fee per student per month in respect of:

(a) Students coming from a distance of upto 2 km. from the school.

(b) Students coming from a distance of upto 4 km. from the school; and

(c) Students coming from a distance of upto 8 km. from the school.

(iii) CALCULATE the minimum bus fare that must be recovered from the students for the year 2020.

Ans.

(i) Statement showing the expenses of operating a single bus and the fleet of 25 buses for a year

Particulars	Per bus per annum (₹)	Fleet of 25 buses per annum (₹)
Running costs : (A)		
Diesel (Refer to working note 1)	2,21,056	55,26,400
Repairs & maintenance costs: (B)	20,500	5,12,500
Fixed charges:		
Driver's salary (₹ 12,000 × 12 months)	1,44,000	36,00,000
Cleaners salary (₹ 8,000 × 12 months)	96,000	24,00,000
Licence fee, taxes etc.	8,400	2,10,000
Insurance	15,600	3,90,000
Depreciation $\left(\frac{20,00,000-1,60,000}{16 years}\right)$	1,15,000	28,75,000

Total fixed charges: (C)	3,79,000	94,75,000
Total expenses: (A+B+C)	6,20,556	1,55,13,900

(ii) Average cost per student per month in respect of students coming from a distance of:

(a)	2 km. from the school {₹ 6,20,556 / (236 students × 12 months)}(Refer to Working Note 2)	₹ 219.12
(b)	4 km. from the school (₹ 219.12 × 2)	₹ 438.24
(c)	8 km. from the school (₹ 219.12 × 4)	₹ 876.48

(iii) Calculation of minimum bus fare to be recovered from the students during the year 2020:

Statement showing the expenses of operating a single bus in year 2020

Particulars	Per bus per annum (₹)
Running costs : (A)	
Diesel (Refer to working note 3)	66,316.80
Repairs & maintenance costs: (B) (₹ 20,500 x 0.75)	15,375
Fixed charges:	
Driver's salary {₹ 12,000 × 3 months + (75% of ₹ 12,000 × 9 months)}	1,17,000
Cleaners salary {₹ 8,000 × 3 months + (75% of ₹ 8,000 × 9 months)}	78,000
Licence fee, taxes etc.	8,400
Insurance	15,600
Depreciation $\frac{20,00,000-1,60,000}{16 years}$	1,15,000
Total fixed charges: (C)	3,34,000
Total expenses: (A+B+C)	4,15,691.80

Minimum bus fare to be recovered:

(a)	2 km. from the school {₹ 4,15,691.8 / (236 students × 12 months)} (Refer to Working Note 2)	₹ 146.78
(b)	4 km. from the school (₹ 146.78 × 2)	₹ 293.56

(c) 8 km. from the school (₹146.78 × 4)	₹ 587.12

Working Notes:

1. Calculation of diesel cost per bus:

No. of trips made by a bus each day	4
Distance travelled in one trip both ways (8 km. × 2 trips)	16 km.
Distance travelled per day by a bus (16 km. × 4 shifts)	64 km.
Distance travelled during a month (64 km. × 22 days)	1,408 km.
Distance travelled per year (1,408 × 10 months)	14,080 km.
No. of litres of diesel required per bus per year (14,080 km. ÷ 5 km.)	2,816 litres
Cost of diesel per bus per year (2,816 litres × ₹ 78.50)	₹ 2,21,056

2. Calculation of equivalent number of students per bus:

Bus capacity of 2 trips (40 students × 2 trips)	80 students
1/4th fare students (15% × 80 students)	12 students
½ fare students (30% × 80 students × 2) (equivalent to 1/4th fare students)	48 students
Full fare students (55% × 80 students × 4) (equivalent to 1/4th fare students)	176 students
Total students equivalent to 1/4th fare students	236 students

3. Calculation of diesel cost per bus in Year 2020:

Distance travelled during a month (64 km. × 22 days)	1,408 km.
Distance travelled during the year 2020 (1,408 × 3 months)	4,224 km.
No. of litres of diesel required per bus per year (4,224 km. ÷ 5 km.)	844.8 litres
Cost of diesel per bus per year (844.8 litres × ₹ 78.50)	₹ 66,316.80

Q.18 Bus Ques (Passenger) | RTP Dec 21

Mr. PS owns a bus which runs according to the following schedule:

(i)	Delhi to Hisar and back, the same day	
	Distance covered:	160 km. one way
	Number of days run each month:	9
	Seating capacity occupied	90%.
(ii)	Delhi to Aligarh and back, the same day	
	Distance covered:	160 km. one way
	Number of days run each month:	12
	Seating capacity occupied	95%
(iii)	Delhi to Alwar and back, the same day	

	Distance covered:	170 km. one way
	Number of days run each month:	6
	Seating capacity occupied	100%
(iv)	Following are the other details:	
	Cost of the bus	₹ 15,00,000
	Salary of the Driver	₹ 30,000 p.m.
	Salary of the Conductor	₹ 26,000 p.m.
	Salary of the part-time Accountant	₹ 7,000 p.m.
	Insurance of the bus	₹ 6,000 p.a.
	Diesel consumption 5 km. per litre at	₹ 90 per litre
	Road tax	₹ 21,912 p.a.
	Lubricant oil	₹ 30 per 100 km.
	Permit fee	₹ 500 p.m.
	Repairs and maintenance	₹ 5,000 p.m.
	Depreciation of the bus	@ 30% p.a.
	Seating capacity of the bus	50 persons

Passenger tax is 20% of the total takings.

CALCULATE the bus fare to be charged from each passenger to earn a profit of 30% on total takings.

The fares are to be indicated per passenger for the journeys: (i) Delhi to Hisar (ii) Delhi to Aligarh and (iii) Delhi to Alwar.

Ans. **Working Notes:**

1. Total Distance (in km.) covered per month

Bus route	Km. per trip	Trips per day	Days per month	Km. per month
Delhi to Hisar	160	2	9	2,880
Delhi to Aligarh	160	2	12	3,840
Delhi to Alwar	170	2	6	2,040
Total				8,760

2. Passenger- km. per month

	Total seats available per month (at 100% capacity)	Capacity utilised		Km. per trip	Passenger-Km. per month
		(%)	Seats		
Delhi to Hisar & Back	900 (50 seats x 2 trips x 9 days)	90	810	160	1,29,600 (810 seats × 160 km.)

Delhi to Aligarh& Back	1,200 (50 seats x 2 trips x 12 days)	95	1,140	160	1,82,400 (1,140 seats × 160 km.)
Delhi to Alwar & Back	600 (50 seats x 2 trips x 6 days)	100	600	170	1,02,000 (600 seats × 170 km.)
Total					4,14,000

Monthly Operating Cost Statement

Particulars	(₹)	(₹)
(i) Running Costs		
Diesel {(8,760 km x 5 km) x ₹ 90}	1,57,680.00	
Lubricant oil {(8,760 km x 100) x ₹ 30}	2,628.00	1,60,308.00
(ii) Maintenance Costs		
Repairs & Maintenance		5,000.00
(iii) Standing charges		
Salary to driver	30,000.00	
Salary to conductor	26,000.00	
Salary of part-time accountant	7,000.00	
Insurance (₹ 6,000 ÷12)	500.00	
Road tax (₹ 21,912 ÷12)	1,826.00	
Permit fee	500.00	
Depreciation {(₹ 15,00,000 x 30%) x 12}	37,500.00	1,03,326.00
Total costs per month before Passenger Tax (i)+(ii)+(iii)		2,68,634.00
Passenger Tax*		1,07,453.60
Total Cost		3,76,087.60
Add: Profit*		1,61,180.40
Total takings per month		5,37,268.00

***Let total takings be X then,**

X = Total costs per month before passenger tax + 0.2 X (passenger tax) + 0.3 X (profit) X = ₹ 2,68,634 + 0.2 X + 0.3 X

0.5 X = ₹ 2,68,634 or, X = ₹ 5,37,268

Passenger Tax = 20% of ₹ 5,37,268 = ₹ 1,07,453.60 Profit = 30% of ₹ 5,37,268 = ₹ 1,61,180.40

Calculation of Rate per passenger km. and fares to be charged for different routes

Rate per Passenger-Km.

$$= \frac{Total takings per month}{Total Passenger - Km \text{ per month}}$$

$$= \frac{5,37,268}{4,14,000 Passenger-km.} = 1.30 \text{ [approx.]}$$

Bus fare to be charged per passenger:

Delhi to Hisar	=	₹ 1.30 x 160 km	=	₹ 208.00
Delhi to Aligarh	=	₹ 1.30 x 160 km	=	₹ 208.00
Delhi to Alwar	=	₹ 1.30 x 170 km	=	₹ 221.00

Q.19 Vehicle running cost Ques | RTP May 22

Navya LMV Pvt. Ltd, operates cab/ car rental service in Delhi/NCR. It provides its service to the offices of Noida, Gurugram and Faridabad. At present it operates CNG fuelled cars but it is also considering to upgrade these into Electric vehicle (EV). The details related with the owning of CNG & EV propelled cars are as tabulated below:

Particulars	CNG Car	EV Car
Car purchase price (₹)	9,20,000	15,20,000
Govt. subsidy on purchase of car (₹)	--	1,50,000
Life of the car	15 years	10 years
Residual value (₹)	95,000	1,70,000
Mileage	20 km/kg	240 km per charge
Electricity consumption per full charge	--	30 Kwh
CNG cost per Kg (₹)	60	--
Power cost per Kwh (₹)	--	7.60
Annual Maintenance cost (₹)	8,000	5,200
Annual insurance cost (₹)	7,600	14,600
Tyre replacement cost in every 5 -year (₹)	16,000	16,000
Battery replacement cost in every 8- year (₹)	12,000	5,40,000

Apart from the above, the following are the additional information:

Particulars	
Average distance covered by a car in a month	1,500 km
Driver's salary (₹)	20,000 p.m
Garage rent per car (₹)	4,500 p.m
Share of Office & Administration cost per car (₹)	1,500 p.m

Required:

CALCULATE the operating cost of vehicle per month per car for both CNG & EV options.

Ans. **Working Notes:**

1. **Calculation of Depreciation per month:**

	Particulars	CNG Car	EV Car

A	Car purchase price (₹)	9,20,000	15,20,000
B	*Less:* Govt. subsidy (₹)	--	(1,50,000)
C	*Less:* Residual value (₹)	(95,000)	(1,70,000)
D	Depreciable value of car (₹) [A-B-C]	8,25,000	12,00,000
E	Life of the car	15 years	10 years
F	Annual depreciation (₹) [D÷E]	55,000	1,20,000
G	**Depreciation per month (₹) [F÷12]**	**4,583.33**	**10,000**

2. Fuel/ Electricity consumption cost per month:

	Particulars	CNG Car	EV Car
A	Average distance covered in a month (KM)	1,500	1,500
B	Mileage (KM)	20	240
C	Qty. of CNG/ Full charge required [A÷B]	75 kg.	6.25
D	Electricity Consumption [C×30kwh]	-	187.5
E	Cost of CNG per kg (₹)	60	-
F	Power cost per Kwh (₹)	-	7.60
G	CNG Cost per month (₹) [C×E]	4,500	-
H	Power cost per month (₹) [D×F]	-	1,425

3. Amortised cost of Tyre replacement:

	Particulars	CNG Car	EV Car
A	Life of vehicle	15 years	10 years
B	Replacement interval	5 years	5 years
C	No. of time replacement required	2 times	1 time
D	Cost of tyres for each replacement (₹)	16,000	16,000
E	Total replacement cost (₹) [C×D]	32,000	16,000
F	Amortised cost per year (₹) [E÷A]	2,133.33	1,600
E	**Cost per month (₹) [F÷12]**	**177.78**	**133.33**

4. Amortised cost of Battery replacement:

	Particulars	CNG Car	EV Car
A	Life of vehicle	15 years	10 years
B	Replacement interval	8 years	8 years
C	No. of time replacement required	1 time	1 time
D	Cost of battery for each replacement (₹)	12,000	5,40,000
E	Total replacement cost (₹) [C×D]	12,000	5,40,000
F	Amortised cost per year (₹) [E÷A]	800	54,000
E	**Cost per month (₹) [F÷12]**	**66.67**	**4,500**

Calculation of Operating cost per month:

	Particulars	CNG Car (₹)	EV Car (₹)
A	**Running cost:**		
	Fuel cost/ Power consumption cost [ReferWN-2]	4,500	1,425
B	**Maintenance cost:**		
	Annual Maintenance cost [Annual cost ÷12]	666.67	433.33
	Annual Insurance cost [Annual cost ÷12]	633.33	1,216.67
	Amortised cost of Tyre replacement[Refer WN-3]	177.78	133.33
	Amortised cost of Battery replacement[Refer WN-4]	66.67	4,500
		1,544.45	6,283.33
C	**Fixed cost:**		
	Depreciation [Refer WN-1]	4,583.33	10,000
	Driver's salary	20,000	20,000
	Garage rent	4,500	4,500
	Share of Office & Administration cost	1,500	1,500
		30,583.33	36,000
D	**Operating cost per month [A+B+C]**	**36,627.78**	**43,708.33**

Q.20 Bus Passenger Bases ques | RTP Nov 22

Royal Transport Services runs fleet of buses within the limits of Jaipur city. The following are the details which were incurred by the company during October, 2021:

Cost of each Bus	24,00,000
Garage Rent	1,00,000
Insurance	25,000
Road tax	20,000
Manager's Salary	60,000
Assistant's Salary (Two)	32,000 each
Supervisor's Salary (Three)	24,000 each
Driver's Salary (Twenty-Five)	20,000 each
Cleaner's Salary (Twenty)	5,000 each
Office Staff's Salary	1,00,000
Consumables	1,20,000

Repairs & Maintenance	90,000
Other Fixed Expenses	72,000
Diesel (10 Kms per Litre)	80 per litre
Oils & Lubricants	1,45,000
Tyres and tubes	35,000
Depreciation	10% p.a. on Cost

Other details are as below:

	Capacity
12 Buses	60 passenger
13 Buses	50 Passengers

Each Bus make 4 round trips, 10 km in each trip in one way. On average 80% bus seats are occupied and generally 5 buses are to be kept away for repairs each day.

Calculate Cost per passenger & Cost sheet for 20 passengers.

Ans.

Particulars	Amount (₹)	Amount (₹)
Standing Charges:		
Depreciation (₹ 24,00,000 X 10% X 1/12 X 25)	5,00,000	
Garage Rent	1,00,000	
Insurance Road	25,000	
Tax	20,000	
Manager's Salary	60,000	
Assistant's Salary (₹ 32,000 X 2)	64,000	
Supervisor's Salary (₹ 24,000 X 3)	72,000	
Driver's Salary (₹ 20,000 X 25)	5,00,000	
Cleaner's Salary (₹ 5,000 X 20)	1,00,000	
Office Staff's Salary	1,00,000	
Consumables	1,20,000	
Repairs & MaintenanceOther	90,000	
Fixed Expenses **Running**	72,000	18,23,000
Charges		
Diesel (49,600 Kms / 10 Kms X ₹ 80 per unit)Oils &	3,96,800	
Lubricants	1,45,000	
Tyres and tubes	35,000	5,76,800
Total Operating Cost		**23,99,800**

Cost per passenger-km = $\frac{Total\,Operating\,Cost}{Passenger-kms}$

= $\frac{23,99,800}{27,18,080}$ = 0.883

Working Note:

Calculation of Total Kilometers and Passenger Kilometers

Specification	Total Km.	Passenger-Km.
12 Buses (60 Passengers)	29,760 Kms (10 Kms × 4 X 2 trips × 31days x 12 Buses)	14,28,480 (29760 Kms x 60 Pass. x 80%)
13 Buses (50 Passengers)	32,240 Kms (10 Kms × 4 X 2 trips × 31days x 13 Buses)	12,89,600 (32240 Kms x 50 Pass. x 80%)
Total	**62,000**	**27,18,080**

Since 5 buses out of 25 buses are kept for repairs every day

Actual total Km. 62,000 × 20/25 = 49,600

Q.21 Electricity Power plant Ques | RTP Nov 23

P Holiday Resorts offers three types of rooms to its guests, viz deluxe room, super deluxe room and luxury suite. You are required to ascertain the tariff to be charged to the customers for different types of rooms on the basis of following information:

Types of Room	Number of Rooms	Occupancy
Deluxe Room	100	90%
Super Deluxe Room	60	75%
Luxury Suite	40	60%

Rent of 'super deluxe' room is to be fixed at 2 times of 'deluxe room' and that of 'luxury suite' is 3 times of 'deluxe room'. Annual expenses are as follows:

Particulars	Amount (₹ lakhs)
Staff salaries	680.00
Lighting, Heating and Power	300.00
Repairs, Maintenance and Renovation	180.00
Linen	30.00
Laundry charges	24.00
Interior decoration	75.00
Sundries	30.28

An attendant for each room was provided when the room was occupied and he was paid

₹ 500 per day towards wages. Further, depreciation is to be provided on building @ 5% on ₹ 900 lakhs, furniture and fixtures @ 10% on ₹ 90 lakhs and air conditioners @ 10% on ₹ 75 lakhs.

Profit is to be provided @ 25% on total taking and assume 360 days in a year.

Ans. **Operating cost statement of P Holiday Resorts**

Particulars	Cost per annum (₹ In lakhs)
Staff Salaries	680.00
Room Attendant's Wages (Refer WN-3)	286.20
Lighting, Heating & Power	300.00
Repairs, Maintenance & Renovation	180.00
Linen	30.00
Laundry charges	24.00
Interior Decoration	75.00
Sundries	30.28
Depreciation: (Refer WN-4)	
Building	45.00
Furniture & Fixture	9.00
Air Conditioners	7.50
Total cost for the year	**1666.98**

Computation of profit:

Let ₹ x be the rent for deluxe from.

Equivalent deluxe room days are 90,720 (Refer WN-2) Total takings = ₹ 90,720x

Profit is 25% of total takings.

Profit = 25% of ₹ 90,720x = ₹ 22,680x

Total takings = Total Cost + Profit

₹ 90,720x = ₹ 16,66,98,000 + ₹ 22,680x

₹ 90,720x - ₹ 22,680x = ₹ 16,66,98,000

₹ 68,040x = ₹ 16,66,98,000

$$X = \frac{16,66,98,000}{68,040} = 2,450$$

Rent to be charged for deluxe room	₹ 2,450
Rent to be charged for super deluxe room = Rent of deluxe room x 2 = ₹ 2,450 x 2	₹ 4,900
Rent to be charged for luxury suite = Rent of Deluxe room x 3 = ₹ 2,450 x 3	₹ 7,350

Working Notes:

1. Computation of Room Occupancy

Type of Room	No. of rooms x no. of days x occupancy %	Room days
Deluxe Room	100 rooms x 360 days x 90% occupancy	32,400
Super Deluxe Room	60 rooms x 360 days x 75% occupancy	16,200

Luxury Suite	40 x 360 days x 60% occupancy	8,640
	Total	57,240

2. **Computation of equivalent deluxe room days**

Rent of 'super deluxe' room is to be fixed at 2 times of 'deluxe room' and luxury suite' is 3 times of 'deluxe room'. Therefore, equivalent room days would be:

Type of Room	Room days	Equivalent deluxe room days
Deluxe Room	32,400 x 1	32,400
Super Deluxe Room	16,200 x 2	32,400
Luxury Suite	8,640 x 3	25,920
	Total	90,720

Q.22 Bus/ Passenger Ques | MTP Nov 18(1)

CALCULATE a suggested fare per passenger-km from the following information for a Mini Bus:

Length of route: 30 km

Purchase price Rs. 4,00,000

Part of above cost met by loan, annual interest of which is Rs. 10,000 p.a.

Other annual charges: Insurance Rs. 15,000, Garage rent Rs. 9,000, Road tax Rs. 3,000 , Repairs & maintenance Rs. 15,000, Administrative charges Rs. 5,000.

Running Expenses: Driver & Conductor Rs. 5,000 p.m., Repairs/Replacement of tyre-tube Rs. 3,600 p.a., Diesel and oil cost per km Rs. 5.

Effective life of vehicle is estimated at 5 years at the end of which it will have a scrap value of Rs. 10,000.

Mini Bus has 20 seats and is planned to make Six no. two way trips for 25 days/p.m.

Provide profit @ 20% of total revenue.

Ans.

1. Depreciation per annum:= $\frac{Purchaseprice - ScrapValue}{Estimatedlife}$

$$= \frac{4,00,000 - 10,000}{5 years} = 78,000$$

2. Total distance travelled by mini-bus in 25 days:

= Length of the route (two -sides) × No. of trips per day × No. of days

= 60 km × 6 trips × 25 days = 9,000 km

3. Total Passenger-Km:

=Total distance travelled by mini-bus in 25 days × No. of seats

= 9,000 km × 20 seats = 1,80,000 passenger-km

Statement suggesting fare per passenger-km

Particulars	Cost per annum Rs.	Cost per month Rs.
Fixed expenses:		
Insurance	15,000	
Garage rent	9,000	
Road tax	3,000	
Administrative charges	5,000	
Depreciation	78,000	
Interest on loan	10,000	10,000
	1,20,000	
Running expenses:		
Repair and maintenance	15,000	1,250
Replacement of tyre-tube	3,600	300 45,000
Diesel and oil cost (9,000 km × Rs. 5)	-	
Driver and conductor's salary	-	5,000
Total cost (per month)		61,550.00
Add: Profit 20% of total revenue cost or 25% of total cost		15,387.50
Total revenue		76,937.50

Rate per passenger-km Rs. 76,937.50/1,80,000 passenger km = 0.42743 i.e.,= 0.43 i.e., 43 paise

Q.23 Airline/ Passenger Ques | MTP Nov 18(2)

DKG Airlines owns single passenger aircraft and operates between Melbourne and Delhi only. Flight leaves Melbourne on Monday and Thursday and departs from Delhi on Wednesday and Saturday. DKG Airlines cannot afford any more flight between Melbourne and Delhi. Only economical class seats are available on its flight and all tickets are booked by travel agents. The following information are collected.

Seating capacity per plane	360
Average passengers per flight	250
Flights per week	4
Flights per year	208
Average one-way fare	Rs.50,000
Variable fuel cost	Rs.28,00,000 per flight
Food service to passengers (not charged to Passengers)	Rs.2,600 per passenger
Commission to travel agents	15% of fare
Fixed annual lease cost allocated to each flight	Rs. 15,30,000 per flight

Fixed ground services (maintenance, check in, Baggage handling cost) allocated to each flight	Rs.1,70,000 per flight
Fixed salaries of flight crew allocated to each flight	Rs.6,50,000 per flight

For the sake of simplicity assume that fuel cost is unaffected by the actual number of passengers on a flight.

Required:

(i) CALCULATE the operating income that DKG Airlines makes on each way flight between Melbourne and Delhi?

(ii) The market research department of DKG Airlines indicates that lowering the average one-way fare to Rs. 48,000 and increase in agents' commission to 17.5% will increase the average number of passenger per flight to 275. DECIDE whether DKG Airlines should lower its fare or not?

Ans (i) **Statement of operating income of DKG Airlines for Melbourne-Delhi flight (one way)**

Particulars	Amount (Rs.)	Amount (Rs.)
Fare received (per flight): 250 passengers × Rs. 50,000		1,25,00,000
Variable costs (per flight):		
- Fuel cost	28,00,000	
- Food (250 × Rs. 2,600)	6,50,000	
- Commission to Travel Agents (15% of Rs. 1,25,00,000)	18,75,000	(53,25,000)
Contribution per flight		71,75,000
Fixed cost (per flight):		
Annual lease cost	15,30,000	
Fixed ground service costs	1,70,000	
Salaries of flight crew	6,50,000	(23,50,000)
Operating income per flight		48,25,000

(ii) Operating income of DKG Airlines per Melbourne-Delhi flight (one way) after reduction in fare

Fare received (per flight): 275 passengers × Rs. 48,000		1,32,00,000
Variable costs (per flight):		
Fuel cost	28,00,000	
Food (275 × Rs.2,600)	7,15,000	
Commission to Travel Agents (17.5% of Rs.1,32,00,000)	23,10,000	(58,25,000)
Contribution per flight		73,75,000

Excess contribution due to lowering of fare (Rs.73,75,000 – Rs.71,75,000) = Rs.2,00,000. DKG Airlines should lower its fare as it would increase its contribution by Rs. 2,00,000

Q.24 Lorry/ Truck Ques | MTP May 19(1)

A transport company has a fleet of three trucks of 10 tonnes capacity each plying in different directions for

transport of customer's goods. The trucks run loaded with goods and return empty. The distance travelled, number of trips made and the load carried per day by each truck are as under:

Truck No.	One way Distance Km	No. of trips per day	Load carried per trip / day tonnes
1	16	4	6
2	40	2	9
3	30	3	12

The analysis of maintenance cost and the total distance travelled during the last two years is as under

Year	Total distance travelled	Maintenance Cost (Rs.)
1	1,60,200	46,050
2	1,56,700	45,175

The following are the details of expenses for the year under review:

Diesel	Rs. 65 per litre. Each litre gives 4 km per litre of diesel on an average.
Driver's salary	Rs. 24,000 per month
Licence and taxes	Rs. 25,000 per annum per truck
Insurance	Rs. 45,000 per annum for all the three vehicles
Purchase Price per truck	Rs. 30,00,000, Life 10 years. Scrap value at the end of life is Rs. 1,00,000.
Oil and sundries	Rs. 250 per 100 km run.
General Overhead	Rs. 1,15,600 per annum

The vehicles operate 24 days per month on an average. On the basis of commercial tone-km, you are required to:

(i) PREPARE an Annual Cost Statement covering the fleet of three vehicles.

(ii) CALCULATE the cost per km. run.

(iii) DETERMINE the freight rate per tonne km. to yield a profit of 10% on freight.

Ans. **(i)** **Annual Cost Statement of three vehicles**

	(Rs.)
Diesel {(1,34,784 km. ÷ 4 km) × Rs. 65) (Refer to Working Note 1)	21,90,240
Oil & sundries {(1,34,784 km. ÷ 100 km.) × Rs. 250}	3,36,960
Maintenance {(1,34,784 km. × Rs. 0.25) + Rs. 6,000} (Refer to Working Note 2)	39,696
Drivers' salary {(Rs.24,000 × 12 months) × 3 trucks}	8,64,000
Licence and taxes (Rs. 25,000 × 3 trucks)	75,000

Insurance	45,000
Depreciation {(Rs. 29,00,000 ÷ 10 years) × 3 trucks}	8,70,000
General overhead	1,15,600
Total annual cost	45,36,496

(ii) Cost per km. run

Cost per kilometer run = $\frac{Total\,annual\,cost\,of\,vehicles}{Total\,kilometre\,travelled\,annually}$ (Refer to Working Note 1)

= 33.86

(iii) Freight rate per tonne km (to yield a profit of 10% on freight)

Cost per tonne km = $\frac{Total\,annual\,cost\,of\,three\,vehicles}{Total\,effective\,tonnes\,kms\,per\,annum}$ (Refer to Working Note 1)

$= \frac{45,36,496}{6,06,528\,kms} = 7.48$

Freight rate per tonne km. $\left(\frac{7.48}{0.9}\right) x1 = 8.31$

Working Notes:

1. Total kilometer travelled and Commercial tonnes kilometer (load carried) by three trucks in one year

Truck	One way distance in kms	No. of trips	Total distance covered in km per day (with load)	Total distance covered in km per day (up & down)	Load carried per trip / day in tonnes	Total effective tonnes km
	a	b	c = a × b	d = c × 2	e	f = 27/3 × c
1	16	4	64	128	6	576
2	40	2	80	160	9	720
3	30	3	90	180	12	810
Total			234	468	27	2,106

Total kilometre travelled by three trucks in one year

(468 km. × 24 days × 12 months) = 1,34,784

Total effective tonnes kilometre of load carried by three trucks during one year (2,106 tonnes km. × 24 days × 12 months) = 6,06,528 tonne-km

2. Fixed and variable component of maintenance cost:

Variable maintenance cost per km. = $\frac{Difference\,in\,maintenance\,cost}{Difference\,in\,Distance\,travelled}$

Q.25 Lorry/ Truck Ques | MTP May 19(1)

XYZ LLP, contractors and civil engineers, are building a new wing to a school. The quoted fixed price for the contract is Rs.30,00,000. Work commenced on 1st January 20X8 and is expected to be completed on schedule by 30 June 20X9.

Data relating to the contract at the year ended 31st March 20X9 is as follows.

	Amount (Rs.)
Plant sent to site at commencement of contract	2,40,000
Hire of plant and equipment	77,000
Materials sent to site	6,62,000
Materials returned from site	47,000
Direct wages paid	9,60,000
Wage related costs	1,32,000
Direct expenses incurred	34,000
Supervisory staff salaries - Direct	90,000
- Indirect	20,000
Regional office expenses apportioned to contract	50,000
Head office expenses apportioned to contract	30,000
Surveyor's fees	27,000
Progress payments received from school	18,00,000

Additional information:

1. Plant is to be depreciated at the rate of 25 % per annum following straight line method, with no residual value.
2. Unused materials on site at 31st March are estimated at Rs. 50,000.
3. Wages owed to direct workers total Rs. 40,000
4. No profit in respect of this contract was included in the year ended 31st March 2016.
5. Budgeted profit on the contract is Rs. 8,00,000
6. Value of work certified by the surveyor is Rs. 24,00,000.
7. The surveyor has not certified the work costing Rs. 1,80,000

You are required to PREPARE the account for the school contract for the fifteen months ended 31st March 20X9, and CALCULAT E the notional profit to date.

Ans. School Contract Account

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Plant	2,40,000	By Material returned	47,000
To Hire of plant	77,000	By Plant c/d	1,65,000
To Materials	6,62,000	By Materials c/d	50,000
To Direct wages 9,60,000		By WIP c/d:	
Add: Accrued 40,000	10,00,000	Value of work certified	24,00,000

To Wages related costs	1,32,000	Cost of work not certified	1,80,000
To Direct expenses	34,000		
To Supervisory staff:			
Direct 90,000			
Indirect 20,000	1,10,000		
To Regional office expenses	50,000		
To Head office expenses	30,000		
To Surveyors' fees	27,000		
To Notional profit c/d	4,80,000		
	28,42,000		28,42,000

Q.26 BOT New Ques | MTP Nov 19

SLS Infrastructure builts and operates a 110 k.m. long highway on the basis of Built-Operate- Transfer (BOT) model for a period of 25 years. A traffic assessment has been carried out to estimate the traffic flow per day. The details are as below:

Sl. No.	Type of vehicle	Daily traffic volume
1.	Two wheelers	44,500
2.	Car and SUVs	3,450
3.	Bus and LCV	1,800
4.	Heavy commercial vehicles	816

The following is the estimated cost of the project:

Sl. no.	Activities	Amount (Rs. in lakh)
1	Site clearance	170.70
2	Land development and filling work	9,080.35
3	Sub base and base courses	10,260.70
4	Bituminous work	35,070.80
5	Bridge, flyovers, underpasses, Pedestrian subway, footbridge, etc.	29,055.60
6	Drainage and protection work	9,040.50
7	Traffic sign, marking and road	8,405.00
8	appurtenance Maintenance, repairing and rehabilitation Environmental management	12,429.60

9	Total Project cost	982.00
	Total	1,14,495.25

An average cost of Rs.1,120 lakh has to be incurred on administration and toll plaza operation. On the basis of the vehicle specifications (i.e. weight, size, time saving etc.), the following weights has been assigned to the passing vehicles:

Sl. No.	Type of vehicle	
1.	Two wheelers	5%
2.	Car and SUVs	20%
3.	Bus and LCV	30%
4.	Heavy commercial vehicles	45%

CACULATE the total project cost per day of concession period.

(ii) COMPUTE toll fee to be charged for per vehicle of each type, if the company wants to earn a profit of 15% on total cost.

[Note: Concession period is a period for which an infrastructure is allowed to operate and recovers its investment]

Ans.

School Contract Account

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Plant	2,40,000	By Material returned	47,000
To Hire of plant	77,000	By Plant c/d	1,65,000
To Materials	6,62,000	By Materials c/d	50,000
To Direct wages 9,60,000		By WIP c/d:	
Add: Accrued 40,000	10,00,000	Value of work certified	24,00,000
To Wages related costs	1,32,000	Cost of work not certified	1,80,000
To Direct expenses	34,000		
To Supervisory staff:			
Direct 90,000			
Indirect 20,000	1,10,000		
To Regional office expenses	50,000		
To Head office expenses	30,000		
To Surveyors' fees	27,000		
To Notional profit c/d	4,80,000		
	28,42,000		28,42,000

Q.27 Toll Road | MTP May 20

KR Resorts (P) Ltd. offers three types of rooms to its guests, viz deluxe room, super deluxe room and luxury suite. You are required to DETERMINE the tariff to be charged to the customers for different types of rooms on the basis of following information:

Types of Room	Number of Rooms	Occupancy
Deluxe Room	100	90%
Super Deluxe Room	60	75%
Luxury Suite	40	60%

Rent of 'super deluxe' room is to be fixed at 2 times of 'deluxe room' and that of 'luxury suite' is 3 times of 'deluxe room'. Annual expenses are as follows:

Particulars	Amount (Rs. lakhs)
Staff salaries	780.00
Lighting, Heating and Power	350.00
Repairs, Maintenance and Renovation	220.00
Linen	60.00
Laundry charges	34.00
Interior decoration	85.00
Sundries	36.28

An attendant for each room was provided when the room was occupied and he was paid Rs. 500 per day towards wages. Further, depreciation is to be provided on building @ 5% on Rs. 900 lakhs, furniture and fixtures @ 10% on Rs. 90 lakhs and air conditioners @ 10% on Rs. 75 lakhs. Profit is to be provided @ 25% on total taking and assume 360 days in a year.

Ans.

Total cost statement of KR Resort (P) Limited

Particulars	Cost per annum (Rs. in lakhs)
Staff Salaries	780.00
Room Attendant's Wages (Refer working note 3)	286.20
Lighting, Heating & Power	350.00
Repairs, Maintenance & Renovation	220.00
Linen	60.00
Laundry charges	34.00
Interior Decoration	85.00
Sundries	36.28
- Building	45.00
- Furniture & Fixture	9.00
- Air Conditioners	7.50
Total cost for the year	1912.98

Computation of profit:

Let Rs. x be the rent for deluxe from.

Equivalent deluxe room days are 90,720 (Refer working note 2) Total takings = Rs. 90,720x

Profit is 25% of total takings.

Profit = 25% of Rs. 90,720x = Rs. 22,680x

Total takings = Total Cost + Profit

Rs. 90,720x = Rs. 19,12,98,000 + Rs. 22,680x

Rs. 90,720x -Rs. 22,680x = Rs. 19,12,98,000

Rs. 68,040x = Rs. 19,12,98,000

$$X = \frac{Rs19,12,98,000}{Rs68,040} \times Rs\ 2,811.55$$

Rent to be charged for deluxe room	Rs. 2,811.55
Rent to be charged for super deluxe room = Rent of deluxe room x 2 = Rs. 2,811.55 x 2	Rs. 5,623.10
Rent to be charged for luxury suite = Rent of Super Deluxe room x 1.5 = Rs. 5,623.10 x 1.5	Rs. 8,434.65

Working Notes:

(1) Computation of Room Occupancy

Type of Room	No. of rooms x no. of days x occupancy %	Room days
Deluxe Room	100 rooms x 360 days x 90% occupancy	32,400
Super Deluxe Room	60 rooms x 360 days x 75% occupancy	16,200
Luxury Suite	40 rooms x 360 days x 60% occupancy	8,640
	Total	57,240

(2) Computation of equivalent deluxe room days

Rent of 'super deluxe' room is to be fixed at 2 times of 'deluxe room' and luxury suite' is 3 times of 'deluxe room'. Therefore, equivalent room days would be:

Type of Room	Room days	Equivalent deluxe room days
Deluxe Room	32,400 x 1	32,400
Super Deluxe Room	16,200 x 2	32,400
Luxury Suite	8,640 x 3	25,920
	Total	90,720

(3) Computation of room attendant's wages

Room occupancy days @ Rs. 500 per day = 286.2 lakhs (i.e. 57,240 days ×Rs. 500)

(4) Computation of Depreciation per annum

Particulars	Cost (Rs.)	Rate of Depreciation	Depreciation (Rs.)
Building	9,00,00,000	5%	45,00,000

Furniture & Fixtures	90,00,000	10%	9,00,000
Air Conditioners	75,00,000	10%	7,50,000

Q.28 Lorry Ques | MTP May 21

GMCS Ltd. collects raw milk from the farmers of Ramgarh, Pratapgarh and Devgarh panchayats and processes this milk to make various dairy products. GMCS Ltd. has its own vehicles (tankers) to collect and bring the milk to the processing plant. Vehicles are parked in the GMCS Ltd.'s garage situated within the plant compound.

Following are the information related with the vehicles:

	Ramgarh	Pratapgarh	Devgarh
No. of vehicles assigned	4	3	5
No. of trips a day	3	2	4
One way distance from the processing plant	24 k.m.	34 k.m.	16 k.m.
Fess & taxes per month (Rs.)	5,600	6,400	---

All the 5 vehicles assigned to Devgarh panchayat, were purchased five years back at a cost of Rs. 9,25,000 each. The 4 vehicles assigned to Ramgarh panchayat, were purchased two years back at a cost of Rs. 11,02,000 each and the remaining vehicles assigned to Pratapgarh were purchased last year at a cost of Rs. 13,12,000 each. With the purchase of each vehicle a two years free servicing warranty is provided. A vehicle gives 10 kmpl mileage in the first two year of purchase, 8 kmpl in next two years and 6 kmpl afterwards. The vehicles are subject to depreciation of 10% p.a. on straight line basis irrespective of usage. A vehicle has the capacity to carry 10,000 litres of milk but on an average only 70% of the total capacity is utilized.

The following expenditures are related with the vehicles:

Salary of Driver (a driver for each vehicle)	Rs. 24,000 p.m.
Salary to Cleaner (a cleaner for each vehicle)	Rs. 12,000 p.m.
Allocated garage parking fee	Rs. 4,200 per vehicle per month
Servicing cost	Rs. 15,000 for every complete 5,000 k.m. run.
Price of diesel per litre	Rs. 78.00

From the above information you are required to CALCULATE

(i) Total operating cost per month for each vehicle. (Take 30 days for the

(ii) Vehicle operating cost per litre of milk.

Ans. **(i) Calculation of Operating Cost per month for each vehicle**

	Ramgarh (Rs.)	Pratapgarh (Rs.)	Devgarh (Rs.)	Total (Rs.)
A. Running Costs:				
- Cost of diesel (Working Note- 2)	1,68,480	95,472	2,49,600	5,13,552
	2,13,480	95,472	2,94,600	6,03,552

- Servicing cost (Working Note- 3)	96,000 (4 drivers × Rs. 24,000)	72,000 (3 drivers × Rs. 24,000)	1,20,000 (5 drivers × Rs. 24,000)	2,88,000
B. Fixed Costs:				
- Salary to drivers	48,000 (4 cleaners × Rs. 12,000)	36,000 (3 cleaners × Rs. 12,000)	60,000 (5 cleaners × Rs. 12,000)	1,44,000
- Salary to cleaners	16,800 (4 vehicles × Rs.4,200)	12,600 (3 vehicles × Rs.4,200)	21,000 (5 vehicles × Rs.4,200)	50,400
- Allocated garage parking fee	36,733	32,800	38,542	
	2,03,133	1,59,800	2,39,542	6,02,475
	4,16,613	2,55,272	5,34,142	12,06,027
- Depreciation	1,04,153 (Rs.4,16,613 ÷ 4 vehicles)	85,091 (Rs.2,55,272 ÷ 3 vehicles)	1,06,828 (Rs.5,34,142 ÷ 5 vehicles)	1,00,502 (Rs.12,06,027 ÷ 12 vehicles)

(ii) **Vehicle operating cost per litre of milk**

$$\frac{Total\,Operating\,Cost\,per\,month}{Total\,milk\,carried\,a\,month} = \frac{12,06,027}{79,80,000\,Litres\,(working\,Note-5)} = 0.15$$

Working Notes:

1. **Distance covered by the vehicles in a month**

Route		Total Distance (in K.M.)
Ramgarh	(4 vehicles × 3 trips × 2 × 24 km. × 30 days)	17,280
Pratapgarh	(3 vehicles × 2 trips × 2 × 34 km. × 30 days)	12,240
Devgarh	(5 vehicles × 4 trips × 2 × 16 km. × 30 days)	19,200

2. **Cost of diesel consumption**

	Ramgarh	Pratapgarh	Devgarh
Total distance travelled (K.M.)	17,280	12,240	19,200
Mileage per litre of diesel	8 kmpl	10 kmpl	6 kmpl
Diesel consumption (Litre)	2,160	1,224	3,200
Cost of diesel consumption @ Rs. 78 per litre (Rs.)	(17,2 1,68,4	(12,2 95,47	(19,200 ÷ 2,49,600

3. **Servicing Cost**

	Ramgarh	Pratapgarh	Devgarh
Total distance travelled (K.M.)	17,280	12,240	19,200
Covered under free service warranty	No	Yes	No
No. of required	3 (17,280 k.m. ÷ 5,000 k.m.)	2 (12,240 k.m. ÷ 5,000 k.m.)	3 (19,200 k.m. ÷ 5,000
Total Service (Rs.)	45,000 (Rs. 15,000 × 3)	---	45,000 (Rs. 15,000 ×

4. Calculation of Depreciation

	Ramgarh	Pratapgarh	Devgarh
No. of vehicles	4	3	5
Cost of a vehicle (Rs.)	11,02,000	13,12,000	9,25,000
Total Cost of vehicles	44,08,000	39,36,000	46,25,000
Depreciation Month(Rs.)	36,733 $\left(\frac{44,08,000 \times 10\%}{12 months}\right)$	32,800 $\left(\frac{39,36,000 \times 10\%}{12 months}\right)$	38,542 $\left(\frac{46,25,000 \times 10\%}{12 months}\right)$

Q.29 BOT New Ques | MTP Dec 21(1)

MKL Infrastructure built and operates 110 k.m. highway on the basis of Built-Operate- Transfer (BOT) for a period of 21 years. A traffic assessment has been carried out to estimate the traffic flow per day which shows the following figures:

Sl. No.	Type of vehicle	Daily traffic volume
1.	Two wheelers	44,500
2.	Car and SUVs	3,450
3.	Bus and LCV	1,800
4.	Heavy commercial vehicles	816

The following is the estimated cost of the project:

Sl. no.	Activities	Amount (₹ in lakh)
1	Site clearance	341.00
2	Land development and filling work	9,160.00
3	Sub base and base courses	10,520.00
4	Bituminous work	32,140.00

5	Bridge, flyovers, underpasses, Pedestrian subway, footbridge,	28,110.00
6	Drainage and protection work	9,080.00
7	Traffic sign, marking and road appurtenance	8,810.00
8	Maintenance, repairing and rehabilitation	12,850.00
9	Environmental management	1,964.00
	Total Project cost	1,12,975.00

An average cost of ₹1,200 lakh has to be incurred on administration and toll plaza operation.
On the basis of the vehicle specifications (i.e. weight, size, time saving etc.), the following weights has been assigned to the passing vehicles:

Sl. No.	Type of vehicle	
1.	Two wheelers	5%
2.	Car and SUVs	20%
3.	Bus and LCV	30%
4.	Heavy commercial vehicles	45%

Required:
(i) CACULATE the total project cost per day of concession period.
(ii) COMPUTE toll fee to be charged for per vehicle of each type, if the company wants earn a profit of 15% on total cost.
[Note: Concession period is a period for which an infrastructure is allowed to operate and recover its investment]

Ans. **(i) Calculation of total project cost per day of concession period:**

Activities	Amount (₹ in lakh)
Site clearance	341.00
Land development and filling work	9,160.00
Sub base and base courses	10,520.00
Bituminous work	32,140.00
Bridge, flyovers, underpasses, Pedestrian subway, footbridge, etc	28,110.00
Drainage and protection work	9,080.00
Traffic sign, marking and road appurtenance	8,810.00
Maintenance, repairing and rehabilitation	12,850.00
Environmental management	1,964.00
Total Project cost	**1,12,975.0**
Administration and toll plaza operation cost	1,200.00
Total Cost	1,14,175.00
Concession period in days (21 years × 365 days)	7,665
Cost per day of concession period (₹ in lakh)	**14.90**

(ii) Computation of toll fee:

Cost to be recovered per day = Cost per day of concession period + 15% profit on cost

= ₹ 14,90,000 + ₹ 2,23,500 = ₹ 17,13,500

Cost per equivalent vehicle $= \frac{17,13,500}{76,444 units (Refer\ Working\ note)}$

= 22.42 per equivalent vehicle

Vehicle type-wise toll fee:

Sl. No.	Type of vehicle	Equivalent cost [A]	Weight [B]	Toll fee per vehicle [A×B]
1.	Two wheelers	₹22.42	1	**22.42**
2.	Car and SUVs	₹22.42	4	**89.68**
3.	Bus and LCV	₹22.42	6	**134.52**
4.	Heavy commercial vehicles	₹22.42	9	**201.78**

Working Note:

The cost per day has to be recovered from the daily traffic. The each type of vehicle is to be converted into equivalent unit. Let's convert all vehicle types equivalent to Two-wheelers

Sl. No	Type of vehicle	Daily traffic	Weight	Ratio [B]	Equivalent Two- wheeler
1.	Two wheelers	44,500	0.05	1	44,500
2.	Car and SUVs	3,450	0.20	4	13,800
3.	Bus and LCV	1,800	0.30	6	10,800
4.	Heavy commercial vehicles	816	0.45	9	7,344
	Total				**76,444**

Q.30 Hotel Ques | MTP Dec 21(2)

A hotel is being run in a Hill station with 200 single rooms. The hotel offers concessional rates during six off-season (winter) 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 31st March, 2021:

(i) Occupancy during the season is 80% while in the off-season it is 40%.

(ii) Total investment in the hotel is ₹ 300 lakhs of which 80% relates to Buildings and the balance to Furniture and other Equipment.

(iii) Room attendants are paid ₹ 15 per room per day on the basis of occupancy of rooms in a month.

(iv) Expenses :

- Staff salary (excluding that of room attendants) ₹ 8,00,000
- Repairs to Buildings ₹ 3,00,000
- Laundry Charges ₹ 1,40,000
- Interior Charges ₹ 2,50,000

- Miscellaneous Expenses ₹ 2,00,200

(v) Annual Depreciation is to be provided on Buildings @ 5% and 15% on Furniture and other Equipments on straight line method.

(vi) Monthly lighting charges are ₹ 110 per room, except in four months in winter when it is ₹ 30 per room and this cost is on the basis of full occupancy for a month.

You are REQUIRED to workout the room rent chargeable per day both during the season and the off-season months using the foregoing information.

(Assume a month to be of 30 days and winter season to be considered as part of off-season).

Ans. **(i) Total Room days in a year**

Season	Occupancy (Room-days)	Equivalent Full Room charge days
Season – 80% Occupancy	200 Rooms × 80% × 6 months × 30 days in a month = **28,800** Room Days	28,800 Room Days × 100% = 28,800
Off-season – 40% Occupancy	200 Rooms × 40% × 6 months × 30 days in a month = **14,400** Room Days	14,400 Room Days × 50% = 7,200
Total Room Days	28,800 + 14,400 = 43,200 Room Days	36,000 Full Room days

(ii) Lighting Charges:

It is given in the question that lighting charges for 8 months is ₹110 per month and during winter season of 4 months it is ₹30 per month. Further it is also given that peak season is 6 months and off season is 6 months.

It should be noted that – being Hill station, winter season is to be considered as part of Off season. Hence, the non-winter season of 8 months include – Peak season of 6 months and Off season of 2 months.

Accordingly, the lighting charges are calculated as follows:

Season	Occupancy (Room-days)
Season & Non-winter – 80% Occupancy	200 Rooms × 80% × 6 months × ₹ 110 per month = ₹ **1,05,600**
Off- season & Non-winter – 40% Occupancy (8 – 6 months)	200 Rooms × 40% × 2 months × ₹110 per month = ₹ **17,600**
Off- season & -winter – 40% Occupancy months)	200 Rooms × 40% × 4 months × ₹ 30 per month = ₹ **9,600**
Total Lighting charges	₹ 1,05,600+ ₹ 17,600 + ₹ 9,600 = ₹ **132,800**

Statement of total cost:

	(₹)
Staff salary	8,00,00
Repairs to building	3,00,00
Laundry	1,40,000
Interior	2,50,00

Miscellaneous Expenses	2,00,20
Depreciation on Building (₹ 300 Lakhs × 80% × 5%)	**12,00,00**
Depreciation on Furniture & Equipment (₹ 300 Lakhs × 20% × 15%)	**9,00,00**
Room attendant's wages (₹ 15 per Room Day for 43,200 Room Days)	**6,48,00**
Lighting charges	1,32,800
Total cost	**45,71,00**
Add: Profit Margin (20% on Room rent or 25% on Cost)	11,42,750
Total Rent to be charged	**57,13,75**

Calculation of Room Rent per day:
Total Rent / Equivalent Full Room days = ₹ 57,13,750/ 36,000 = ₹ 158.72
Room Rent during Season – ₹ 158.72
Room Rent during Off season = ₹ 158.72 × 50% = ₹ 79.36

Q.31 Bus Passenger Ques | MTP May 22(1)

YSPP Transport Company is running local city buses. It has a fleet of 20 Buses. Each bus can carry average 40 passengers per day and cover distance of 112.50 kms per day. Due to Covid-19 pandemic, the company is running 90% buses on average.

Below are the operational expenses worked out for the month of November, 2021:

Original cost per bus	₹ 48,00,000
Insurance for 20 buses	₹ 63,36,000 per annum
Diesel & Oil	₹ 10 per km.
Salary of drivers per bus	₹ 25,000
Salary of cleaners per bus	₹ 15,000
Tyres and tubes	₹ 12,58,040
Lubricants	₹ 10,70,000
Repairs	₹ 24,70,000
Road tax per bus	₹ 1,50,000
Administrative overhead	₹ 50,88,000 per annum

Depreciation on buses is computed @ 20% using Straight Line Method. Passenger tax is 15% on total taking. Based on abovementioned information, you are required to COMPUTE the fare to be charged from each passenger per kilometer assuming 25% margin on total taking (Total receipts from passengers.)

Ans.

Particulars	**Total Cost Per Month (in ₹)**
Fixed Charges:	
Salary of Drivers (₹ 25,000 × 20 buses)	5,00,000
Salary of Cleaners (₹ 15,000 × 20 buses)	3,00,000
Road Tax (₹ 1,50,000 × 20 buses)	30,00,000

Insurance (₹ 63,36,000/12 months)	5,28,000
Depreciation $\frac{48,00,000 x 20\% x 20 buses}{12 months}$	16,00,000
Administrative Overheads (₹ 50,88,000/12 months)	4,24,000
Total (A)	**63,52,000**
Variable Charges:	
Diesel (60,750 km. × ₹10)	6,07,500
Tyres and Tubes	12,58,040
Lubricants	10,70,000
Repairs	24,70,000
Total (B)	**54,05,540**
Total Operating Cost (A+B)	1,17,57,540
Add: Passenger tax (Refer to WN-1)	29,39,385
Add: Profit (Refer to WN-1)	48,98,975
Total takings (C)	**1,95,95,900**
No. of passengers kms. in a month (D)	24,30,000
Cost per passenger km. (C/D)	**8.06**

Working Notes:

1. Let total takings be X then Passenger tax and profit will be as follows: X = ₹ 1,17,57,540 + 0.15X + 0.25X

   X – 0.40X = ₹ 1,17,57,540

   $X = \frac{1,17,57,540}{0.60}$ = ₹ 1,95,95,900

   Passenger tax = ₹ 1,95,95,900 × 0.15 = ₹ 29,39,385

   Profit = ₹ 1,95,95,900 × 0.25 = ₹ 48,98,975

2. Total Kilometres to run during the month of November, 2021
   = (112.50 km. × 30 days × 20 Buses) x 90% = 60,750 Kilometres

3. Total passenger Kilometres during the month of November, 2021
   = 60,750 km. × 40 passengers = 24,30,000 Passenger- km.

Q.32 Compare 3 Different Situation | MTP Nov 22(1)

A company has the following three alternative proposals for conveyance facilities for its sales personnel who has to do substantial traveling, approximately 20,000 kilometers yearly:

(i) Purchasing and maintaining its own fleet of cars. The average cost of a car is ₹ 7,20,000

(ii) Allow the Executive to use their own car and reimburse the expenses @ ₹ 12 per kilometer and also bear insurance costs.

(iii) Hire cars from an agency at ₹ 2,16,000 per year per car. The company will have to bear costs of petrol,

taxes and tyres.

The following further details are available:

Petrol	₹ 7.20 per km.
Tyre	₹ 0.144 per km.
Taxes	₹ 960 per car per annum
Repairs and maintenance	₹ 0.24 per km.
Insurance	₹ 1,440 per car per annum
Life of the car	5 years with annual mileage of 20,000 km.
Resale value	₹ 96,000 at the end of the fifth year.

WORK OUT the relative costs of three proposals and rank them.

Ans. Calculation of relative costs of three proposals and their ranking

	I- Use of company's car	II- Use of own car	III- Use of hired car
Reimbursement	--	12.00	--
Hire Charges	--	--	10.80*
Fixed cost:			
Insurance	0.072	0.072	--
Taxes	0.048	--	0.048
Depreciation	6.24	--	--
Running and Maintenance Cost:			
Petrol	7.20	--	7.20
Repairs and Maintenance	0.24	--	--
Tyre	0.144	--	0.144
Total cost per km.	13.944	12.072	18.192
Cost for 20,000 km.	2,78,880	2,41,440	3,63,840
Ranking of proposals	II	I	III

(₹ 2,16,000 ÷ 20,000 km.) = ₹ 10.80

[(₹ 7,20,000 - ₹ 96,000) ÷ 5 years] ÷ 20,000 km. = ₹ 6.24

The Second alternative i.e., use of own car by the executive and reimbursement of expenses by the company is the best alternative from company's point of view.

Q.33 Cab Passenger Ques | MTP May 23(2)

Arnav LMV Pvt. Ltd, operates cab/ car rental service in Delhi/NCR. It provide s its service to the offices of Noida, Gurugram and Faridabad. At present it operates CNG fueled cars but it is also considering to upgrade these into Electric vehicle (EV). The following details related with the

owning of CNG & EV propelled cars are as tabulated below:

Particulars	CNG Car	EV Car
Car purchase price (₹)	9,20,000	15,20,000
Govt. subsidy on purchase of car (₹)	--	1,50,000
Life of the car	15 years	10 years
Residual value (₹)	95,000	1,70,000
Mileage	20 km/kg	240 km per charge
Electricity consumption per full charge	--	30 Kwh
CNG cost per Kg (₹)	90	--
Power cost per Kwh (₹)	--	7.60
Annual Maintenance cost (₹)	8,000	5,200
Annual insurance cost (₹)	7,600	14,600
Tyre replacement cost in every 5 -year (₹)	16,000	16,000
Battery replacement cost in every 8- year (₹)	12,000	5,40,000

Apart from the above, the following are the additional information:

Particulars	
Average distance covered by a car in a month	1,500 km
Driver's salary (₹)	20,000 p.m
Garage rent per car	4,500 p.m
(₹)	1,500 p.m

Required:

(i) CALCULATE the operating cost of vehicle per month per car for both CNG & EV options.

Ans. 1. **Calculation of Depreciation per month:**

	Particulars	CNG Car	EV Car
A	Car purchase price (₹)	9,20,000	15,20,000
B	Less: Govt. subsidy (₹)	--	(1,50,000)
C	Less: Residual value (₹)	(95,000)	(1,70,000)
D	Depreciable value of car (₹) [A-B-C]	8,25,000	12,00,000
E	Life of the car	15 years	10 years
F	Annual depreciation (₹) [D÷E]	55,000	1,20,000
G	**Depreciation per month (₹) [F÷12]**	**4,583.33**	**10,000**

2. Fuel/ Electricity consumption cost per month:

	Particulars	CNG Car	EV Car
A	Average distance covered in a month	1,500	1,500
B	(KM) Mileage (KM)	20	240
C	Qty. of CNG/ Full charge required	75 kg.	6.25
D	[A÷B] Electricity Consumption	-	187.5
E	[C×30kwh]	90	-
F	Cost of CNG per kg	-	7.60
G	(₹) Power cost per	**6,750**	**-**
H	Kwh (₹)	**-**	**1,425**

3. Amortised cost of Tyre replacement:

	Particulars	CNG Car	EV Car
A	Life of vehicle	15 years	10 years
B	Replacement interval	5 years	5 years
C	No. of time replacement required	2 times	1 time
D	Cost of tyres for each replacement	16,000	16,000
E	(₹) Total replacement cost (₹)	32,000	16,000
F	[C×D] Amortised cost per year (₹)	2,133.33	1,600
E	[E÷A]	**177.7**	**133.3**

4. Amortised cost of Battery replacement:

	Particulars	CNG Car	EV Car
A	Life of vehicle	15 years	10 years
B	Replacement interval	8 years	8 years
C	No. of time replacement required	1 time	1 time
D	Cost of battery for each replacement	12,000	5,40,000
E	(₹) Total replacement cost (₹) [C×D]	12,000	5,40,000
F	Amortised cost per year (₹) [E÷A]	800	54,000
E	**Cost per month (₹) [F÷12]**	**66.67**	**4,500**

Calculation of Operating cost per month:

	Particulars	CNG Car (₹)	EV Car (₹)
A	**Running cost:**		
	Fuel cost/ Power consumption cost [Refer WN-2]	6,750	1,425

B	**Maintenance cost:**		
	Annual Maintenance cost [Annual cost ÷12]	666.67	433.33
	Annual Insurance cost [Annual cost ÷12]	633.33	1,216.67
	Amortised cost of Tyre replacement [Refer WN-	177.78	133.33
	Amortised cost of Battery replacement [Refer	66.67	4,500
		1,544.45	6,283.33
C	**Fixed cost:**		
	Depreciation [Refer WN-1]	4,583.33	10,000
	Driver's salary	20,000	20,000
	Garage rent	4,500	4,500
	Share of Office & Administration cost	1,500	1,500
		30,583.33	36,000
D	**Operating cost per month [A+B+C]**	**38,877.7**	**43,708.3**

12 CHAPTER Cost Accounting System

Q.1 Reconciliation Statement | PY May 18

GK Ltd. showed net loss of ₹ 2,43,300 as per their financial accounts for the year ended31st March, 2018. However, cost accounts disclosed net loss of ₹ 2,48,300 for the same period. On scrutinizing both the set of books of accounts, the following information were revealed:

		₹
(i)	Works overheads over recovered 30,400	30,000
(ii)	Selling overheads under recovered Administrative overheads	20,300
(iii)	under recovered Depreciation over charged in cost accounts Bad	27,700
(iv)	debts w/off in financial accounts Preliminary Exp. w/off in	35,100
(v)	financial accounts	15,000
(vi)	Interest credited during the year in financial accounts	5,000
(vii)		7,500

Prepare a reconciliation statement reconciling losses shown by financial and cost accounts by taking costing net loss as base.

Ans

Reconciliation Statement

	Particulars	₹	₹
	Loss as per Cost Accounts		(2,48,300)
Add:	Works overheads over recovered	30,400	
	Depreciation over charged in cost accounts	35,100	
	Interest credited during the year in financial accounts	7,500	73,000
Less:	Selling overheads under recovered	20,300	
	Administrative overheads under recovered	27,700	
	Bad debts w/off in financial accounts	15,000	
	Preliminary Exp. w/off in financial accounts	5,000	(68,000)
	Loss as per Financial Accounts		(2,43,300)

Q.2 RM, WIP, FG Contro Account | PY Nov 18

The following balances were extracted from a Company's ledger as on 30th June, 2018:

Particulars	Debit (₹)	Credit (₹)
Raw material control a/c	2,82,450	
Work-in-progress control a/c	2,38,300	
Finished stock control a/c	3,92,500	
General ledger adjustment a/c		9,13,250
Total	9,13,250	9,13,250

The following transactions took place during the quarter ended 30th September, 2018:

		₹
(i)	Factory overheads - allocated to work-in-progress	1,36,350
(ii)	Goods furnished - at cost	13,76,200
(iii)	Raw materials purchased	12,43,810
(iv)	Direct wages - allocated to work-in-progress	2,56,800
(v)	Cost of goods sold	14,56,500
(vi)	Raw materials - issued to production	13,60,430

(vii)	Raw materials - credited by suppliers	27,200
(viii)	Raw materials losses - inventory audit	6,000
(ix)	Work-in-progress rejected (with no scrap value)	12,300
(x)	Customer's returns (at cost) of finished goods	45,900

You are required to prepare:
(i) Raw material control a/c
(ii) Work-in-progress control a/c
(iii) Finished stock control a/c
(iv) General ledger adjustment a/c

Ans

(i) Raw Material Control A/c

		(₹)			(₹)
To	Balance b/d	2,82,450	By A/c	General Ledger Adjustment	27,200
"	General Ledger Adjustment A/c	12,43,810	"	Work-in-progress Control A/c	13,60,430
			"	Costing P&L A/c	6,000
				(Loss) (OR GLA)	
			"	Balance c/d	1,32,630
		15,26,260			15,26,260

(ii) Work-in-Progress Control A/c

		(₹)			(₹)
To	Balance b/d	2,38,300			
"	Raw Material Control A/c	13,60,430	"	Finished Goods Control A/c	13,76,200
"	Wages Control A/c	2,56,800		Costing P&L A/c (OR GLA)	12,300
"	Factory OH Control A/c	1,36,350	"	Balance c/d	6,03,380
		19,91,880			19,91,880

(iii) Finished Goods Control A/c

		(₹)			(₹)
To	Balance b/d	3,92,500	By	Cost of goods sold A/c (OR GLA)	14,56,500
	General Ledger Adjustment A/c	45,900			
"	Work-in-process Control A/c	13,76,200	"	Balance c/d	3,58,100
		18,14,600			18,14,600

(iv) General Ledger Adjustment A/c

		(₹)			(₹)
To	Costing P&L A/c (sales) (Balancing figure)	25,68,910	By	Balance b/d	9,13,250
"	Raw Material Control A/c	27,200	"	Raw Material Control A/c	12,43,810
			"	Wages Control A/c	2,56,800

		" Factory OH Control A/c	1,36,350
		" Finished Goods Control A/c	45,900
	25,96,110		25,96,110

OR

General ledger adjustment account

	(₹)		(₹)
To Raw Material Control A/c	27,200	By Balance b/d	9,13,250
" Raw Material control account(loss)	6,000	" Raw Material Control A/c	12,43,810
" WIP control Account (rejection)	12,300	" Wages Control A/c	2,56,800
" Finished stock Control Account	14,56,500	" Factory OH Control A/c	1,36,350
"" Balance c/d	10,94,110	" Finished Goods Control A/c	45,900
	25,96,110		25,96,110

Working:

Factory Overhead Control A/c

	(₹)		(₹)
To General Ledger Adjustment A/c	1,36,350	By Work-in-progress A/c	1,36,350
	1,36,350		1,36,350

Q.3 Memo Reconciliation Account | PY May 19

M/s Abid Private Limited disclosed a net profit of ₹ 48,408 as per cost books for the year ending 31st March 2019. However, financial accounts disclosed net loss of ₹ 15,000 for the same period. On scrutinizing both the set of books of accounts, the following information was revealed:

Works Overheads under-recovered in Cost Books	48,600
Office Overheads over-recovered in Cost Books	11,500
Dividend received on Shares	17,475
Interest on Fixed Deposits	21,650
Provision for doubtful debts	17,800
Obsolescence loss not charged in Cost Accounts	17,200
Stores adjustments (debited in Financial Accounts)	35,433
Depreciation charged in financial accounts	30,000
Depreciation recovered in Cost Books	35,000

Prepare a Memorandum Reconciliation Account.

Ans. **Memorandum Reconciliation Account**

Dr. Cr.

Particulars	(₹)	Particulars	(₹)

To Works overheads under recovered in Cost Accounts	48,600	By Net profit as per Costing books	48,408
To Provision for doubtful debts	17,800	By Office overheads over recovered in cost accounts	11,500
To Obsolescence loss	17,200	By Dividend received on shares	17,475
To Store adjustment (Debit)	35,433	By Interest on fixed deposit	21,650
		By Depreciation over- charged	5,000
		By Net loss as per financial accounts	15,000
	1,19,033		1,19,033

[Note: This question may also be solved by taking net loss as per financial accounts as basis.]

Q.4 Reconciliation Statement | PY Jul 21

The Profit and Loss account of ABC Ltd. for the year ended 31st March, 2021 is given below:

Profit and Loss account
(for the year ended 31st March, 2021)

To Direct Material	6,50,000	By Sales (15000 units)	15,00,000
To Direct Wages	3,50,000	By Dividend received	9,000
To Factory overheads	2,60,000		
To Administrative overheads	1,05,000		
To Selling overheads	85,000		
To Loss on sale of investments	2,000		
To Net Profit	57,000		
	15,09,000		15,09,000

- Factory overheads are 50% fixed and 50% variable.
- Administrative overheads are 100% fixed.
- Selling overheads are completely variable.
- Normal production capacity of ABC Ltd. is 20,000 units.
- Indirect Expenses are absorbed in the cost accounts on the basis of normal production capacity.
- Notional rent of own premises charged in Cost Accounts is amounting to ₹ 12,000. You are required to:

(i) Prepare a Cost Sheet and ascertain the Profit as per Cost Records for the year ended 31st March, 2021.

(ii) Reconcile the Profit as per Financial Records with Profit as per Cost Records.

Ans. **(i)**

Cost Sheet

(for the year ended 31st March, 2021)

	(₹)	(₹)
Direct material		6,50,000
Direct wages		3,50,000
Prime cost		**10,00,000**

Factory Overheads:		
Variable (50% of ₹ 2,60,000)	1,30,000	
Fixed (₹ 1,30,000 × 15,000/20,000)	97,500	2,27,500
Works cost		**12,27,500**
Administrative Overheads (₹ 1,05,000 × 15,000/20,000)		78,750
Notional Rent		12,000
Cost of production		**13,18,250**
Selling Overheads		85,000
Cost of Sales		**14,03,250**
Profit (Balancing figure)		96,750
Sales revenue		**15,00,000**

(ii) Statement of Reconciliation

(Reconciling profit shown by Financial and Cost Accounts)

	(₹)	(₹)
Profit as per Cost Account		96,750
Add: Dividend received	9,000	
Add: Notional Rent	12,000	21,000
Less: Factory Overheads under-charged in Cost Accounts (₹ 2,60,000 – ₹ 2,27,500)	32,500	
Less: Administrative expenses under-charged in Cost Accounts (₹ 1,05,000 – ₹ 78,750)	26,250	
Less: Loss on sale of Investments	2,000	(60,750)
Profit as per Financial Accounts		57,000

(Note: Solution can be done considering base profit as per Financial Accounts)

Q.5 Reconciliation Statement | PY Dec 21

R Ltd. showed a Net Profit of ₹ 3,60,740 as per their cost accounts for the year ended 31st March, 2021. The following information was revealed as a result of scrutiny of the figures from the both sets of accounts:

Sr. No.	Particulars	(₹)
i.	Over recovery of selling overheads in cost accounts	10,250
ii.	Over valuation of closing stock in cost accounts	7,300
iii.	Rent received credited in financial accounts	5,450
iv.	Bad debts provided in financial accounts	3,250
v.	Income tax provided in financial accounts	15,900
vi.	Loss on sale of capital asset debited in financial accounts	5,800
vii.	Under recovery of administration overheads in cost accounts	3,600

Required:

Prepare a reconciliation statement showing the profit as per financial records.

Ans.

Statement of Reconciliation

(Reconciling the profit as per costing records with the profit as per financial records)

	(₹)	(₹)
Net Profit as per Cost Accounts		3,60,740
Add:		
Over recovery of selling overheads in cost accounts	10,250	
Rent received credited in financial accounts	5,450	15,700
		376,440
Less:		
Over valuation of closing stock in cost accounts	7,300	
Bad debts provided in financial accounts	3,250	
Income tax provided in financial accounts	15,900	
Loss on sale of capital asset debited in financial accounts	5,800	
Under recovery of administration overheads in cost accounts	3,600	35,850
Profit as per Financial Accounts		3,40,590

Q.6 Journalise Integrated Account | PY May 22

Journalize the following transactions assuming the cost and financial accounts are integrated:

Particulars	Amount (₹)
Direct Materials issued to production	₹ 5,88,000
Allocation of Wages (Indirect)	₹ 7,50,000
Factory Overheads (Over absorbed)	₹ 2,25,000
Administrative Overheads (Under absorbed)	₹ 1,55,000
Deficiency found in stock of Raw material (Normal)	₹ 2,00,000

Ans.

Particulars		(₹)	(₹)
(i) Work-in-Progress Ledger Control A/c	Dr.	5,88,000	
To Stores Ledger Control A/c			5,88,000
(Being issue of direct materials to production)			
(ii) Factory Overhead control A/c	Dr.	7,50,000	
To Wages Control A/c			7,50,000
(Being allocation of Indirect wages)			
(iii) Factory Overhead Control A/c	Dr.	2,25,000	
To Costing Profit & Loss A/c			2,25,000
(Being transfer of over absorption of Factory overhead)			
(iv) Costing Profit & Loss A/c	Dr.	1,55,000	
To Administration Overhead Control A/c			1,55,000

	(Being transfer of under absorption of Administration overhead)			
(v)	Factory Overhead Control A/c	Dr.	2,00,000	
	To Stores Ledger Control A/c			2,00,000
	(Being transfer of deficiency in stock of raw material)			

(Note: Costing P/&/L = P/&/L and SLC = MLC)

Q.7 Reconciliation Statement | PY Nov 22

X Ltd. follows Non-Integrated Accounting System. Financial Accounts of the company show a Net Profit of ₹ 5,50,000 for the year ended 31st March, 2022. The chief accountant of the company has provided following information from the Financial Accounts and Cost Accounts:

Sr. No	Particulars	(₹)
(i)	Legal Chargers Provided in Financial accounts	15,250
(ii)	Interim Dividend received credited in financial accounts	4,50,000
(iii)	Preliminary Expenses written off in financial accounts	25,750
(iv)	Over recovery of selling overheads in cost accounts	11,380
(v)	Profit on sale of capital asset credited in financial accounts	30,000
(vi)	Under valuation of closing stock in cost accounts	25,000
(vii)	Over recovery of production overheads in cost accounts	10,200
(viii)	Interest paid on Debentures shown in financial accounts	50,000

Required:
Find out the Profit (Loss) as per Cost Accounts by preparing a Reconciliation Statement.

Ans.

Reconciliation Statement
(Reconciliation the profit as per financial records with the profit as per costing records)

	Particulars	(₹)	Total (₹)
	Profit as per Financial Accounts		5,50,000
Add:	Legal Charges	15,250	
	Preliminary expenses written off	25,750	
	Interest paid	50,000	91,000
			6,41,000
Less:	Under-valuation of closing stock in cost book	25,000	
	Interim Dividend Received	4,50,000	
	Over recovery of selling overheads in cost accounts	11,380	
	Over recovery of production overhead in cost accounts	10,200	5,26,580
	Profit on sale of Assets	30,000	
	Profit as per Cost Accounts		1,14,420

Q.8 Cost Ledger Control Account | RTP May 18

As of 31st March, 2018, the following balances existed in a firm's cost ledger, which is maintained separately on

a double entry basis:

	Debit (₹)	Credit (₹)
Stores Ledger Control A/c	3,20,000	–
Work-in-process Control A/c	1,52,000	–
Finished Goods Control A/c	2,56,000	–
Manufacturing Overhead Control A/c	–	28,000
Cost Ledger Control A/c	–	7,00,000
	7,28,000	7,28,000

During the next quarter, the following items arose:

	(₹)
Finished Product (at cost)	2,35,500
Manufacturing overhead incurred	91,000
Raw material purchased	1,36,000
Factory wages	48,000
Indirect labour	20,600
Cost of sales	1,68,000
Materials issued to production	1,26,000
Sales returned (at cost)	8,000
Materials returned to suppliers	11,000
Manufacturing overhead charged to production	86,000

Required:

PREPARE the Cost Ledger Control A/c, Stores Ledger Control A/c, Work-in-process Control A/c, Finished Stock Ledger Control A/c, Manufacturing Overhead Control A/c, Wages Control A/c, Cost of Sales A/c and the Trial Balance at the end of the quarter as per costing records.

Ans.

Cost Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To Store Ledger Control A/c	11,000	By Opening Balance	7,00,000
To Balance c/d	9,84,600	By Store ledger control A/c	1,36,000
		By Manufacturing Overhead Control A/c	91,000
		By Wages Control A/c	68,600
	9,95,600		9,95,600

Stores Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To Opening Balance	3,20,000	By WIP Control A/c	1,26,000
To Cost ledger control A/c	1,36,000	By Cost ledger control A/c (Returns)	11,000
		By Balance c/d	3,19,000
	4,56,000		4,56,000

WIP Control Account

Particulars	(₹)	Particulars	(₹)
To Opening Balance	1,52,000	By Finished Stock Ledger Control A/c	2,35,500
To Wages Control A/c	48,000	By Balance c/d	1,76,500
To Stores Ledger Control A/c	1,26,000		
To Manufacturing Overhead Control A/c	86,000		
	4,12,000		4,12,000

Finished Stock Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To Opening Balance	2,56,000	By Cost of Sales	1,68,000
To WIP Control A/c	2,35,500	By Balance c/d	3,31,500
To Cost of Sales A/c (Sales Return)	8,000		
	4,99,500		4,99,500

Manufacturing Overhead Control Account

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	91,000	By Opening Balance	28,000
To Wages Control A/c	20,600	By WIP Control A/c	86,000
To Over recovery c/d	2,400		
	1,14,000		1,14,000

Wages Control Account

Particulars	(₹)	Particulars	(₹)
To Transfer to Cost Ledger Control A/c	68,600	By WIP Control A/c	48,000
		By Manufacturing Overhead Control A/c	20,600
	68,600		68,600

Cost of Sales Account

Particulars	(₹)	Particulars	(₹)
To Finished Stock Ledger Control A/c	1,68,000	By Finished Stock Ledger Control A/c (Sales return)	8,000
		By Balance c/d	1,60,000
	1,68,000		1,68,000

Trial Balance

	(₹)	(₹)
Stores Ledger Control A/c	3,19,000	
WIP Control A/c	1,76,500	
Finished Stock Ledger Control A/c	3,31,500	

Manufacturing Overhead Control A/c	--	2,400
Cost of Sales A/c	1,60,000	
Cost ledger control A/c	--	9,84,600
	9,87,000	9,87,000

Q.9 Reconciliation Statement | RTP Nov 19

The financial books of a company reveal the following data for the year ended 31 st March, 20X8:

Opening Stock:	(₹)
Finished goods 625 units	53,125
Work-in-process	46,000
01.04.20X7 to 31.03.20X8	
Raw materials consumed	8,40,000
Direct Labour	6,10,000
Factory overheads	4,22,000
Administration overheads (Production related)	1,98,000
Dividend paid	1,22,000
Bad Debts	18,000
Selling and Distribution Overheads	72,000
Interest received	38,000
Rent received	46,000
Sales 12,615 units	22,80,000
Closing Stock: Finished goods 415 units	45,650
Work-in-process	41,200

The cost records provide as under:

- Factory overheads are absorbed at 70% of direct wages.
- Administration overheads are recovered at 15% of factory cost.
- Selling and distribution overheads are charged at ₹ 3 per unit sold.
- Opening Stock of finished goods is valued at ₹ 120 per unit.
- The company values work-in-process at factory cost for both Financial and Cost Profit Reporting.

Required:

(i) PREPARE a statements for the year ended 31st March, 20X8. Show

- the profit as per financial records
- the profit as per costing records.

(iii) PREPARE a statement reconciling the profit as per costing records with the profit as per Financial Records.

Ans. **(i) Statement of Profit as per Financial records (for the year ended March 31, 20X8)**

	(₹)		(₹)
To Opening stock of Finished Goods	53,125	By Sales	22,80,000
To Work-in-process	46,000	By Closing stock of finished Goods	45,650

To Raw materials consumed	8,40,000	By Work-in-Process	41,200
To Direct labour	6,10,000	By Rent received	46,000
To Factory overheads	4,22,000	By Interest received	38,000
To Administration overheads	1,98,000		
To Selling & distribution overheads	72,000		
To Dividend paid	1,22,000		
To Bad debts	18,000		
To Profit	69,725		
	24,50,850		24,50,850

Statement of Profit as per Costing records
(for the year ended March 31,20X8)

	(₹)
Sales revenue (A)(12,615 units)	22,80,000
Cost of sales:	
Opening stock (625 units ×₹ 120)	75,000
Add: Cost of production of 12,405 units(Refer to working note 2)	21,63,350
Less: Closing stock (₹174.39 × 415 units)	(72,372)
Cost of goods sold (12,615 units)	21,65,978
Selling & distribution overheads(12,615 units ×₹ 3)	37,845
Cost of sales: (B)	22,03,823
Profit: {(A) – (B)}	76,177

(ii) Statement of Reconciliation
(Reconciling the profit as per costing records with the profit as per financial records)

	(₹)	(₹)
Profit as per Cost Accounts		76,177
Add: Administration overheads over absorbed (₹ 2,81,550 – ₹ 1,98,000)	83,550	
Opening stock overvalued (₹ 75,000 – ₹ 53,125)	21,875	
Interest received	38,000	
Rent received	46,000	
Factory overheads over recovered (₹ 4,27,000 – ₹ 4,22,000)	5,000	1,94,425
		2,70,602
Less: Selling & distribution overheads under recovery (₹ 72,000 – ₹ 37,845)	34,155	
Closing stock overvalued (₹ 72,372 – ₹ 45,650)	26,722	
Dividend	1,22,000	
Bad debts	18,000	(2,00,877)
Profit as per financial accounts		69,725

Working notes:

1. **Number of units produced**

	Units
Sales	12,615
Add: Closing stock	415
Total	13,030
Less: Opening stock	(625)
Number of units produced	12,405

2. **Cost Sheet**

	(₹)
Raw materials consumed	8,40,000
Direct labour	6,10,000
Prime cost	14,50,000
Factory overheads (70% of direct wages)	4,27,000
Factory cost	18,77,000
Add: Opening work-in-process	46,000
Less: Closing work-in-process	41,200
Factory cost of goods produced	18,81,800
Administration overheads(15% of factory cost)	2,81,550
Cost of production of 12,405 units(Refer to working note 1)	21,63,350
Cost of production per unit: $\frac{\text{Total Cost of Production}}{\text{No.of unitsproduced}} = \frac{21,63,350}{12,405 \text{ units}}$ =₹174.39	

Q.10 Costing P/L & Reconciliation | RTP May 19

The following is the summarised Trading and Profit and Loss Account of XYZ Ltd. for the year ended 31st March 2019:

Particulars	Amount (₹)	Particulars		Amount (₹)
Direct Material	14,16,000	Sales (30,000 units)		30,00,000
Direct wages	7,42,000	Finished stock (2,000 units)		1,67,500
Works overheads	4,26,000	Work-in-progress:		
Administration overheads	1,50,000	- Materials	34,000	
Selling and distributionoverheads	1,65,000	- Wages	16,000	
Net profit for the year	3,22,500	- Works overhead	4,000	54,000
	32,21,500			32,21,500

The company's cost records show that in course of manufacturing a standard unit (i) works overheads have been charged @ 20% on prime cost, (ii) administration overheads are related with production activities and are recovered at ₹5 per finished unit, and (iii) selling and distribution overheads are recovered at ₹6 per unit sold. You are required to PREPARE:

(i) Costing Profit and Loss Account indicating the net profits,

(ii) A Statement showing reconciliation between profit as disclosed by the Cost Accounts and Financial Accounts.

Ans.

(i) Costing Profit and Loss Account for the year ended 31st March 2019:

Particulars	Amount (₹)	Particulars	Amount (₹)
Material consumed	14,16,000	Sales (30,000 units)	30,00,000
Direct wages	7,42,000		
Prime Cost	21,58,000		
Works overheads (20% of Prime cost)	4,31,600		
	25,89,600		
Less: Work in progress	(54,000)		
Factory cost	25,35,600		
Administration overheads (₹5 × 32,000 units)	1,60,000		
Cost of production	26,95,600		
Less: Finished stock	(1,68,475)		
Cost of goods sold	25,27,125		
Selling and distribution overheads (₹6 × 30,000 unit)	1,80,000		
Cost of sales	27,07,125		
Profit (balancing figure)	2,92,875		
	30,00,000		30,00,000

(ii) Statement reconciling the profit as per costing profit and loss account with the profit as per financial accounts

Particulars	Amount (₹)	Amount (₹)
Profit as per cost records		2,92,875
Add: Overheads over-absorbed:		
- Works overheads (₹ 4,31,600 – ₹ 4,26,000)	5,600	
- Administration OH (₹ 1,60,000 – ₹ 1,50,000)	10,000	
- Selling and Distribution (₹ 1,80,000 – ₹ 1,65,000)	15,000	30,600
Less: Closing stock overvalued (₹ 1,68,475 – ₹ 1,67,500)		(975)
Profit as per financial accounts		3,22,500

*It is assumed that the number of units Produced
= Number of units sold + Finished stock = 30,000 + 2,000 = 32,000 units.

Q.11 Cost Ledger Control Account | RTP Nov 19

As of 30th September, 2019, the following balances existed in a firm's cost ledger, which is maintained separately on a double entry basis:

	Debit(₹)	Credit(₹)
Stores Ledger Control A/c	15,00,000	–
Work-in-progress Control A/c	7,50,000	–
Finished Goods Control A/c	12,50,000	–
Manufacturing Overhead Control A/c	–	75,000
Cost Ledger Control A/c	–	34,25,000
	35,00,000	35,00,000

During the next quarter, the following items arose:

	(₹)
Finished Product (at cost)	11,25,000
Manufacturing overhead incurred	4,25,000
Raw material purchased	6,25,000
Factory wages	2,00,000
Indirect labour	1,00,000
Cost of sales	8,75,000
Materials issued to production	6,75,000
Sales returned (at cost)	45,000
Materials returned to suppliers	65,000
Manufacturing overhead charged to production	4,25,000

Required:
PREPARE the Cost Ledger Control A/c, Stores Ledger Control A/c, Work-in-progress Control A/c, Finished Stock Ledger Control A/c, Manufacturing Overhead Control A/c , Wages Control A/c, Cost of Sales A/c and the Trial Balance at the end of the quarter.

Ans.

Cost Ledger Control Account

Dr. Cr.

	(₹)		(₹)
To Store Ledger Control A/c	65,000	By Opening Balance	34,25,000
To Balance c/d	47,10,000	By Store ledger control A/c	6,25,000
		By Manufacturing Overhead Control A/c	4,25,000
		By Wages Control A/c	3,00,000
	47,75,000		47,75,000

Stores Ledger Control Account

Dr. Cr.

	(₹)		(₹)

To	Opening Balance	15,00,000	By	WIP Control A/c	6,75,000
To	Cost ledger control A/c	6,25,000	By	Cost ledger control A/c (Returns)	65,000
			By	Balance c/d	13,85,000
		21,25,000			21,25,000

WIP Control Account

Dr. **Cr.**

		(₹)			(₹)
To	Opening Balance	7,50,000	By	Finished Stock Ledger Control A/c	11,25,000
To	Wages Control A/c	2,00,000	By	Balance c/d	9,25,000
To	Stores Ledger Control A/c	6,75,000			
To	Manufacturing Overhead Control A/c	4,25,000			
		20,50,000			20,50,000

Finished Stock Ledger Control Account

Dr. **Cr.**

		(₹)			(₹)
To	Opening Balance	12,50,000	By	Cost of Sales	8,75,000
To	WIP Control A/c	11,25,000	By	Balance c/d	15,45,000
To	Cost of Sales A/c (Sales Return)	45,000			
		24,20,000			24,20,000

Manufacturing Overhead Control Account

Dr. **Cr.**

		(₹)			(₹)
To	Cost Ledger Control A/c	4,25,000	By	Opening Balance	75,000
To	Wages Control A/c	1,00,000	By	WIP Control A/c	4,25,000
			By	Under recovery c/d	2 5,000
		5,25,000			5,25,000

Wages Control Account

Dr. **Cr.**

		(₹)		(₹)
To	Transfer to Cost Ledger Control A/c	3,00,000	By WIP Control A/c	2,00,000
			By Manufacturing Overhead Control A/c	1,00,000
		3,00,000		3,00,000

Cost of Sales Account

Dr. Cr.

	(₹)		(₹)
To Finished Stock Ledger Control A/c	8,75,000	By Finished Stock Ledger Control A/c (Sales return)	45,000
		By Balance c/d	8,30,000
	8,75,000		8,75,000

Trial Balance

	(₹)	(₹)
Stores Ledger Control A/c	13,85,000	
WIP Control A/c	9,25,000	
Finished Stock Ledger Control A/c	15,45,000	
Manufacturing Overhead Control A/c	25,000	
Cost of Sales A/c	8,30,000	
Cost ledger control A/c	----	47,10,000
	47,10,000	47,10,000

Q.12 Cost Ledger Control Account | RTP May 20

The following are the balances existed in the books of JPG Ltd. for the year ended, 31st March, 2019:

Particulars	Dr. (₹)	Cr. (₹)
Stores Ledger Control A/c	30,00,000	
WIP Control A/c	15,00,000	
Finished Goods Control A/c	25,00,000	
Manufacturing Overheads Control A/c		1,50,000
Cost Ledger Control A/c		68,50,000

During the year 2019-20, the following transactions took place:

Particulars	Amount (₹)
Finished product (at cost)	22,50,000
Manufacturing Overhead incurred	8,50,000
Raw material purchased	12,50,000
Factory wages	4,00,000
Indirect labour	2,00,000
Cost of sales	17,50,000
Materials issued to production	13,50,000
Sales returned (at cost)	90,000
Material returned to suppliers	1,30,000
Manufacturing overhead charged to production	8,50,000

Required:
PREPARE the following control accounts and Trial balance at the end of the year:
Cost Ledger, Stores Ledger, Work-in-process, Finished Stock, Manufacturing Overhead, Wages and Cost of Sales.

Ans.

Cost Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To Stores Ledger control A/c	1,30,000	By Balance b/d	68,50,000
To Costing Profit & Loss A/c	17,10,000	By Stores Ledger control A/c	12,50,000
		By Wages Control A/c	6,00,000
To Balance c/d	77,10,000	By Manufacturing overheadcontrol A/c	8,50,000
	95,50,000		95,50,000

Store Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	30,00,000	By WIP Control A/c	13,50,000
To Cost Ledger control A/c	12,50,000	By Cost Ledger control A/c(return)	1,30,000
		By Balance c/d	27,70,000
	42,50,000		42,50,000

WIP Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	15,00,000	By Finished Stock ControlA/c	22,50,000
To Wages Control A/c	4,00,000		
To Stores Ledger control A/c	13,50,000		
To Manufacturing overheadcontrol A/c	8,50,000	By Balance c/d	18,50,000
	41,00,000		41,00,000

Finished Stock Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	25,00,000	By Cost of Sales A/c	17,50,000
To WIP Control A/c	22,50,000		
To Cost of Sales A/c (salesreturn)	90,000	By Balance c/d	30,90,000
	48,40,000		48,40,000

Manufacturing Overhead Control Account

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	8,50,000	By Balance b/d	1,50,000
To Wages Control A/c	2,00,000	By WIP Control A/c	8,50,000
		By Costing P&L A/c (underrecovery)	50,000
	10,50,000		10,50,000

Wages Control Account

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	6,00,000	By WIP Control A/c	4,00,000
		By Manufacturing overheadcontrol A/c	2,00,000
	6,00,000		6,00,000

Cost of Sales Account

Particulars	(₹)	Particulars	(₹)
To Finished Stock ControlA/c	17,50,000	By Finished Stock ControlA/c (sales return)	90,000
		By Costing Profit & Loss A/c	16,60,000
	17,50,000		17,50,000

Trial Balance

Particulars	Dr. (₹)	Cr. (₹)
Stores Ledger Control A/c	27,70,000	
WIP Control A/c	18,50,000	
Finished Goods Control A/c	30,90,000	
Cost Ledger Control A/c		77,10,000
	77,10,000	77,10,000

Working:

Costing P&L Account

Particulars	(₹)	Particulars	(₹)
To Cost of Sales A/c	16,60,000	By Cost Ledger control A/c	17,10,000
To Manufacturing overheadcontrol A/c	50,000		
	17,10,000		17,10,000

Q.13 Memo Reconciliation | RTP Nov 20

A manufacturing company disclosed a net loss of ₹6,94,000 as per their cost accounts for the year ended March 31,2020. The financial accounts however disclosed a net loss of ₹10,20,000 for the same period. The following information was revealed as a result of scrutiny of the figures of both the sets of accounts.

	(₹)
(i) Factory Overheads under-absorbed	80,000
(ii) Administration Overheads over-absorbed	1,20,000
(iii) Depreciation charged in Financial Accounts	6,50,000
(iv) Depreciation charged in Cost Accounts	5,50,000
(v) Interest on investments not included in Cost Accounts	1,92,000
(vi) Income-tax provided	1,08,000
(vii) Interest on loan funds in Financial Accounts	4,90,000
(viii) Transfer fees (credit in financial books)	48,000

(ix) Stores adjustment (credit in financial books)	28,000
(x) Dividend received	64,000

PREPARE a memorandum Reconciliation Account.

Ans.

Memorandum Reconciliation Accounts

Dr. Cr.

	(₹)		(₹)
To Net Loss as per Costing books	6,94,000	By Administration overheads over recovered in cost accounts	1,20,000
To Factory overheads under absorbed in Cost Accounts	80,000	By Interest on investment not included in Cost Accounts	1,92,000
To Depreciation under charged in Cost Accounts	1,00,000	By Transfer fees in Financial books	48,000
To Income-Tax not provided in Cost Accounts	1,08,000	By Stores adjustment (Credit in financial books)	28,000
To Interest on Loan Funds in Financial Accounts	4,90,000	By Dividend received in financial books	64,000
		By Net loss as per Financial books	10,20,000
	14,72,000		14,72,000

Q.14 Control Accounts | RTP Dec 21

XYZ Ltd. maintains a non-integrated accounting system for the purpose of management information. The following are the data related with year 2020-21:

Particulars	(₹ in '000)
Opening balances:	
- Stores ledger control A/c	24,000
- Work-in-process control A/c	6,000
- Finished goods control A/c	1,29,000
- Building construction A/c	3,000
- Cost ledger control A/c	1,62,000
During the year following transactions took place:	
Materials:	
- Purchased	12,000
- Issued to production	15,000
- Issued to general maintenance	1,800
- Issued to building construction	1,200
Wages:	
- Gross wages paid	45,000
- Indirect wages paid	12,000
- For building construction	3,000

Factory overheads:	
- Actual amount incurred (excluding items shown above)	48,000
- Absorbed in building construction	6,000
- Under-absorbed	2,400
Royalty paid	1,500
Selling, distribution and administration overheads	7,500
Sales	1,35,000

At the end of the year, the stock of raw material and work-in-process was ₹ 1,65,00,000 and ₹ 75,00,000 respectively. The loss arising in the raw material account is treated as factory overheads. The building under construction was completed during the year. Gross profit margin is 20% on sales.

Required:

PREPARE the relevant control accounts to record the above transactions in the cost ledger of the company.

Ans.

Cost Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Costing P&L A/c	1,35,000	By Balance b/d	1,62,000
To Building Construction A/c	13,200	By Stores Ledger control A/c	12,000
To Balance c/d	1,44,900	By Wages Control A/c	45,000
		By Factory overhead control A/c	48,000
		By Royalty A/c	1,500
		By Selling, Distribution and Administration overheads	7,500
		By Costing P&L A/c	17,100
	2,93,100		2,93,100

Stores Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	24,000	By WIP control A/c	15,000
To Cost Ledger control A/c	12,000	By Factory overheads control A/c	1,800
		By Building construction A/c	1,200
		By Factory overhead control A/c (bal. fig.) (loss)	1,500
		By Balance c/d	16,500
	36,000		36,000

Wages Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	45,000	By Factory overhead control A/c	12,000
		By Building Construction A/c	3,000
		By WIP Control A/c (bal. fig.)	30,000
	45,000		45,000

Factory Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Stores Ledger control A/c	1,800	By Building Construction A/c	6,000
To Wages Control A/c	12,000	By WIP Control A/c (bal. fig.)	54,900
To Cost Ledger control A/c	48,000	By Costing P&L A/c (under absorption)	2,400
To Stores Ledger control A/c(loss)	1,500		
	63,300		63,300

Royalty Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	1,500	By WIP Control A/c	1,500
	1,500		1,500

Work-in-process Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	6,000	By Finished goods controlA/c (bal. fig.)	99,900
To Stores Ledger control A/c	15,000		
To Wages Control A/c	30,000		
To Factory overhead controlA/c	54,900		
To Royalty A/c	1,500	By Balance c/d	7,500
	1,07,400		1,07,400

Finished Goods Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	1,29,000	By Cost of Goods Sold A/c(Refer working note)	1,08,000
To WIP control A/c	99,900	By Balance c/d	1,20,900
	2,28,900		2,28,900

Cost of Goods Sold Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Finished Goods controlA/c	1,08,000	By Cost of sales A/c	1,08,000
	1,08,000		1,08,000

Selling, Distribution and Administration Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	7,500	By Cost of sales A/c	7,500
	7,500		7,500

Cost of Sales Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Goods Sold A/c	1,08,000	By Costing P&L A/c	1,15,500

To Selling, Distribution andAdministration A/c	7,500		
	1,15,500		1,15,500

Costing P&L Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Sales A/c	1,15,500	By Cost Ledger control A/c	1,35,000
To Factory overhead controlA/c	2,400		
To Cost Ledger control A/c(bal. fig.) (Profit)	17,100		
	1,35,000		1,35,000

Building Construction Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	3,000	By Cost Ledger control A/c	13,200
To Stores Ledger controlA/c	1,200		
To Wages Control A/c	3,000		
To Factory overhead control A/c	6,000		
	13,200		13,200

Trial Balance

Particulars	Dr. (₹ in '000)	Cr. (₹ in '000)
Stores Ledger Control A/c	16,500	
WIP Control A/c	7,500	
Finished Goods Control A/c	1,20,900	
Cost Ledger Control A/c		1,44,900
	1,44,900	1,44,900

Workings:

Cost of Goods sold = ₹ $\frac{13,50,00,000 \times 80}{100}$ = ₹ 10,80,00,000

Q.15 Control Accounts | RTP May 22

X Ltd. maintains a non-integrated accounting system for the purpose of management information. The following are the data related with year 2021 -22:

Particulars	Amount ('000)
Opening balances:	
- Stores ledger control A/c	48,000
- Work-in-process control A/c	12,000
- Finished goods control A/c	2,58,000
- Building construction A/c	6,000

- Cost ledger control A/c	3,24,000
During the year following transactions took place:	
Materials:	
- Purchased	24,000
- Issued to production	30,000
- Issued to general maintenance	3,600
- Issued to building construction	2,400
Wages:	
- Gross wages paid	90,000
- Indirect wages paid	24,000
- For building construction	6,000
Factory overheads:	
- Actual amount incurred (excluding items shown above)	96,000
- Absorbed in building construction	12,000
- Under-absorbed	4,800
Royalty paid	3,000
Selling distribution and administration overheads	15,000
Sales	2,70,000

At the end of the year, the stock of raw material and work-in-process was ₹3,30,00,000 and ₹15,00,000 respectively. The loss arising in the raw material account is treated as factory overheads. The building under construction was completed during the year. Gross profit margin is 20% on sales.

Required:

PREPARE the relevant control accounts to record the above transactions in the cost ledger of the company.

Ans.

Cost Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Costing P&L A/c	2,70,000	By Balance b/d	3,24,000
To Building Construction A/c	26,400	By Stores Ledger Control A/c	24,000
To Balance c/d	2,89,800	By Wages Control A/c	90,000
		By Factory overhead control A/c	96,000
		By Royalty A/c	3,000
		By Selling, Distribution and Administration overheads	15,000
		By Costing P&L A/c	34,200
	5,86,200		5,86,200

Stores Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	48,000	By WIP control A/c	30,000
To Cost Ledger control A/c	24,000	By Factory overheads control A/c	3,600

		By Building construction A/c	2,400
		By Factory overhead control A/c (loss) (Bal. fig)	3,000
		By Balance c/d	33,000
	72,000		72,000

Work-in-process Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	12,000	By Finished goods control A/c	1,99,800
To Stores Ledger control A/c	30,000		
To Wages Control A/c	60,000		
To Factory overhead control A/c	1,09,800		
To Royalty A/c	3,000	By Balance c/d	15,000
	2,14,800		2,14,800

Finished Goods Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	2,58,000	By Cost of Goods Sold A/c (Refer working note)	2,16,000
To WIP control A/c	1,99,800	By Balance c/d	2,41,800
	4,57,800		4,57,800

Cost of Sales Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Goods Sold A/c	2,16,000	By Costing P&L A/c	2,31,000
To Selling, Distribution and Administration A/c	15,000		
	2,31,000		2,31,000

Costing P&L Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Sales A/c	2,31,000	By Cost Ledger control A/c	2,70,000
To Factory overhead control A/c	4,800		
To Cost Ledger control A/c	34,200		
	2,70,000		2,70,000

Building Construction Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	6,000	By Cost Ledger control A/c	26,400
To Stores Ledger control A/c	2,400		
To Wages Control A/c	6,000		
To Factory overhead control A/c	12,000		
	26,400		26,400

Factory Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Stores Ledger control A/c	3,600	By Building Construction A/c	12,000
To Wages Control A/c	24,000	By WIP Control A/c	1,09,800
To Cost Ledger control A/c	96,000	By Costing P&L A/c	4,800
To Stores Ledger control A/c (loss)	3,000		
	1,26,600		1,26,600

Wages Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	90,000	By Factory overhead control A/c	24,000
		By Building Construction A/c	6,000
		By WIP Control A/c	60,000
	90,000		90,000

Royalty Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	3,000	By WIP Control A/c	3,000
	3,000		3,000

Cost of Goods Sold Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Finished Goods control A/c	2,16,000	By Cost of sales A/c	2,16,000
	2,16,000		2,16,000

Selling, Distribution and Administration Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	15,000	By Cost of sales A/c	15,000
	15,000		15,000

Trial Balance

Particulars	Dr.	Cr.
	(₹ in '000)	(₹ in '000)
Stores Ledger Control A/c	33,000	
WIP Control A/c	15,000	
Finished Goods Control A/c	2,41,800	
Cost Ledger Control A/c		2,89,800
	2,89,800	2,89,800

Working Note:
Cost of Goods sold = 2,70,000 × 80/100 = ₹ 2,16,000

Q.16 Reconciliation Statement | RTP Nov 22

The financial books of a company reveal the following data for the financial year ending on 31st March, 2022:

	(₹)
Opening Stock:	
Finished goods 875 units	1,48,750
Work-in-process	64,000
01.04.2021 to 31.3.2022	
Raw materials consumed	15,60,000
Direct Labour	9,00,000
Factory overheads	6,00,000
Goodwill written off	2,00,000
Administration overheads	5,90,000
Dividend paid	1,70,000
Bad Debts	24,000
Selling and Distribution Overheads	1,22,000
Interest received	90,000
Rent received	36,000
Sales 14,500 units	41,60,000
Closing Stock: Finished goods 375 units	82,500
Work-in-process	77,334

The cost records provide as under:

- Factory overheads are absorbed at 60% of direct wages.
- Administration overheads are recovered at 20% of factory cost.
- Selling and distribution overheads are charged at ₹ 8 per unit sold.
- Opening Stock of finished goods is valued at ₹ 208 per unit.
- The company values work-in-process at factory cost for both Financial and Cost Profit Reporting.

Required:

(i) PREPARE statements for the year ended 31st March, 2022 showing-

- the profit as per financial records
- the profit as per costing records.

(ii) PRESENT a statement reconciling the profit as per costing records with the profit as per Financial Records.

Ans.

(i) Statement of Profit as per financial records (for the year ended March 31, 2022)

	(₹)		(₹)
To Opening stock:		By Sales	41,60,000
Finished Goods	1,48,750	By Closing stock:	
Work-in-process	64,000	Finished Goods	82,500
To Raw materials consumed	15,60,000	Work-in-Process	77,334
To Direct labour	9,00,000	By Rent received	36,000

To Factory overheads	6,00,000	By Interest received	90,000
To Goodwill written off	2,00,000		
To Administration overheads	5,90,000		
To Selling & distribution overheads	1,22,000		
To Dividend paid	1,70,000		
To Bad debts	24,000		
To Profit	**67,084**		
	44,45,834		44,45,834

Statement of Profit as per costing records
(for the year ended March 31,2022)

	(₹)	(₹)
Sales revenue (14,500 units) (A)		41,60,000
Cost of Sales:		
Opening stock (875 units x ₹ 208)	1,82,000	
Add: Cost of production of 14,000 units(Refer to Working Note 1& 2)	35,84,000	
₹ 35,84,000 × 375 units	(96,000)	
Less: Closing stock (14,000 units)		
Production cost of goods sold (14,500 units)	36,70,000	
Selling & distribution overheads (14,500 units x ₹ 8)	1,16,000	
Cost of sales: (B)		37,86,000
Profit: {(A) – (B)}		**3,74,000**

(ii) Statement of Reconciliation

(Reconciling the profit as per costing records with the profit as per financial records)

	(₹)	(₹)
Profit as per Cost Accounts		**3,74,000**
Add: Admin. overheads over absorbed (₹ 5,97,333 – ₹ 5,90,000)	7,333	
Opening stock overvalued (₹ 1,82,000 – ₹ 1,48,750)	33,250	
Interest received	90,000	
Rent received	36,000	**1,66,583**
		5,40,583
Less: Factory overheads under recovery (₹ 6,00,000 – ₹ 5,40,000)	60,000	
Selling & distribution overheads under recovery (₹ 1,22,000 – ₹ 1,16,000)	6,000	
Closing stock overvalued (₹ 96,000 – ₹ 82,500)	13,500	
Goodwill written off	2,00,000	
Dividend	1,70,000	
Bad debts	24,000	**4,73,500**
Profit as per financial accounts		**67,083**

Working Notes:

1. **Number of units produced** Units

Sales	14,500
Add: Closing stock	375
Total	14,875
Less: Opening stock	875
Number of units produced	14,000

2. Cost Sheet

	(₹)	(₹)
Raw materials consumed		15,60,000
Direct labour		9,00,000
Prime cost		24,60,000
Factory overheads (60% of direct wages)		5,40,000
Factory cost		30,00,000
Add: Opening work-in-process		64,000
Less: Closing work-in-process		77,334
Factory cost of goods produced		29,86,666
Administration overheads (20% of factory cost)		5,97,333
Cost of production of 14,000 units		35,83,999

Cost of production per unit: $= \frac{\text{Total Cost of Production}}{\text{No. of units produced}} = \frac{35,83,999}{14,000 \text{units}} = ₹ 256$

Q.17 Reconciliation Statement | RTP May 23

The financial records of Riva Private Limited showed a net profit of ₹1,69,500 for the year ended 31st March, 2022. The cost accounts, however, disclosed a net loss of ₹ 88,500 for the same period. The following information were revealed as a result of scrutiny of the figures of cost accounts and financial accounts:

		(₹)
(i)	(Administrative overhead under recovered	63,750.0
(ii)	Factory overhead over recovered	3,37,500.0
(iii)	Depreciation under charged in Cost Accounts	65,000.0
(iv)	Dividend received	50,000.0
(v)	Loss due to obsolescence charged in Financial Accounts	42,000.0
(vi)	Income tax provided	1,09,000.0
(vii)	Bank interest credited in Financial Accounts	34,000.0
(viii)	Value of opening stock:	
	In Cost Accounts	4,12,500.0
	In Financial Accounts	3,62,500.0
(ix)	Value of closing stock:	
	In Cost Accounts	3,13,750.0
	In Financial Accounts	3,30,000.0
(x)	Goodwill written-off in Financial Accounts	62,500.0
(xi)	Notional rent of own premises charged in Cost Accounts	1,50,000.0

(xii)	Provision for doubtful debts in Financial Accounts	37,500.0

Prepare a reconciliation statement by taking costing net loss as base.

Ans. Statement of Reconciliation

Sl. No.	Particulars	(₹)	(₹)
	Net loss as per Cost Accounts		(88,500)
	Additions		
1	Factory O/H over recovered	3,37,500	
2	Dividend Received	50,000	
3	Bank Interest received	34,000	
4	Difference in Value of Opening Stock (4,12,500 – 3,62,500)	50,000	
5	Difference in Value of Closing Stock (3,30,000 – 3,13,7500)	16,250	
6	Notional Rent of own Premises	1,50,000	6,37,750
	Deductions		
1	Administration O/H under recovered	63,750	
2	Depreciation under charged	65,000	
3	Loss due to obsolescence	42,000	
4	Income tax Provided	1,09,000	
5	Goodwill written-off	62,500	
6	Provision for doubtful debts	37,500	(3,79,750)
	Net Profit as per Financial A/c.		1,69,500

Q.18 Reconciliation Statement | RTP Nov 23

The financial books of a company reveal the following data for the year ended 31st March, 2023:

	(₹)
Opening Stock:	
Finished goods 625 units	1,06,250
Work-in-process	92,000
01.04.2022 to 31.03.2023	
Raw materials consumed	16,80,000
Direct Labour	12,20,000
Factory overheads	8,44,000
Administration overheads (production related)	3,96,000
Dividend paid	2,44,000
Bad Debts	36,000
Selling and Distribution Overheads	1,44,000
Interest received	76,000

Rent received	92,000
Sales 12,615 units	45,60,000
Closing Stock: Finished goods 415 units	91,300
Work-in-process	82,400

The cost records provide as under:

- Factory overheads are absorbed at 70% of direct wages.
- Administration overheads are recovered at 15% of factory cost.
- Selling and distribution overheads are charged at ₹ 6 per unit sold.
- Opening Stock of finished goods is valued at ₹ 240 per unit.
- The company values work-in-process at factory cost for both Financial and Cost Profit Reporting.

Required:

(i) Prepare statements for the year ended 31st March, 2023 showing:

- the profit as per financial records
- the profit as per costing records.

(ii) Prepare a statement reconciling the profit as per costing records with the profit as per financial records.

Ans. **(i)**

Statement of Profit as per financial records
(for the year ended March 31, 2023)

	(₹)		(₹)
To Opening stock of Finished Goods	1,06,250	By Sales	45,60,000
To Work-in-process	92,000	By Closing stock of finished Goods	91,300
To Raw materials consumed	16,80,000	By Work-in-Process	82,400
To Direct labour	12,20,000	By Rent received	92,000
To Factory overheads	8,44,000	By Interest received	76,000
To Administration overheads	3,96,000		
To Selling & distribution overheads	1,44,000		
To Dividend paid	2,44,000		
To Bad debts	36,000		
To Profit	1,39,450		
	49,01,700		49,01,700

Statement of Profit as per costing records
(for the year ended March 31,2023)

	(₹)
Sales revenue (A) (12,615 units)	45,60,000
Cost of sales:	
Opening stock (625 units × ₹ 240)	1,50,000
Add: Cost of production of 12,405 units (Refer to working note 2)	43,28,140
Less: Closing stock	(1,44,795)

$\left(\frac{43,28,140 \times 415 \text{ units}}{12,405 \text{ units}}\right)$	
Production cost of goods sold (12,615 units)	43,33,345
Selling & distribution overheads (12,615 units × ₹6)	75,690
Cost of sales: (B)	44,09,035
Profit: {(A) – (B)}	1,50,965

(ii) Statement of Reconciliation

(Reconciling the profit as per costing records with the profit as per financial records)

	(₹)	(₹)
Profit as per Cost Accounts		1,50,965
Add: Administration overheads over absorbed (₹5,64,540 – ₹3,96,000)	1,68,540	
Opening stock overvalued (₹1,50,000 – ₹ 1,06,250)	43,750	
Interest received	76,000	
Rent received	92,000	
Factory overheads over recovered (₹ 8,54,000 – ₹ 8,44,000)	10,000	3,90,290
		5,41,255
Less: Selling & distribution overheads under recovery (₹ 1,44,000 – ₹ 75,690)	68,310	
Closing stock overvalued (₹1,44,795 – ₹ 91,300)	53,495	
Dividend	2,44,000	
Bad debts	36,000	(4,01,805)
Profit as per financial accounts		1,39,450

Working notes:

1. **Number of units produced**

	Units
Sales	12,615
Add: Closing stock	415
Total	13,030
Less: Opening stock	(625)
Number of units produced	12,405

2. **Cost Sheet**

	(₹)
Raw materials consumed	16,80,000
Direct labour	12,20,000
Prime cost	29,00,000
Factory overheads (70% of direct wages)	8,54,000
Factory cost	37,54,000

Add: Opening work-in-process	92,000
Less: Closing work-in-process	(82,400)
Factory cost of goods produced	37,63,600
Administration overheads (15% of factory cost)	5,64,540
Cost of production of 12,405 units (Refer to working note 1)	43,28,140
Cost of production per unit:	
$\frac{\text{Total Cost of Production}}{\text{No. of units produced}} = \frac{43,28,140}{12,405\text{units}}$ = ₹348.90	

13 CHAPTER JOB & BATCH COSTING

Q.1 Explain Job & Batch Cost | PY May 18

Explain 'Just In Time' (JIT) approach of inventory management.

Ans.

Just in Time (JIT) Inventory Management

JIT is a system of inventory management with an approach to have a zero inventories in stores. According to this approach material should only be purchased when it is actually required for production.

JIT is based on two principles

(i) Produce goods only when it is required and

(ii) the products should be delivered to customers at the time only when they want.

It is also known as 'Demand pull' or 'Pull through' system of production. In this system, production process actually starts after the order for the products is received. Based on the demand, production process starts and the requirement for raw materials is sent to the purchase department for purchase. This can be understood with the help of the following diagram:

Q.2 Batch Costing: Optimum run | PY Nov 18

XYZ Ltd. has obtained an order to supply 48000 bearings per year from a concern. On a steady basis, it is estimated that it costs ₹ 0.20 as inventory holding cost per bearing per month and the set-up cost per run of bearing manufacture is ₹ 384.

You are required to:

(i) compute the optimum run size and number of runs for bearing manufacture. (ii) compute the interval between two consecutive runs.

(iii) find out the extra costs to be incurred, if company adopts a policy to manufacture 8000 bearings per run as compared to optimum run Size.

(iv) give your opinion regarding run size of bearing manufacture.

Assume 365 days in a year.

Ans.

(i) Optimum batch size or Economic Batch Quantity (EBQ):

$$EBQ = \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2X48000X384}{2.4}} = 3919.18 \text{ or } 3,920 \text{ units}$$

Number of Optimum runs = 48,000 ÷ 3,920 = 12.245 or 13 run

(ii) Interval between 2 runs (in days) = 365 days ÷ 13 = 28 days

Or 365÷12.24=29.82 days

(iii) If 8,000 bearings are manufactures in a run:

Total cost = Set-up cost + Inventory holding cost

= ₹.384×(48,000÷8,000) + (8,000÷2)×₹.2.4

= **2304+9,600** = 11,904

Extra cost = ₹(11,904 – 9,406*) =₹ 2,498/-
OR
Extra cost = ₹ (11,904 – 9,696*) = ₹ 2,208/-
* Minimum Inventory Cost = Average Inventory × Inventory Carrying Cost per unit per annum
Average Inventory = 3,920 units ÷ 2 = 1,960 units
Carrying Cost per unit per annum = ₹0.2 × 12 months = ₹2.4
Minimum Inventory Holding Costs = 1,960 units × ₹2.4 = ₹4,704
Total cost = Set-up cost + Inventory holding cost = (12.245×384) + 4704 = **₹ 9,406** (approx.)
OR
Total cost = Set-up cost + Inventory holding cost = (13×384) + 4704 = **₹ 9,696** (approx.)

(iv) To save cost the company should run at optimum batch size i.e. 3,920 Units. It saves ₹ 2,498 or 2208. Run size should match with the Economic production run of bearing manufacture. When managers of a manufacturing operation make decisions about the number of units to produce for each production run, they must consider the costs related to setting up the production process and the costs of holding inventory

Alternative presentation to part 3(a) (iii)
Statement showing Total Cost at Production Run size of 3,600 and 8,000 bearings

A.	Annual requirement	48,000	48,000
B.	Run Size	3,920	8,000
C.	No. of runs (A/B)	12.245	6
D.	Set up cost per run	₹ 384	₹ 384
E.	Total set up cost (CxD)	₹ 4,702	₹ 2,304
F.	Average inventory (B/2)	1,960	4,000
G.	Carrying cost per unit p.a.	2.40	2.40
H.	Total Carrying cost (FxG)	4,704	9,600
I.	Total cost (E+H)	9,406	11,904

Extra cost incurred, if run size is of 8,000= ₹11,904-9,406= **₹ 2,498**

Q.3 Job Cost Sheet & Sp. | PY Nov 19

The following data is presented by the supervisor of a factory for a Job:

	₹ per unit
Direct Material	120
Direct Wages @ ₹ 4 per hour (Departments A-4 hrs, B-7 hrs, C-2 hrs & D-2 hrs)	60
Chargeable Expenses	20
Total	200

Analysis of the Profit and Loss Account for the year ended 31st March, 2019

Material		2,00,000	**Sales**	**4,30,000**
Direct Wages				
Dept. A	12,000			
Dept. B	8,000			
Dept. C	10,000			

Dept. D	20,000	50,000		
Special Store items		6,000		
Overheads				
Dept. A	12,000			
Dept. B	6,000			
Dept. C	9,000			
Dept. D	17,000	44,000		
Gross Profit c/d		1,30,000		
		4,30,000		4,30,000
Selling Expenses		90,000		1,30,000
Net Profit		40,000	**Gross Profit b/d**	
		1,30,000		1,30,000

It is also to be noted that average hourly rates for all the four departments are similar. Required:

(i) Prepare a Job Cost Sheet.
(ii) Calculate the entire revised cost using the above figures as the base.
(iii) Add 20% profit on selling price to determine the selling price.

Ans. **(b)** **Job Cost Sheet**

Customer Details ——— Job No._____
Date of commencement —— Date of completion _____

Particulars		Amount (₹)
Direct materials		120
Direct wages:		
Deptt. A ₹ 4.00 × 4 hrs.	₹ 16.00	
Deptt. B ₹ 4.00 × 7 hrs.	₹ 28.00	
Deptt. C ₹ 4.00 × 2 hrs.	₹ 8.00	
Deptt. D ₹ 4.00 × 2 hrs.	₹ 8.00	60
Chargeable expenses		20
Prime cost		**200**
Overheads		
Deptt. A = $\frac{12000}{12000}$ x100 =100% of ₹ 16	₹ 16	
Deptt. B = $\frac{6000}{8000}$ x100 = 75% of ₹ 28	₹ 21	
Deptt. C = $\frac{9000}{10000}$ x100 = 90% of ₹ 8 = $\frac{9000}{10000}$ x100 = 90% of ₹ 8 = ₹ 7.20	₹ 7.20	
Deptt. D = $\frac{17000}{20000}$ x100 = 85% of ₹ 8	₹ 6.80	**51.00**

Works cost		251.00
Selling expenses =100 = 30% of work cost		**75.30**
Total cost		326.30
Profit (20% profit on selling price i.e 25% of total cost)		**81.58**
Selling price		**407.88**

Q.4 Eco Production run | PY Nov 19

AUX Ltd. has an Annual demand from a single customer for 60,000 Covid-19 vaccines. The customer prefers to order in the lot of 15,000 vaccines per order. The production cost of vaccine is ₹ 5,000 per vaccine. The set-up cost per production run of Covid-19 vaccines is ₹ 4,800. The carrying cost is ₹ 12 per vaccine per month.

You are required to:

(i) Find the most Economical Production Run.

(ii) Calculate the extra cost that company incurs due to production of 15,000 vaccines in a batch.

Ans.

(i) Calculation of most Economical Production Run

$$= \sqrt[2]{\frac{x60000x4800}{12\ 12x}} = \textbf{2,000 Vaccine}$$

(ii) Calculation of Extra Cost due to processing of 15,000 vaccines in a batch

	When run size is 2,000 vaccines	When run size is 15,000 vaccines
Total set up cost	$\frac{60,000}{2,000}$ × ₹ 4,800 = ₹ 1,44,000	$\frac{60,000}{15,000}$ × ₹ 4,800 = ₹ 19,200
Total Carrying cost	$\frac{1}{2}$ × 2,000 × ₹ 144 = ₹ 1,44,000	$\frac{1}{2}$ × 15,000 × ₹ 144 = ₹ 10,80,000
Total Cost	₹ 2,88,000	₹ 10,99,200

Thus, extra cost = ₹ 10,99,200 – ₹ 2,88,000 = ₹ 8,11,200

Q.5 Calculate Sp. | PY Nov 22

A Ltd. is a pharmaceutical company which produces vaccines for diseases like Monkey Pox, Covid-19 and Chickenpox. A distributor had given an order for 1,600 Monkey Pox Vaccines. The company can produce 80 vaccines at a time. To process a batch of 80 Monkey Pox vaccines, the following costs would be incurred:

	₹
Direct Materials	4,250
Direct wages	500
Lab set-up cost	1,400

The Production Overheads are absorbed at a rate of 20% of direct wages and 20% of total production cost is charged in each batch for Selling, distribution and administration Overheads. The company is willing to earn profit of 25% on sales value.

You are required to determine:

(i) Total Sales value for 1,600 Monkey Pox Vaccines

(ii) Selling price per unit of the Vaccine.

Ans. **(i) & (ii) Calculation of Sales value and Selling price per unit of Monkey Pox vaccine**

Particulars	Amount (₹) per Batch	Amount (₹) for 1600	Amount (₹)

		units or 20 batches	per unit
Direct materials	4,250	85,000	53.125
Direct wages	500	10,000	6.250
Lab set-up cost	1,400	28,000	17.500
Production overheads (20% of direct wages)	100	2,000	1.250
Production Cost	6,250	1,25,000	78.125
Selling, distribution and administration cost (20% of Production cost)	1,250	25,000	15.625
Total Cost	7,500	1,50,000	93.75
Add: Profit (1/3rd of Total cost or 25% of Sales value)	2,500	50,000	31.25
Sales value	10,000	2,00,000	125.00

Q.6 EBQ | PY May 23

TSK Limited manufactures a variety of products. The annual demand for one of its products- Product 'X' is estimated as ₹1,35,000 units. Product 'X' is to be manufactured done in batches. Set up cost of each batch is ₹ 3,375 and inventory holding cost is ₹ 5 per unit. It is expected that demand of Product 'X' would be uniform throughout the year.

Required:

(i) Calculate the Economic Batch (EBQ) for Product 'X'.

(ii) Assuming that the company has a policy of manufacturing 7,500 units of Product 'X' per batch, calculate the additional cost incurred as compared to the cost incurred as per Economic Batch Quantity (EBQ) as computed in (i) above

Ans.

(i) Economic Batch Quantity (EBQ) = $\sqrt{\frac{2DS}{C}}$

where,

D = Annual demand for the product

S = Set-up cost per batch

C = Carrying cost per unit per annum.

$\sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 135000 \times 3375}{5}}$ = 13,500 units.

(ii) Total Cost (of maintaining the inventories) when batch size (Q) are 13,500 and 7,500 units respectively

Total cost = Total set-up cost + Total carrying cost.

	When batch size is 13,500units	When batch size is 7,500units
Total set up cost	$= \frac{135000}{13500} \times ₹3,375 = ₹33,750$ Or, No. of setups = 10 = 10 x ₹3,375 = ₹33,750	$= \frac{135000}{7500} \times$ ` 3,375 = ₹60,750
Total Carrying cost	1/2 × 13,500 × 5 = ₹33,750	1/2 × 7,500 × 5 = ₹18,750

Total Cost	₹67,500	₹79,500

₹ 12,000 is the excess cost borne by the company due to batch size not being economic batch quantity.
Alternative presentation

	EOQ 13,500	Batch size 7500	Extra cost	Saving
No of setup	10	18	8 x 3375 = 27,000	
Carrying cost	13,500 - 7500 = 6000/ 2 @ 5			15,000

Net extra cost = (27,000- 15,000) = ₹ 12,000

Q.7 Cost & SP Per Each | RTP May 18

Arnav Confectioners (AC) owns a bakery which is used to make bakery items like pastries, cakes and muffins. AC use to bake at least 50 units of any item at a time. A customer has given an order for 600 cakes. To process a batch, the following cost would be incurred:
Direct materials - ₹ 5,000
Direct wages - ₹ 500 (irrespective of units)
Oven set- up cost - ₹750 (irrespective of units)
AC absorbs production overheads at a rate of 20% of direct wages cost. 10% is added to the total production cost of each batch to allow for selling, distribution and administration overheads.
AC requires a profit margin of 25% of sales value.
Required:
(i) DETERMINE the price to be charged for 600 cakes.
(ii) CALCULATE cost and selling price per cake.
(iii) DETERMINE what would be selling price per unit If the order is for 605 cakes.

Ans.

Statement of cost per batch and per order
No. of batch = 600 units ÷ 50 units = 12 batches

	Particulars	Cost per batch(`)	Total Cost (`)
	Direct Material Cost	5,000.00	60,000
	Direct Wages	500.00	6,000
	Oven set-up cost	750.00	9,000
	Add: Production Overheads (20% of Directwages)	100.00	1,200
	Total Production cost	6,350.00	76,200
	Add: S&D and Administration overheads (10% of Total production cost)	635.00	7,620
	Total Cost	6,985.00	83,820
	Add: Profit (1/3rd of total cost)	2,328.33	27,940
(i)	**Sales price**	**9,313.33**	**1,11,760**
	No. of units in batch	50 units	
(ii)	**Cost per unit** (`6,985 ÷ 50 units)	**139.70**	
	Selling price per unit (9,313.33 ÷ 50 units)	**186.27**	

(iii) If the order is for 605 cakes, then selling price per cake would be as below:

Particulars	Total Cost (₹)

Direct Material Cost	60,500
Direct Wages (₹500 × 13 batches)	6,500
Oven set-up cost (₹750 × 13 batches)	9,750
Add: Production Overheads (20% of Direct wages)	1,300
Total Production cost	78,050
Add: S&D and Administration overheads (10% of Total production cost)	7,805
Total Cost	85,855
Add: Profit (1/3rd of total cost)	28,618
Sales price	**1,14,473**
No. of units	605 units
Selling price per unit (₹1,14,473 ÷ 605 units)	**189.21**

Q.8 Job Cost sheet | RTP May 18

A factory uses job costing. The following data are obtained from its books for the year ended 31st March, 2018:

	Amount (₹)
Direct materials	9,00,000
Direct wages	7,50,000
Selling and distribution overheads	5,25,000
Administration overheads	4,20,000
Factory overheads	4,50,000
Profit	6,09,000

Required:

(i) PREPARE a Job Cost sheet indicating the Prime cost, Cost of Production, Cost of sales and the Sales value.

(ii) In 2018-19, the factory received an order for a job. It is estimated that direct materials required will be ₹ 2,40,000 and direct labour will cost ₹ 1,50,000. DETERMINE what should be the price for the job if factory intends to earn the same rate of profit on sales assuming that the selling and distribution overheads have gone up by 15%. The factory overheads is recovered as percentage of wages paid, whereas, other overheads as a percentage of cost of production, based on cost rates prevailing in the previous year.

Ans. **(i)**

Production Statement
For the year ended 31st March, 2018

		Amount (₹)
Direct materials		9,00,000
Direct wages		7,50,000
	Prime Cost	16,50,000
Factory overheads		4,50,000
	Cost of Production	21,00,000
Administration overheads		4,20,000
Selling and distribution overheads		5,25,000

	Cost of Sales	30,45,000
Profit		6,09,000
	Sales value	36,54,000

Calculation of Rates:

1. Percentage of factory overheads to direct wages = $\frac{450000}{750000} \times 100 = 60\%$

2. Percentage of administration overheads to Cost of production = $\frac{420000}{2100000} \times 100 = 20\%$

3. Selling and distribution overheads = ₹ 5,25,000 × 115% = ₹ 6,03,750 Selling and distribution overhead % to Cost of production = $\frac{603750}{2100000} \times 100 = 28.75\%$

4. Percentage of profit to sales = $\frac{609000}{3654000} \times 100 = 16.67\%$

(ii) Calculation of price for the job received in 2018-19

	Amount (₹)
Direct materials	2,40,000
Direct wages	1,50,000
Prime Cost	3,90,000
Factory overheads (60% of ₹1,50,000)	90,000
Cost of Production	4,80,000
Administration overheads (20% of ₹4,80,000)	96,000
Selling and distribution overheads (28.75% of ₹4,80,000)	1,38,000
Cost of Sales	7,14,000
Profit (20% of ₹7,14,000)	1,42,800
Sales value	8,56,800

Q.9 Determine Price for Job | RTP Nov 18

A company has been asked to quote for a job. The company aims to make a net profit of 30% on sales. The estimated cost for the job is as follows:
Direct materials 10 kg @₹10 per kg
Direct labour 20 hours @ ₹5 per hour
Variable production overheads are recovered at the rate of ₹ 2 per labour hour.
Fixed production overheads for the company are budgeted to be ₹1,00,000 each year and are recovered on the basis of labour hours.
There are 10,000 budgeted labour hours each year. Other costs in relation to selling, distribution and administration are recovered at the rate of ₹50 per job.
DETERMINE quote for the job by the Company.

Ans. **Determination of quotation price for the job**

Cost	(₹)
Direct Material (10kg × ₹10)	100
Direct Labour (20hrs × ₹5)	100

Variable production overhead (20hrs × ₹2)	40
Fixed Overhead $\left(\frac{100000}{10000 \text{ budgeted hours}} \times 20 \text{ hours}\right)$	200
Other costs	50
Total costs	490

Net profit is 30% of sales, therefore total costs represent 70% (₹ 490 × 100) ÷ 70 = ₹ 700 price to quote for job.
To check answer is correct; profit achieved will be ₹ 210 (₹ 700 - ₹ 490)
= ₹ 210 ÷ ₹ 700 = 30%

Q.10 Eco Batch Qty & annual cost | RTP Nov 19

BTL LLP. manufactures glass bottles for HDL Ltd., a pharmaceutical company, which is in ayurvedic medicines business..
BTL can produce 2,00,000 bottles in a month. Set-up cost of each production run is ₹ 5,200 and the cost of holding one bottle for a year is ₹ 1.50.
As per an estimate HDL Ltd. can order as much as 19,00,000 bottles in a year spreading evenly throughout the year.
At present the BTL manufactures 1,60,000 bottles in a batch.
Required:
(i) COMPUTE the Economic Batch Quantity for bottle production.
(ii) COMPUTE the annual cost saving to BTL by adopting the EBQ of a production.

Ans.

Economic Batch Quantity (EBQ) =
Where, D = Annual demand for the product
S = Setting up cost per batch
C = Carrying cost per unit of production

(i) Computation of EBQ :

$$= \sqrt{\frac{2 \times 1900000 \times 5200}{1.5}}$$

= 1,14,775 bottles

(ii) Computation of savings in cost by adopting EBQ:

Batch Size	No. of Batch	Set-up cost	Carrying cost	Total Cost
1,60,000 bottles	12	62,400 (`5,200 × 12)	1,20,000 (`1.5 × ½ × 1,60,000)	1,82,400
1,14,775 bottles	17	88,400 (`5,200 × 17)	86,081.25 (`1.5 × ½ × 1,14,775)	1,74,481.25
Saving				7,918.75

Q.11 Price to be charged | RTP Nov 19

Ispat Engineers Limited (IEL) undertook a plant manufacturing work for a client. It will charge a profit mark up of 20% on the full cost of the jobs. The following are the information related to the job:
Direct materials utilised – ₹1,87,00,000
Direct labour utilised – 2,400 hours at ₹80 per hour
Budgeted production overheads are Rs. 48,00,000 for the period and are recovered on the basis of 24,000 labour hours.

Budgeted selling and administration overheads are ₹18,00,000 for the period and recovered on the basis of total budgeted total production cost of ₹36,00,00,000.

Required:

CALCULATE the price to be charged for the job.

Ans. **Calculation of job price**

Particulars	Amount (₹)
Direct materials	1,87,00,000
Direct wages (₹80 × 2,400 hours)	1,92,000
Production overheads $\left(\frac{4800000}{24000hrs} \times 2400hrs\right)$	4,80,000
Production cost	**1,93,72,000**
Selling and administration overheads $\left(\frac{1800000}{360000000} \times 19372000\right)$	96,860
Total cost of sales	1,94,68,860
Profit mark-up @ 20%	38,93,772
Price for the job	**2,33,62,632**

Q.12 Job Cost Sheet | RTP May 20

A factory uses job costing system. The following data are obtained from its books for the year ended 31st March, 2020:

	Amount (₹)
Direct materials	18,00,000
Direct wages	15,00,000
Selling and distribution overheads	10,50,000
Administration overheads	8,40,000
Factory overheads	9,00,000
Profit	12,18,000

(i) PREPARE a Job Cost sheet indicating the Prime cost, Cost of Production, Cost of sales and the Sales value.

(ii) In 2019-20, the factory received an order for a job. It is estimated that direct materials required will be ₹4,80,000 and direct labour will cost ₹3,00,000. DETERMINE what should be the price for the job if factory intends to earn the same rate of profit on sales assuming that the selling and distribution overheads have gone up by 15%. The factory overheads is recovered as percentage of wages paid, whereas, other overheads as a percentage of cost of production, based on cost rates prevailing in the previous year.

Ans. **(i)**

Production Statement
For the year ended 31st March, 2020

	Amount (₹)
Direct materials	18,00,000
Direct wages	15,00,000
Prime Cost	33,00,000

Factory overheads		9,00,000
	Cost of Production	42,00,000
Administration overheads		8,40,000
Selling and distribution overheads		10,50,000
	Cost of Sales	60,90,000
Profit		12,18,000
	Sales value	73,08,000

Calculation of Rates:

1. Percentage of factory overheads to direct wages = $\frac{900000}{1500000} \times 100 = 60\%$
2. Percentage of administration overheads to Cost of production = $\frac{840000}{4200000} \times 100 = 20\%$
3. Selling and distribution overheads = ₹10,50,000 × 115% = ₹12,07,500 Selling and distribution overhead % to Cost of production = $\frac{1207500}{4200000} \times 100 = 28.75\%$
4. Percentage of profit to sales = $\frac{1218000}{7308000} \times 100 = 16.67\%$ or, 1/6

(ii) Calculation of price for the job received in 2019-20

	Amount (₹)
Direct materials	4,80,000
Direct wages	3,00,000
Prime Cost	7,80,000
Factory overheads (60% of ₹3,00,000)	1,80,000
Cost of Production	9,60,000
Administration overheads (20% of ₹9,60,000)	1,92,000
Selling and distribution overheads (28.75% of ₹9,60,000)	2,76,000
Cost of Sales	14,28,000
Profit (1/5 of ₹14,28,000)	2,85,600
Sales value	17,13,600

Q.13 Total Cost for Job & Price | RTP Nov 20

AP Ltd. received a job order for supply and fitting of plumbing materials. Following are the details related with the job work:

Direct Materials

AP Ltd. uses a weighted average method for the pricing of materials issues. Opening stock of materials as on 12th August 2020:

- 15mm GI Pipe, 12 units of (15 feet size) @ ₹600 each
- 20mm GI Pipe, 10 units of (15 feet size) @ ₹ 660 each
- Other fitting materials, 60 units @ ₹ 26 each
- Stainless Steel Faucet, 6 units @ ₹ 204 each
- Valve, 8 units @ ₹ 404 each

Purchases:

On 16th August 2020:

- 20mm GI Pipe, 30 units of (15 feet size) @ ₹ 610 each
- 10 units of Valve @ ₹ 402 each

On 18th August 2020:

- Other fitting materials, 150 units @ ₹ 28 each
- Stainless Steel Faucet, 15 units @ ₹ 209 each

On 27th August 2020:

- 15mm GI Pipe, 35 units of (15 feet size) @ ₹ 628 each
- 20mm GI Pipe, 20 units of (15 feet size) @ ₹ 660 each
- Valve, 14 units @ ₹ 424 each

Issues for the hostel job:

On 12th August 2020:

- 20mm GI Pipe, 2 units of (15 feet size)
- Other fitting materials, 18 units

On 17th August 2020:

- 15mm GI Pipe, 8 units of (15 feet size)
- Other fitting materials, 30 units

On 28th August 2020:

- 20mm GI Pipe, 2 units of (15 feet size)
- 15mm GI Pipe, 10 units of (15 feet size)
- Other fitting materials, 34 units
- Valve, 6 units

On 30th August 2020:

- Other fitting materials, 60 units
- Stainless Steel Faucet, 15 units

Direct Labour:

Plumber: 180 hours @ ₹100 per hour (includes 12 hours overtime)

Helper: 192 hours @ ₹70 per hour (includes 24 hours overtime)

Overtimes are paid at 1.5 times of the normal wage rate.

Overheads:

Overheads are applied @ ₹26 per labour hour.

Pricing policy:

It is company's policy to price all orders based on achieving a profit margin of 25% on sales price.

You are required to

(a) CALCULATE the total cost of the job.

(b) CALCULATE the price to be charged from the customer.

Ans. **(a) Calculation of Total Cost for the Job:**

Particulars	Amount (₹)	Amount (₹)
Direct Material Cost:		
- 15mm GI Pipe (Working Note- 1)	11,051.28	
- 20mm GI Pipe (Working Note- 2)	2,588.28	
- Other fitting materials (Working Note- 3)	3,866.07	
- Stainless steel faucet $15 \text{ units} \times \left(\frac{6\times204 + 15\times209}{21\text{units}}\right)$	3,113.57	
- Valve $6 \text{ units} \times \left(\frac{8\times404 + 10\times402 + 14\times424}{32\text{units}}\right)$		

	2,472.75	23,091.95
Direct Labour:		
- Plumber [(180 hours × ₹100) + (12 hours ×₹50)]	18,600.00	
- Helper [(192 hours × ₹70) + (24 hours × ₹35)]	14,280.00	32,880.00
- Overheads[₹26 × (180 + 192) hours]		9,672.00
Total Cost		**65,643.95**

(b) Price to be charged for the job work:

	Amount (₹)
Total Cost incurred on the job	65,643.95
Add: 25% Profit on Job Price $\left(\frac{65643.95}{75\%} \times 25\%\right)$	21,881.32
	87,525.27

Working Note:

1. Cost of 15mm GI Pipe

Date		Amount (₹)
17-08-2020	8 units × ₹ 600	4,800.00
28-08-2020	10 units × $\left(\frac{4\times600+35\times628}{39\text{units}}\right)$	6,251.28
		11,051.28

2. Cost of 20mm GI Pipe

Date		Amount (₹)
12-08-2020	2 units × ₹ 660	1,320.00
28-08-2020	2 units × $\left(\frac{8\times660+30\times610+20\times660}{58\text{ units}}\right)$	1,268.28
		2,588.28

3. Cost of Other fitting materials

Date		Amount (₹)
12-08-2020	18 units × ₹ 26	468.00
17-08-2020	30 units × ₹ 26	780.00
28-08-2020	34 units × $\left(\frac{12\times26+150\times28}{162\text{units}}\right)$	946.96
30-08-2020	60 units × $\left(\frac{12\times26+150\times28}{162\text{units}}\right)$	1,671.11
		3,866.07

Q.14 Optimum Run Size | RTP May 22

Brostom Ltd. manufactures 'Stent' that is used by hospitals in angioplasty, a procedure used to open blocked coronary arteries without open-heart surgery. As per the estimates provided by Pharmaceutical Industry Bureau, there will be a demand of 1 crore 'Stents' in the coming year. Brostom Ltd. is having a market share of 10% of the total market demand of the Stents. It is estimated that it costs ₹ 3.00 as inventory holding cost per

stent per month and that the set-up cost per run of stent manufacture is ₹ 450.

Required:

(i) WHAT would be the optimum run size for Stent manufacture?

(ii) WHAT is the minimum inventory holding cost?

Ans.

(i) Computation of Optimum Run size of 'Stents' or Economic Batch Quantity (EBQ)

$$\text{Economic Batch Quantity (EBQ)} = \sqrt{\frac{2DS}{C}}$$

Where, D = Annual demand for the Stents
= 1,00,00,000 × 10% = 10,00,000 units

S = Set- up cost per run
= ₹ 450

C = Carrying cost per unit per annum
= ₹ 3 × 12 = ₹ 36

$$\text{EBQ} = \sqrt{\frac{2\times1000000\times450}{36}}$$

= 5,000 units of Stents

(ii) Minimum inventory holding cost

Minimum Inventory Cost = Average Inventory × Inventory Carrying Cost per unit per annum
= (5,000 ÷ 2) × ₹ 36
= ₹ 90,000

(iii) Calculation of the extra cost due to manufacturing policy

	When run size is 6,000 units	When run size is 5,000units i.e. at EBQ
Total set up cost	$\frac{1000000}{6000}\times450$ = ₹75,000	$\frac{1000000}{5000}\times450$ =₹90,000
Total Carrying cost	½ × 6,000 × ₹36 = ₹1,08,000	½ × 5,000 × ₹36 = ₹90,000
Total Cost	**₹ 1,83,000**	**₹ 1,80,000**

Extra cost= ₹ 1,83,000 - ₹ 1,80,000 = **₹ 3,000**

Q.15 SP of Batch | RTP Nov 22

PS Ltd. manufactures articles in predetermined lots simultaneously. The following costs have been incurred for Batch No. 'PS143' in the month of March, 2022:

Units produced 1,000 units
Direct materials cost ₹ 2,00,000
Direct Labour -
Department A 800 labour hours @ ₹ 100 per hour.
Department B 1,400 labour hours @ ₹ 120 per hour.
Factory overheads are absorbed on labour hour basis and the rates are:
Department A @ ₹ 140 per hour.
Department B @ ₹ 80 per hour.
Administrative overheads are absorbed at 10% of selling price.
The firm expects 25% gross profit (sales value minus factory cost) for determining the selling price.
You are required to CALCULATE the selling price per unit of Batch No. 'PS143'.

Ans. **Statement showing selling price per unit of Batch number 'PS143'**

Particulars	Amount (₹)	Amount (₹)
Direct Materials		2,00,000
Direct Labour		
Department A 800 labour hours @ ₹100 per hour	80,000	
Department B 1400 labour hours @ ₹120 per hour	1,68,000	**2,48,000**
Factory overheads		
Department A 800 labour hours @ ₹140 per hourDepartment	1,12,000	
B 1400 labour hours @ ₹80 per hour	1,12,000	2,24,000
Factory Cost		**6,72,000**
Add: Administrative overheads (10% of selling price) (6,72,000/75% x 10%)		89,600
Cost of production		7,61,600
Add: Profit (15% of selling price) (6,72,000/75% x 15%)		1,34,400
Selling price of batch no 'PS143'		**8,96,000**
Selling price per unit (8,96,000 / 1000 units)		**896**

Alternatively, selling price calculation:- Selling price assume X 25% = (X – factory cost) / X
or 0.25 X = X- 6,72,000
or 0.75 X = 6,72,000
hence X = ₹ 8,96,000

Q.16 Cost & Profit Per Batch | RTP May 23

A jobbing factory has undertaken to supply 200 pieces of a component per month for the ensuing six months. Every month a batch order is opened against which materials and labour hours are booked at actual. Overheads are levied at a rate per labour hour. The selling price contracted for is ₹ 80 per piece. From the following data. COMPUTE the cost and profit per piece of each batch order and overall position of the order for 1,200 pieces.

Month	Batch Output (Pieces)	Material cost (₹)	Direct wages (₹)	Direct labour (Hours)
January	210	6,500	1,200	240
February	200	6,400	1,400	280
March	220	6,800	1,500	280
April	180	6,300	1,400	270
May	200	7,000	1,500	300
June	220	7,200	1,600	320

The other details are:

Month	Chargeable expenses (₹)	Direct labour Hours
January	1,20,000	4,800
February	1,05,600	4,400
March	1,20,000	5,000
April	1,05,800	4,600

May	1,30,000	5,000
June	1,20,000	4,800

Ans.

Particulars	Jan.(₹)	Feb.(₹)	March (₹)	April (₹)	May(₹)	June(₹)	Total(₹)
Batch output(in pieces)	210	200	220	180	200	220	1,230
Sale value @ ₹80	16,80	16,00	17,60	14,40	16,00	17,60	98,40
Material cost	6,500	6,400	6,800	6,300	7,000	7,200	40,20
Direct wages	1,200	1,400	1,500	1,400	1,500	1,600	8,600
Chargeable expenses*	6,000	6,720	6,720	6,210	7,800	8,000	41,45
Total cost	13,70	14,52	15,02	13,91	16,30	16,80	90,25
Profit per batch	3,100	1,480	2,580	490	(300)	800	8,150
Total cost per piece	65.2	72.6	68.3	77.3	81.5	76.4	73.4
Profit per piece	14.8	7.4	11.7	2.7	(1.5)	3.6	6.6

Overall position of the order for 1,200 pieces

Sales value of 1,200 pieces @ ₹ 80 per piece	₹ 96,000
Total cost of 1,200 pieces @ ₹ 73.4 per piece	₹ 88,080
Profit	₹ 7,920

* $\frac{\text{Chargeable expenses}}{\text{Direct labour hour for the month}} \times$ Direct labour hours for batch

Q.17 OH Recover Rate & Cost Sheet | RTP Nov 23

SM Motors Ltd. is a manufacturer of auto components. Following are the details of expenses for the year 2022-23:

		(₹)
(i)	Opening Stock of Material	15,00,000
(ii)	Closing Stock of Material	20,00,000
(iii)	Purchase of Material	1,80,50,000
(iv)	Direct Labour	90,50,000
(v)	Factory Overhead	30,80,000
(vi)	Administrative Overhead	20,50,400

During the FY 2023-24, the company has received an order from a car manufacturer where it estimates that the cost of material and labour will be ₹ 80,00,000 and ₹ 40,50,000 respectively. The company charges factory overhead as a percentage of direct labour and administrative overheads as a percentage of factory cost based on previous year's cost.

Cost of delivery of the components at customer's premises is estimated at ₹ 4,50,000.

You are required to:

(i) Calculate the overhead recovery rates based on actual costs for 2022-23.

(ii) Prepare a Job cost sheet for the order received and the price to be quoted if the desired profit is 25% on sales.

Ans.

(i) Calculation of Overhead Recovery Rate:

Factory Overhead Recovery Rate = $\frac{3080000}{9050000} \times 100$ = 34% of Direct labour

Administrative Overhead Recovery Rate = $\frac{2050400}{29680000} \times 100$ = 6.91% of Factory Cost

Working Note: Calculation of Factory Cost in 2022-23

Particulars	Amount (₹)
Opening Stock of Material	15,00,000
Add: Purchase of Material	1,80,50,000
Less: Closing Stock of Material	(20,00,000)
Material Consumed	1,75,50,000
Direct Labour	90,50,000
Prime Cost	2,66,00,000
Factory Overhead	30,80,000
Factory Cost	2,96,80,000

(ii) Job Cost Sheet for the order received in 2023-24

Particulars	Amount (₹)
Material	80,00,000
Labour	40,50,000
Factory Overhead (34% of ₹ 40,50,000)	13,77,000
Factory Cost	1,34,27,000
Administrative Overhead (6.91% of ₹1,34,27,000)	9,27,806
Cost of delivery	4,50,000
Total Cost	1,48,04,806
Add: Profit @ 25% of Sales or 33.33% of cost	49,34,935
Sales value (Price to be quoted for the order)	1,97,39,741

Hence the price to be quoted is ₹1,97,39,741.

Q.18 Job cost Sheet | MTP Nov 18(1)

A factory uses job costing. The following data are obtained from its books for the year ended 31st March, 20X8:

	Amount (Rs.)
Direct materials	9,00,000
Direct wages	7,50,000
Selling and distribution overheads	5,25,000
Administration overheads	4,20,000
Factory overheads	4,50,000
Profit	6,09,000

(i) PREPARE a Job Cost sheet indicating the Prime cost, Cost of Production, Cost of sales and the Sales value.

(ii) In 2018-19, the factory received an order for a job. It is estimated that direct materials required will be Rs.2,40,000 and direct labour will cost Rs.1,50,000. DETERMINE what should be the price for the job if factory intends to earn the same rate of profit on sales assuming that the selling and distribution overheads have gone up by 15%. The factory recovers overheads as a percentage of Cost of Production, based on cost rates prevailing in the previous year.

Ans. **(i) Production Statement**

For the year ended 31st March, 20X8

		Amount (Rs.)
Direct materials		9,00,000
Direct wages		7,50,000
	Prime Cost	16,50,000
Factory overheads		4,50,000
	Cost of Production	21,00,000
Administration overheads		4,20,000
Selling and distribution overheads		5,25,000
	Cost of Sales	30,45,000
Profit		6,09,000
	Sales value	36,54,000

1. Percentage of factory overheads to direct wages = $\frac{450000}{750000} \times 100 = 60\%$

2. Percentage of administration overheads to Cost of production = $\frac{420000}{2100000} \times 100 = 20\%$

3. Selling and distribution overheads = Rs.5,25,000 × 115% = Rs.6,03,750 Selling and distribution overhead % to Cost of production

$= \frac{603750}{2100000} \times 100 = 28.75\%$

4. Percentage of profit to sales = $\frac{609000}{3654000} \times 100 = 16.67\%$

(ii) Calculation of price for the job received in 20X8-X9

	Amount (Rs.)
Direct materials	2,40,000
Direct wages	1,50,000
Prime Cost	3,90,000
Factory overheads (60% of Rs.1,50,000)	90,000
Cost of Production	4,80,000
Administration overheads (20% of Rs.4,80,000)	96,000
Selling and distribution overheads (28.75% of Rs.4,80,000)	1,38,000
Cost of Sales	7,14,000
Profit (20% of Rs.7,14,000)	1,42,800
Sales value	8,56,800

Q.19 Optimum Run Size | MTP Nov 18(2)

M/s. KBC Bearings Ltd. is committed to supply 48,000 bearings per annum to M/s. KMR Fans on a steady daily basis. It is estimated that it costs Rs. 1 as inventory holding cost per bearing per month and that the set up cost per run of bearing manufacture is Rs. 3,200

(i) DETERMINE what would be the optimum run size of bearing manufacture?

(ii) DETERMINE What would be the interval between two consecutive optimum runs?

(iii) CALCULATE the minimum inventory cost?

Ans.

(i) Optimum batch size or Economic Batch Quantity (EBQ):

$$EBQ = \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 48000 \times 3200}{12}} = 5{,}060 \text{ units.}$$

(ii) Number of Optimum runs = 48,000 ÷ 5,060 = 9.49 or 10 runs Interval between 2 runs (in days) = 365 days ÷ 10 = 36.5 days

(iii) Minimum Inventory Cost = Average Inventory × Inventory Carrying Cost per unit per annum Average Inventory = 5,060 units ÷ 2 = 2,530 units Carrying Cost per unit per annum = Rs.1 × 12 months = Rs.12 Minimum Inventory Holding Costs = 2,530 units × Rs. 12 = Rs.30, 360

Q.20 Optimum Run Size | MTP May 18(2)

Arnav Motors Ltd. manufactures pistons used in car engines. As per the study conducted by the Auto Parts Manufacturers Association, there will be a demand of 80 million pistons in the coming year. Arnav Motors Ltd. is expected to have a market share of 1.15% of the total market demand of the pistons in the coming year. It is estimated that it costs Rs.1.50 as inventory holding cost per piston per month and that the set-up cost per run of piston manufacture is Rs. 3,500.

(i) DETERMINE the optimum run size for piston manufacturing?

(ii) Assuming that the company has a policy of manufacturing 40,000 pistons per run, CALCULATE the extra costs company would be incurring as compared to the optimum run suggested in (i) above?

(iii) IDENTIFY variability of cost with respect to unit and batch level from the following cost:

(a) Inventory carrying cost;

(b) Designing cost for a job;

(c) Machine set-up cost to run production and (d) Depreciation of factory building.

Ans.

(i) Optimum run size or Economic Batch Quantity (EBQ) = $\sqrt{\frac{2DxS}{C}}$

Where, D = Annual demand i.e. 1.15% of 8,00,00,000 = 9,20,000 units

S = Set-up cost per run = Rs. 3,500

C = Inventory holding cost per unit per annum = Rs.1.5 × 12 months = Rs. 18

$$EBQ = \sqrt{\frac{2 \times 920000 \text{units} \times 3500}{18}} = 18{,}915 \text{ units}$$

(ii) Calculation of Total Cost of set-up and inventory holding

	Batch size	No. of set-ups	Set-up Cost (Rs.)	Inventory holding cost (Rs.)	Total Cost (Rs.)
A	40,000 units	23 $\left(\frac{920000}{40000}\right)$	80,500 (23 × Rs. 3,500)	3,60,000 $\left(\frac{40000 \times 18}{2}\right)$	4,40,500
B	18,915 units	49 $\left(\frac{920000}{18915}\right)$	1,71,500 (49 × Rs.3,500)	1,70,235 $\left(\frac{18915 \times 18}{2}\right)$	3,41,735
	Extra Cost (A - B)				98,765

(iii)

	Costs	Unit level	Batch level
(a)	Inventory carrying cost	Variable cost	Variable cost
(b)	Designing cost for a job	Fixed cost	Variable cost, provided the entire jobwork is processed in

			a single batch.
(c)	Machine set-up cost to run production	Fixed cost	Variable cost
(d)	Depreciation of factory building	Fixed cost	Fixed cost

Q.21 Optimum Run Size | MTP May 19(2)

Nirmal Motors Ltd. manufactures pistons used in car engines. As per the study conducted by the Auto Parts Manufacturers Association, there will be a demand of 80 million pistons in the coming year. Arnav Motors Ltd. is expected to have a market share of 1.15% of the total market demand of the pistons in the coming year. It is estimated that it costs Rs.150 as inventory holding cost per piston per month and that the set-up cost per run of piston manufacture is Rs. 3,50,000.

(i) DETERMINE the optimum run size for piston manufacturing?

(ii) Assuming that the company has a policy of manufacturing 40,000 pistons per run, CALCULATE how much extra costs the company would be incurring as compared to the optimum run suggested in (i) above

Ans.

(i) Optimum run size or Economic Batch Quantity (EBQ) = $\sqrt{\frac{2xDxS}{C}}$

Where, D = Annual demand i.e. 1.15% of 8,00,00,000 = 9,20,000 units

S = Set-up cost per run = Rs. 3,50,000

C = Inventory holding cost per unit per annum

= Rs.150 × 12 months = Rs. 1,800

EBQ = $\sqrt{\frac{2x920000\ unitsx350000}{1800}}$ = 18,915 units

(ii) Calculation of Total Cost of set-up and inventory holding

	Batch size	No. of setups	Set-up Cost (Rs.)	Inventory holding cost (Rs.)	Total Cost (Rs.)
A	40,000 units	23 $\left(\frac{920000}{40000}\right)$	80,50,000 (23×Rs.3,50,000)	3,60,00,000 $\left(\frac{40000x1800}{2}\right)$	4,40,50,000
B	18,915 units	49 $\left(\frac{920000}{18915}\right)$	1,71,50,000 (49×Rs.3,50,000)	1,70,23,500 $\left(\frac{18915x1800}{2}\right)$	3,41,73,500
	Extra Cost (A – B)				98,76,500

Q.22 Job Cost & SP | MTP Nov 19

APFL Ltd. deals in plumbing materials and also provides plumbing services to its customers.

On 12th August, 2019, APFL received a job order for a students' hostel to supply and fitting of plumbing materials. The work is to be done on the basis of specification provided by the hostel owner. Hostel will be inaugurated on 5th September, 2019 and the work is to be completed by 3rd September, 2019. Following are the details related with the job work:

Direct Materials

APFL uses a weighted average method for the pricing of materials issues. Opening stock of materials as on 12th August 2019:

- 15mm GI Pipe, 12 units of 15 feet size @ Rs.600 each
- 20mm GI Pipe, 10 units of 15 feet size @ Rs.660 each
- Other fitting materials, 60 units @ Rs. 26 each
- Stainless Steel Faucet, 6 units @ Rs. 204 each
- Valve, 8 units @ Rs. 404 each

Purchases:

On 16th August 2019:

- 20mm GI Pipe, 30 units of 15 feet size @ Rs. 610 each
- 10 units of Valve @ Rs. 402 each

On 18th August 2019:

- Other fitting materials, 150 units @ Rs. 28 each
- Stainless Steel Faucet, 15 units @ Rs. 209 each

On 27th August 2019:

- 15mm GI Pipe, 35 units of 15 feet size @ Rs.628 each
- 20mm GI Pipe, 20 units of 15 feet size @ Rs.660 each
- Valve, 14 units @ Rs. 424 each

Issues for the hostel job: On 12th August 2019:

- 20mm GI Pipe, 2 units of 15 feet size
- Other fitting materials, 18 units

On 17th August 2019:

- 15mm GI Pipe, 8 units of 15 feet size
- Other fitting materials, 30 units

On 28th August 2019:

- 20mm GI Pipe, 2 units of 15 feet size
- 15mm GI Pipe, 10 units of 15 feet size
- Other fitting materials, 34 units
- Valve, 6 units

On 30th August:

- Other fitting materials, 60 units
- Stainless Steel Faucet, 15 units

Direct Labour:

Plumber: 180 hours @ Rs. 50 per hour (includes 12 hours overtime) Helper: 192 hours @ Rs.35 per hour (includes 24 hours overtime) Overtimes are paid at 1.5 times of the normal wage rate. **Overheads:** Overheads are applied @ Rs. 13 per labour hour.

Pricing policy:

It is company's policy to price all orders based on achieving a profit margin of 25% on sales price.

You are required to

(a) CALCULATE the total cost of the job.

(b) CALCULATE the price to be charged from the customer.

Ans.

(a) Calculation of Total Cost for the Hostel Job

Particulars	Amount (Rs.)	Amount (Rs.)
Direct Material Cost:		
- 15mm GI Pipe (Working Note- 1)	11,051.28	
- 20mm GI Pipe (Working Note- 2)	2,588.28	
- Other fitting materials (Working Note- 3)	3,866.07	
- Stainless steel faucet		
$15\ \text{units} \times \left(\frac{6 \times 204 + 15 \times 209}{21\ \text{units}}\right)$		

	3,113.57	
- Valve		
6 units x $\left(\frac{8x404+40x402x424}{32units}\right)$		
	2,472.75	23,091.95
Direct Labour:		
Plumber [(180 hours × Rs. 50) + (12 hours × Rs. 25)]	9,300.00	
Helper [(192 hours × Rs. 35) + (24 hours × Rs. 17.5)]	7,140.00	16,440.00
- Overheads [Rs. 13 × (180 + 192) hours]		4,836.00
Total Cost		44,367.95

(b) Price to be charged for the job work:

	Amount (Rs.)
Total Cost incurred on the job	44,367.95
Add: 25% Profit on Job Price $\left(\frac{44367.95}{75\%}x25\%\right)$	14,789.32
	59,157.27

Working Note:

1. Cost of 15mm GI Pipe

Date		Amount (Rs.)
17-08-2019	8 units × Rs. 600	4,800.00
28-08-2019	10 units x $\left(\frac{4x600+35x628}{39units}\right)$	6,251.28
		11,051.28

2. Cost of 20mm GI Pipe

Date		Amount (Rs.)
12-08-2019	2 units × Rs. 660	1,320.00
28-08-2019	2 units x $\left(\frac{8x660+30x610+20x660}{58units}\right)$	1,268.28
		2,588.28

3. Cost of Other fitting materials

Date		Amount (Rs.)
12-08-2019	18 units × Rs. 26	468.00
17-08-2019	30 units × Rs. 26	780.00
28-08-2019	34 units x $\left(\frac{12x26+150x28}{162\ units}\right)$	946.96
30-08-2019	60 units x $\left(\frac{12x26+150x28}{162\ units}\right)$	1,671.11
		3,866.07

Q.23 Calculate per Batch | MTP Nov 20

A jobbing factory has undertaken to supply 300 pieces of a component per month for the ensuing six months. Every month a batch order is opened against which materials and labour hours are booked at actual. Overheads are levied at a rate per labour hour. The selling price contracted for is ₹ 8 per piece. From the following data CALCULATE the cost and profit per piece of each batch order and overall position of the order for 1,800 pieces.

Month	Batch Output	Material cost (₹)	Direct wages (₹)	Direct labour hours
January	310	1150	120	240
February	300	1140	140	280
March	320	1180	150	280
April	280	1130	140	270
May	300	1200	150	300
June	320	1220	160	320

The other details are:

Month	Chargeable expenses (₹)	Direct labour (Hours)
January	12,000	4,800
February	10,560	4,400
March	12,000	5,000
April	10,580	4,600
May	13,000	5,000
June	12,000	4,800

Ans.

Statement of Cost and Profit per batch

Particulars	Jan.	Feb.	March	April	May	June	Total
Batch output (in units)	310	300	320	280	300	320	1,830
Sale value (₹)	2,480	2,400	2,560	2,240	2,400	2,560	14,640
Material cost (₹)	1,150	1,140	1,180	1,130	1,200	1,220	7,020
Direct wages (₹)	120	140	150	140	150	160	860
Chargeable expenses* (₹)	600	672	672	621	780	800	4,145
Total cost (₹)	1,870	1,952	2,002	1,891	2,130	2,180	12,025
Profit per batch (₹)	610	448	558	349	270	380	2,615
Total cost per unit(₹)	6.03	6.51	6.26	6.75	7.10	6.81	6.57
Profit per unit (₹)	1.97	1.49	1.74	1.25	0.90	1.19	1.43

Overall position of the order for 1,200 units

Sales value of 1,800 units @ ₹ 8 per unit	₹ 14,400
Total cost of 1,800 units @ ₹ 6.57 per unit	₹ 11,826
Profit	₹ 2,574

$$* \frac{\text{Chargeable expenses}}{\text{Direct labour hour for themonth}} \times \text{Direct labour hours for batch}$$

Q.24 Expenses Attributable to Job | MTP May 21

A Ltd. is an engineering manufacturing company producing job orders on the basis of specifications provided by the customers. During the last month it has completed three jobs namely A, B and C. The following are the items of expenditures which are incurred in addition to direct materials and direct employee cost:

(i) Office and administration cost - Rs. 6,00,000
(ii) Product blueprint cost for job A - Rs. 2,80,000
(iii) Hire charges paid for machinery used in job work B - Rs. 80,000
(iv) Salary to office attendants - Rs. 1,00,000
(v) One time license fee paid for software used to make computerised graphics for job C - Rs. 1,00,000.
(vi) Salary paid to marketing manager - Rs. 2,40,000.

Required:
CALCULATE direct expenses attributable to each job.

Ans. **(i) Calculation of Direct expenses**

Particulars	Job A (Rs.)	Job B (Rs.)	Job C (Rs.)
Product blueprint cost	2,80,000	--	--
Hire charges paid for machinery	--	80,000	--
License fee paid for software	--	--	1,00,000
Total Direct expenses	2,80,000	80,000	1,00,000

Q.25 Profit per Batch | MTP May 21

A jobbing factory has undertaken to supply 200 pieces of a component per month for the ensuing six months. Every month a batch order is opened against which materials and labour hours are booked at actual. Overheads are levied at a rate per labour hour. The selling price contracted for is Rs. 80 per piece. From the following data COMPUTE the cost and profit per piece of each batch order and overall position of the order for 1,200 pieces.

Month	Batch Output (Pieces)	Material cost (Rs.)	Direct wages (Rs.)	Direct labour (Hours)
January	210	6,500	1,200	240
February	200	6,400	1,400	280
March	220	6,800	1,500	280
April	180	6,300	1,400	270
May	200	7,000	1,500	300
June	220	7,200	1,600	320

The other details are:

Month	Chargeable expenses (Rs.)	Direct labour hours
January	1,20,000	4,800
February	1,05,600	4,400
March	1,20,000	5,000
April	1,05,800	4,600
May	1,30,000	5,000

June	1,20,000	4,800

Ans.

Particulars	Jan. (Rs.)	Feb. (Rs.)	March (Rs.)	April (Rs.)	May (Rs.)	June (Rs.)	Total (Rs.)
Batch output (in pieces)	210	200	220	180	200	220	1,230
Sale value @ Rs.80	16,800	16,000	17,600	14,400	16,000	17,600	98,400
Material cost	6,500	6,400	6,800	6,300	7,000	7,200	40,200
Direct wages	1,200	1,400	1,500	1,400	1,500	1,600	8,600
Chargeable expenses*	6,000	6,720	6,720	6,210	7,800	8,000	41,450
Total cost	13,700	14,520	15,020	13,910	16,300	16,800	90,250
Profit per batch	3,100	1,480	2,580	490	(300)	800	8,150
Total cost per piece	65.2	72.6	68.3	77.3	81.5	76.4	73.4
Profit per piece	14.8	7.4	11.7	2.7	(1.5)	3.6	6.6

Overall position of the order for 1,200 pieces

Sales value of 1,200 pieces @ Rs. 80 per piece	Rs. 96,000
Total cost of 1,200 pieces @ Rs. 73.4 per piece	Rs. 88,080
Profit	Rs. 7,920

* $\frac{\text{Chargeable expenses}}{\text{Direct labour hour for the month}}$ x Direct labourhours for batch

Q.26 Economic Batch Quantity | MTP May 22(2)

Arnav Ltd. operates in beverages industry where it manufactures soft -drink in three sizes of Large (3 litres), Medium (1.5 litres) and Small (600 ml) bottles. The produc ts are processed in batches. The 5,000 litres capacity processing plant consumes electricity of 90 Kilowatts per hour and a batch takes 1 hour 45 minutes to complete. Only symmetric size of products can be processed at a time. The machine set-up takes 15 minutes to get ready for next batch processing. During the set-up, power consumption is only 20%.

(I) The current price of Large, Medium and Small are ₹ 150, ₹ 90 and ₹ 50 respectively.

(II) To produce a litre of beverage, 14 litres of raw material-W and 25 ml of Material-C are required which costs ₹ 0.50 and ₹1,000 per litre respectively.

(III) 20 direct workers are required. The workers are paid ₹ 880 for 8 hours shift of work.

(IV) The average packing cost per bottle is ₹3

(V) Power cost is ₹ 7 per Kilowatt -hour (Kwh)

(VI) Other variable cost is ₹ 30,000 per batch.

(VII) Fixed cost (Administration and marketing) is ₹ 4,90,00,000.

(VIII) The holding cost is ₹ 1 per bottle per annum.

The marketing team has surveyed the following demand (bottle) of products:

Large	Medium	Small
3,00,000	7,50,000	20,00,000

Required:

CALCULATE net profit/ loss of the organisation and also COMPUTE Economic Batch Quantity (EBQ).

Ans.

Workings:

1. **Maximum number of bottles that can be processed in a batch:**

$$= \frac{5000 \text{ ltrs}}{\text{Bottle volume}}$$

Large		Medium		Small	
Qty (ltr)	Max bottles	Qty (ltr)	Max bottles	Qty (ml)	Max bottles
3	1,666	1.5	3,333	600	8,333

For simplicity of calculation small fractions has been ignored.

2. **Number of batches to be run:**

		Large	Medium	Small	Total
A	Demand	3,00,000	7,50,000	20,00,000	
B	Bottles per batch (Refer WN-1)	1,666	3,333	8,333	
C	No. of batches [A÷B]	180	225	240	645

For simplicity of calculation small fractions has been ignored.

3. **Quantity of Material-W and Material C required to meet demand:**

	Particulars	Large	Medium	Small	Total
A	Demand (bottle)	3,00,000	7,50,000	20,00,000	
B	Qty per bottle (Litre)	3	1.5	0.6	
C	Output (Litre) [A×B]	9,00,000	11,25,000	12,00,000	32,25,000
D	Material-W per litre of output (Litre)	14	14	14	
E	Material-W required (Litre) [C×D]	**1,26,00,000**	**1,57,50,000**	**1,68,00,000**	**4,51,50,000**
F	Material-C required per litre of output (ml)	25	25	25	
G	Material-C required (Litre) [(C×F)÷1000]	**22,500**	**28,125**	**30,000**	**80,625**

4. **No. of Man-shift required:**

		Large	Medium	Small	Total
A	No. of batches	180	225	240	645
B	Hours required per batch (Hours)	2	2	2	
C	Total hours required (Hours) [A×B]	360	450	480	1,290
D	No. of shifts required [C÷8]	45	57	60	162
E	**Total manshift [D×20 workers]**	**900**	**1,140**	**1,200**	**3,240**

For simplicity of calculation small fractions has been ignored.

5. **Power consumption in Kwh**

		Large	Medium	Small	Total
For processing					

A	No. of batches	180	225	240	645
B	Hours required per batch (Hours)	1.75	1.75	1.75	1.75
C	Total hours required (Hours) [A×B]	315	393.75	420	1,128.75
D	Power consumption per hour (Kwh)	90	90	90	90
E	**Total Power consumption (Kwh) [C×D]**	**28,350**	**35,437.5**	**37,800**	**1,01,587**
F	**Per batch consumption* (Kwh) [E÷A]**	**157.5**	**157.5**	**157.5**	**157.5**
For set-up					
G	Hours required per batch (Hours)	0.25	0.25	0.25	0.25
H	Total hours required (Hours) [A×G]	45	56.25	60	161.25
I	Power consumption per hour (Kwh) [20%×90]	18	18	18	18
J	**Total Power consumption (Kwh) [H×I]**	**810**	**1,012.5**	**1,080**	**2,902.5**
K	**Per batch consumption* (Kwh) [J÷A]**	**4.5**	**4.5**	**4.5**	**4.5**

* Per batch consumption can be directly calculated as [Hours required per batch x Power consumption per hour]

Calculation of Profit/ loss per batch:

	Particulars	Large	Medium	Small	Total
A	Demand (bottle)	3,00,000	7,50,000	20,00,000	30,50,000
B	Price per bottle (₹)	150	90	50	
C	**Sales value (₹) [A×B]**	**4,50,00,000**	**6,75,00,000**	**10,00,00,000**	**21,25,00,000**
	Direct Material cost:				
E	**Material-W (₹) [Qty in WN-3 × ₹0.50]**	**63,00,000**	**78,75,000**	**84,00,000**	**2,25,75,000**
F	**Material-C (₹) [Qty in WN-3 × ₹1,000]**	**2,25,00,000**	**2,81,25,000**	**3,00,00,000**	**8,06,25,000**
G	**[E+F]**	**2,88,00,000**	**3,60,00,000**	**3,84,00,000**	**10,32,00,000**
H	**Direct Wages (₹) [Man-shift in WN-4 × × ₹880]**	**7,92,000**	**10,03,200**	**10,56,000**	**28,51,200**
I	Packing cost (₹) [A×₹3]	9,00,000	22,50,000	60,00,000	91,50,000
	Power cost (₹)				
J	For processing (₹) [WN-5 × ₹7]	1,98,450	2,48,062.5	2,64,600	7,11,112.5
K	For set-up time (₹) [WN-5 × ₹7]	5,670	7,087.5	7,560	20,317.5
L	[J+K]	**2,04,120**	**2,55,150**	**2,72,160**	**7,31,430**
M	Other variable cost (₹) [No. of batch in WN-2 ×	54,00,000	67,50,000	72,00,000	1,93,50,000

	₹30,000]				
N	**Total Variable cost per batch [G+H+I+L+M]**	**3,60,96,120**	**4,62,58,350**	**5,29,28,160**	**13,52,82,630**
O	**Profit/ loss before fixed cost [C-N]**	**89,03,880**	**2,12,41,650**	**4,70,71,840**	**7,72,17,370**
P	Fixed Cost				4,90,00,000
Q	**Net Profit [O-P]**				**2,82,17,370**

Computation of Economic Batch Quantity (EBQ):

$$EBQ = \sqrt{\frac{2xDxS}{C}}$$

D = Annual Demand for the Product = Refer A below
S = Set-up cost per batch = Refer D below
C = Carrying cost per unit per annum =Refer E below

	Particulars	Large	Medium	Small
A	**Annual Demand (bottle)**	**3,00,000**	**7,50,000**	**20,00,000**
B	Power cost for set-up time (₹) [Consumption per batch in WN-5 × ₹7]	31.50	31.50	31.50
C	Other variable cost (₹)	30,000	30,000	30,000
D	**Total Set-up cost [B+C]**	**30,031.50**	**30,031.50**	**30,031.50**
E	**Holding cost:**	**1.00**	**1.00**	**1.00**
F	**EBQ (Bottle)**	**1,34,234**	**2,12,243**	**3,46,592**

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