Hey my buddies !!

How are you all ?? All good ? I hope everything is going very - very - very good

I am presenting to you all COLOURFUL QUESTION BANK for CA Intermediate COST MANAGEMENT

It took a lot of efforts . dedication . patience and obviously some hardwork to combine all PP , RTP , MTP and SM Questions and then group them on the basis of concepts asked. This book is a one - stop solution for all your COST related doubts and I assure that this single book will make you READY - TO - GO and score the marks that you desire to achieve.

Don't worry . be assured and we will give you all the Tips and Tricks to solve and also the list of all important and tough Questions which you must practice.

So thank you so much ❤ for choosing me for this interesting subject and now GET READY AND FASTEN YOUR SEAT BELTS as you are going to witness a super exciting journey.

Thanking you all :
CA AMIT SHARMA
aka yours_amitbhai

F.A.S.T
first attempt success tutorials

INDEX



Let's fall in love..
With every chapter, With every page, With every concept.
Let's make it more interesting & fun in our own ways.
Let's open our hearts for this book in a new way.

CA AMIT SHARMA

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 $\left(\frac{78,26,000}{91,000\text{ units}} x\ 5,000\text{ units}\right)$	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		9,20,000
	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 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	
	- Performance bonus paid to sales staffs	1,80,000	
(xi)	Distribution overheads:		12,10,000
	- 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 = $\frac{13\,\text{Lakhs}}{50\,\text{Lakhs}} \times 100 = 26\%$

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 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	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:	96,000	
	- Plant & Machinery		
	- 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

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

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

13%of Rs.150
= 54,462 units

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

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

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

$\frac{* (Rs.150 \times 19,28,000) + (Rs.200 \times 77,56,000)}{(19,28,000 + 77,56,000)}$ = 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 $\left(\frac{₹ 83,600}{100 + 120 \text{units}} \times 100\right)$	₹ 45,600 $\left(\frac{₹ 83,600}{100 + 120 \text{units}} \times 120\right)$

	(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 = $\frac{\text{Rs.}1,53,600}{\text{Rs.}72,00,000} x\ 100$ = 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 = $\frac{1}{2} \times 300 \times 12$	1,800
Relevant cost	3,690

(iii) 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

(iv) 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	$\left[\frac{Q}{2} xCxi - 600 \text{ units} \times 640 \times 1/2 \times 18.75/100)\right]$	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

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

(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.

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

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 = $\frac{1}{2}$ × 2,263 × 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):

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

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

= ₹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

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

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

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	$\frac{17,200kg.}{1,000kg.} = 17.2 or 18 orders$	$\frac{17,200kg.}{1,200kg.} = 14.33 or 15 orders$

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)** (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 $= \frac{360}{\text{Inventory turnover ratio}}$ $= \frac{360 days}{2.09}$ = 172.25 days	**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 $= \frac{360}{\text{Inventory turnover ratio}}$ $= \frac{360 days}{2.45}$ = 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

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

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.

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

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

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

Or, Min. lead time + 4 days + Min. lead time = 12 days

$$\text{Or, 2 Min. lead time } = \frac{8days}{2} = 4days$$

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

$$\text{Or, Maximum Consumption per day } = \frac{1,60,000 units}{8days} = 20units$$

(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

$$\text{Or, Minimum Consumption per day } = \frac{60,000 \text{ units}}{4days} = 15,000units$$

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 37 orders	$\frac{70,800kg}{1,928kg} = 36.72$ or 37 orders
III	Ordering Cost	37 orders × ₹ 1,340 = ₹ 49,580	31 orders × ₹ 1,340= ₹ 41,540
IV	Average Inventory		

V	Carrying Cost	$\frac{1,928kg}{2} = 964kg$ 964 kg. × ₹ 35 = 33,740	$\frac{2,328kg.}{2}$ = 1,164kg 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(2)

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):

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

$$\sqrt{\frac{2x34,400kgx720}{125x13.76\%}} = \sqrt{\frac{2x34,400kgx720}{17.2}} = 1,697 \text{ kg.}$$

(ii) Re- Order level:

= (Maximum consumption per day × Maximum lead time)

$$\left\{\left(=\frac{AnnualConsumptionofdee}{364DAYS}X20KG\right)X8DAYS\right\}$$

$$\left\{\left(=\frac{36,400KG}{364DAYS}X20KG\right)X8DAYS\right\} = 960kg$$

(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	$=\frac{34,400kg}{1,497kg.}=22.9$or 23orders	$=\frac{34,400kg}{1,697kg}=20.27$or 21orders
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 (1)

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(2)

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 $= \sqrt{\frac{2 \times 40{,}000 \text{ kgs.} \times ` 1{,}000}{20}} = 20{,}000 kgs$
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 (₹) ($\frac{1}{2}$ × 2,000 kg. × ₹ 20)	= ₹ 20,000
Total cost	₹ 40,000

(i) Re-order point = Safety stock + Lead time consumption

$= 1{,}000 \text{ kg.} + \frac{40{,}000 \text{ kg.}}{360 days} x 360 days$

= 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)=$\frac{1}{2}$×(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 Units	Rate (₹)	Amount (₹)	Qty Units	Rate (₹)	Amount (₹)	Qty Units	Rate (₹)	Amount (₹)
1-4-19	_	_	_	_	_	_	1,000	15	15,000
4-4-19	3,000	16	48,000	_	_	_	1,000 3,000	15 16	15,000 48,000
8-4-19	_	_	_	1,000	16	16,000	1,000 2,000	15 16	15,000 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

$$EOQ = \sqrt{\frac{2Ao}{c}} = \sqrt{\frac{2 \times 8{,}000 units \times 200}{400 x 20/100}} = 200 \text{ units}$$

(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

$$= \frac{\text{Annual demand for fertilizer bags}}{EOQ}$$

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 × Per tonne cost (₹)	Ordering cost A/q × ₹ 1200 (₹)	Carrying cost p.t. p.a 1/2× q × 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

Av. rate of consumption $= \frac{Consumption + Consumption}{2}$

1,500 units per day $= \frac{X \text{ units / day} + 2{,}000 \text{ units per day}}{2}$ or x

= 1,000 units per day.

2. Re-order Quantity (ROQ)= $\sqrt{\frac{2 \times 5{,}0000 \text{ units} \times 4{,}000}{10}} = 20{,}000$ units

Q.47 EOQ / Extra Cost | ICAI MAT

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

$$\frac{A}{Q} xO + \frac{1}{2} xQ\,(Ci)$$

$$\left(\frac{48,units}{4,000units} x120\right) + \left(\frac{1}{2} x4,000 units x10\% x20\right)$$

1,440 + 4,000 = 5,440

B. Total cost when order size is equal EOQ i.e. 2,400 units:

$$\text{Total cost} = \left(\frac{48,units}{2,400units} x120\right) + \left(\frac{1}{2} x2,400 units x10\% x20\right)$$

= ₹ 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:

$$\text{Minimum carrying cost} = \frac{1}{2} x2,400 units x10\% x20 = 2,400.$$

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
19-9-22	38	10	5.75	57.50	—	—	—	—	25 10	6.10 5.75	210.00
20-9-22	4	5	5.75	28.75	—	—	—	—	5 25 10	5.75 6.10 5.75	238.75
						5	5.75		20	6.10	

26-9-22	—	—	—	—	146	5	6.10	59.25	10	5.75	179.50
30-9-22	—	—	—	—	Shortage	2	6.10	12.20	18 1 0	6.10 5.7 5	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
Jan. 23	Issue to Job W 17	—	—	—	40	1	40	80	2	160
					20	2	40			

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 =

$$(\text{Actual time taken} \times \text{wage rate}) + \frac{\text{Time Saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Wage rate}$$

$$= (5 \text{ hours} \times 120) + \left(\frac{1hour}{5hour} \times 5hours \times 120A\right)$$

= 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

$$\text{Or, } X\frac{360}{80} = 4.5hours$$

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:

(i) Separate Method $:= \frac{\text{Number of employees seperated during the period}}{\text{Average number of employees during the period on roll}} \times 100$

$$\text{OR}, = \frac{\text{Number of employees left} + \text{Number of employees discharged}}{\text{Average number of employees during the period on roll}} \times 100$$

$$= \frac{(160 + 640)}{(9,400 + 10,600)} \times 100$$

$$= \frac{800}{1000} \times 100 = 8\%$$

(ii) Replacement Method $= \frac{\text{Number of employees replaced during the period}}{\text{Average number of employees during the period on roll}} \times 100$

$$= \frac{400}{10,000} \times 100 = 4\%$$

(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)

$$= \frac{\text{No. of Separations}(S)}{\text{Average number of workers on roll}} \times 100$$

$$\text{Or, } \frac{16}{100} - \frac{45 + A}{900} \text{ Or, } A = \left[\frac{1440}{100} - 45\right] = 99$$

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, $\frac{6}{100} \frac{\text{No.ofwor ker sseperated}}{450}$ 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, $\frac{14}{100} \frac{27 + \text{No. of accessions (Joinings)}}{450}$ 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:

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

$$= \frac{2 Hours}{4 Hours} \times 2 \text{ hours} \times ₹5 = ₹5$$

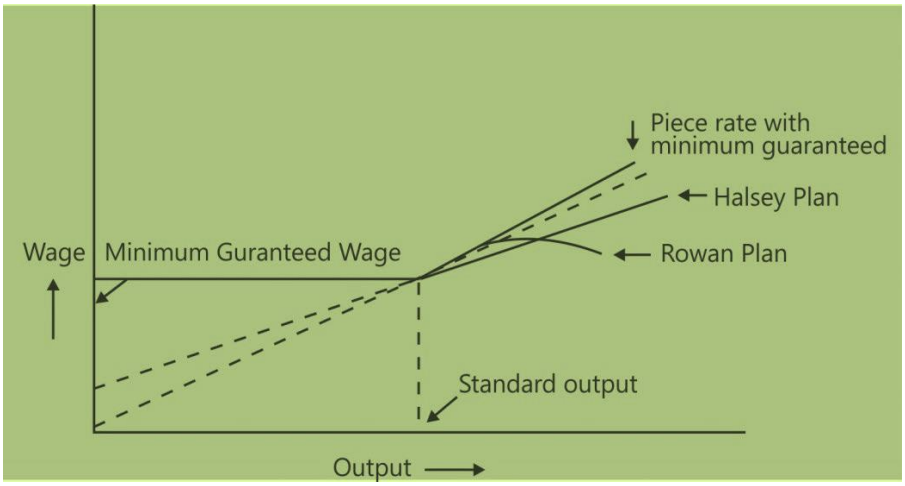
$$= \frac{1 Hours}{4 Hours} \times 3 \text{ hours} \times ₹5 = ₹3.75$$

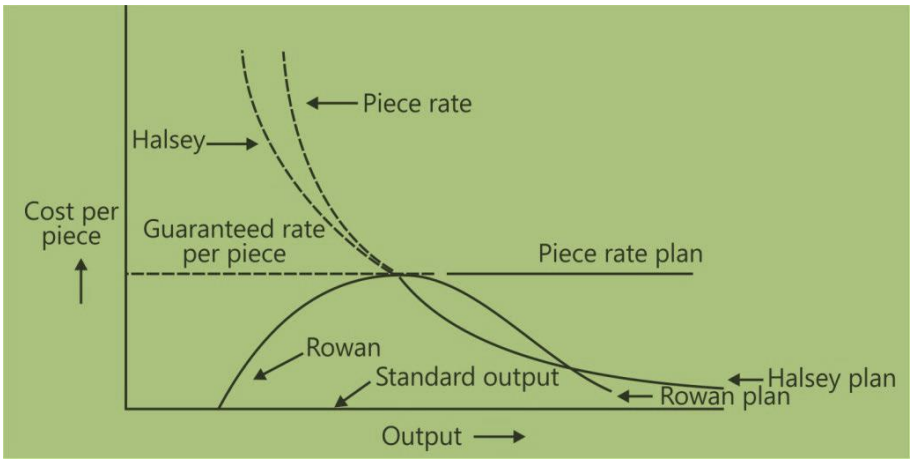
The above figures of bonus clearly show that when time taken is half of the time allowed, the bonus is maximum. When the time taken is reduced from 2 to 1 hour, the bonus figure fell by ₹1.25. Hence, it is quite apparent to workers that it is of no use to increase speed of work. This feature of Rowan 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 $9,000 \frac{1}{9}$	1,000	
II. Rent $\times \frac{1}{10}$ ₹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)					
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

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) x10]

b = 3,61,000 + 0.20 a (ii)

or, -0.20a + b = 3,61,000

Solving equation (i) & (ii)

$$10a - b = 62,90,000$$
$$-0.20a + b = 3,61,000$$
$$9.8a = 3,61,000$$

a = 66,51,000

Putting the value of 'a' in equation (ii), we get

b = 3,61,000+ 0.20 × 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, $\frac{(\text{Rs. } 8.75\ X + \text{Rs. } 2,12,000)}{X}$ = 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

(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):

$$= \frac{\text{Total Support Cost}}{\text{Total cost of goods sold}} \times 100$$

$$= \frac{92,10,000}{2,30,25,000} \times 100 = 40\%$$

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):

$$= \frac{\text{Total support cost}}{\text{Total cost of goods sold}} \times 100$$

$$= \frac{45,00,000}{1,50,00,000} \times 100 = 30\%$$

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

(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 (₹)	Cost-driver level	Cost driver rate (₹)
	(A)	(B)	(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. - 2lakh statements are expected to be increased in budgeted period. For every Increase of one lakh statement, one lakh rupees is the budgeted increase.
	2,00,000	
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.