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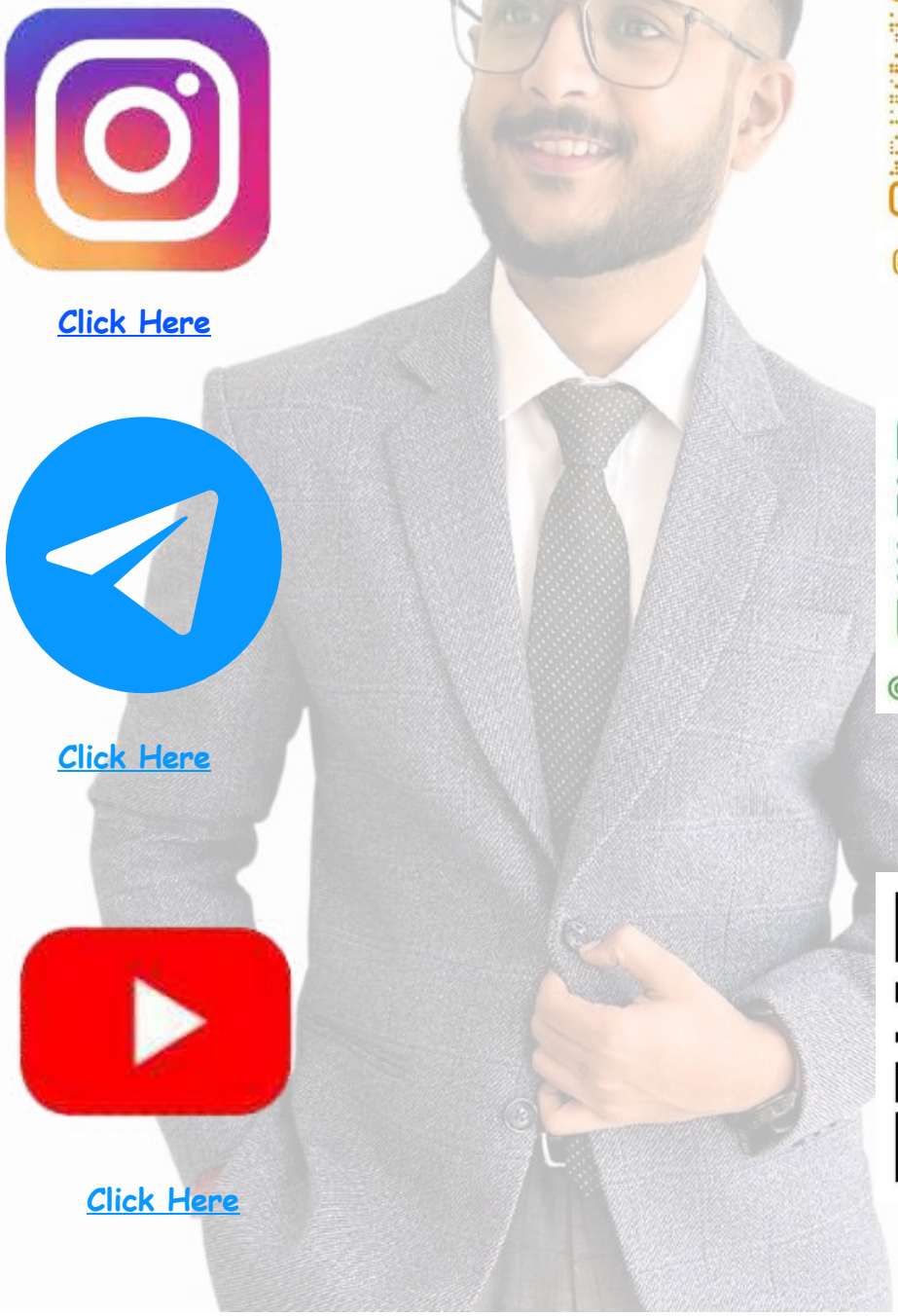

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COST SHEET

Q.1 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.2 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.3 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.4 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.5 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.6 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.7 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.8 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.9 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

MATERIAL COST

Q.10 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.11 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.12 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.13 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

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

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

13%of Rs.150
= 54,462 units

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

13%of Rs.200
= 94,600 units

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

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

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

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

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

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

Q.14 All Formulas | RTP Nov 22

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 = $\frac{3,44,085 kg.}{10 \text{ ton}' 1,000}$ = 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.15 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) = $\frac{1,50,000 \text{units}}{3 \text{unitsperkg}}$ = 50,000kg.

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	₹8,960	₹56,000
(No. of orders × Costper order)	(4 order × ₹2,240)	(25 orders × ₹2,240)
5. Inventory carryingcost	₹3,50,000	₹56,000
(Average inventory ×Carrying cost per unit)	(12,500 kg. × ½ × ₹56)	(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 = $\frac{₹ 2,46,960}{₹ 95,00,000}$ × 100 = 2.60%

Q.16 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.17 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:

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

= 3,893.3 packs or 3,893 packs.

(ii) Number of orders per year

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

(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.

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

Supply.

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

(b) Days requirement covered by inventory

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

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

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

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

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

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

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

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

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

Relevant Cost of this order quantity

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

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

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

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

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

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

Q.19 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.20 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.

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

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

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

(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

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

Q.21 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	Usage per	Re-order	Price	Delivery period (in weeks)	Re- order	Minimum

Material	unit of product (Kg.)	Quantity (Kg.)	per Kg. (₹)	Minimum	Average	Maximum	level (Kg.)	level (Kg.)
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?
(iv) Average stock level of A?
(v) Re-order level of D?
(vi) 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.22 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

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

$$\text{Or, 236 kg. } \frac{Min.consumption + 276kg}{2}$$

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	$\frac{70,800kg}{1,928kg} = 36.72or\ 37orders$	$\frac{70,800kg}{1,928kg} = 36.72or\ 37orders$
III	Ordering Cost	37 orders × ₹ 1,340 = ₹ 49,580	31 orders × ₹ 1,340= ₹ 41,540
IV	Average Inventory	$\frac{1,928kg}{2} = 964kg$	$\frac{2,328kg.}{2}$ = 1,164kg
V	Carrying Cost	964 kg. × ₹ 35 = 33,740	1,164 kg. × ₹ 35 = ₹ 40,740
VI	Total Cost	83,320	82,280

Extra Cost incurred due to not ordering EOQ = ₹83,320 - ₹82,280 = ₹1,040

Q.23 Total Cost / EOQ / Reorder | MTP Dec 21 (2)

The yearly production of a company's product which has a steady market is 40,000 units. Each unit of a product requires 1 kg. of raw material. The cost of placing one order for raw material is ₹ 1,000 and the inventory carrying cost is ₹ 20 per annum. The lead time for procurement of raw material is 36 days and a safety stock of 1,000 kg. of raw materials is maintained by the company. The company has been able to negotiate the following discount structure with the raw material supplier

Order quantity (kg.)	Discount (₹) Upto 6,000
6,001 – 8,000	4,000
8,001 – 16,000	20,000
16,001 – 30,000	32,000
30,001 – 45,000	4,0000

You are REQUIRED to:

(i) Calculate the re-order point considering 30 days in a month.

(ii) Prepare a statement showing the total cost of procurement and storage of raw material after considering the discount of the company elects to place one, two, four or five orders in the year.

(iii) State the number of orders which the company should place to minimize the costs after taking EOQ also into consideration.

Ans.

Working notes

1. Annual production = 40,000 units
2. Raw material required for 40,000 units (40,000 units × 1 kg.) = 40,000 kg.
3. EOQ = $\sqrt{\frac{2 \times 40,000\ kgs. \times `1,000}{20}} = 20,000kgs$
4. Total cost of procurement and storage when the order size is equal to EOQ or 2,000 kg.

No. of orders (40,000 kg. ÷ 2,000 kg.	= 20 times
Ordering cost (20 orders × ₹1,000)	= ₹ 20,000
Carrying cost (₹) (½ × 2,000 kg. × ₹ 20)	= ₹ 20,000
Total cost	₹ 40,000

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

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

= 1,000 kg. + 4,000 kg. = 5,000 kg.

(ii) Statement showing the total cost of procurement and storage of raw materials (after considering the discount)

Order size	No. of orders	Total cost of procurement	Average stock	Total cost of storage of raw materials	Discount	Total cost
Kg.		(₹)	Kg.	(₹)	(₹)	(₹)
(1)	(2)	(3)=(2)×₹1,000	(4)=½×(1)	(5)=(4)×₹20	(6)	(7)=[(3)+(5)– (6)
40,000	1	1,000	20,000	4,00,000	40,000	3,61,000
20,000	2	2,000	10,000	2,00,000	32,000	1,70,000
10,000	4	4,000	5,000	1,00,000	20,000	84,000
8,000	5	5,000	4,000	80,000	4,000	81,000

(i) 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.24 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	Rate	Amount	Qty	Rate	Amount	Qty	Rate	Amount

	Units	(₹)	(₹)	Units	(₹)	(₹)	Units	(₹)	(₹)
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

(a) 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	15	15,000
							3,000	16	48,000
8-4-19	_	_	_	1,000	16	16,000	1,000	15	15,000
							2,000	16	32,000
15-4-19	1,500	18	27,000	_	_	_	1,000	15	15,000
							2,000	16	32,000
							1,500	18	27,000
20-4-19	_	_	_	1,200	18	21,600	1,000	15	15,000
							2,000	16	32,000
							300	18	5,400
25-4-19	_	_	_	300	18	5,400	1,000	15	15,000
							2,000	16	32,000
26-4-19	_	_	_	1,000	16	16,000	1,000	15	15,000
							1,000	16	16,000
28-4-19	500	17	8,500	_	_	_	1,000	15	15,000
							1,000	16	16,000
							500	17	8,500
30-4-19	_	_	_	50	17	850	1,000	15	15,000
							1,000	16	16,000
							450	17	7,650

(i) 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.25 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.26 EOQ / Next Order be placed | RTP May 18

'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
26-9-22	—	—	—	—	146	5 5	5.75 6.10	59.25	20 10	6.10 5.75	179.50
30-9-22	—	—	—	—	Shortage	2	6.10	12.20	18 1 0	6.10 5.7 5	167.30

EMPLOYEE COST

Q.27 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.28 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.

$$\text{Over time} = \frac{2 \times (\text{Basic wage} + \text{D.A.}) \times 20\text{hours}}{200\text{hours}}$$

$$= 2x\frac{22,500}{200} x20hours$$

$$= 4,500$$

Q.29 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.30 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	$1\frac{1}{2}$	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

*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.31 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.32 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.33 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

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

(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.34 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	*1.975 hours*

be taken as time allowed)	
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)

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

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

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

(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.35 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)

$$= \frac{(\text{Rate} \times \text{Hours Worked}) + (\text{Rate} \times 50\% \text{ of Time Saved})}{\text{Hours Worked}} = 180$$

$$= \frac{(150 \times T) + 150 \times 50\%(10 - T)}{T} = 180 \quad \text{OR} \quad 150T + 750 - 75T = 180T \quad \text{OR} \quad 180T - 75T = 750$$

$$T = \frac{\mathbf{750}}{105} = 7.14$$

Q.36 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.37 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.38 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.39 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.40 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.41 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 × 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

$$\text{Wages} = \text{Time taken} \times \text{Rate per hour} + \frac{Time saved}{Time allowed} x Time taken x Rate per hour$$

$$= (48 \text{ hours} \times ₹ 15) + \left(\frac{60 - 48 \text{ hours}}{60 \text{ hours}} x\ 48 \text{ hours} \times 15\right)$$

= 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.42 EOQ / Next Order be placed | RTP May 18

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.43 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.44 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

(i) 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.45 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,
(i) 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

$$= \frac{\text{No. of replacements}}{\text{Average number of workers on roll}} \times 100$$

$$or, \frac{8}{100} = \frac{72}{\text{Average number of workers on roll}}$$

$$Or,\ \text{Average number of workers on roll} = \frac{72 \times 100}{8} = 900$$

(ii) Number of workers left and discharged:

Employee turnover rate (Separation method)

$$= \frac{\text{No. of Separations}(S)}{\text{Average number of workers on roll}} \times 100 \quad \frac{5}{100} = \frac{S}{900}\ Or,\ S = 45$$

Hence, number of workers left and discharged comes to 45

(iii) Number of workers recruited and joined:

Employee turnover rate (Flux method)

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

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

No. of workers recruited and joined 99

(iv) Calculation of Equivalent employee turnover rates:

$$= \frac{\text{EmployeeTurnove rate for the quarter}(s)}{\text{Number of quarter}(s)} \times 4 quarters$$

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.46 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. **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
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 - $120 \times \frac{3}{8} = 45$, Staff Attorney - $120 \times \frac{3}{8} = 45$ & Associate Attorney - $120 \times \frac{2}{8} = 30$} 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:

$$\text{Replacement Method} = \frac{\text{No.of employeesreplacedduringtheyear}}{\text{Averageno.of employeesonroll}} \times 100$$

$$= \frac{165}{(1{,}158 + 2{,}694)/2} \times 100 = \frac{165}{1{,}926} \times 100 = 8.57\%$$

$$\text{Separation Method} = \frac{\text{No.of employeesseparatedduringthe year}}{\text{Averageno.of employeesonroll}} \times 100$$

$$= \frac{315}{1{,}926} \times 100 = 16.36\%$$

(b) Labour Turnover rate under Flux Method:

$$\frac{\text{No.of employees(Joined + Separated)duringthe year}}{\text{Averageno.of employeesonroll}} \times 10$$

$$= \frac{\text{No. of employees (Replaced + New recruited + Separated) during the year}}{\text{Average no. of employeeson roll}} \times 100$$

$$\frac{1{,}851 + 315}{1{,}926} \times 100 = 112.46\%$$

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.47 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 + ½ × time saved × Rate per hour
= 3 hours ×₹ 30 + ½ × 1 hour ×₹30 = ₹105

Effective hourly rate $= \frac{Totalearnings}{Hourstaken} = \frac{105}{3Hours}$ 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 + $\frac{Timesaved}{Timeallowed}$ × 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 OR ₹ 37.5 = ₹ 30 + ₹30 - 7.5T

OR, ₹ 7.5 T = ₹60-₹37.5 OR, ₹ 7.5 T = ₹ 22.5

T = 3 hours.

OVERHEADS

Q.48 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.49 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.50 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%)	5,50,000	41.97

$\left(\frac{5,50,000}{6\text{machines}} \times \frac{1}{2,184\text{hours}}\right)$			
	(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.51 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.52 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.53 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.54 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

(ii) 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**

(i) 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.55 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 Canteen Subsidy	Machinery (66:30:3:7) 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

(ii) 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.56 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.57 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.58 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

(i) 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	5,400 x 5 hours	Pie = 5,400 units x 1 hour x ₹ 28.80	(+) ₹ 1,36,080

	units	x ₹ 20.40 = ₹ 5,50,800	= ₹ 1,55,520	
			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.

(ii) 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	102.00	102.00
A = 5 hours x ₹ 20.40 per hour B = 5 hours x ₹ 20.40 per hour		
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.59 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

(iv) 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.60 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 Material	2,100.00
Direct Wages	660.00
Overheads	1,078.00
Factory Cost	3,838.00
Add:- Markup **(30% OF 3838)**	**1,151.40**
Selling Price	**4,989.40**

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.61 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

$$\text{Supplementary rate per unit} = \frac{30,000}{24,000} = ₹ 1.25$$

ACTIVITY BASED COSTING

Q.62 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.63 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.64 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	56,00,000	50%	28,00,000	300 Production runs	9,333.33

incentives		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	8,51,711	2,12,928	9,70,951	2,04,410	22,40,000
On Setp hours	(2,129.28 x 400)	(2,129.28 x 100)	(2,129.28 x456)	(2,129.28 x 96)	
- 10% based	1,40,000	1,40,000	1,40,000	1,40,000	5,60,000

on number of parts	(1,40,000 x 1)				
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.65 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.66 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 [A×F]	6,00,000	3,20,000	1,80,000	11,00,000
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 Working note-2)	2	2	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.67 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

16,08,000/60,000		

Q.68 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	₹ 8,64,000	8,640 hours of shelf-

	shelves and on-going restocking		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.69 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.70 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.71 Cost Driver Rate | MTP May 19(2)

'Humara - Apna' bank offers three products, viz., deposits, Loans and Credit Cards. The bank has selected 4 activities for a detailed budgeting exercise, following activity based costing methods.

The bank wants to know the product wise total cost per unit for the selected activities, so that prices may be fixed accordingly.

The following information is made available to formulate the budget:

Activity	Present Cost(Rs.)	Estimation for the budget period
ATM Services:		
(a) Machine Maintenance	4,00,000	All fixed, no change.
(b) Rents	2,00,000	Fully fixed, no change.
(c) Currency Replenishment Cost	1,00,000	Expected to double during budget period.
	7,00,000	(This activity is driven by no. of ATM transactions)
Computer Processing	5,00,000	Half this amount is fixed and no change is expected. The variable portion is expected to increase to three times the current level. (This activity is driven by the number of computer transactions)
Issuing Statements	18,00,000	Presently, 3 lakh statements are made. In the budget period, 5 lakh statements are expected. For every increase of one lakh statement, one lakh rupees is the budgeted increase. (This activity is driven by the number of statements)
Computer Inquiries	2,00,000	Estimated to increase by 80% during the budget period. (This activity is driven by telephone minutes)

The activity drivers and their budgeted quantifies are given below:

Activity Drivers	Deposits	Loans	Credit Cards
No. of ATM Transactions	1,50,000	---	50,000
No. of Computer Processing Transactions	15,00,000	2,00,000	3,00,000
No. of Statements to be issued	3,50,000	50,000	1,00,000
Telephone Minutes	3,60,000	1,80,000	1,80,000

The bank budgets a volume of 58,600 deposit accounts, 13,000 loan accounts, and 14,000 Credit Card Accounts.

Required

(i) CALCULATE the budgeted rate for each activity.

(ii) PREPARE the budgeted cost statement activity wise.

(iii) COMPUTE the budgeted product cost per account for each product using (i) and (ii) above.

Ans Statement Showing "Budgeted Cost per unit of the Product"

Activity	Activity Cost (Budgete d) (Rs.)	Activity Driver	No. of Units of Activity Driver (Budget)	Activity Rate (Rs.)	Deposits	Loans	Credit Cards
ATM Services	8,00,000	No. of ATM Transaction	2,00,000	4.00	6,00,000	---	2,00,000
Computer Processing	10,00,000	No. of Computer Transaction	20,00,000	0.50	7,50,000	1,00,000	1,50,000
Issuing Statements	20,00,000	No. of Statements	5,00,000	4.00	14,00,000	2,00,000	4,00,000
Customer Inquiries	3,60,000	Telephone Minutes	7,20,000	0.50	1,80,000	90,000	90,000
Budgeted Cost	41,60,000				29,30,000	3,90,000	8,40,000
Units of Product (as estimated in the budget period)					58,600	13,000	14,000
Budgeted Cost per unit of the product					50	30	60

Working Note

Activity	Budgeted Cost (Rs.)	Remark
ATM Services:		
Machine Maintenance	4,00,000	All fixed, no change.
Rents	2,00,000	Fully fixed, no change.
Currency Replenishment Cost	2,00,000	Doubled during budget period.
Total	8,00,000	
Computer Processing	2,50,000	- Rs.2,50,000 (half of Rs.5,00,000) is fixed and no change is expected.
	7,50,000	- Rs.2,50,000 (variable portion) is expected to increase to three times the current level.
Total	10,00,000	
Issuing Statements	18,00,000	- Existing.
	2,00,000	- 2lakh statements are expected to be increased in budgeted period. For every Increase of one lakh statement, one lakh rupees is the budgeted increase.
Total	20,00,000	
Computer Inquiries	3,60,000	- Estimated to increase by 80% during the budget period. (Rs.2,00,000 x 180%)
Total	3,60,000	

Q.72 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.73 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.74 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.

MARGINAL COSTING

Q.75 MOS/BEP/Pv ratio calc | PY May 18

Following figures have been extracted from the books of M/s. RST Private Limited:

Financial Year	Sales (₹)	Profit/Loss (₹)
2016-17	4,00,000	15,000(loss)
2017-18	5,00,000	15,000 (Profit)

You are required to calculate:
(i) Profit Volume Ratio
(ii) Fixed Costs
(iii) Break Even Point
(iv) Sales required to earn a profit of ₹ 45,000.
(v) Margin of Safety in Financial Year 2017-18.

Ans.

	Sales (₹)	Profit (₹)
Year 2016	4,00,000	15,000 (loss)
Year 2017	5,00,000	15,000 (profit)
Difference	1,00,000	30,000

(i) $\text{P/V Ratio} = \frac{\text{Difference in profit}}{\text{Difference in Sales}} \times 100 = \frac{30,000}{1,00,000} \times 100 = 30\%$

(ii)

Contribution in 2016 (4,00,000 x 30%)		1,20,000
Add: Loss		15,000
Fixed Cost*		1,35,000
*Contribution	=	Fixed cost + Profit
∴ Fixed cost	=	Contribution – Profit

(iii) Break-even point $= \frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{1,35,000}{30\%} = 4,50,000$

(iv) Sales to earn a profit of 45,000

$$\frac{\text{Fixed cost} + \text{Desired profit}}{\text{P/V ratio}} = \frac{1,35,000 + 45,000}{30\%} = 6,00,000$$

(v) Margin of safety in 2017 -18

Margin of safety = Actual sales – Break-even sales
= 5,00,000-4,50,000 = 50,000

Q.76 Calculate sales for fixed profit | PY May 18

PH Gems Ltd. is manufacturing readymade suits. It has annual production capacity of 2,000 pieces. The Cost Accountant has presented following information for the year to the management:

Particulars	Amount (₹)	Amount (₹)

Sales 1,500 pieces @ ₹ 1,800 per piece		27,00,000
Direct Material	5,94,200	
Direct Labour	4,42,600	
Overheads (40% Fixed)	11,97,000	22,33,800
Net Profit		4,66,300

Evaluate following options:

(i) If selling price is increased by ₹ 200, the sales will come down to 60% of the total annual capacity. Should the company increase its selling price?

(ii) The company can earn a profit of 20% on sales if the company provide TIEPIN with ready-made suit. The cost of each TIEPIN is ₹ 18. Calculate the sales to earn a profit of 20% on sales.

Ans. (i) Evaluation of Option

Selling Price = 1800 + 200 = 2,000

Sales = 2000 x 60% = 1200 Pieces

	(₹)
Sales (1,200 pieces @ ₹ 2,000)	24,00,000
Less: Direct Material $\left(\frac{5,94,200}{1500 \text{ units}} x 1,200\right)$	4,75,360
Direct Labour $\left(\frac{4,42,600}{1,500 \text{ units}} x 1,200\right)$	3,54,080
Variable Overhead $\left(\frac{11,97,000 x 60\%}{1,500 \text{ units}} x 1,200\right)$	5,74,560
Contribution	9,96,000
Less: Fixed cost (Rs. 11,97,000x40%)	4,78,800
Profit	5,17,200

If price has been increased by 11.11% (increases by 200 on 1,800) sales goes down by 20% (decreased by 300 on 1,500). Change in demand is greater than change in price. Since the variable costs are still same profit has been arose to ₹ 5,17,200 in-spite of high elasticity of demand. PH gems would not be able to sustain this policy on account of change if any in variable costs.

(ii) Evaluation of Option

	(₹)
Sales	1,800.00
Less: Direct Material $\frac{5,94,200}{1500}$	396.13
Cost of Tie PIN	18.00
Direct Labour $\frac{4,42,600}{1,500}$	295.07

Variable Overheads $\left(\frac{11,97,000 \times 60\%}{1,500}\right)$	478.80
Contribution	612.00
P/V Ratio (612/1800x100)	34.0%

Sales to required earn a profit of 20%

Sales = $\frac{4,78,800+0.20 \text{ of Sales}}{34.00\%}$

Sales= 34,20,000 or 1,900 units (34,20,000/1800)

To earn profit 20% on sales of readymade suit (along with TIE PIN) company has to sold 1,900 units i.e. 95% of the full capacity. This sales level of 1,900 units is justified only if variable cost is constant. Any upside in variable cost would impact profitability, to achieve the desired profitability. Production has to be increased but the scope is limited to 5% only.

Q.77 Calculate sales for fixed | PY Nov 18

A manufacturing company is producing a product 'A' which is sold in the market at ₹45 per unit. The company has the capacity to produce 40000 units per year. The budget for the year 2018-19 projects a sale of 30000 units. The costs of each unit are expected as under:

	₹
Materials	12
Wages	9
Overheads	6

Margin of safety is ₹ 4,12,500.
You are required to:
(i) calculate fixed cost and break-even point.
(ii) calculate the volume of sales to earn profit of 20% on sales.

Ans

Margin of Safety = $\frac{\text{Pmfit}}{\text{P/V ratio}}$ = 4,12,500

= $\frac{\text{Profit}}{\frac{45-(12+9+6)}{45}}$ =4,12,500

= $\frac{\text{Profit}}{\frac{18}{45}}$ = 4,12,500

Profit = 1,65,000 OR P/V = (18/45) x 100 =40%

(i) Fixed Cost

Profit= (Sales × P/V Ratio) – Fixed Cost

1,65,000 = $\left((30,000 \times 45) \times \frac{18}{45}\right)$ -Fixed Cost

Or Fixed Cost = 5,40,000 – 1,65,000

= ₹ 3,75,000

OR

Profit = Contribution – Fixed Cost=₹ 5,40,000-₹ 3,75,000 =₹.1,65,000

P/V Ratio = $\frac{18}{45}$ =40%

Break-even Point = Total Sales – Margin of Safety
= ₹ (30,000 × 45) – 4,12,500
= 13,50,000 – 4,12,500 =₹ 9,37,500

Q.78 BEP Units & Sales for fixed | PY May 19

M/s Gaurav Private Limited is manufacturing and selling two products: 'BLACK' and 'WHITE' at selling price of ₹ 20 and ₹ 30 respectively.

The following sales strategy has been outlined for the financial year 2019-20:

(i) Sales planned for the year will be ₹ 81,00,000 in the case of 'BLACK' and ₹ 54,00,000 in the case of 'WHITE'.

(ii) The selling price of 'BLACK' will be reduced by 10% and that of 'WHITE' by 20%.

(iii) Break-even is planned at 70% of the total sales of each product.

(iv) Profit for the year to be maintained at ₹ 8,26,200 in the case of 'BLACK' and ₹ 7,45,200 in the case of 'WHITE'. This would be possible by reducing the present annual fixed cost of ₹ 42,00,000 allocated as ₹ 22,00,000 to 'BLACK' and ₹ 20,00,000 to 'WHITE'.

You are required to calculate:

(1) Number of units to be sold of 'BLACK' and 'WHITE' to Break even during the financial year 2019-20.

(2) Amount of reduction in fixed cost product-wise to achieve desired profit mentioned at (iv) above.

Ans **(i)** Statement showing Break Even Sales

Particulars	Black	White
Sales Planned	81,00,000	54,00,000
Selling Price (₹)	18	24
Number of Units to be sold	4,50,000	2,25,000
Break Even sales (in Units),70% of total sales	**3,15,00**	**1,57,500**
Or		
Break Even sales (in ₹),70% of total sales	**56,70,00**	**37,80,000**

(ii) Statement Showing Fixed Cost Reduction

Profit to be maintained (₹)	8,26,200	7,45,200
Margin of Safety (70% of Sales) (₹)	24,30,000	16,20,000
PVR (Profit/ Margin of Safety) x 100	34%	46%
Contribution (Sales x 34% or 46%) (₹)	27,54,000	24,84,000
Less: Profit (₹)	8,26,200	7,45,200
Revised Fixed Cost (₹)	**19,27,80**	**17,38,800**
Present Fixed Cost (₹)	22,00,000	20,00,000
Reduction in Fixed Cost	**2,72,20**	**2,61,200**

Q.79 Calculate lowest Sp | PY Nov 19

PJ Ltd manufactures hockey sticks. It sells the products at ₹ 500 each and makes a profit of ₹ 125 on each stick. The Company is producing 5,000 sticks annually by using 50% of its machinery capacity.
The cost of each stick is as under:
Direct Material ₹ 150
Direct Wages ₹ 50
Works Overhead ₹ 125 (50% fixed)
Selling Expenses ₹ 50 (25% variable)
The anticipation for the next year is that cost will go up as under:
Fixed Charges 10%
Direct Wages 20%
Direct Material 5%
There will not be any change in selling price.
There is an additional order for 2,000 sticks in the next year.
Calculate the lowest price that can be quoted so that the Company can earn the same profit as it has earned in the current year?

Ans Selling Price = ₹ 500 Profit = ₹ 125 No of Sticks = 5,000

Particular	Current Year (₹)	Next Year (₹)
Direct Material	150	157.50 (150 + 5%)
Direct Wages	50	60 (50+20%)
Works Overheads	62.50 (125 × 50%)	62.5
Selling Expenses	12.50 (50 × 25%)	12.5
Total Variable Cost	275	292.50
Fixed Cost (62.5 × 5,000) = 3,12,500; (37.5 × 5,000) = 1,87,500	5,00,000	5,50,000

Let: Lowest Price Quoted = K
Now, Sales = Target Profit (5,000 units × ₹ 125) + Variable Cost + Fixed Cost Or, = (5,000 × 500) + (2,000 × K) = 6,25,000 + 20,47,500 + 5,50,000 Or, K = ₹ 361.25
So, Lowest Price that can be quoted to earn the profit of ₹ 6,25,000 (same as current year) is ₹ 361.25

Q.80 Best Product Mix | PY Nov 20

Moon Ltd. produces products 'X', 'Y' and 'Z' and has decided to analyse it's production mix in respect of these three products - 'X', 'Y' and 'Z'.
You have the following information :

	X	Y	Z
Direct Materials ₹ (per unit)	160	120	80
Variable Overheads ₹ (per unit)	8	20	12

Direct labour :

Departments:	Rate per Hour (₹)	Hours per unit	Hours per unit	Hours per unit
		X	Y	Z
Department-A	4	6	10	5
Department-B	8	6	15	11

From the current budget, further details are as below :

	X	Y	Z
Annual Production at present (in units)	10,000	12,000	20,000
Estimated Selling Price per unit (₹)	312	400	240
Sales departments estimate of possible sales in thecoming year (in units)	12,000	16,000	24,000

There is a constraint on supply of labour in Department-A and its manpower cannot be increased beyond its present level.

Required:

(i) Identify the best possible product mix of Moon Ltd.

(ii) Calculate the total contribution from the best possible product mix.

Ans

(i) Statement Showing "Calculation of Contribution/ unit"

Particulars	X (₹)	Y (₹)	Z (₹)
Selling Price (A)	312	400	240
Variable Cost:			
Direct Material	160	120	80
Direct Labour			
Dept. A (Rate x Hours)	24	40	20
Dept. B (Rate x Hours)	48	120	88
Variable Overheads	8	20	12
Total Variable Cost (B)	240	300	200
Contribution per unit (A - B)	**72**	**100**	**40**
Hours in Dept. A	6	10	5
Contribution per hour	12	10	8
Rank	I	II	III

Existing Hours = 10,000 x 6hrs. + 12,000 x 10 hrs. + 20,000 x 5 hrs. = 2,80,000 hrs. Best possible product mix (Allocation of Hours on the basis of ranking)

Produce 'X' = 12,000 units

Hours Required = 72,000 hrs (12,000 units × 6 hrs.)

Balance Hours Available = 2,08,000 hrs (2,80,000 hrs. – 72,000 hrs.)

Produce 'Y' (the Next Best) = 16,000 units

Hours Required	=	1,60,000 hrs (16,000 units × 10 hrs.)
Balance Hours Available	=	48,000 hrs (2,08,000 hrs. – 1,60,000 hrs.)
Produce 'Z' (balance)	=	9,600 units (48,000 hrs./ 5 hrs.)

(ii) Statement Showing "Contribution"

Product	Units	Contribution/ Unit (₹)	Total Contribution (₹)
X	12,000	72	8,64,000
Y	16,000	100	16,00,000
Z	9,600	40	3,84,000
		Total	**28,48,000**

Q.81 Fixed Cost, Sales, BEP | PY Jan 21

During a particular period ABC Ltd has furnished the following data: Sales ₹ 10,00,000
Contribution to sales ratio 37% and Margin of safety is 25% of sales.
A decrease in selling price and decrease in the fixed cost could change the "contribution to sales ratio" to 30% and "margin of safety" to 40% of the revised sales. Calculate:

(i) Revised Fixed Cost.
(ii) Revised Sales and
(iii) New Break-Even Point.

Ans

(a) Contribution to sales ratio (P/V ratio) = 37%
Variable cost ratio = 100% - 37% = 63%
Variable cost 10,00,000 x 63%= 6,30,000
After decrease in selling price and fixed cost, sales quantity has not changed.
Thus, variable cost is ₹ 6,30,000
Revised Contribution to sales = 30%
Thus, Variable cost ratio = 100%-30% = 70%

Thus, Revised sales = $\frac{6,30,000}{70\%}$ =9,00,000

Revised, Break-even sales ratio = 100% - 40% (revised Margin of safety) = 60%

(i) Revised fixed cost = revised breakeven sales x revised contribution to sales ratio
(ii) Revised sales = ₹ 9,00,000 (as calculated above)
(iii) Revised Break-even point = Revised sales x Revised break-even sales ratio
= ₹ 9,00,000 x 60%
= ₹ 5,40,000

Q.82 BE Sales, Sales t/0 | PY Jan 21

Two manufacturing companies A and B are planning to merge. The details are as follows:

	A	B
Capacity utilisation (%)	90	60
Sales (₹)	63,00,000	48,00,000
Variable Cost (₹)	39,60,000	22,50,000
Fixed Cost (₹)	13,00,000	15,00,000

Assuming that the proposal is implemented, calculate:

(i) Break-Even sales of the merged plant and the capacity utilization at that stage.

(ii) Profitability of the merged plant at 80% capacity utilization.

(iii) Sales Turnover of the merged plant to earn a profit of ₹ 60,00,000.

(iv) When the merged plant is working at a capacity to earn a profit of ₹ 60,00,000, what percentage of increase in selling price is required to sustain an increase of 5% in fixed overheads.

Ans **Workings:**

1. Statement showing computation of Breakeven of merged plant and other required information

S.No.	Particulars	Plan A		Plant B		Merged Plant (100%) (₹)
		Before (90%) (₹)	After (100%)(₹)	Before (60%) (₹)	After (100%) (₹)	
(i)	Sales	63,00,000	70,00,000	48,00,000	80,00,000	1,50,00,000
(ii)	Variable cost	39,60,000	44,00,000	22,50,000	37,50,000	81,50,000
(iii)	Contribution (i - ii)	23,40,000	26,00,000	25,50,000	42,50,000	68,50,000
(iv)	Fixed Cost	13,00,000	13,00,000	15,00,000	15,00,000	28,00,000
(v)	Profit (iii - iv)	10,40,000	13,00,000	10,50,000	27,50,000	40,50,000

2 PV ratio of merged plant = $\frac{\text{Contribution}}{\text{Sales}} \times 100$

$= \frac{68,50,000}{1,50,00,000} \times 100 = 45.67\%$

(i) Break even sales of merged plant = $\frac{\text{Fixed Cost}}{\text{P/V Ratio}}$

$= \frac{28,00,000}{45.67\%}$

= 61,30,939.34 (approx..)

Capacity utilisation = $\frac{61,30,939.34}{1,50,00,000} \times 100 = 40.88\%$

(ii) Profitability of the merged plant at 80% capacity utilisation

= (1,50,00,000 x 80%) x P/v ratio-fixed cost

= 1,20,00,000 x 45.67%-28,00,000

(iii) Sales to earn a profit of ₹ 60,00,000

Desired sales = $\frac{\text{Fixed Cost + desired profit}}{\text{P/V Ratio}}$

$= \frac{28,00,000+60,00,000}{45.67\%}$

= ₹ 1,92,68,666 (approx.)

(iii) Increase in fixed cost = ₹ 28,00,000 x 5% = ₹ 1,40,000

Therefore, percentage increase in sales price=

$\frac{1,40,000}{1,92,68,666} \times 100 = 0.726\%$ (approx.)

Q.83 BEP/ Cost Indifference | PY July 21

LR Ltd. is considering two alternative methods to manufacture a new product it intends to market. The two methods have a maximum output of 50,000 units each and produce identical items with a selling price of ₹ 25 each. The costs are:

	Method-1 Semi-Automatic (₹)	Method-2 Fully-Automatic (₹)
Variable cost per unit	15	10
Fixed costs	1,00,000	3,00,000

You are required to calculate:
(1) Cost Indifference Point in units. Interpret your results.
(2) The Break-even Point of each method in terms of units.

Ans **(i)** Cost Indifference Point

	Method-1 and Method- (₹))
Differential Fixed Cost (I)	2,00,000 (3,00,000 - 1,00,000)
Differential Variable Costs (II)	5 (15 - 10)
Cost Indifference Point (I/II) (Differential Fixed Cost / Differential Variable Costs per unit)	**40,000**

Interpretation of Results
At activity level below the indifference points, the alternative with lower fixed costs and higher variable costs should be used. At activity level above the indifference point, alternative with higher fixed costs and lower variable costs should be used.

No. of Product	Alternative to be Chosen
Product ≤ 40,000 units	Method-1, Semi-Automatic
Product ≥ 40,000 units	Method-2, Automatic

(ii) Break Even point (in units)

	Method-1	Method-2
BEP (in units) = Fixed cost / Contribution per unit	$\frac{1,00,000}{(25-15)}$ = 10,000	$\frac{3,00,000}{(25-10)}$ = 20,000

Q.84 CVP Analysis | PY Nov 22

An agriculture based company having 210 hectares of land is engaged in growing three different cereals namely, wheat, rice and maize annually. The yield of the different crops and their selling prices are given below:

	Wheat	Rice	Maize
Yield (in kgs per hectare)	2,000	500	100
Selling Price (₹ per kg)	20	40	250

The variable cost data of different crops are given below:

Crop	Labour charges	Packing Materials	Other variable expenses
Wheat	8	2	4
Rice	10	2	1
Maize	120	10	20

The company has a policy to produce and sell all the three kinds of crops. The maximum and minimum area to be cultivated for each crop is as follows:

Crop	Maximum Area (in hectares)	Minimum Area (in hectares)
Wheat	160	100
Rice	50	40
Maize	60	10

You are required to:

(i) Rank the crops on the basis of contribution per hectare.

(ii) Determine the optimum product mix considering that all the three cereals are to be produced.

(iii) Calculate the maximum profit which can be achieved if the total fixed cost per annum is ₹ 21,45,000.(Assume that there are no other constraints applicable to this company)

Ans

(i) Statement showing Ranking of crops on the basis of Contribution per hectare

Sl. No	Particulars	Wheat	Rice	Maize
(I)	Sales price per kg (₹)	20	40	250
(II)	Variable cost* per kg (₹)	14	13	150
(III)	Contribution per kg (₹)	6	27	100
(IV)	Yield (in kgs per hectare)	2,000	500	100
(V)	Contribution per hectare (₹)	12,000	13,500	10,000
(VI)	Ranking	II	I	III

*Variable cost = Labour Charges +Packing Material+ Other Variable Expenses

Therefore, to maximize profits, the order of priority of production would be Rice, Wheat and Maize.

(ii) & (iii) Statement showing optimum product mix considering that all the three cereals are to be produced and maximum profit thereof

Sl. No.	Particulars	Wheat	Rice	Maize	Total
(i)	Minimum Area (in hectare)	100	40	10	150
(ii)	Remaining area (in hectare)				60
(iii)	Distribution of remaining area based on ranking considering Maximum area	50	10	-	60
(iv)	Optimum mix (in hectare)	150	50	10	210
(v)	Contribution per hectare (₹)	12,000	13,500	10,000	
(vi)	Total contribution (₹)	18,00,000	6,75,000	1,00,000	25,75,000
(vii)	Fixed cost (₹)				21,45,000
(viii)	Maximum Profit (₹)				4,30,000

Optimum Product Mix and calculation of maximum profit earned by company can also be presented as below

(ii) Optimum Product Mix:

Particular	Area (in hectares)	Yield (kg per hectare)	Total Production (in kgs)
(a) Maximum of Rice	50	500	25000
(b) Minimum of Maize	10	100	1000
(c) Balance of Wheat	150	2000	300000
	210		326000

(iii) Calculation of maximum profit earned by the company:

	Production (in kgs)	Contribution (₹ per kg)	Total contribution (₹)
(a) Rice	25,000	24	6,75,000
(b) Maize	1,000	100	1,00,000
(c) Wheat	3,00,000	6	18,00,000
Total contribution			25,75,000
Less: Total Fixed Cost per annum			(21,45,000)
Maximum profits earned by the company			4,30,000

Q.85 Compute best option | RTP May 18

A company manufactures two types of herbal product, A and B. Its budget shows profit figures after apportioning the fixed joint cost of ₹15 lacs in the proportion of the numbers of units sold. The budget for 2018, indicates:

	A	B
Profit (₹)	1,50,000	30,000
Selling Price / unit (₹)	200	120
P/V Ratio (%)	40	50

Required:

COMPUTE the best option among the following, if the company expects that the number of units to be sold would be equal.

(i) Due to exchange in a manufacturing process, the joint fixed cost would be reduced by 15% and the variables would be increased by 7½ %.

(ii) Price of A could be increased by 20% as it is expected that the price elasticity of demand would be unity over the range of price.

(iii) Simultaneous introduction of both the option, viz, (i) and (ii) above.

Ans

Option (i)

Increase in profit when due to change in a manufacturing process there is reduction in joint fixed cost and increase in variable costs.

	(₹)
Revised Contribution from 12,000 units of A due to 7.5% increase in Variable Cost {12,000 units × (₹200 – ₹129)}	8,52,000
Revised Contribution from 12,000 units of B due to 7.5% increase in Variable Cost {12,000 units × (₹120 – ₹64.50)}	6,66,000
Total Revised Contribution	15,18,000

Less: Fixed Cost (₹15,00,000 – 15% × ₹15,00,000)	12,75,000
Revised Profit	2,43,000
Less: Existing Profit	1,80,000
Increase in Profit	63,000

Option (ii)
Increase in profit when the price of product A increased by 20% and the price elasticity of its demand would be unity over the range of price.

	(₹)
Budgeted Revenue from Product A (12,000 units × ₹200)	24,00,000
Revised Demand (in units) (₹24,00,000 / ₹240)	10,000
Revised Contribution (in ₹) [10,000 units × (₹240 – ₹120)]	12,00,000
Less: Existing Contribution (12,000 units × ₹80)	9,60,000
Increase in Profit (Contribution)	2,40,000

*Note: Since Price Elasticity of Demand is 1, therefore the Revenue in respect of Products will remain same.
Option (iii)
Increase in profit on the simultaneous introduction of above two options.

	(₹)
Revised Contribution from Product A [10,000 units × (₹240 – ₹129)]	11,10,000
Revised Contribution from Product B [12,000 units × (₹120 – ₹64.50)]	6,66,000
Total Revised Contribution	17,76,000
Less: Revised Fixed Cost	12,75,000
Revised Profit	5,01,000
Less: Existing Profit	1,80,000
Increase in Profit	3,21,000

A comparison of increase in profit figures under above three options clearly indicates that the option (iii) is the best as it increases the profit of the concern by ₹3,21,000.
Note: The budgeted profit / (loss) for 2018 in respect of products A and B should be ₹ 2,10,000 and (₹30,000) respectively instead of ₹ 1,50,000 and ₹ 30,000.

Workings

1. Contribution per unit of each product:

	Product	
	A (₹)	B (₹)
Contribution per unit	80	60
(Sales × P/V Ratio)	(₹200 × 40%)	(₹120 × 50%)

2. Number of units to be sold:
Total Contribution – Fixed Cost = Profit
Let x be the number of units of each product sold, therefore:
(80x + 60x) – ₹15,00,000 = ₹1,50,000 + ₹30,000
Or x = 12,000 units

Q.86 Pv ratio/BEP/Total Contri | RTP May 22

A Limited manufactures three different products and the following information has been collected from the books of accounts:

	Products		
	S	T	U

Sales Mix	25%	35%	40%
Selling Price	₹ 600	₹800	₹400
Variable Cost	₹ 300	₹400	₹240
Total Fixed Costs			₹ 36,00,000
Total Sales			₹ 1,20,00,000

The company has currently under discussion, a proposal to discontinue the manufacture of Product U and replace it with Product M, when the following results are anticipated:

	Products		
	S	T	M
Sales Mix	40%	35%	25%
Selling Price	₹ 600	₹ 800	₹ 600
Variable Cost	₹ 300	₹ 400	₹ 300
Total Fixed Costs			₹ 36,00,000
Total Sales			₹ 1,28,00,000

Required:

(i) COMPUTE the PV ratio, total contribution, profit and Break-even sales for the existing product mix.

(ii) COMPUTE the PV ratio, total contribution, profit and Break-even sales for the proposed product mix

Ans

(i) Computation of PV ratio, contribution, profit and break-even sales for existing product mix

	Products			Total
	S	T	U	
Selling Price (₹)	600	800	400	
Less: Variable Cost (₹)	300	400	240	
Contribution per unit (₹)	300	400	160	
P/V Ratio (Contribution/Selling price)	50%	50%	40%	
Sales Mix	25%	35%	40%	
Contribution per rupee of sales (P/V Ratio × Sales Mix)	12.5%	17.5%	16%	46%
Present Total Contribution (₹1,20,00,000 × 46%)				₹ 55,20,000
Less: Fixed Costs				₹ 36,00,000
Present Profit				₹ 19,20,000
Present Break Even Sales (₹ 36,00,000/0.46)				₹ 78,26,087

(ii) Computation of PV ratio, contribution, profit and break-even sale for proposed product mix

	Products			
	S	T	M	Total
Selling Price (₹)	600	800	600	
Less: Variable Cost (₹)	300	400	300	
Contribution per unit (₹)	300	400	300	
P/V Ratio (Contribution/Selling price)	50%	50%	50%	
Sales Mix	40%	35%	25%	
Contribution per rupee of sales (P/V Ratio x Sales Mix)	20%	17.5%	12.5%	
				50%
Proposed Total Contribution (₹ 1,28,00,000 x 50%)				₹ 64,00,000
Less: Fixed Costs				₹ 36,00,000
Proposed Profit				₹ 28,00,000
Proposed Break- Even Sales (₹ 36,00,000/0.50)				₹ 72,00,000

Q.87 Special order, Minimum price | RTP Nov 22

(a) RPP Manufacturers is approached by an international customer for one-time special order similar to one offered to its domestic customers. Per unit data for sales to regular customers is provided below:

Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Fixed manufacturing support	₹ 1092
Total manufacturing costs	₹ 2604
Markup (50%)	₹ 1302
Targeted selling price	₹ 3906

It is provided that RPP Manufacturers has excess capacity. Required:

(i) WHAT is the full cost of the product per unit?

(ii) WHAT is the contribution margin per unit?

(iii) WHICH costs are relevant for making the decision regarding this one-time special order? WHY?

(iv) For RPP Manufacturers, WHAT is the minimum acceptable price of this one- time-special order only

(v) For this one-time-only special order, SHOULD RPP Manufacturers consider a price of ₹ 2100 per unit? WHY or why not?

(b) The lab corner of Newlife Hospital Trust operates two types of specialist MRI scanning machine- MR10 and MR59. Following details are estimated for the next period:

Machine	MR10	MR59
Running hours	1,100	2,000
	(₹)	(₹)
Variable running costs excluding special technology	68,750	1,60,000
Fixed Costs	50,000	2,43,750

A brain scan is normally carried out on machine type MR10. This task uses special technology costing ₹ 100 each and takes four hours of machine time. Because of the nature of the process, around 10% of the scans produce blurred and therefore useless results.

Required:

(i) CALCULATE the total cost of a satisfactory brain scan on machine type MR10.

(ii) Brain scans can also be done on machine type MR59 and would take only 1.8 hours per scan with a reduced reject rate of 6%. However, the cost of the special technology would be ₹ 137.50 per scan. ADVISE which type should be used, assuming sufficient capacity is available on both types of machines. Consider fixed costs will remain unchanged.

Ans (a) (i) Full cost of the product per unit

Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Fixed manufacturing support	₹ 1092
Total manufacturing costs	₹ 2604

(ii) Contribution margin per unit

Selling price	₹ 3906
Less: Variable costs	
Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Contribution margin per unit	₹ 2394

(iii) Costs for decision making are those costs that differ between alternatives, which in this situation are the incremental costs.

Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Total incremental costs	₹ 1512

(iv) Minimum acceptable price would be the incremental costs in the short term i.e. ₹ 1512

(v) Yes, RPP Manufacturers may consider a price of ₹ 2100 per unit because this price is greater than the minimum acceptable price.

(b) (i)

Particulars	(₹)
Variable cost per running hour of Machine MR10 (₹ 68,750/1100 hours)	62.50
Fixed cost (₹ 50,000/1100 hours)	45.46
Cost of brain scan on Machine MR10:	(₹)
xVariable machine cost (4 hours × ₹ 62.50)	250.00
Special technology	100.00
Total variable cost	350.00
Fixed machine cost (4 hours × ₹ 45.46)	181.84
Total cost of a scan	531.84
Total cost of a satisfactory scan (₹ 531.84/0.9)	590.93

(ii) It is given that fixed cost will remain unchanged and thus they are not relevant for the decision. The relevant costs would be the incremental costs of an additional scan:

Machine MR10:	(₹)
Variable cost per scan	350.00
Variable cost per satisfactory scan (₹ 350/0.9)	388.89
Machine MR59:	(₹)
Variable machine cost per scan (₹ 1,60,000 / 2000 hours × 1.8 hours)	144.00
Special technology	137.50

Variable cost per scan	281.50
Variable cost per satisfactory scan (₹ 281.50/0.94)	299.47

The relevant costs per satisfactory scan are cheaper on Machine MR59 and therefore brain scans should be undertaken on said machine.

Q.88 Break even point | RTP May 23

The following data are available from the budget records of Finesign Women's Handbag Company for the forthcoming budget period.

	₹
Selling Price per unit	1000
Variable cost per unit:	
Cost of Material used	750.00
Sales commission	50.00
Total Variable Cost	800.00
Annual fixed expenses:	
Rent	7,00,000
Salaries	11,00,000
Other fixed expenses	5,00,000
Total Fixed Cost	23,00,000

Although the firm manufactures Bags with different styles, they have identical purchase costs and selling price.
Requirement:

(a) What is the annual break-even point both in terms of units and value?

(b) If the store manager is paid 1 per cent commission on sales, what would be the annual break-even point both in terms of units and value?

(c) If the firm decides to pay a fixed salary of ₹ 9,00,000 in lieu of sales commission, what would be the annual break-even point in terms of units and value.Considering break-even point in requirement (a), If the stores manager is paid 2 per cent commission on each bag sold in excess of the break-even point, what would be the profit if 20000 bags were sold.

Ans

(a) P/V ratio: $\frac{\text{Sales perunit} - \text{Variable Cost per unit}}{\text{Selling priceper unit}} \times 100$

$= \frac{1000 - 800}{1000} \times 100$

$= \frac{200}{1000} \times 100 = 20\%$

Annual BEP in units $\frac{\text{Annual fixed cost}}{\text{Contribution per unit}}$

$= \frac{23,00,000}{200} = 11,500 \text{ units}$

Annual BEP in value: $\frac{\text{Annual fixed cost}}{\text{P / V ratio}}$

$\frac{23,00,000}{20\%} = ₹1,15,00,000$

(b) Revised P/V ratio and BEP :

commission on sales per unit= 1% of 1,000= ₹10

So, P/V ratio : $\frac{1000-(750+50+10)}{1000}$

$= \frac{190}{1000} \times 100 = 19\%$

BEP in terms of units: $\frac{\text{Annual fixed cost}}{\text{Contribution per unit}}$

$= \frac{29,00,000}{190} = 12,106 \text{ units}$

BEP in terms of value: $\frac{\text{Annual fixed cost}}{P/V}$

$\frac{23,00,000}{19\%} = ₹1,21,05,263$

(c) Break-even point under fixed salary plan:

P/V ratio = $\frac{\text{Contribution per unit}}{\text{Selling price per unit}} = \frac{1000-750}{1000} \times 100 = \frac{250}{1000} \times 100 = 25\%$

Revised fixed cost

Original fixed cost	₹ 23,00,000
Proposed fixed salary	₹ 9,00,000
Total	₹ 32,00,000

BEP in terms of units: $\frac{\text{Annual fixed cost}}{\text{Contribution per unit}} = \frac{32,00,000}{250} = 12.800 \text{ units}$

BEP in terms of value: $\frac{\text{Annual fixed cost}}{P/V \text{ ratio}} = \frac{32,00,000}{25\%} = 1,28,00,000$

(d) Annual break-even point under requirement (a) is 11,500 units.

Margin of safety at sales volume of 20,000 unit of bags (20,000 – 11,500) = 8500 units

Contribution on sales beyond break-even sales:

Revised contribution per unit: 200 – (2% of 1000) = 180
Profit = Margin of safety (in units) × Contribution per unit
= 8500 × 180 = ₹ 15,30,000

Q.89 Allocate Cost & Calc. Income | PY Nov 22

The M-Tech Manufacturing Company is presently evaluating two possible processes for the manufacture of a toy. The following information is available:

Particulars	Process A (Rs.)	Process B (Rs.)

Variable cost per unit	12	14
Sales price per unit	20	20
Total fixed costs per year	30,00,000	21,00,000
Capacity (in units)	4,30,000	5,00,000
Anticipated sales (Next year, in units)	4,00,000	4,00,000

SUGGEST:

1. Which process should be chosen?
2. Would you change your answer as given above, if you were informed that the capacities of the two processes are as follows: A - 6,00,000 units; B - 5,00,000 units? STATE the reason?

Ans

(1) Comparative Profitability Statements

Particulars	Process- A (Rs.)	Process- B (Rs.)
Selling Price per unit	20.00	20.00
Less: Variable Cost per unit	12.00	14.00
Contribution per unit	8.00	6.00
Total Contribution	32,00,000 (Rs. 8 × 4,00,000)	24,00,000 (Rs. 6 × 4,00,000)
Less: Total fixed costs	30,00,000	21,00,000
Profit	2,00,000	3,00,000
*Capacity (units)	4,30,000	5,00,000
Total Contribution at full capacity	34,40,000 (Rs. 8 × 4,30,000)	30,00,000 (Rs. 6 × 5,00,000)
Fixed Cost	30,00,000	21,00,000
Profit	4,40,000	9,00,000

Process- B should be chosen as it gives more profit as compared to Process-A.

(2)

Particulars	Process- A (Rs.)	Process- B (Rs.)
*Capacity (units)	6,00,000	5,00,000
Total contribution	48,00,000 (Rs. 8 × 6,00,000)	30,00,000 (Rs. 6 × 5,00,000)
Fixed Cost	30,00,000	21,00,000
Profit	18,00,000	9,00,000

If the capacity of the Process A and B is 6,00,000 units and 5,00,000 units respectively then Process-A is giving double profit than Process C. Thus Process A be chosen.*Note: It is assumed that capacity produced equals sales

Q.90 Opportunity Cost | MTP Nov 20

A company can make any one of the 3 products X, Y or Z in a year. It can exercise its option only at the beginning of each year. Relevant information about the products for the next year is given below.

	X	Y	Z
Selling Price (Rs. / unit)	100	120	120
Variable Costs (Rs. / unit)	60	90	70
Market Demand (unit)	3,000	2,000	1,000
Production Capacity (unit)	2,000	3,000	900
Fixed Costs (Rs.)		3,00,000	

COMPUTE the opportunity costs for each of the products.

Ans

	X	Y	Z
(i) Contribution per unit (Rs.)	40	30	50
(ii) Units (Lower of Production / Market Demand)	2000	2,000	90
(iii) Possible Contribution (Rs.) [I × II]	80,000	60,000	45,000
(iv) Opportunity Cost* (Rs.)	60,000	80,000	80,000

(*) Opportunity cost is the maximum possible contribution forgone by not producing alternative product i.e. if Product X is produced then opportunity cost will be maximum of (Rs. 60,000 from Y, Rs. 45,000 from Z).

Q.91 BEP & Sp per bottle | MTP Nov 20

CanCola, a zero sugar cold drink manufacturing Indian company, is planning to establish a subsidiary company in Nepal to produce coconut flavoured juice. Based on the estimated annual sales of 60,000 bottles of the juice, cost studies produced the following estimates for the Nepalese subsidiary:

	Total Annual Costs (₹)	Percent of Total Annual Cost which is variable
Material	2,70,000	100%
Labour	1,97,000	80%
Factory Overheads	1,20,000	60%
Administration Expenses	52,000	35%

The Nepalese production will be sold by manufacturer's representatives who will receive a commission of 9% of the sale price. No portion of the Indian office expenses is to be allocated to the Nepalese subsidiary. You are required to-

(i) COMPUTE the sale price per bottle to enable the management to realize an estimated 20% profit on sale proceeds in Nepal.

(ii) CALCULATE the break-even point in rupees value sales and also in number of bottles for the Nepalese subsidiary on the assumption that the sale price is ₹ 14 per bottle.

Ans

(i) Computation of Sale Price Per Bottle
Output: 60,000 Bottles

	(₹)
Variable Cost:	
Material	2,70,000
Labour (₹ 1,97,000 × 80%)	1,57,600
Factory Overheads (₹1,20,000 × 60%)	72,000
Administrative Overheads (₹ 52,000 × 35%)	18,200
Commission (9% on ₹9,00,000 (Working Note -1))	81,000
Fixed Cost:	
Labour (₹ 1,97,000 × 20%)	39,400
Factory Overheads (₹ 1,20,000 × 40%)	48,000
Administrative Overheads (₹ 52,000 × 65%)	33,800
Total Cost	7,20,000

Profit (20% of ₹ 9,00,000)	1,80,000
Sales Proceeds	9,00,000
Sales Price per bottle Rs $\left(\frac{9,00,000}{60,000}\right)$	15

(ii) Calculation of Break-even Point

Sales Price per Bottle = ₹ 14

Variable Cost per Bottle = $\frac{\text{Rs } 5,93,400 \text{(workingnote-2)}}{60,000 \text{bottles}} = 9.89$

Contribution per Bottle = 14-9.89 = 4.11

Break -even Point (in number of Bottles) = $\frac{\text{Fixed cost}}{\text{Contributionperbottle}}$

$= \frac{\text{Rs } 1,21,200}{\text{Rs } 4.11} = 29,489$

Break- even Point (in Sales Value) = 29,489 Bottles x 14

4,12,846

Working Note

(1) Let the Sales Price be 'X'

Commission = $\frac{9X}{100}$

Profit = $\frac{20X}{100}$

$$X = 2,70,000 + 1,57,600 + 72,000 + 18,200 + 39,400 + 48,000 + 33,800 + \frac{9X}{100} + \frac{20X}{100}$$

$$X = 6,39,000 + \frac{9X}{100} + \frac{20X}{100}$$

$100X - 9X - 20X = 6,39,00,000$

$71X = 6,39,00,000$

$X = \frac{6,39,00,000}{71} = 9,00,000$

(2)

Total Variable Cost	**(₹)**
Material	2,70,000
Labour	1,57,600
Factory Overheads	72,000
Administrative Overheads	18,200
Commission [(60,000 Bottles × ₹ 14) × 9%]	75,600
	5,93,400

Q.92 BEP level | MTP Nov 22(1)

PS Limited is a manufacturing company and is operating at 75% capacity utilization. The PV ratio at this level of activity is 40%. The flexible budget drafted by the company for two levels of activity is given below:

	Capacity utilization (75	Capacity utilization (100
	Amount in ₹	Amount in ₹ (Lakhs)
Direct materials	180	240
Direct wages	120	160
Power and fuel	12	16
Repairs and maintenance	18	21
Consumables	21	28
Supervision	20	20
Indirect labour	36	42
Administrative expenses	21	21
Selling expenses	18	18
Depreciation	54	54

You are required to:

i. CALCULATE the profit earned by PS Limited at 75% level of activity.

ii. CALCULATE the break-even level of activity.

Ans

Calculation of Semi Variable component

	Repairs and Maintenance (₹)	Indirect labour (₹)
At 75% capacity	18,00,000	36,00,000
At 100% capacity	21,00,000	42,00,000
Variable component for 25%	3,00,000	6,00,000
Hence variable cost at 75%	3,00,000 x 75/25=**9,00,000**	6,00,000 x 75/25 =**18,00,000**
Fixed cost at 75% capacity	18,00,000 – 9,00,000 = **9,00,000**	36,00,000 – 18,00,000=**18,00,000**

Segregation of Fixed and Variable cost

	75%	100%	VC at 75%	FC at 75%
Direct Material	180	240	180	
Direct Labour	120	160	120	
Power and fuel	12	16	12	
Repairs and maintenance	18	21	**9**	**9**
Consumables	21	28	21	
Supervision	20	20		20
Indirect labour	36	42	**18**	**18**
Administrative expenses	21	21		21

Selling expenses	18	18		18
Depreciation	54	54		54
Total	500	620	**360**	**140**

(i) Calculation of profit earned at 75% capacity

Given PV ratio = 40%, Hence variable cost would be 60%

If variable cost is ₹ 360 lakhs then sales would be 360/ 0.60 = 600 lakhs

Less: Variable cost = ₹ 360 lakhs

Less: Fixed cost = ₹ 140 lakhs

Profit = ₹ 100 lakhs

(ii) **Break-even level of activity**

BEP Sales = FC/ P/V ratio = 140 /0.40 = ₹ 350 lakhs

STANDARD COSTING

Q.93 Materail Variance | PY Nov 22

Y Lid manufactures "Product M" which requires three types of raw materials - "A", "B" & "C". Following information related to 1st quarter of the F.Y. 2022-23 has been collected from its books of accounts. The standard material input required for 1,000 kg of finished product 'M' are as under:

Material	Quantity (Kg.)	Std. Rate per Kg. (₹)
A	500	25
B	350	45
C	250	55
	1100	
Standard Loss	100	
Standard Output	1000	

During the period, the company produced 20,000 kg of product "M" for which the actual quantity of materials consumed and purchase prices are as under:

Material	Quantity (Kg.)	Purchase price per Kg. (₹)
A	11,000	23
B	7,500	48
C	4,500	60

You are required to calculate:

(i) Material Cost Variance

(ii) Material Price Variance for each raw material and Product 'M'

(iii) Material Usage Variance for each raw material and Product 'M'

(iv) Material Yield Variance

Note: Indicate the nature of variance i.e. Favourable or Adverse.

Ans

(a) Basic Calculations:

	Standard for 20,000 kg.			Actual for 20,000 kg.		
	Qty.	Rate	Amount	Qty.	Rate	Amount
	Kg.	(₹)	(₹)	Kg.	(₹)	(₹)
A	10,000	25	2,50,000	11,000	23	2,53,000
B	7,000	45	3,15,000	7,500	48	3,60,000
C	5,000	55	2,75,000	4,500	60	2,70,000
Total	22,000		8,40,000	23,000		8,83,000

Calculation of Variances:

(i) Material Cost Variance = Std. Cost for actual output-Actual cost

MCV=8,40,000- 8,83,000 = ₹ 43,000(A)

(ii) Material Price Variance = (SP-AP) × AQ

A = (25 - 23) x 11,000 = 22,000 (F)

B = (45 - 48) x 7,500 = 22,500 (A)

C = (55 - 60) x 4,500 = 22,500 (A)

23000 (A)

(iii) Material Usages Variance = (SQ-AQ) × SP

A = (10,000 - 11,000) x 25 = 25,000 (A)

B = (7,000 - 7,500) x 45 = 22,500 (A)

C = (5,000 - 4,500) x 55 = 27,500 (F)

20,000 (A)

(iv) Material Yield Variance = (SQ-RSQ*) × SP

A = (10,000 – 10,454.54) x 25 = 11,363.5(A)

B = (7,000 – 7,318.18) x 45 = 14,318.1(A)

C = (5,000 – 5,227.27) x 55= 12,500(A)

38,181.6(A)

Revised Standard Quantity (RSQ)

$A = \frac{10,000}{22,000} \times 23,000 = 10,454.54$

$B = \frac{7,000}{22,000} \times 23,000 = 7,318.18$

$C = \frac{5,000}{22,000} \times 23,000 = 5,227.27$

Material Yield Variance can also be Calculated as below

Material yield variance = Standard cost per unit (Actual yield – Standard yield)

$\text{Standard cost per unit} = \frac{8,40,000}{20,000} = ₹\ 42$

$\text{New Standard Yield} = \frac{20,000}{22,000} \times 23,000 = 20,909$

Material yield variance = ₹ 42 (20,000 – 20,909)

= ₹ 38,178 (A)

Q.94 Material Variance | MTP Nov 20

Following data is extracted from the books of XYZ Ltd. for the month of January, 2020:

(i) Estimation-

Particulars	Quantity (kg.)	Price (₹)	Amount (₹)
Material-A	800	?	--
Material-B	600	30.00	18,000
			--

Normal loss was expected to be 10% of total input materials.

(ii) Actuals-

1480 kg of output produced.

Particulars	Quantity (kg.)	Price (₹)	Amount (₹)
Material-A	900	?	--
Material-B	?	32.50	--
			59,825

(iii) Other Information-

Material Cost Variance = ₹ 3,625 (F)

Material Price Variance = ₹ 175 (F)

You are required to CALCULATE: (i) Standard Price of Material-A; (ii) Actual Quantity of Material-B; (iii) Actual Price of Material-A;

(iv) Revised standard quantity of Material-A and Material-B; and

(v) Material Mix Variance;

Ans (i) Material Cost Variance (A + B) = {(SQ × SP) – (AQ × AP)}

₹ 3,625 = (SQ × SP) – ₹ 59,825

(SQ × SP) = ₹ 63,450
(SQ_A × SP_A) + (SQ_B × SP_B) = ₹ 63,450
(940 kg × SPA) + (705 kg × ₹ 30) = ₹ 63,450
($940 kg × SP_A$) + ₹ 21,150 = ₹ 63,450
($940 kg × SP_A$) = ₹ 42,300

$$SP_A = \frac{42,300}{940kg}$$

Standard Price of Material-A = ₹ 45

Working Note:
SQ i.e. quantity of inputs to be used to produce actual output

$$= \frac{1,480\ kg}{90\%} = 1,645\ kg$$

= 1,645 kg

$$SQ_A = \frac{800kg}{(800 + 600)} \times 1,645kg. = 940\ kg$$

$$SQ_B = \frac{600kg}{(800 + 600)} \times 1,645kg. = 705\ kg$$

(ii) Material Price Variance (A + B) = {(AQ × SP) – (AQ × AP)}
₹ 175 = (AQ × SP) – ₹ 59,825
(AQ × SP) = ₹ 60,000
(AQ_A × SP_A) + (AQ_B × SP_B) = ₹ 60,000
(900 kg × ₹ 45 (from (i) above)) + (AQ_B × ₹30) = ₹ 60,000
₹ 40,500 + (AQ_B × ₹ 30) = ₹ 60,000
(AQ_B × ₹ 30) = ₹ 19,500

$$AQ_B = \frac{19,500}{30} = 650\ kg$$

Actual Quantity of Material B = 650 kg.

(iii) (AQ × AP) = ₹ 59,825
(AQA × APA) + (AQB × APB) = ₹ 59,825
(900 kg × APA) + (650 kg (from (ii) above) × ₹ 32.5) = ₹ 59,825
(900 kg × APA) + ₹ 21,125 = ₹ 59,825
(900 kg × APA) = ₹ 38,700

$$AP_A = \frac{38,700}{900} = 43$$

Actual Price of Material-A = ₹ 43

(iv) Total Actual Quantity of Material-A and Material-B
= AQA + AQB
= 900 kg + 650 kg (from (ii) above)
= 1,550 kg

Now,

$$\text{Revised } SQ_A = \frac{800kg}{(800 + 600)} \times 1,550kg. = 886\ kg$$

$$\text{Revised } SQ_B = \frac{600kg}{(800 + 600)} \times 1,550kg. = 664\ kg$$

(v) Material Mix Variance (A + B) = {(RSQ × SP) – (AQ × SP)}
= {(RSQ_A × SP_A) + (RSQ_B × SP_B) – 60,000}
= (886 kg (from (iv) above) × ₹ 45 (from (i) above))
+ (664 kg (from (iv) above) × ₹ 30) - ₹60,000
= (39,870 + 19,920) – 60,000 = ₹ 210 (A)

Q.95 Material Variance | MTP May 22(2)

Rounak Minerals Ltd. operates in iron ore mining through open cast mining method. Explosives and detonators are used for excavation of iron ores from the mines. The following are the details of standard quantity of explosives materials used for mining:

Particulars	Rate (₹)	Standard Qty. for Iron ore	Standard Qty. for Overburden (OB)
SME	40.00 per kg.	2.4 kg per tonne	1.9 kg per cubic- meter
Detonators	20.00 per piece	2 pcs per tonne	2 pcs per cubic-meter

The standard stripping ratio is 3:1 (means 3 cubic- meter of overburden soil to be removed to get one tonne of iron ore).
During the month of December 2021, the company produced 20,000 tonnes of iron ore and removed 58,000 cubic-meter of OB. The quantity of explosive materials used and paid for the month is as below:

Material	Quantity	Amount (₹)
SME	1,67,200 kg.	63,53,600
Detonators	1,18,400 pcs	24,27,200

You are required to COMPUTE:
(i) Material price variance
(ii) Material quantity variance
(iii) Material cost variance.

Ans

1. Calculation of Standard Qty. of Explosives and Detonators for actual output:

	Particulars	Iron ore	Overburden (OB)	Total
SME:				
A	Actual Output	20,000 tonne	58,000 M3	
B	Standard Qty per unit	2.4 kg./tonne	1.9 kg./M3	
C	Standard Qty. for actual production [A×B]	48,000 kg.	1,10,200 kg.	1,58,200 kg.
Detonators:				
D	Standard Qty per unit	2 pcs/ tonne	2 pcs/ M3	
E	Standard Qty. for actual production [A×D]	40,000 pcs.	1,16,000 pcs	1,56,000 pcs

2. Calculation of Actual Price per unit of materials:

Material	Quantity [A]	Amount (₹) [B]	Rate (₹) [C = B÷A]
SME	1,67,200 kg.	63,53,600	38.00
Detonators	1,18,400 pcs	24,27,200	20.50

(i) Computation of material price variance:
Material Price Variance = Actual Qty. × (Std. Price - Actual Price)
SME = 1,67,200 kg. × (₹40 – ₹38) = ₹ 3,34,400 (F)

Detonators = 1,18,400 pcs × (₹20 – ₹20.5) = ₹ 59,200 (A)
Total = ₹ 2,75,200 (F)

(ii) Computation of material quantity variance:
Material Qty. Variance = Std. Price × (Std. Qty for actual output - Actual Qty.)
SME = ₹40 × (1,58,200 kg. - 1,67,200 kg.) = ₹ 3,60,000 (A)
Detonators = ₹20 × (1,56,000 pcs -1,18,400 pcs) = ₹ 7,52,000 (F)
Total = ₹ 3,92,000 (F)

(iii) Computation of material cost variance:
Material cost variance = Std. cost – Actual Cost
Or, (Std. Price × Std. Qty) – (Actual Price × Actual Qty.)
SME = (₹40 × 1,58,200 kg) – (₹38 × 1,67,200 kg.)
= ₹63,28,000 – ₹63,53,600 = ₹ 25,600 (A)
Detonators = (₹20 × 1,56,000 pcs) – (₹20.50 × 1,18,400 pcs)
= ₹31,20,000 – ₹24,27,200 = ₹ 6,92,800 (F)
Total = ₹ 6,67,200 (F)

Q.96 Material Variance | MTP May 23(1)

Following data is extracted from the books of RAMZY Ltd. for the month of March:

(i) Estimation-

Particulars	Quantity (kg.)	Price (₹)	Amount (₹)
Material-A	1320	?	--
Material-B	990	50	49500
			--

Normal loss was expected to be 5% of total input materials. (ii) Actuals- 2,500 kg of output produced.

Particulars	Quantity (kg.)	Price (₹)	Amount (₹)
Material-A	1500	?	--
Material-B	?	53	--
			98,000

(iii) Other Information-
Material Cost Variance = ₹ 5,500 (F)
Material Price Variance = ₹ 300 (F)
You are required to CALCULATE:
(i) Standard Price of Material-A;
(ii) Actual Quantity of Material-B;
(iii) Actual Price of Material-A;
(iv) Revised standard quantity of Material-A and Material-B; and
(v) Material Mix Variance.

Ans

(i)	Material Cost Variance (A + B)	= {(SQ × SP) – (AQ × AP)}
	Or ₹5,500	= (SQ × SP) – ₹98,000
	Or (SQ × SP)	= ₹1,03,500
	Or (SQA × SPA) + (SQB × SPB)	= ₹ 1,03,500
	Or (1,503.8 kg × SPA) + (1,127.8 kg × ₹50)	= ₹ 1,03,500
	Or (1,503.8 kg × SPA) + ₹56,390	= ₹1,03,500
	Or (1,503.8 kg × SPA)	= ₹ 47,110

	Or SPA	= 47,110 / 1503.80 kg = ₹31.33
(ii)	Material Price Variance (A + B)	= {(AQ × SP) – (AQ × AP)}
	Or ₹300	= (AQ × SP) – ₹ 98,000
	Or (AQ × SP)	= ₹ 98,300
	Or (AQA × SPA) + (AQB × SPB)	= ₹98,300
	Or (1,500 kg × ₹31.33 (from (i) above)) + AQB × ₹50	= ₹98,300
	Or ₹ 46,995 + (AQB × ₹ 50)	= ₹ 98,300
	Or (AQB × ₹ 50)	= ₹ 51,305
	Or AQB	= 1,026kg
	Actual Quantity of Material B	**= 1,026 kg.**
(iii)	(AQ × AP)	= ₹98,000
	Or (AQ_A × AP_A) + (AQ_B × AP_B)	= ₹ 98,000
	Or (1,500 kg × AP_A) + (1,026 kg (from (ii) above) × ₹53)	= ₹ 98,000
	Or (1,500 kg × AP_A) + ₹ 54,378	= ₹ 98,000
	Or (1,500 kg AP_A)	= ₹ 43,622
	Or AP = 43,622 / 1,500	= ₹ 29.10
	Actual Price of Material A	**= ₹ 29.10**
(iv)	Total Actual Quantity of Material-A and Material-B	= AQA + AQB
	Or 1,500 kg + 1,026 kg (from (ii) above)	= 2,526 kg
	Revised SQ_A = 1320 kg / (1,320 + 990) × 2,526 kg	= 1,443 kg
	Revised SQ_B = 990 kg / (1,320 + 990) × 2,526 kg	= 1,083 kg

(v) Material Mix Variance (A + B) ={(RSQ × SP) – (AQ × SP)}
= {(RSQA × SPA) + (RSQB × SPB) – ₹98,300} = (1,443 kg (from (iv) above) × ₹ 31.33 (from (i) above)) + (1,083 kg (from (iv) above) × ₹50) - ₹98,300
= (₹45,209 + ₹54,150) – ₹98,300 = ₹ 1059 (F)

Q.97 Material Variance | MTP May 19(2)

BBC Ltd. manufactures Ordinary Portland Cement (OPC). The standard data for the raw materials that are used to manufacture OPC are as follows:

Material	Composition (%)	Rate per Metric Ton (Rs.)
Limestone	65	565
Silica	20	4,800
Alumina	5	32,100
Iron ore	5	₹₹₹₹₹₹₹₹₹₹₹₹₹₹₹₹₹1,800
Others	5	2,400

During the month of February 20X8, A Ltd. produced 500 MT OPC. Actual data related with the consumption and costs are as follows:

Raw Material	Quantity (MT)	Total Cost (Rs.)
Limestone	340	1,90,400
Silica	105	5,09,250
Alumina	25	8,12,500
Iron ore	30	53,400
Others	23	51,750

You are required to COMPUTE the following variances related with the production of OPC for the month of February 20X8:

(i) Material Price Variance
(ii) Material Mix Variance
(iii) Material Yield Variance
(iv) Material Cost Variance.

Ans

(i) Material Price Variance = Actual Quantity (Std. Price – Actual Price)

Limestone = $340\left(565-\frac{1,90,400}{340}\right)$

= 340 (Rs. 565 - Rs. 560) = 1,700 (F)

Silica $=105\left(4800-\frac{5,09,250}{105}\right)$

=105 (Rs. 4,800 - Rs. 4,850) = 5,250 (A)

Alumina $= 25\left(32,100-\frac{8,12,500}{25}\right)$

=25 (Rs. 32,100 - Rs. 32,500) = 10,000 (A)

Iron ore $=30\left(18,00-\frac{53,400}{30}\right)$

=30 (Rs. 1,800 - Rs. 1,780) = 600 (F)

Others $= 23\left(2,400-\frac{51,750}{23}\right)$

=23 (Rs. 2,400 - Rs. 2,250) = 3,450 (F)

9,500 (A)

(ii) Material Mix Variance = Std. Price (Revised Std. Quantity – Actual Quantity)

Limestone	= Rs. 565 (523 × 65% - 340)	
	= Rs. 565 (339.95 - 340)	= 28.25 (A)
Silica	= Rs. 4,800 (523 × 20% - 105)	
	= Rs. 4,800 (104.6 - 105)	= 1,920 (A)
Alumina	= Rs. 32,100 (523 × 5% - 25)	
	= Rs. 32,100 (26.15 - 25)	= 36,915 (F)
Iron ore	= Rs. 1,800 (523 × 5% - 30)	
	= Rs. 1,800 (26.15 - 30)	= 6,930 (A)
Others	= Rs. 2,400 (523 × 5% - 23)	
	= Rs. 2,400 (26.15 - 23)	= 7,560 (F)
		35,596.75 (F)

(iii) Material Yield Variance = Std. Price (Standard Quantity – Revised Std. Quantity)

Limestone	=	Rs. 565 (500 × 65% - 523 × 65%)	
	=	Rs. 565 (325 - 339.95)	= 8,446.75 (A)
Silica	=	Rs. 4,800 (500 × 20% - 523 × 20%)	
	=	Rs. 4,800 (100 - 104.6)	= 22,080 (A)
Alumina	=	Rs. 32,100 (500 × 5% - 523 × 5%)	
	=	Rs. 32,100 (25 - 26.15)	= 36,915 (A)
Iron ore	=	Rs. 1,800 (500 × 5% - 523 × 5%)	
	=	Rs. 1,800 (25 - 26.15)	= 2,070 (A)
Others	=	Rs. 2,400 (500 × 5% - 523 × 5%)	
	=	Rs. 2,400 (25 - 26.15)	= 2,760 (A)
			72,271.75 (A)

(iv) Material Cost Variance = (Std. Quantity × Std. Price) – (Actual Quantity × Actual Price)

Limestone	=	Rs. 565 × (500 × 65%) - Rs. 1,90,400	
	=	Rs. 1,83,625 - Rs. 1,90,400	= 6,775 (A)
Silica	=	Rs. 4,800 × (500 × 20%) - Rs. 5,09,250	
	=	Rs. 4,80,000 – Rs. 5,09,250	= 29,250 (A)
Alumina	=	Rs. 32,100 (500 × 5%) – Rs. 8,12,500	
	=	Rs. 8,02,500 – Rs. 8,12,500	= 10,000 (A)
Iron ore	=	Rs. 1,800 (500 × 5%) – Rs. 53,400	
	=	Rs. 45,000 – Rs. 53,400	= 8,400 (A)
Others	=	Rs. 2,400 (500 × 5%) – Rs. 51,750	
	=	Rs. 60,000 – Rs. 51,750	= 8,250 (F)
			46,175 (A)

Q.98 Allocate Cost & Calc. Income | PY Nov 22

JVG Ltd. produces a product and operates a standard costing system and value material and finished goods inventories at standard cost. The information related with the product is as follows:

Particulars	Cost per unit (₹)
Direct materials (30 kg at ₹350 per kg)	10,500
Direct labour (5 hours at ₹80 per hour)	400

The actual information for the month just ended is as follows:

(a) The budgeted and actual production for the month of September 2019 is 1,000 units.

(b) Direct materials -5,000 kg at the beginning of the month. The closing balance of direct materials for the month was 10,000 kg. Purchases during the month were made at ₹ 365 per kg. The actual utilization of direct materials was 7,200 kg more than the budgeted quantity.

(c) Direct labour – 5,300 hours were utilised at a cost of ₹ 4,34,600.

Required:

CALCULATE (i) Direct material price and usage variances (ii) Direct labour rate and efficiency variances.

Ans **Quantity of material purchased and used.**

No. of units produced	1,000 units
Std. input per unit	30kg.
Std. quantity (Kg.)	30,000 kg.
Add: Excess usage	7,200 kg.
Actual Quantity	37,200 kg.
Add: Closing Stock	10,000 kg.

Less: Opening stock	5,000 kg.
Quantity of Material purchased	42,200 kg.

(i) Direct Material Price Variance:
= Actual Quantity purchased (Std. Price – Actual Price)
= 42,200 kg.(₹350 – ₹365) = 6,33,000 (Adverse)
Direct Material Usage Variance:
= Std. Price (Std. Quantity – Actual Quantity)
= ₹350 (30,000 kg. – 37,200 kg.) = ₹25,20,000 (Adverse)

(ii) Direct Labour Rate Variance:
= Actual hours (Std. Rate – Actual Rate)
= 5,300 hours (₹80 – ₹82) = ₹10,600 (Adverse)
Direct Labour Efficiency Variance:
= Std. Rate (Std. hours – Actual hours)
= ₹80 (1,000 units × 5 hours – 5,300 hours) = ₹24,000 (Adverse)

Q.99 Material, Labour Variance | MTP May 19(1)

The following standards have been set to manufacture a product:

Direct Materials:	(Rs.)
2 units of X at Rs.40 per unit	80.00
3 units of Y at Rs. 30 per unit	90.00
15 units of Z at Rs.10 per unit	150.00
	320.00
Direct labour 3 hours @ Rs. 55 per hour	165.00
Total standard prime cost	485.00

The company manufactured and sold 6,000 units of the product during the year 20X8.

Direct material costs were as follows:

12,500 units of X at Rs. 44 per unit.

18,000 units of Y at Rs. 28 per unit.

88,500 units of Z at Rs.12 per unit.

The company worked 17,500 direct labour hours during the year 20X8. For 2,500 of these hours the company paid at Rs. 58 per hour while for the remaining hours the wages were paid at the standard rate.

Required:

COMPUTE the following variances:

Material Price, Material Usage, Material Mix, Material Yield, Labour Rate and Labour Efficiency.

Ans

Material Price Variance = Actual Quantity (Std. Price – Actual Price)
X = 12,500 units (Rs.40 – Rs.44) = 50,000 (A)
Y = 18,000 units (Rs.30 – Rs.28) = 36,000 (F)
Z = 88,500 units (Rs.10 – Rs.12) = 1,77,000 (A)
1,91,000 (A)
Material Usage Variance = Std. Price (Std. Qty – Actual Qty.)
X = Rs.40 (6,000 × 2 – 12,500) = 20,000 (A)
Y = Rs.30 (6,000 × 3 – 18,000) = Nil
Z = Rs.10 (6,000 × 15 – 88,500) = 15,000 (F)
5,000 (A)

Material Mix Variance = Std. Price (Revised Std. Qty. – Actual Qty.)

$X = Rs.40\left(\frac{1,19,000x2}{20} - 12,500\right) = 24,000\ (A)$

$Y = Rs.30\left(\frac{1,19,000x3}{20} - 18,000\right) = 4,500\ (A)$

$Z = Rs.10\left(\frac{1,19,000x15}{20} - 88,500\right) = \underline{7,500\ (F)}$

21,000 (A)

Material Yield Variance = Std. Price (Std. Qty. – Revised Std. Qty.)

$X = Rs.40\left(6,000 \times 2 - \frac{1,19,000x2}{20}\right) = 4,000\ (F)$

$Y = Rs.30\left(6,000 \times 3 - \frac{1,19,000x3}{20}\right) = 4,500\ (F)$

$Z = Rs.10\left(6,000 \times 15 - \frac{1,19,000x15}{20}\right) = \underline{7,500\ (F)}$

16,000 (F)

Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)
= 2,500 hours (Rs.55 – Rs.58) = 7,500 (A)

Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)
= Rs.55 (6,000 × 3 – 17,500)= 27,500 (F)

Q.100 Material, Labour Variance | MTP Nov 22(1)

The details regarding a product manufactured by the company for the last one week are as follows: Standard cost (per unit)

Direct materials 10 units @ ₹ 22.50	₹ 225
Direct wages 5 hours @ ₹ 120	₹ 600
Total:	₹ 825
Actual (for whole activity):	
Direct materials	₹ 96,525
Direct wages	₹ 2,44,860
Analysis of variances: Direct materials:	
Price	₹ 8,775 (Adverse)
Usage	₹ 5,625 (Favourable)
Direct wages (labour):	
Efficiency	₹ 5,400 (Adverse)

You are required to CALCULATE:

(i) Material Cost variance
(ii) Actual output units
(iii) Actual price of material per unit
(iv) Actual Wages rate per labour hour
(v) Labour rate variance
(vi) Labour Cost variance

Ans

(i) Material Cost Variance = Material Price Variance+ Material Usage Variance
= ₹ 8,775 A + ₹ 5,625 F= ₹ 3,150 Adverse

(ii) Actual output units
Let x be the actual quantity of output

Then Standard Quantity of input for actual output 'x'
SQ = 10x
Material cost variance = (SQ x SP) - (AQ x AP)
-3,150 = (10x x ₹ 22.50) - ₹ 96,525
-3,150 = 225x - ₹ 96,525
225x = ₹ 96,525 – 3,150 = ₹ 93,375
x = ₹ 93,375/225 = 415 Units

(iii) Actual Price of Material per unit
Material Usage variance = (SQ - AQ) x SP
5,625 = (10x - AQ) x ₹ 22.50
5,625 = (10 x 415 units - AQ) x ₹ 22.50
5,625/22.50 = 4,150 - AQ
AQ = 4,150 - 250 = 3,900 units
Now, AQ x AP = ₹ 96,525 (given) AP = ₹ 96,525/AQ
= ₹ 96,525/3,900 units = ₹ 24.75

(iv) Actual wages rate per labour hour
Labour efficiency variance = 5,400 Adverse (given)
Standard rate per hour (Standard time – Actual time) = -5,400
₹ 120 [(Actual output units x Number of hours per output) – Actual time] = -5,400
₹ 120 [(415 units x 5 hrs) – Actual time] = -5,400
2,075 hrs – Actual time = -5,400/120
Actual time = 2,075 + 45
= 2,120 hrs
Now Direct wages = ₹ 2,44,860 (given)
Actual time x Actual rate per hour = ₹ 2,44,860
Actual rate per hour = ₹ 2,44,860 / 2,120 hrs
= ₹ 115.50

(v) Labour rate variance
= Actual time (Standard Rate – Actual Rate)
= 2,120 hrs (₹ 120 - ₹ 115.50)
= 2,120 hrs x ₹ 4.50 = 9,540 Favourable

(vi) Labour Cost variance
= Labour rate variance+ Labour efficiency variance
= 9,540 F + 5,400 A = 4,140 Favourable

Q.101 Material, Labour & OH Variance | RTP Nov 18

Aaradhya Ltd. manufactures a commercial product for which the standard cost per unit is as follows:

	(₹)
Material:	
5 kg. @ ₹ 4 per kg.	20.00
Labour:	
3 hours @ ₹10 per hour	30.00
Overhead	
Variable: 3 hours @ ₹1	3.00
Fixed: 3 hours @ ₹0.50	1.50
Total	54.50

During Jan. 20X8, 600 units of the product were manufactured at the cost shown below:

	(₹)
Materials purchased:	
5,000 kg. @ ₹4.10 per kg.	20,500
Materials used:	
3,500 kg.	
Direct Labour:	
1,700 hours @ ₹ 9	15,300
Variable overhead	1,900
Fixed overhead	900
Total	38,600

The flexible budget required 1,800 direct labour hours for operation at the monthly activity level used to set the fixed overhead rate.

COMPUTE:

(a)Material price variance,

(b) Material Usage variance;

(c) Labour rate variance;

(d) Labour efficiency variance;

(e) Variable overhead expenditure variance;

(f) Variable overhead efficiency variance;

(g) Fixed overhead expenditure variance;

(h) Fixed overhead volume variance;

(i) Fixed overhead capacity variance; and

(j) Fixed overhead efficiency variance.

Also RECONCILE the standard and actual cost of production.

Ans

(a) Material price variance:
= (Standard price – Actual Price) × Actual quantity
= (₹ 4 – ₹ 4.10) × 5,000 = ₹ 500 Adv.

(b) Material usage variance:
= (Std. quantity for actual output – Actual qtty.) × Std. price
= (600 × 5 – 3,500) × 4 = ₹ 2,000 Adv.

(c) Labour Rate Variance:
= (Standard rate – Actual rate) × Actual hours
= (₹10 – ₹9) × 1,700 = ₹ 1,700 Fav.

(d) Labour Efficiency Variance:
= (Standard hours for actual output – Actual hours) × Standard rate
= (600 × 3 – 1,700) × ₹10
= ₹ 1,000 Fav.

(e) Variable Overhead Expenditure Variance
= (Actual Hours × Standard Rate) – Actual Overhead
= (1,700 × ₹ 1) – ₹ 1,900
= ₹ 200 Adv.

(f) Variable Overhead Efficiency Variance:
= Std. hours for actual output – Actual hours) × Std. rate

= (600 × 3 – 1,700) × ₹1 = ₹100 Fav.

(g) Fixed Overhead Expenditure Variance:
= (Budgeted overhead – Actual overhead)
= (1,800 × 0.50 – 900) = Nil

(h) Fixed Overhead Volume Variance:
= (Std. hours for actual output – Budgeted hours) × Std. rate
= (600 × 3 – 1,800) × ₹ 0.50 = Nil

(i) Fixed Overhead Capacity Variance:
= (Budgeted hours – Actual Hours) × Standard rate
= (1,800 – 1,700) × ₹ 0.50 = ₹ 50 Adv.

(j) Fixed Overhead Efficiency Variance:
= (Std. hours for actual output – Actual hours) × Standard rate
= (600 × 3 – 1,700) × ₹ 0.50 = ₹ 50 Fav.

Verification:	(₹)	(₹)
Overhead recovered: 600 units @ ₹4.50		2,700
Actual Overhead:		
Variable	1,900	
Fixed	900	2,800
		100 Adv.
Variable expenditure variance		200 Adv
Variable Efficiency variance		100 Fav.
Fixed expenditure variance		Nil
Fixed overhead volume variance		Nil
		100 Adv.

Reconciliation Statement

Standard Cost: 600 units @ ₹54.50		32,700	
Actual Cost:	38,600		
Less: Material Stock at standard cost: (1,500 × ₹4)	6,000	(32,600)	100 Fav.
Variances:	Adv. (₹)	Fav. (₹)	
Material price	500		
Material usage	2,000		
Labour rate		1,700	
Labour efficiency		1,000	
Variable expenditure	200		
Variable efficiency		100	
Total	2,700	2,800	100 Fav.

Q.102 Material, Labour, OH Variance | RTP Nov 20

Following are the standard cost for a product-X:

	(₹)
Direct materials 10 kg @ ₹ 90 per kg	900
Direct labour 8 hours @ ₹100 per hour	800
Variable Overhead 8 hours @ ₹15 per hour	120
Fixed Overhead	400
	2,220

Budgeted output for the year was 2,000 units. Actual output is 1,800 units.

Actual cost for year is as follows:	(₹)
Direct Materials 17,800 Kg @ ₹ 92 per Kg.	16,37,600
Direct Labour 14,000 hours @ ₹ 104 per hour	14,56,000
Variable Overhead incurred	2,17,500
Fixed Overhead incurred	7,68,000

You are required to CALCULATE:

(i) Material Usage Variance

(ii) Material Price Variance

(iii) Material Cost Variance

(iv) Labour Efficiency Variance

(v) Labour Rate Variance

(vi) Labour Cost Variance

(vii) Variable Overhead Cost Variance

(viii) Fixed Overhead Cost Variance.

Ans

(i) Material Usage Variance = Std. Price (Std. Quantity – Actual Quantity)
= ₹ 90 (18,000 kg. – 17,800 kg.)
= ₹ 18,000 (Favourable)

(ii) Material Price Variance = Actual Quantity (Std. Price – Actual Price)
= 17,800 kg. (₹ 90 – ₹ 92) = ₹ 35,600 (Adverse)

(iii) Material Cost Variance = Std. Material Cost – Actual Material Cost
= (SQ × SP) – (AQ × AP)
= (18,000 kg. × ₹ 90) – (17,800 kg. × ₹ 92)
= ₹ 16,20,000 – ₹ 16,37,600
= ₹17,600 (Adverse)

(iv) Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)
= ₹ 100 (1,800 units × 8 – 14,000 hrs.)
= ₹ 100 (14,400 hrs. – 14,000 hrs.)
= ₹ 40,000 (Favourable)

(v) Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)
= 14,000 hrs. (₹ 100 – ₹104)
= ₹ 56,000 (Adverse)

(vi) Labour Cost Variance = Std. Labour Cost – Actual Labour Cost
= (SH × SR) – (AH × AR)
= (14,400 hrs. × ₹ 100) – (14,000 hrs. × ₹ 104)
= ₹ 14,40,000 – ₹ 14,56,000
= ₹16,000 (Adverse)

(vii) Variable Cost Variance = Std. Variable Cost – Actual Variable Cost
= (14,400 hrs. × ₹ 15) – ₹ 2,17,500
= ₹ 1,500 (Adverse)

(viii) Fixed Overhead Cost Variance = Absorbed Fixed Overhead – Actual Fixed Overhead
= (1,800 units × ₹400) - ₹ 7,68,000
= ₹ 7,20,000 – ₹ 7,68,000 = ₹ 48,000 (Adverse)

Q.103 Material, Labour, OH Variance | RTP Dec 21

BabyMoon Ltd. uses standard costing system in manufacturing one of its product 'Baby Cap'. The details are as follows:

Direct Material 1 Meter @ ₹ 60 per meter	₹ 60
Direct Labour 2 hour @ ₹ 20 per hour	₹ 40
Variable overhead 2 hour @ ₹ 10 per hour	₹ 20
Total	₹ 120

During the month of August, 10,000 units of 'Baby Cap' were manufactured. Details are as follows:

Direct material consumed	11,400 meters	@	₹ 58 per meter	
Direct labour Hours	?	@	?	₹ 4,48,800
Variable overhead incurred				₹ 2,24,400

Variable overhead efficiency variance is ₹ 4,000 A. Variable overheads are based on Direct Labour Hours.

You are required to CALCULATE the following Variances:

(a) Material Variances- Material Cost Variance, Material Price Variance and Material Usage Variance.

(b) Variable Overheads variances- Variable overhead Cost Variance, Variable overhead Efficiency Variance and Variable overhead Expenditure Variance.

(c) Labour variances- Labour Cost Variance, Labour Rate Variance and Labour Efficiency Variance.

Ans

(i) Material Variances

Budget			Std. for actual			Actual		
Quantity (Meter)	Price (₹)	Amount (₹)	Quantity (Meter)	Price (₹)	Amount (₹)	Quantity (Meter)	Price (₹)	Amount (₹)
1	60	60	10,000	60	6,00,000	11,400	58	6,61,200

Material Cost Variance = (SQ × SP – AQ × AP)

= 6,00,000 – 6,61,200 = ₹ 61,200 (A)

Material Price Variance = (SP – AP) AQ

= (60 - 58) 11,400 = ₹ 22,800 (F)

Material Usage Variance = (SQ – AQ) SP

= (10,000 – 11,400) 60 = ₹ 84,000 (A)

(ii) Variable Overheads variances Variable overhead cost Variance

= Standard variable overhead – Actual Variable Overhead

= (10,000 units × 2 hours × ₹ 10) – 2,24,400 = ₹ 24,400 (A)

Variable overhead Efficiency Variance

= (Standard Hours – Actual Hours) × Standard Rate per Hour

Let Actual Hours be 'X', then:

(20,000 – X) × 10 = 4,000 (A)

2,00,000 – 10X = - 4,000

X = 2,04,000 ÷ 10

Therefore, Actual Hours (X) = 20,400

Variable overhead Expenditure Variance

= Variable Overhead at Actual Hours - Actual Variable Overheads

= 20,400 × ₹ 10 – 2,24,400 = ₹ 20,400 (A)

(iii) Labour variances

Budget			Std. for actual			Actual		
Hours	Rate (₹)	Amount (₹)	Hours	Rate (₹)	Amount (₹)	Hours	Rate (₹)	Amount (₹)
2	20	40	20,000	20	4,00,000	20,400	22	4,48,800

*Actual Rate = ₹ 4,48,800 ÷ 20,400 hours = ₹ 22

Labour Cost Variance = (SH × SR) – (AH × AR)

= 4,00,000 – 4,48,800 = ₹ 48,800 (A)

Labour Rate Variance = (SR – AR) × AH

= (20 – 22) × 20,400 = ₹ 40,800 (A)

Labour Efficiency Variance = (SH – AH) × SR

= (20,000 – 20,400) × 20 = ₹ 8,000 (A)

Q.104 Labour Variance | PY May 19

A gang of workers normally consists of 30 skilled workers, 15 semi-skilled workers and 10 unskilled workers. They are paid at standard rate per hour as under:

Skilled ₹ 70
Semi-skilled ₹ 65
Unskilled ₹ 50

In a normal working week of 40 hours, the gang is expected to produce 2,000 units of output. During the week ended 31st March, 2019, the gang consisted of 40 skilled, 10 semi-skilled and 5 unskilled workers. The actual wages paid were at the rate of ₹ 75, ₹ 60 and ₹ 52 per hour respectively. Four hours were lost due to machine breakdown and 1,600 units were produced.

Calculate the following variances showing clearly adverse (A) or favourable (F)

(i) Labour Cost Variance (ii) Labour Rate Variance
(iii) Labour Efficiency Variance (iv) Labour Mix Variance
(v) Labour Idle Time Variance

Ans

(i) Labour Cost Variance = Standard Cost – Actual Cost
= ₹1,14,400 – ₹1,54,400
= 40,000 (A)
(1,600*75+400*60+200*52= ₹1,54,400)
Or

Types of workers	Standard Cost – Actual Cost	Amount (₹)
Skilled Workers	(30x40x70/2,000x1,600)- (40x40x75) 67,200-1,20,000	52,800 (A)
Semi- Skilled	(15x40x65/2,000x1,600)- (10x40x60) 31,200-24,000	7,200 (F)
Un-Skilled Workers	(10x40x50/2,000x1,600)- (5x40x52) 16,000-10,400	5,600 (F)
Total	1,14,400-1,54,400	**40,000 (A)**

(ii) Labour Rate Variance

Types of workers	Actual Hours × (Standard Rate - Actual Rate)	Amount (₹)
Skilled Workers	1,600 hours × (₹70.00 – ₹75.00)	8,000 (A)
Semi- Skilled	400 hours × (₹65.00 – ₹60.00)	2,000 (F)
Un-Skilled Workers	200 hours × (₹50.00 – ₹52.00)	400 (A)
Total	₹8,000 (A) + ₹2,000 (F) + ₹400 (A)	6,400 (A)

(iii) Labour Efficiency Variance

Types of workers	Standard Rate × (Standard Hours – Actual Hours)	Amount (₹)
Skilled Workers	₹70.00 × (960 hours – 1,440 hours)	33,600 (A)
Semi- Skilled	₹65.00 × (480 hours – 360 hours)	7,800 (F)
Un-Skilled Workers	₹50.00 × (320 hours – 180 hours)	7,000 (F)
Total	33,600 (A) + 7,800 (F) + 7,000 (F)	18,800 (A)

Alternatively labour efficiency can be calculated on basis of labour hours paid

Types of workers	Standard Rate × (Standard Hours – Actual Hours)	Amount (₹)
Skilled Workers	70.00 × (960 hours – 1600 hours)	44,800 (A)
Semi- Skilled	65.00 × (480 hours – 400 hours)	5,200 (F)
Un-Skilled Workers	50.00 × (320 hours – 200 hours)	6,000 (F)
Total	33,600 (A) + 7,800 (F) + 7,000 (F)	33,600 (A)

(iv) Labour Mix Variance

= Total Actual Time Worked (hours) × {Average Standard Rate per hour of Standard Gang Less Average Standard Rate per hour of Actual Gang}

@on the basis of hours worked

$$= 1{,}980 \text{ hours} \times \frac{1{,}14{,}400}{1{,}760 \text{ hrs.}} - \frac{1{,}440\text{hrs.} \times 70 + 360\text{hrs.} \times 65 + 180\text{hrs.} \times 50}{1{,}980 \text{ hrs}}$$

= ₹ 4,500 (A)

Or

Labour Mix Variance

Types of workers	Std. Rate x (Revised Actual Hours Worked- Actual Hours Worked)	Amount (₹)
Skilled Workers	₹70 × (1,080 hrs. – 1440 hrs.)	25,200 (A)
Semi- Skilled	₹65 × (540 hrs. – 360 hrs.)	11,700 (F)
Un Skilled Workers	₹50 × (360 hrs. – 180 hrs.)	9,000 (F)
Total	₹25,200 (A) + ₹11,700 (F) + ₹9,000 (F)	4,500 (A)

(v) Labour Idle Time Variance

Types of workers	Standard Rate × (Hours Paid – Hours Worked)	Amount (₹)
Skilled Workers	₹70.00 × (1,600 hours – 1,440 hours)	11,200 (A)
Semi- Skilled	₹65.00 × (400 hours – 360 hours)	2,600 (A)
Un-Skilled Workers	₹50.00 × (200 hours – 180 hours)	1,000 (A)
Total	11,200 (A) + 2,600 (A) + 1,000 (A)	14,800 (A)

Verification:

Labour Cost Variance

= Labour Rate Variance + Labour Efficiency Variance + Labour Idle Time Variance
= 6,400 (A) + 18,800 (A) + 14,800 (A) = ₹ 40,000 (A)
Labour Cost Variance
= Labour Rate Variance + Labour Efficiency Variance
= 6400(A) + 33600(A)= ₹40000(A)
In this case, labour idle time variance is a part of labour efficiency variance.
Working Notes:

Category	Standard Cost			Actual (1600 units)			Revised Actual Hours
	Hrs.	Rate	Amt. (₹)	Hrs.	Rate	Amt. (₹)	
Skilled	960	70.00	67,200	1,440		1,08,000	1,080
	(30Wx40x1,600/ 2, 000)			(40Wx36)	75.00		(1,980x6/11)
Semi-	480	65.00	31,200	360		21,600	540
Skilled	(15Wx40 x1,600/2,000)			(10Wx36)	60.00		(1,980x3/11)
Unskilled	320	50.00	16,000	180	52.00	9,360	360
	(10Wx40 x1,600/2,000)			(5Wx36)			(1,980x2/11)
Total	1,760	65	1,14,400	1,980		1,38,960	1,980

Q.105 Labour Variance | PY Jul 21

The standard output of a Product 'DJ' is 25 units per hour in manufacturing department of a Company employing 100 workers. In a 40 hours week, the department produced 960 units of product 'DJ' despite 5% of the time paid was lost due to an abnormal reason. The hourly wage rates actually paid were ₹ 6.20, ₹ 6.00 and ₹ 5.70 respectively to Group 'A' consisting 10 workers, Group 'B' consisting 30 workers and Group 'C' consisting 60 workers. The standard wage rate per labour is same for all the workers. Labour Efficiency Variance is given ₹ 240 (F).
You are required to compute:
(i) Total Labour Cost Variance.
(ii) Total Labour Rate Variance.
(iii) Total Labour Gang Variance.
(iv) Total Labour Yield Variance, and
(v) Total Labour Idle Time Variance

Ans

1. Calculation of Standard Man hours
When 100 workers work for 1 hour, the standard output is 25 units.

$$\text{Standard man hours per unit} = \frac{100 \text{ hours}}{25 \text{ units}} = 4 \text{ hours per unit}$$

2. Calculation of standard man hours for actual output:
= 960 units x 4 hours = 3,840 hours.
3. Calculation of actual cost

Type of Workers	No of Workers	Actual Hours Paid	Rate (₹)	Amount(₹)	Idle Hours (5% of hours paid)	Actual hours Worked
Group 'A'	10	400	6.2	2,480	20	380
Group 'B'	30	1,200	6	7,200	60	1,140
Group 'C'	60	2,400	5.7	13,680	120	2,280
	100	4,000		23,360	200	3,800

4. Calculation of Standard wage Rate:
Labour Efficiency Variance = 240F

(Standard hours for Actual production – Actual Hours) x SR = 240F
(3,840 – 3,800) x SR = 240
Standard Rate (SR) = ₹ 6 per hour

(i) Total Labour Cost Variance
= (Standard hours x Standard Rate) – (Actual Hours x Actual rate)
= (3,840 x 6) – 23,360 = 320A

(ii) Total Labour Rate Variance
= (Standard Rate – Actual Rate) x Actual Hours
Group 'A' = (6- 6.2) 400 = 80A
Group 'B' = (6- 6) 1,200 = 0
Group 'C' = (6 – 5.7) 2,400 = 720F
640F

(iii) Total Labour Gang Variance
= Total Actual Time Worked (hours) × {Average Standard Rate per hour of Standard Gang -Average Standard Rate per hour of Actual Gang@}
@ on the basis of hours worked

$$= 3,800 \times \left(6 \frac{3,840 \times 6}{3,800}\right)$$

= 0

(iv) Total Labour Yield Variance
= Average Standard Rate per hour of Standard Gang × {Total Standard Time (hours) - Total Actual Time worked (hours)}
= 6 x (3,840 – 3,800)
= 240F

(v) Total Labour idle time variance
= Total Idle hours x standard rate per hour
= 200 hours x 6
= 1,200A

Q.106 Labout, OH Variance | MTP Nov 18(1)

Z. Ltd. uses standard costing system in manufacturing of its single product 'M'. The standard cost per unit of M is as follows:

	Rs.
Direct Material – 2 metres @ Rs. 6 per metre	12.00
Direct labour- 1 hour @ Rs. 4.40 per hour	4.40
Variable overhead- 1 hour @ Rs. 3 per hour	3.00

During July, 2016, 6,000 units of M were produced and the related data are as under:
Direct material acquired- 19,000 metres @ Rs.5.70 per metre.

Material consumed – 12,670 metres.

Direct labour – ? hours @ Rs. ? per hour Rs. 27,950

Variable overheads incurred Rs. 20,475
The variable overhead efficiency variance is Rs. 1,500 adverse. Variable overheads are based on direct labour hours. There was no stock of the material in the beginning.
You are required to DETERMINE the missing figures and work out all the relevant variances.

Ans

Standard Costs

	Rs.
Direct materials (6,000 × Rs. 12)	72,000
Direct labour (6,000 × Rs. 4.40)	26,400
Variable overheads (6,000 × Rs. 3)	18,000
Total	1,16,400

Actual Cost

Direct Materials (12,670 × 5.70)	72,219
Direct wages	27,950
Variable overhead incurred	20,475
Total	1,20,644

Total Variance = SC- AC = 1,16,400 –1,20,644 = Rs. 4,244 (A)

Missing Figures

1. Actual Direct Labour Hours (DLH)

We can find out this through Variable overhead efficiency variance of Rs. 1,500 adverse

VOH Efficiency Variance= SR (SH – AH)

1,500 A	=	3(6,000 – AH)
-1,500	=	18,000 – 3 AH
3AH	=	18,000 + 1,500 = 19,500
AH = 19,500/3	=	6,500 Actual Hours i.e. Actual DLH.

Actual Labour Rate per hour = $\frac{\text{Rs. } 27,950}{6,500 \text{ DLH}}$ = Rs. 4.30

Relevant Variances:

1	Material Variances:	
	(a) MCV = SC – AC = 72,000 – 72,219 =	Rs. 219 (A)
	(b) MPV = AQ (SR – AR) = 12,670 (6 – 5.70) =	Rs. 3,801 (F)
	or = 19,000 (6 – 5.70) =	Rs. 5,700(F)
	(c) MUV = SR (SQ – AQ) = 6 (6,000 × 2 – 12,670)	
	= 6 (12,000 – 12,670) =	Rs. 4,020 (A)
2.	Labour Variances:	
	(a) LCV = SC – AC = 26,400 – 27,950 =	Rs. 1,550 (A)
	(b) LRV = AHP (SR – AR) = 6,500 (4.40 – 4.30) =	Rs. 650 (F)
	(c) LEV = SR (SH – AHP) = 4.40 (6,000 – 6,500) =	Rs. 2,200 (A)
3.	Variable Overhead Variances : (Output Basis)	
	(a) VOH Variance = SVO – AVO= 18,000 – 20,475	Rs. 2,475 (A)
	(b) Efficiency Variance = SR (SQ – AQ) (Note 1)	
	= 3 (6,500 – 6,000) =	Rs. 1,500 (A)
	(a) Expenditure Variance = (SVOSP – AVO) (Note 2)	
	= (19,500 – 20,475) =	Rs. 975 (A)

Note :

1. One unit of production in one hour. For 6,500 DLH, 6,500 units should have been produced (SQ). But AQ = 6,000 units. i.e. less than SQ. Hence, it is adverse variance of Rs. 1 ,500.

2. Standard Variable Overhead on Standard Production = 6,500 × 3 = Rs. 19,500

Q.107 OH Variance | PY Jan 21

Premier Industries has a small factory where 52 workers are employed on an average for 25 days a month and they work 8 hours per day. The normal down time is 15%. The firm has introduced standard costing for cost control. Its monthly budget for November, 2020 shows that the budgeted variable and fixed overhead are ₹ 1,06,080 and ₹ 2,21,000 respectively.

The firm reports the following details of actual performance for November, 2020, after the end of the month:

Actual hours worked	8,100 hrs.
Actual production expressed in standard hours	8,800 hrs.
Actual Variable Overheads	₹ 1,02,000
Actual Fixed Overheads	₹ 2,00,000

You are required to calculate:

(i) Variable Overhead Variances:
- (a) Variable overhead expenditure variance.
- (b) Variable overhead efficiency variance.

(ii) Fixed Overhead Variances:
- (a) Fixed overhead budget variance.
- (b) Fixed overhead capacity variance.
- (c) Fixed overhead efficiency variance.

(iii) Control Ratios:
- (a) Capacity ratio.
- (b) Efficiency ratio.
- (c) Activity ratio.

Ans

Calculation of budgeted hours

Budgeted hours = (52 x 25 x 8) x 85% = 8,840 hours

(i) Variable overheads variance

(a) Variable overhead expenditure variance

= Std. overhead for Actual hours – Actual variable Overhead

$$= \left(\frac{1,06,080}{8,840} x 8,100\right) - 1,02,000$$

= 4800 A

(b) Variable overhead efficiency variance

Std. rate per hour × (Std. hours for actual production – Actual hours)

$$= \frac{1,06,080}{8,840} (8,800 \text{ hours} - 8,100 \text{ hours})$$

= 8400 F

(ii) Fixed overhead variances

(a) Fixed overhead budget variance

= Budgeted overhead – Actual overhead

= ₹ 2,21,000 – ₹ 2,00,000

= 21,000 F

(b) Fixed overhead capacity variance

= Std rate x (Actual hours – budgeted hours)

$$= \frac{2,21,000}{8,840} \times (8,100 - 8,840)$$

(c) Fixed overhead efficiency variance

= Std rate x (Std hours for actual production – Actual hours)

$$= \frac{2,21,000}{8,840} \times (8,800 - 8,100)$$

= 17,500 F

(iii) Control Ratios

(a) Capacity Ratio

$$= \frac{\text{Actual hours}}{\text{Budgeted hours}} \times 100$$

$$= \frac{8,100}{8,840} \times 100 = 91.63\%$$

(b) Efficiency Ratio

$$= \frac{\text{Standard hours}}{\text{Actual hours}} \times 100$$

$$= \frac{8,800}{8,100} \times 100 = 108.64\%$$

(c) Activity Ratio

$$= \frac{\text{Standard hours}}{\text{Budgted hours}} \times 100$$

$$= \frac{8,800}{8,840} \times 100 = 99.55\%$$

Q.108 OH Variance | PY Dec 21

In a manufacturing company the standard units of production for the year were fixed at 1,20,000 units and overhead expenditures were estimated to be as follows:

Particulars	Amount (₹)
Fixed	12,00,000
Semi-variable (60% expenses are of fixed nature and 40% are ofvariable nature)	1,80,000
Variable	6,00,000

Actual production during the month of April, 2021 was 8,000 units. Each month has 20 working days. During the month there was one public holiday. The actual overheads were as follows:

Particulars	Amount (₹)
Fixed	1,10,000
Semi-variable (60% expenses are of fixed nature and 40% are of variable)	19,200
Variable	48,000

You are required to calculate the following variances for the month of April 2021:

i. Overhead Cost variance
ii. Fixed Overhead Cost variance
iii. Variable Overhead Cost variance
iv. Fixed Overhead Volume variance
v. Fixed Overhead Expenditure Variance
vi. Calendar Variance

Ans

Fixed Overheads = $\frac{\text{Budgeted FixedOverheads}}{\text{Budgeted Output}} = \frac{12,00,000}{1,20,000 \text{ units}}$	₹ 10

Fixed Overheads element in Semi-Variable Overheads i.e. 60% of ₹1,80,000	₹ 1,08,000
Fixed Overheads = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Output}} = \frac{1,08,000}{1,20,000 \text{ units}}$	₹ 0.90
Standard Rate of Absorption of Fixed Overheads *per unit* (₹10 + ₹0.90)	₹ 10.90
Fixed Overheads Absorbed on 8,000 units @ ₹ 10.90	₹ 87,200
Budgeted Variable Overheads	₹ 6,00,000
Add: Variable element in Semi-Variable Overheads 40% of ₹ 1,80,000	₹ 72,000
Total Budgeted Variable Overheads	₹ 6,72,000
Standard Variable Cost per unit = $\frac{\text{Budgeted Variable Overheads}}{\text{Budgeted Output}} = \frac{6,72,000}{1,20,000 \text{ units}}$	₹5.60
Standard Variable Overheads for 8,000 units @ ₹5.60	₹ 44,800
Budgeted Annual Fixed Overheads (₹ 12,00,000 + 60% of ₹ 1,80,000)	₹ 13,08,000
Possible Fixed Overheads = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Days}} \times \text{Actual Days} = \left[\frac{1,09,000}{20 \text{ Days}} \times 19 \text{Days}\right]$	₹ 1,03,550
Actual Fixed Overheads (₹1,10,000 + 60% of ₹ 19,200)	₹ 1,21,520
Actual Variable Overheads (₹48,000 + 40% of ₹19,200)	₹ 55,680

COMPUTATION OF VARIANCES

i. Overhead Cost Variance = Absorbed Overheads – Actual Overheads
= (₹ 87,200 + ₹ 44,800) – (₹ 1,21,520 + ₹ 55,680)
= ₹ 45,200 (A)

ii. Fixed Overhead Cost Variance= Absorbed Fixed Overheads – Actual Fixed Overheads
= ₹ 87,200 – ₹ 1,21,520
= ₹ 34,320 (A)

iii. Variable Overhead Cost Variance = Standard Variable Overheads for Production– Actual Variable Overheads
= ₹ 44,800 – ₹ 55,680
= ₹ 10,880 (A)

iv. Fixed Overhead Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads
= ₹ 87,200 – ₹1,09,000
= ₹ 21,800 (A)

v. Fixed Overhead Expenditure Variance = Budgeted Fixed Overheads – Actual Fixed Overheads
= ₹ 10.90 × 10,000 units – ₹ 1,21,520
= ₹ 12,520 (A)

vi. Calendar Variance = Possible Fixed Overheads – Budgeted Fixed Overheads
= ₹ 1,03,550 – ₹ 1,09,000
= ₹ 5,450 (A)

OR

Calendar Variance = (Actual days – Budgeted days) x Standard fixed overhead rate per day
Standard fixed overhead rate per day = 1308000/20*12 = ₹ 5450
Fixed Overhead Calendar Variance = (19-20) x 5450 = 5450(A)

Q.109 OH Variance | PY Nov 20

ABC Ltd. has furnished the following information regarding the overheads for the month of June 2020 :

(i)	Fixed Overhead Cost Variance	₹ 2,800 (Adverse)
(ii)	Fixed Overhead Volume Variance	₹ 2,000 (Adverse)
(iii)	Budgeted Hours for June, 2020	2,400 hours
(iv)	Budgeted Overheads for June,2020	₹ 12,000
(v)	Actual rate of recovery of overheads	₹ 8 Per Hour

From the above given information Calculate:

(1) Fixed Overhead Expenditure Variance

(2) Actual Overheads Incurred

(3) Actual Hours for Actual Production

(4) Fixed Overhead Capacity Variance

(5) Standard hours for Actual Production

(6) Fixed Overhead Efficiency Variance

Ans

(1) Fixed Overhead Expenditure Variance
= Budgeted Fixed Overheads – Actual Fixed Overheads
= ₹ 12,000 – ₹ 12,800 (as calculated below) = ₹ 800 (A)

(2) Fixed Overhead Cost Variance= Absorbed Fixed Overheads – Actual Fixed Overheads
2,800 (A) = ₹ 10,000 – Actual Overheads
Actual Overheads = ₹ 12,800

(3) Actual Hours for Actual Production = ₹ 12,800/ ₹8 = 1,600 hrs.

(4) Fixed Overhead capacity Variance
= Budgeted Fixed Overheads for Actual Hours– Budgeted Fixed Overheads
= ₹ 5 x 1600 hrs. – ₹ 12,000 = ₹ 4,000 (A)

(5) Standard Hours for Actual Production
= Absorbed Overheads/ Std. Rate
= ₹ 10,000/ ₹ 5 = 2,000 hrs.

(6) Fixed Overhead Efficiency Variance
= Absorbed Fixed Overheads – Budgeted Fixed Overheads for Actual Hours
= ₹ 10,000 – ₹ 5 x 1,600 hrs. = ₹ 2,000 (F)

Working Note:

(i)	Fixed Overhead Volume Variance	= Absorbed Fixed Overheads – Budgeted Fixed Overheads
	2,000 (A)	= Absorbed Fixed Overheads – ₹12,000
	Absorbed Fixed Overheads	= ₹ 10,000
(ii)	Standard Rate/ Hour	= ₹ 5 (₹ 12,000/2,400 hrs.)
	Cost per unit of spare (c)	= ₹ 50
	Carrying cost per unit (i × c)	= ₹ 50 × 12.5% = ₹ 6.25

Q.110 OH Variance | MTP May 22(1)

Following are the details given:

Budgeted Days	25
Budgeted Fixed Overheads	1,00,000

Budgeted Production	800 units per day
Actual Production	21,000 units
Fixed Overheads are absorbed @ ₹ 10 per hour.	
Fixed overheads efficiency variance	10,000A
Fixed overheads calendar variance	8,000F
Fixed overheads cost variance	15,000A

You are required to CALCULATE:

(a) Actual Fixed Overheads
(b) Actual Days
(c) Actual Hours
(d) Fixed overheads Expenditure variance
(e) Fixed overheads volume variance
(f) Fixed overheads capacity variance

Ans

(i) Fixed Overhead Cost Variance = (Std Fixed Overheads – Actual Fixed Overheads)

$$=\left(\frac{1,00,000}{20,000} \times 21,000 \text{ units} - \text{Actual Fixed Overheads}\right) = 15,000A$$

$$= (1,05,000 - \text{Actual Fixed Overheads}) = 15,000A$$

$$= \text{Actual Fixed Overheads} = 1,20,000$$

(ii) Fixed Overhead Calendar Variance = (Actual Days – Budgeted Days) x Budgeted rate per day

$$= (\text{Actual Days} - 25) \times \frac{1,00,000}{25} = 8,000F$$

$$= (\text{Actual Days} - 25) = 2$$

$$= \text{Actual Days} = 27$$

(iii) Fixed Overhead Efficiency Variance = (Standard Hours for Actual Production – Actual Hours) x Budgeted rate per hour

$$= \left(\frac{10,000}{20,000} \times 21,000 - \text{Actual Hours}\right) \times 10 = 10,000A$$

$$= (10,500 - \text{Actual Hours}) = -1,000$$

$$= \text{Actual Hours} = 11,500$$

(iv) Fixed overheads Expenditure variance = (Budgeted Fixed Overheads – Actual Fixed Overheads)

$$= (1,00,000 - 1,20,000) = 20,000A$$

(v) Fixed overheads volume variance = (Budgeted units – Actual Units) x Budgeted Rate per unit

$$= (20,000 - 21,000) \times \frac{1,00,000}{20,000} = 5,000F$$

(vi) Fixed overheads capacity variance = (Budgeted Hours for Actual Days – Actual Hours) x Budgeted Rate per Hour.

$$= \left(\frac{10,000}{25} \times 27 - 11,500\right) \times 10 = 7,000F$$

JOINT & BY PRODUCT

Q.111 Allocate Cost | PY May 19

A Factory is engaged in the production of chemical Bomex and in the course of its manufacture a by-product Cromex is produced which after further processing has a commercial value. For the month of April 2019 the following are the summarised cost data:

	Joint Expenses (₹)	Separate Expenses (₹)	
		Bomex	Cromex
Materials	1,00,000	6,000	4,000
Labour	50,000	20,000	18,000
Overheads	30,000	10,000	6,000
Selling Price per unit		100	40
Estimated profit per unit on sale of Cromex			5
Number of units produced		2,000 units	2,000 units

The factory uses net realisable value method for apportionment of joint cost to by-products.
You are required to prepare statements showing :
(i) Joint cost allocable to Cromex
(ii) Product wise and overall profitability of the factory for April 2019.

Ans. **(i) Statement Showing Joint Cost Allocation to 'Cromex'**

Particulars	**Cromex (₹)**
Sales (₹ 40 × 2,000 units)	80,000
Less: Post Split Off Costs (4,000+18,000+6,000)	(28,000)
Less: Estimated Profit (₹ 5 × 2,000 units)	(10,000)
Joint cost allocable	**42,000**

(ii) Statement Showing Product Wise and Overall Profitability

Particulars	**Bomex (₹)**	**Cromex (₹)**	**Total (₹)**
Sales	2,00,000	80,000	2,80,000
Less: Share in Joint Expenses	**(1,38,000)***	(42,000)	(1,80,000)
Less: Post Split Off Costs	(36,000)	(28,000)	(64,000)
Profit	**26,000**	**10,000**	**36,000**

(*) 1,80,000 – 42,000

Q.112 Allocate Cost | PY Nov 19

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

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

Fixed Overheads ₹ 32,000
Sales: A- 100 units@ ₹ 600 per unit; B – 120 units @ ₹ 200 per unit.
I. Apportion joints costs on the basis of:
(i) Physical Quantity of eac h product.
(ii) Contribution Margin method, and
II. Determine Profit or Loss under both the methods.

Ans.

Total Joint Cost

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

Apportionment of Joint Costs:

			Product-A	Product-B
I.	(i)	Apportionment of Joint Cost on the basis of 'Physical Quantity'	**₹ 38,000** $\left(\frac{83600}{100+120units} x100\right)$	**₹ 45,600** $\left(\frac{83600}{100+120units} x120\right)$
	(ii)	Apportionment of Joint Cost on the basis of 'Contribution Margin Method':		
		- Variable Costs (on basis of physical units)	**₹ 23,455** $\left(\frac{51600}{100+120units} x100\right)$	**₹ 28,145** $\left(\frac{51600}{100+120units} x120\right)$
		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	₹ 55,455	₹ 28,145

	Margin Method'		
A-C	**Profit or (Loss)**	₹ 4,545	₹ (4,145)

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

Q.113 Allocate Cost | PY May 23

Product 'X' that passes through three processes: R, S and T. Three types of raw materials, viz., J, K, and L are used in the ratio of 40:40:20 in process R. The output of each process is transferred to next process. Process loss is 10% of total input in each process. At the stage of output in process T, a by-product 'Z' is emerging and the ratio of the main product 'X' to the by-product 'Z' is 80:20. The selling price of product 'X' is ₹60 per kg.The company produced 14,580 kgs of product 'X'

Material price : Material J @ ₹ 15 per kg;
Material K @ ₹ 9 per kg. Material L@ ₹ 7 per kg Process costs are as follows:

Process	Variable cost per kg (₹)	Fixed cost of Input (₹)
R	5.00	42,000
S	4.50	5,000
T	3.40	4,800

The by-product 'Z' cannot be processed further and can be sold at ₹ 30 per kg at the split- off stage. There is no realizable value of process losses at any stage.

Required:

Present a statement showing the apportionment of joint costs on the basis of the sales value of product 'X' and by-product 'Z' at the split- off point and the profitability of product 'X' and by-product 'Z.

Ans.

Working Notes:

1. **Calculation of Input of Raw Material**

Let assume total raw material in Process R be 100%

∴ Output of Process T will be equal to:

Input R	100%
- 10% Normal Loss	₹ 10
Input S	₹ 90%
- 10% Normal loss	₹ 9
Input T	81%
- 10% Normal loss	₹ 8.1
Output of T	72.9
Actual output of X	14,580 units

Which is 80% of the total output

∴ Output of Process T

$= \frac{14580}{80\%} = 18,225$

∴ Input of Process R $= \frac{18225}{72.9\%} = 25,000$ kgs

Alternative presentation for Calculation of Input in Process R, S and T Working notes:

Process T (Kg.)			
To Input (Transfer from process S)	20,250	By Normal loss	2,025
		By Output Product X	14,580

		By output of by-product Z	3,645
	20,250		20,250

Process S (kg.)			
To Input (Transfer from process S)	22,500	By Normal loss (10%)	2,250
		By Transfer to process T	20,250
	22,500		22,500

Process R (kg.)			
To Input	25,000	By Normal loss (10%)	2,500
		By Transfer to process S	22,500
	25,000		25,000

2. Calculation of Joint Cost

Process	Inputs	Variable cost per kg	Variable cost	Fixed Cost	Total Cost
		₹	₹	₹	₹
R	25,000	5	1,25,000	42,000	1,67,000
S	22,500	4.5	1,01,250	5,000	1,06,250
T	20,250	3.4	68,850	4,800	73,650
					3,46,900

Raw material	J	10000 x 15	₹ 1,50,000
	K	10000 x 9	₹ 90,000
	L	5000 x 7	₹ 35,000
			2,75,000
Add: Processing cost (as above)			₹ 3,46,900
Total Joint Cost			6,21,900

(i) Statement showing apportionment of Joint Cost

Particulars	Product X	By-Product Z	Total
Units	14,580	3,645	
Selling price (₹)	60	30	
Sales Value (₹)	8,74,800	1,09,350	9,84,150
(₹ 6,21,900 to apportioned in ratio of sales value at split off point)	5,52,800	69,100	6,21,900

(ii) Statement of Profitability

Particulars	Product X	By-Product Z	Total
Sales Value	8,74,800	1,09,350	9,84,150
Joint Cost (As apportioned above)	(5,52,800)	(69,100)	(6,21,900)
Profit	3,22,000	40,250	3,62,250

Q.114 Allocate cost | PY Nov 20

A company's plant processes 6,750 units of a raw material in a month to produce two products 'M' and 'N'.
The process yield is as under:
Product M 80%
Product N 12%
Process Loss 8%
The cost of raw material is ₹ 80 per unit.
Processing cost is ₹ 2,25,000 of which labour cost is accounted for 66%. Labour is chargeable to products 'M' and 'N' in the ratio of 100:80.
Prepare a Comprehensive Cost Statement for each product showing:
(i) Apportionment of joint cost among products 'M' and 'N' and
(ii) Total cost of the products 'M' and 'N'.

Ans. **Comprehensive Cost Statement**

Particulars	Total Cost (₹)	Product-M (₹)	Product-N (₹)
No. of units produced *		5,400 units	810 units
Cost of raw material (₹ 80 × 6,750 units)	5,40,000		
Processing cost:			
- Labour cost (₹ 2,25,000 × 66%)	1,48,500		
- Other costs (₹ 2,25,000 - 1,48,500)	76,500		
Total joint cost	**7,65,000**		
(i) Apportionment of joint costs between the joint products			
Labour cost in the ratio of 100:80	1,48,500	**82,500** $\left(\frac{148500\times100}{180}\right)$	**66,000** $\left(\frac{148500\times80}{180}\right)$
Other joint costs (including material) in the ratio of output (5,400:810)	6,16,500	**5,36,087** $\left(\frac{616500\times5400}{6210}\right)$	**80,413** $\left(\frac{616500\times810}{6210}\right)$
(ii) Total product cost	7,65,000	**6,18,587**	**1,46,413**

No. of units produced of Product M = 6750 units x 80% = 5400 units
No. of units produced of Product N = 6750 units x 12% = 810 units

Q.115 Allocate Cost & Further Process | RTP May 18

A company processes a raw material in its Department 1 to produce three products, viz. A, B and X at the same split-off stage. During a period 1,80,000 kgs of raw materials were processed in Department 1 at a total cost of ₹ 12,88,000 and the resultant output of A, B and X were 18,000 kgs, 10,000 kgs and 54,000 kgs respectively. A and B were further processed in Department 2 at a cost of ₹ 1,80,000 and ₹ 1,50,000 respectively.
X was further processed in Department 3 at a cost of ₹1,08,000. There is no waste in further processing. The details of sales affected during the period were as under:

	A	B	X
Quantity Sold (kgs.)	17,000	5,000	44,000
Sales Value (₹)	12,24,000	2,50,000	7,92,000

There were no opening stocks. If these products were sold at split-off stage, the selling prices of A, B and X would have been ₹ 50, ₹ 40 and ₹ 10 per kg respectively.

Required:

(i) PREPARE a statement showing the apportionment of joint costs to A, B and X.

(ii) PREPARE a statement showing the cost per kg of each product indicating joint cost and further processing cost and total cost separately.

(iii) PREPARE a statement showing the product wise and total profit for the period.

(iv) DECIDE with supporting calculations as to whether any or all the products should be further processed or not

Ans. (i) **Statement showing the apportionment of joint costs to A, B and X**

Products	A	B	X	Total
Output (kg)	18,000	10,000	54,000	
Sales value at the point of split off (₹)	9,00,000 (₹ 50 x 18,000)	4,00,000 (₹ 40 x 10,000)	5,40,000 (₹ 10 x 54,000)	18,40,000
Joint cost apportionment on the basis of sales value at the point of split off (₹)	6,30,000 $\left(\frac{1288000}{1840000} \times 900000\right)$	2,80,000 $\left(\frac{1288000}{1840000} \times 400000\right)$	3,78,000 $\left(\frac{1288000}{1840000} \times 540000\right)$	12,88,000

(ii) Statement showing the cost per kg. of each product (indicating joint cost; further processing cost and total cost separately)

Products	A	B	X
Joint costs apportioned (₹) : (I)	6,30,000	2,80,000	3,78,000
Production (kg) : (II)	18,000	10,000	54,000
Joint cost per kg (₹): (I ÷ II)	35	28	7
Further processing Cost per kg. (₹)	10 $\left(\frac{180000}{18000\ kg}\right)$	15 $\left(\frac{150000}{10000\ kg}\right)$	2 $\left(\frac{108000}{54000\ kg}\right)$
Total cost per kg (₹)	45	43	9

(iii) Statement showing the product wise and total profit for the period

Products	A	B	X	Total
Sales value (₹)	12,24,000	2,50,000	7,92,000	
Add: Closing stock value (₹) (Refer to Working note 2)	45,000	2,15,000	90,000	
Value of production (₹)	12,69,000	4,65,000	8,82,000	26,16,000
Apportionment of joint cost (₹)	6,30,000	2,80,000	3,78,000	
Add: Further processing cost (₹)	1,80,000	1,50,000	1,08,000	
Total cost (₹)	8,10,000	4,30,000	4,86,000	17,26,000
Profit (₹)	4,59,000	35,000	3,96,000	8,90,000

Working Notes

1.

Products	A	B	X

Sales value (₹)	12,24,000	2,50,000	7,92,000
Quantity sold (Kgs.)	17,000	5,000	44,000
Selling price ₹/kg	72 $\left(\frac{1224000}{17000\ kg}\right)$	50 $\left(\frac{250000}{5000\ kg}\right)$	18 $\left(\frac{792000}{44000\ kg}\right)$

2. Valuation of closing stock:
Since the selling price per kg of products A, B and X is more than their total costs, therefore closing stock will be valued at cost.

Products	A	B	X	Total
Closing stock (kgs.)	1,000	5,000	10,000	
Cost per kg (₹)	45	43	9	
Closing stock value(₹)	45,000 (₹ 45 x 1,000 kg)	2,15,000 (₹ 43 x 5,000 kg)	90,000 (₹9x10,000 kg)	3,50,00

(iv) Calculations for processing decision

Products	A	B	X
Selling price per kg at the point of split off (₹)	50	40	10
Selling price per kg after further processing (₹) (Refer to working Note 1)	72	50	18
Incremental selling price per kg (₹)	22	10	8
Less: Further processing cost per kg (₹)	(10)	(15)	(2)
Incremental profit (loss) per kg (₹)	12	(5)	6

Product A and X has an incremental profit per unit after further processing, hence, these two products may be further processed. However, further processing of product B is not profitable hence, product B shall be sold at split off point.

Q.116 Further Processing | RTP May 23

Key Pee Limited produces and sells the following products:

Products	Units	Selling price at split-off point (₹)	Selling price after further processing (₹)
A	500000	42.5	62.5
B	75000	32.5	42.5
C	62500	20	30
D	50000	25	-
E	187500	35	50

Cost of raw material ₹ 89,75,000 and other manufacturing ex-penses cost ₹13,67,500 in the manufacturing process which are absorbed on the products on the basis of their 'Net realisable value'. The further processing costs of A, B, C and E are ₹31,25,000; ₹ 3,75,000; ₹1,25,000 and ₹3,75,000 respectively. Fixed costs are ₹11,82,500.
You are required to PREPARE the following in respect of the coming year:
(a) Statement showing income forecast of the company assuming that none of its products are to be further processed.

(b) Statement showing income forecast of the company assuming that products A, B, C and E are to be processed further.

Ans.

Working Note:

Apportionment of joint costs on the basis of Net Realisable Value method

Products	Sales Value (₹)	Post separation Cost (₹)	Net Realisable Value (₹)	Apportioned Cost (₹)
A	3,12,50,000 (5,00,000 units x ₹ 62.50)	31,25,000	2,81,25,000	67,74,563
B	31,87,500 (75,000 units x ₹ 42.5)	3,75,000	28,12,500	6,77,456
C	18,75,000 (62,500 units x ₹ 30)	1,25,000	17,50,000	4,21,528
D	12,50,000 (50,000 units x ₹ 25)	---	12,50,000	3,01,092
E	93,75,000 (1,87,500 units x ₹ 50)	3,75,000	90,00,000	21,67,860
			4,29,37,500	1,03,42,500

Total joint cost =Raw material costs + Manufacturing expenses = ₹89,75,000 + ₹13,67,500 = ₹1,03,42,500

Apportioned joint cost = (Total Joint Cost/ Total Net Realisable value of each X Net Realisable value of each product)

Apportioned joint cost for Product A = (1,03,42,500 / 4,29,37,500 X 2,81,25,000) = ₹67,74,563.32

Similarly, the apportioned joint cost for products B, C, D and E are ₹6,77,456, ₹4,21,528, ₹3,01,092 and ₹21,67,860 respectively.

(a) Statement showing income forecast of the company assum-ing that none of its products are further processed.

	Products					
	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)	Total (₹)
Sales revenue	2,12,50,000 (₹42.5 × 5,00,000)	24,37,500 (₹ 32.5 × 75,000)	12,50,000 (₹ 20 × 62,500)	12,50,000 (₹ 25 × 50,000)	65,62,500 (₹ 35 × 1,87,500)	3,27,50,000
Less: Apportioned Costs (Refer Working note)	67,74,563	6,77,456	4,21,528	3,01,092	21,67,860	1,03,42,500
	1,44,75,437	17,60,044	8,28,472	9,48,908	43,94,640	2,24,07,500
Less: Fixed Cost						11,82,500
Profit						2,12,25,000

(b) Statement showing income forecast of the company: assuming that products A, B, C and E are further processed (Refer to working note)

	Products					
	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)	Total (₹)
A. Sales revenue	3,12,50,000	31,87,500	18,75,000	12,50,000	93,75,000	4,69,37,500
B. Apportioned Costs	67,74,563	6,77,456	4,21,528	3,01,092	21,67,860	1,03,42,500
C. Further processing cost	31,25,000	3,75,000	1,25,000	-	3,75,000	40,00,000
D. Total processing cost (B+ C)	98,99,563	10,52,456	5,46,528	3,01,092	25,42,860	1,43,42,500
E. Excess of sales revenue (A-D)	2,13,50,437	21,35,044	13,28,472	9,48,908	68,32,140	3,25,95,000
F. Fixed Cost						11,82,500
G. Profit (E - F)						3,14,12,500

Q.117 Further Processing | MTP May 18

SV chemicals Limited processes 9,00,000 kgs. of raw material in a month purchased at ₹ 95 per kg in department X. The input output ratio of department X is 100 : 90. Processing of the material results in two joint products being produced 'P1' and 'P2' in the ratio of 60 : 40. Product 'P1' can be sold at split off stage or can be further processed in department Y and sold as a new product 'YP1'. The input output ratio of department Y is 100 : 95. Department Y is utilized only for further processing of product 'P1' to product 'YP1'. Individual departmental expenses are as follows:

	Dept. X (₹ lakhs)	Dept. Y (₹ lakhs)
Direct Materials	95.00	14.00
Direct Wages	80.00	27.00
Variable Overheads	100.00	35.00
Fixed Overheads	75.00	52.00
Total	350.00	128.00

Further, selling expenses to be incurred on three products are:

Particulars	Amount (₹ in lakhs)
Product 'P1'	28.38
Product 'P2'	25.00
Product 'YP1'	19.00

Selling price of the products 'P1' and 'P2' at split off point is ₹ 110 per kg and ₹ 325 per kg respectively. Selling price of new product 'YP1' is ₹ 150 per kg.

You are required to:

(i) PREPARE a statement showing apportionment of joint costs, in the ratio of value of sales, net of selling expenses.

(ii) PREPARE a Statement showing profitability at split off point.

(iii) PREPARE a Statement of profitability of 'YP1'.

(iv) DETERMINE that would you recommend further processing of P1?

Ans.

Working Notes:

Input output ratio of material processed in Department X = 100:90

Particulars	Quantity (Kg)
Material input	9,00,000
Less: Loss of material in process @ 10% of 9,00,000 kgs	(90,000)
Output	8,10,000

Output of department X is product 'P1' and 'P2' in the ratio of 60 : 40.

Output 'P1' = $\frac{60 \times 810000}{100}$ = 4,86,000 kgs.

Output 'P2' = $\frac{40 \times 810000}{100}$ = 3,24,000 kgs.

Statement showing ratio of net sales

Product	P1	P2	Total
Quantity (kgs)	4,86,000	3,24,000	8,10,000
Selling price per kg (₹)	110.00	325.00	
Sales Value (₹ in lakhs)	534.60	1,053.00	1587.60
Less: Selling Expenses (₹ in lakhs)	(28.38)	(25.00)	(53.38)
Net Sales (₹ in lakhs)	506.22	1,028.00	1,534.22
Ratio	33%	67%	100.00

Computation of Joint Costs

Particulars	Amount (₹ Lakhs)
Raw Material input 9,00,000 kgs @ ₹ 95 per kg	855.00
Direct Materials	95.00
Direct Wages	80.00
Variable Overheads	100.00
Fixed Overheads	75.00
Total	1,205.00

(i) Statement showing apportionment of joint costs in the ratio of net sales

Particulars	Amount (₹ in lakhs)
Joint cost of P1 – 33% of ₹ 1,205 lakhs	397.65
Joint cost of P2 – 67% of ₹ 1,205 lakhs	807.35
Total	1,205.00

(ii) Statement showing profitability at split off point

Product	P1	P2	Total
Net Sales Value (₹ in lakhs) – [A]	506.22	1,028.00	1,534.22
Less: Joint costs (₹ in lakhs)	(397.65)	(807.35)	(1,205.00)
Profit (₹ in lakhs) [A] – [B]	108.57	220.65	329.22

Alternative Presentation

Product	P1	P2	Total
Sales Value (₹ in lakhs) – [A]	534.60	1,053.00	1,587.60

Less: Joint costs (₹ in lakhs)	397.65	807.35	1,205.00
Selling Expenses	28.38	25.00	53.38
Total Cost [B]	426.03	832.35	1,258.38
Profit (₹ in lakhs) [A] – [B]	108.57	220.65	329.22

(iii) Statement of profitability of product 'YP1'

Particulars		YP1
Sales Value (₹ in lakhs) (Refer working note) [A]		629.55
Less: Cost of P1	397.65	
Cost of Department Y	128.00	
Selling Expenses of Product 'YP1'	19.00	
Total Costs [B]		544.65
Profit (₹ in lakhs) [A] – [B]		84.90

Working Note:
Computation of product 'YP1'
Quantity of product P1 input used = 4,86,000 kgs
Input output ratio of material processed in Department Y = 100 : 95

Particulars	Quantity (Kg)
Material input	4,86,000
Less: Loss of material in process @ 5% of 4,86,000	(24,300)
Output	4,61,700

Sales Value of YP1 = 4,61,700 kgs @ ₹ 150 per kg = ₹ 692.55 lakhs

(iv) Determination of profitability after further processing of product P1 into product YP1:

Particulars	(₹ in lakhs)
Profit of Product 'P1' {refer (ii) above}	108.57
Profit of Product 'YP1'{refer (iii) above}	84.90
Decrease in profit after further processing	23.67

Based on the above profitability statement, further processing of product P1 into YP1 should not be recommended.

Q.118 Further Processing | MTP Nov 19

In an Oil Mill, four products emerge from a refining process. The total cost of input during the quarter ending March 2019 is Rs.22,20,000. The output, sales and additional processing costs are as under:

Products	Output in Litres	Additional processing cost after split off (Rs.)	Sales value (Rs.)
A	8,000	6,45,000	25,87,500
B	4,000	1,35,000	2,25,000
C	2,000	–	90,000
D	4,000	22,500	6,75,000

In case these products were disposed-off at the split off point that is before further processing, the selling price

per litre would have been:

A (Rs.)	B (Rs.)	C (Rs.)	D (Rs.)
225.00	90.00	45.00	112.50

PREPARE a statement of profitability based on:

(i) If the products are sold after further processing is carried out in the mill.

(ii) If they are sold at the split off point.

Ans.

(i) Statement of profitability of an Oil Mill (after carrying out further processing) for the quarter ending 31st March 2019.

Products	Sales Value after further processing	Share of Joint cost	Additional processing cost	Total cost after processing	Profit (loss)
A	25,87,500	14,80,000	6,45,000	21,25,000	4,62,500
B	2,25,000	2,96,000	1,35,000	4,31,000	(2,06,000)
C	90,000	74,000	–	74,000	16,000
D	6,75,000	3,70,000	22,500	3,92,500	2,82,500
	35,77,500	22,20,000	8,02,500	30,22,500	5,55,000

(ii) Statement of profitability at the split off point

Products	Selling price of split off	Output in units	Sales value at split off point	Share of joint cost	Profit at split off point
A	225.00	8,000	18,00,000	14,80,000	3,20,000
B	90.00	4,000	3,60,000	2,96,000	64,000
C	45.00	2,000	90,000	74,000	16,000
D	112.50	4,000	4,50,000	3,70,000	80,000
			27,00,000	22,20,000	4,80,000

Note: Share of Joint Cost has been arrived at by considering the sales value at split off point.

Q.119 Joint Product Cost | MTP Nov 22(1)

A manufacturing process yields the following products out of the raw materials introduced in the process:

Main Product X 60% of Raw Materials

By-Product Y 15% of Raw Materials

By Product Z 20% of Raw Materials

Wastage 5% of Raw Materials

Other information is as follows:

a. Total Cost: Raw Materials 1,000 units of ₹ 9,200; Labour ₹ 8,200; Overheads ₹ 12,000

b. One unit of product z requires ½ the raw materials required for one unit of product Y, one unit of product X requires1½ times the raw materials required for product Y.

c. Product X required double the time needed for production of one unit of Y and one unit of Z.

d. Product Z requires ½ the time required for the production of one unit of product Y.

e. Overheads are to be apportioned in the ratio of 6:1:1.

You are required to CALCULATE the total and per unit of cost of each of the products.

Ans. **Statement of Distribution of Costs**

Cost Elements	Basis	Total Cost	Main Product X (600 Units)		By-Product Y (150 Units)		By-Product Z (200 Units)	
			Total	Per Unit	Total	Per Unit	Total	Per Unit
Raw Materials	18:3:2	9,200	7,200	12	1,200	8	800	4
Labour	36:3:2	8,200	7,200	12	600	4	400	2
Overheads	6:1:1	12,000	9,000	15	1,500	10	1,500	7.50
Total		**29,400**	**23,400**	**39**	**3,300**	**22**	**2,700**	**13.50**

Working Notes:

1. **Calculation of Units produced:**

Main Product X	60% of Raw Materials	600 Units
By-Product Y	15% of Raw Materials	150 Units
By Product Z	20% of Raw Materials	200 Units
Wastage	5% of Raw Materials	50 Units
		1000 Units

2. **Cost Allocation**

Raw Materials

Let Product Z requires 1 unit of raw materials then, Product Y will require 2 units of raw materials and Product X will require 3 units of raw materials.

Product	X		Y		Z
Individual Unit ratio (a)	3	:	2	:	1
Units (b)	600		150		200
Ratio for Cost Allocation (a*b)	1800	:	300	:	200
Ratio	18	:	3	:	2

Labour:

Let Product Z requires 1 hour of Labour then, Product Y will require 2 hours of Labour and Product X will require 6 hours of Labour.

Product	X		Y		Z
Individual hour ratio (a)	6	:	2	:	1
Units (b)	600		150		200
Ratio for Cost Allocation (a*b)	3600	:	300	:	200
Ratio	36	:	3	:	2

Q.120 NRV Method to apportion cost | MTP Nov 20

'Buttery Butter' is engaged in the production of Buttermilk, Butter and Ghee. It purchases processed cream and let it through the process of churning until it separates into buttermilk and butter. For the month of January, 2020, 'Buttery Butter' purchased 50 Kilolitre processed cream @ ₹ 100 per 1000 ml. Conversion cost of ₹ 1,00,000 were incurred up-to the split off point, where two saleable products were produced i.e. buttermilk and butter. Butter can be further processed into Ghee.

The January, 2020 production and sales information is as follows:

Products	Production (in Kilolitre/tonne)	Sales Quantity (in Kilolitre/tonne)	Selling price per Litre/Kg (₹)
Buttermilk	28	28	30
Butter	20	—	—
Ghee	16	16	480

All 20 tonne of butter were further processed at an incremental cost of ₹ 1,20,000 to yield 16 Kilolitre of Ghee. There was no opening or closing inventories of buttermilk, butter or ghee in January, 2020.

Required:

(i) SHOW how joint cost would be apportioned between Buttermilk and Butter under Estimated Net Realisable Value method.

(ii) 'Healthy Bones' offers to purchase 20 tonne of butter in February at ₹ 360 per kg. In case 'Buttery Butter' accepts this offer, no Ghee would be produced in February. SUGGEST whether 'Buttery Butter' shall accept the offer affecting its operating income or further process butter to make Ghee itself?

Ans. **(i) Estimated Net Realisable Value Method:**

	Buttermilk Amount (₹)	Butter Amount (₹)
Sales Value	8,40,000 (₹ 30 × 28 × 1000)	76,80,000 (₹ 480 × 16 × 1000)
Less: Post split-off cost (Further processing cost)	-	(1,20,000)
Net Realisable Value	8,40,000	75,60,000
Apportionment of Joint Cost of ₹ 51,00,000* in ratio of 1:9	5,10,000	45,90,000

*** [(₹ 100 × 50 × 1000) + ₹ 1,00,000] = ₹ 51,00,000**

(ii) Incremental revenue from further processing of Butter into Ghee

(₹ 480 × 16 × 1000 - ₹ 360 × 20 × 1000)	₹ 4,80,000
Less: Incremental cost of further processingof Butter into Ghee	₹ 1,20,000
Incremental operating income from further processing	₹ 3,60,000

The operating income of 'Buttery Butter' will be reduced by ₹ 3,60,000 in February if it sells 20 tonne of Butter to 'Healthy Bones', instead of further processing of Butter into Ghee for sale. Thus, 'Buttery Butter' is advised not to accept the offer and further process butter to make Ghee itself.

Q.121 NRV Method to apportion | MTP May 23(2)

ABC Ltd. operates a simple chemical process to convert a single material into three separate items, referred to here as X, Y and Z. All three end products are separated simultaneously at a single split-off point.

Product X and Y are ready for sale immediately upon split off without further processing or any other additional costs. Product Z, however, is processed further before being sold. There is no available market price for Z at the split-off point.

The selling prices quoted here are expected to remain the same in the coming year. During 2022-23, the selling prices of the items and the total amounts sold were:

X – 186 tons sold for ₹3,000 per ton

Y – 527 tons sold for ₹2,250 per ton

Z – 736 tons sold for ₹1,500 per ton

The total joint manufacturing costs for the year were ₹12,50,000. An additional ₹6,20,000 was spent to finish product Z.

There were no opening inventories of X, Y or Z at the end of the year. The following inventories of complete units were on hand:

X 180 tons

Y 60 Tons

Z 25 tons

There was no opening or closing work-in-progress.

Required:

COMPUTE the cost of inventories of X, Y and Z and cost of goods sold for year ended March 31, 2023, using Net realizable value (NRV) method of joint cost allocation.

Ans. **Statement of Joint Cost allocation of inventories of X, Y and Z**
(By using Net Realisable Value Method)

	Products			Total
	X	Y	Z	
	(₹)	(₹)	(₹)	(₹)
Final sales value of total production (Working Note 1)	10,98,000 (366 × ₹3,000)	13,20,750 (587 × ₹2,250)	11,41,500 (761 × ₹1,500)	35,60,250
Less: Additional cost	--	--	(6,20,000)	(6,20,000)
Net realisable value (at split-off point)	10,98,000	13,20,750	5,21,500	29,40,250
Joint cost allocated (Working Note 2)	4,66,797	5,61,496	2,21,707	12,50,000

Cost of goods sold as on March 31, 2023
(By using Net Realisable Value Method)

	Products			Total
	X	Y	Z	
	(₹)	(₹)	(₹)	(₹)
Allocated joint cost	4,66,797	5,61,496	2,21,707	12,50,000
Additional costs	--	--	6,20,000	6,20,000
Cost of goods available for sale (CGAS)	4,66,797	5,61,496	8,41,707	18,70,000
Less: Cost of ending inventory (Working Note 1)	2,29,571 (CGAS×49.18%)	57,385 (CGAS × 10.22%)	27,692 (CGAS × 3.29%)	3,14,648
Cost of goods sold	2,37,226	5,04,111	8,14,015	15,55,352

Working Notes

1. **Total production of three products for the year 2022-2023**

Products	Quantity sold in tones	Quantity of ending inventory in tons	Total production	Ending inventory percentage (%)
(1)	(2)	(3)	(4) = [(2) + (3)}	(5) = (3)/ (4)
X	186	180	366	49.18
Y	527	60	587	10.22
Z	736	25	761	3.29

2. **Joint cost apportioned to each product:**

$$\frac{\text{Total Joint cost}}{\text{Total Net Realisable Value}} \times \text{Net Realisable Value of each product}$$

$$\text{Total cost of Product X} = \frac{1250000}{2940250} \times ₹10,98,000 = ₹4,66,797$$

Total cost of Product $Y = \frac{1250000}{2940250} \times ₹13,20,750 = ₹5,61,496$

Total cost of Product $Z = \frac{1250000}{2940250} \times ₹5,21,500 = ₹2,21,707$

Q.122 Reverse Calculation | RTP Nov 22

JP Ltd. uses joint production process that produces three products at the split –off point. Joint production costs during the month of July, 2022 were ₹ 33,60,000.

Product information for the month of July is as follows:

Particulars	Product A	Product B	Product C
Units produced	3,000	6,000	9,000
Sales prices:			
At the split-off	₹ 200		
After further processing	₹ 300	₹ 350	₹ 100
Costs to process after split-off	₹ 6,00,000	₹ 6,00,000	₹ 6,00,000

Other information is as follows:

Product C is a by-product and the company accounts for the by-product at net realizable value as a reduction of joint cost. Further, Product B & C must be processed further before they can be sold. FIND OUT the joint cost allocated to Product A in the month of July if joint cost allocation is based on Net Realizable Value.

Ans.

Product A

As the question says that "Products B and C must be processed further before they can be sold", it means Product A can be sold at the split-off point.

Cost to process Product A after the split-off point = ₹ 6,00,000

Additional revenue to be earned by processing further = ₹ 3,00,000

(₹ 100 increase in selling price per unit x 3,000 units)

Therefore, Product A will not be processed further, and the sales value at split -off for A will be used for allocating the joint costs.

Sales value at the split-off for A = ₹ 6,00,000

(₹ 200 × 3,000 units)

Product B

Since Product B must be processed further, we use its net realizable value for the joint cost allocation.

Net realizable value of Product B = ₹ 15,00,000

[(₹ 350 × 6,000 units) – ₹ 6,00,000 further processing costs]

Product C

Product C, the by-product, must also be processed further to be sold.

Net realizable value of Product C = ₹ 3,00,000

[(₹ 100 × 9,000 units) – ₹ 6,00,000 in further processing costs]

Joint Cost Allocation

Joint production cost = ₹ 33,60,000

Since, by-product C is accounted for as a reduction to the joint costs, the joint costs to be allocated = ₹ 30,60,000

(₹ 33,60,000 - ₹ 3,00,000 NRV of Product C)

Allocation of joint costs between Product A and B will be on the basis of ₹ 6,00,000: ₹ 15,00,000

Joint Cost allocated to Product A = ₹ 30,60,000 x $\frac{`\ 6,00,000}{`\ 21,00,000}$ = `\ 8,74,286

Q.123 Reverse Calculation | MTP Nov 18(1)

Three products X,Y and Z along with a by product B are obtained again in a crude state which require further processing at a cost of Rs. 5 for X; Rs. 4 for Y; and Rs. 2.50 for Z per unit before sale. The by product is however saleable as such to a nearby factory. The selling prices for the three main products and by product, assuming they should yield a net margin of 25 percent of cost, are fixed at Rs. 13.75 Rs. 8.75 and Rs. 7.50 and Re. 1.00 respectively – all per unit quantity sold.

During a period, the joint input cost including the material cost was Rs. 90,800 and the respective outputs were:

X	8,000 units
Y	6,000 units
Z	4,000 units
B	1,000 units

By product should be credited to the joint cost and only the net joint costs are to be allocated to the main products. CALCULATE the joint cost per unit of each product and the margin available as a percentage on cost.

Ans. **Working Notes:**

(i) Computation of Allocation Ratio for Joint Costs

	Products		
	X Rs.	Y Rs.	Z. Rs.
Selling Price	13.75	8.75	7.50
Less: Anticipated margin@ 25% on cost or 20% on sales	2.75	1.75	1.50
Cost of sales	11.00	7.00	6.00
Less: Post split off cost	5.00	4.00	2.50
Joint cost per unit	6.00	3.00	3.50
Output (units)	8,000	6,000	4,000
Total output cost	48,000	18,000	14,000
Allocation ratio for joint costs	24	9	7

(ii) Computation of net allocable joint costs

	Rs.	Rs.
Joint input cost including material cost		90,800
Less: Credit for realization from by-product B:Sales revenue (1,000 × Re. 1)	1,000	
Less: profit @ 25% on cost or 20% on sales	200	800
Net joint costs to be allocated		90,000

Determination of joint cost per unit of each product

Product	Net joint costs allocation Rs.	Output (units) Rs.	Joint cost per unit Rs.
X	54,000 (Note : 1)	8,000	6.75
Y	20,250	6,000	3.38
Z	15,750	4,000	3.94
	90,000		

Profit margin available on each product as a percentage on cost

Product	Joint Cost Rs.	Post spilt off cost Rs.	Total Cost Rs.	Selling Price Rs.	Margin Rs.	Margin % on cost Rs.
X	6.75	5.00	11.75	13.75	2.00	17.02
Y	3.38	4.00	7.38	8.75	1.37	18.56
Z	3.94	2.50	6.44	7.50	1.06	16.46

Note: 1

X= $\frac{24}{40}$ x90000 =54,000

Y= $\frac{9}{40}$ x90000 =20,250

Z= $\frac{7}{40}$ x90000 =15,750

90,000

PROCESS COSTING

Q.124 Process a/c and sp calculate | PY May 18

Alpha Ltd. is engaged in the production of a product A which passes through 3 different process - Process P, Process Q and Process R. The following data relating to cost and output is obtained from the books of accounts for the month of April 2017:

Particulars	Process P	Process Q	Process R
Direct Material	38,000	42,500	42,880
Direct Labour	30,000	40,000	50,000

Production overheads of ₹ 90,000 were recovered as percentage of direct labour.
10,000 kg of raw material @ ₹ 5 per kg. was issued to Process P. There was no stock of materials or work in process. The entire output of each process passes directly to the next process and finally to warehouse. There is normal wastage, in processing, of 10 %. The scrap value of wastage is ₹ 1 per kg. The output of each process transferred to next process and finally to warehouse are as under:

Process P = 9,000 kg

Process Q = 8,200 kg

Process R = 7,300 kg

The company fixes selling price of the end product in such a way so as to yield a profit of

25% selling price.
Prepare Process P, Q and R accounts. Also calculate selling price per unit of end product.

Ans. **Process- P Account**

Particulars	Kg.	Amount (₹)	Particulars	Kg.	Amount (₹)
To Input	10,000	50,000	By Normal wastage (1,000 kg. × ₹ 1)	1,000	1,000
To Direct Material	---	38,000	By Process- Q (9,000 kg. × ₹ 15.50)	9,000	1,39,500
To Direct Labour	---	30,000			
To Production OH (₹ 90,000 × 3/12)	---	22,500			
	10,000	1,40,500		10,000	1,40,500

Cost per unit = $\frac{1,40,500-1,000}{10,000kg-1,000kg.}=15.50$

Process- Q Account

Particulars	Kg.	Amount (₹)	Particulars	Kg.	Amount (₹)
To Process-P A/c	9,000	1,39,500	By Normal wastage (900 kg. × ₹ 1)	900	900

To Direct Material	---	42,500	By Process- Q (8,200 kg. × ₹ 31)	8,200	2,54,200
To Direct Labour	---	40,000			
To Production OH (₹ 90,000 × 4/12)	---	30,000			
To Abnormal Gain (100 kg. × ₹ 31)	100	3,100			
	9,100	2,55,100		9,100	2,55,100

Cost per unit = $\frac{2,52,000-900}{9,000kg-900} = 31$

Process- R Account

Particulars	Kg.	Amount (₹)	Particulars	Kg.	Amount (₹)
To Process-Q A/c	8,200	2,54,200	By Normal wastage (820 kg. × Re.1)	820	820
To Direct Material	---	42,880	By Abnormal loss (80 kg. × ₹ 52)	80	4,160
To Direct Labour	---	50,000	By Finished Goods (7,300 kg. × ₹52)	7,300	3,79,600
To Production OH (₹ 90,000 × 5/12)	---	37,500			
	8,200	3,84,580		8,200	3,84,580

Cost per unit = $\frac{3,84,584-820}{8,200kg-820kg.} = 52$

Calculation of Selling price per unit of end product:

Cost per unit	52.00
Add: Profit 25% on selling price i.e. 1/3rd of cost	17.33
Selling price per unit	69.33

Q.125 Find Cost of equivalent units | PY Nov 18

Following details have been provided by M/s AR Enterprises:

(i) Opening works-in-progress - 3000 units (70% complete)

(ii) Units introduced during the year - 17000 units

(iii) Cost of the process (for the period) - ₹ 33,12,720

(iv) Transferred to next process - 15000 units

(v) Closing works-in-progress - 2200 units (80% complete)

(vi) Normal loss is estimated at 12% of total input (including units in process in the beginning). Scraps realise ₹ 50 per unit. Scraps are 100% complete.

Using FIFO method, compute:
(i) Equivalent production
(ii) Cost per equivalent unit

Ans. **Statement of Equivalent Production Units (Under FIFO Method)**

Particulars	Input units	Particulars	Output units	Equivalent Production	
				(%)	Equivalent units
Opening W-I-P	3,000	From opening W-I-P	3,000	30	900
Units introduced	17,000	From fresh inputs	12,000	100	12,000
		Units completed (Transferred to next process)	15,000		
		Normal Loss {12% (3,000 + 17,000 units)}	2,400	--	--
		Closing W-I-P	2,200	80	1760
		Abnormal loss (Balancing figure)	400	100	400
	20,000		11,000		15,060

Computation of cost per equivalent production unit :

Cost of the Process (for the period)	33,12,720
Less: Scrap value of normal loss (₹ 50 × 2,400 units)	(₹ 1,20,000)
Total process cost	31,92,720

Q.126 Process Cost a/c & FG a/c | PY May 19

KT Ltd. produces a product EMM which passes through two processes before it is completed and transferred to finished stock. The following data relate to May 2019:

Particulars	*Process*		*Finished stock*
	A (₹)	*B (₹)*	*(₹)*
Opening Stock	*5,000*	*5,500*	*10,000*
Direct Materials	*9,000*	*9,500*	
Direct Wages	*5,000*	*6,000*	
Factory Overheads	*4,600*	*2,030*	
Closing Stock	*2,000*	*2,490*	*5,000*
Inter-process profit included in opening stock		*1,000*	*4,000*

Output of Process A is transferred to Process B at 25% profit on the transfer price and output of Process B is transferred to finished stock at 20% profit on the transfer price. Stock in process is valued at prime cost. Finished stock is valued at the price at which it is received from Process B. Sales during the period are ₹ 75,000. Prepare the Process cost accounts and Finished stock account showing the profit element at each stage.

Ans.

Process-A A/c

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	5,000	5,000	_	Process B A/c	**28,800**	**21,600**	**7,200**
Direct materials	9,000	9,000	_				
Direct wages	5,000	5,000	_				
	19,000	19,000	_				
Less: Closing stock	(2,000)	(2,000)	_				
Prime Cost	17,000	17,000	_				
Overheads	4,600	4,600	_				
Process Cost	**21,600**	**21,600**	_				
Profit (33.33% of total cost)	**7,200**	-	**7,200**				
	28,800	**21,600**	**7,200**		28,800	21,600	7,200

Process-B A/c

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	5,500	4,500	1,000	Finished stock A/c	**61,675**	**41,550**	**20,125**
Process A A/c	28,800	21,600	7,200				
Direct materials	9,500	9,500	_				
Direct wages	6,000	6,000	_				
	49,800	41,600	8,200				
Less: Closing stock	**(2,490)**	**(2,080)**	**(410)**				
Prime Cost	**47,310**	**39,520**	7,790				
Overheads	2,030	2,030	_				
Process Cost	49,340	41,550	7,790				
Profit (25% of total cost)	**12,335**	-	**12,335**				
	61,675	41,550	20,125		61,675	41,550	20,125

Finished Stock A/c

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	10,000	6,000	4,000	Costing P&L A/c	**75,000**	**44,181**	**30,819**
Process B A/c	61,675	41,550	20,125				
	71,675	47,550	24,125				
Less: Closing stock	**(5,000)**	**(3,369)**	**(1,631)**				
COGS	66,675	44,181	22,494				

Profit	**8,325**	-	**8,325**				
	75,000	44,181	30,819		75,000	44,181	30,819

Q.127 Process 1-2 a/c | PY Nov 20

Following details are related to the work done in Process-I by ABC Ltd. during the month of May 2019 :

	(₹)
Opening work in process (3,000 units)	
Materials	*1,80,500*
Labour	*32,400*
Overheads	*90,000*
Materials introduced in Process-I (42,000 units)	*36,04,000*
Labour	*4,50,000*
Overheads	*15,18,000*

Units Scrapped
Degree of completion Materials
Labour & overhead Closing Work-in-process
Degree of completion Materials
Labour & overhead
Units finished and transferred to Process-II : 36,000 units Normal loss:
4% of total input including opening work-in-process Scrapped units fetch ₹ 62.50 per piece.

Prepare:
(i) Statement of equivalent production.
(ii) Statement of cost per equivalent unit.
(iii) Process-I A/c
(iv) Normal Loss Account and
(v) Abnormal Loss Account

Ans. **(i) Statement of Equivalent Production (Weighted Average method)**

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & O.H.	
				%	Units	%	Units
Opening WIP	3,000	Completed and Transferred to Process-II	36,000	100	36,000	100	36,000
Units introduced	42,000	Normal Loss (4% of 45,000 units)	1,800	--	--	--	--
		Abnormal loss (Balancing figure)	3,000	100	3,000	70	2,100
		Closing WIP	4,200	100	4,200	50	2,100
	45,000		45,000		**43,200**		**40,200**

(ii) Statement showing cost for each element

Particulars	Materials (₹)	Labour (₹)	Overhead (₹)	Total (₹)

Cost of opening work-in-process	1,80,500	32,400	90,000	3,02,900
Cost incurred duringthe month	36,04,000	4,50,000	15,18,000	55,72,000
Less: RealisableValue of normal scrap (₹ 62.50 × 1,800 units)	(1,12,500)	--	--	(1,12,500)
Total cost: (A)	**36,72,000**	**4,82,400**	**16,08,000**	57,62,400
Equivalent units: (B)	43,200	40,200	40,200	
Cost per equivalent unit: (C) = (A ÷ B)	**85.00**	**12.00**	**40.00**	137.00

Statement of Distribution of cost

Particulars	Amount (₹)	Amount (₹)
1. Value of units completed and transferred: (36,000 units × ₹ 137)		49,32,000
2. Value of Abnormal Loss:		
- Materials (3,000 units × ₹ 85)	2,55,000	
- Labour (2,100 units × ₹ 12)	25,200	
- Overheads (2,100 units × ₹ 40)	84,000	3,64,200
3. Value of Closing W-I-P:		
- Materials (4,200 units × ₹ 85)	3,57,000	
- Labour (2,100 units × ₹ 12)	25,200	
- Overheads (2,100 units × ₹ 40)	84,000	4,66,200

(iii) **Process-I A/c**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W.I.P:					
— Materials	3,000	1,80,500	By Normal Loss(₹ 62.5 × 1,800 units)	1,800	1,12,500
— Labour	--	32,400			
— Overheads	--	90,000			
To Materials introduced	42,000	36,04,000	By Abnormal loss	3,000	**3,64,200**
To Labour		4,50,000	By Process-I A/c	36,000	49,32,000
To Overheads		15,18,000	By Closing WIP	4,200	**4,66,200**
	45,000	**58,74,900**		45,000	**58,74,900**

(iv) **Normal Loss A/c**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	1,800	1,12,500	By Cost Ledger Control A/c	1,800	1,12,500
	1,800	**1,12,500**		1,800	**1,12,500**

(v) **Abnormal Loss A/c**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	3,000	3,64,200	By Cost Ledger ControlA/c (₹ 62.5 × 3,000 units)	3,000	**1,87,500**
			By Costing Profit & Loss A/c (Bal. Figure)		**1,76,700**
	3,000	**3,64,200**		3,000	**3,64,200**

Q.128 Process a/c prepare | PY July 21

A Manufacturing unit manufactures a product 'XYZ' which passes through three distinct Processes - X, Y and Z. The following data is given:

	Process X	Process Y	Process Z
Material consumed (in ₹)	2,600	2,250	2,000
Direct wages (in ₹)	4,000	3,500	3,000

- The total Production Overhead of ₹ 15,750 was recovered @ 150% of Direct wages.
- 15,000 units at ₹ 2 each were introduced to Process 'X'.
- The output of each process passes to the next process and finally, 12,000 units were transferred to Finished Stock Account from Process 'Z'.
- No stock of materials or work in progress was left at the end.

The following additional information is given:

Process	% of wastage to normal input	Value of Scrap per unit (₹)
X	6%	1.10
Y	?	2.00
Z	5%	1.00

You are required to:

(i) Find out the percentage of wastage in process 'Y', given that the output of Process 'Y' is transferred to Process 'Z' at ₹ 4 per unit.

(ii) Prepare Process accounts for all the three processes X, Y and Z.

Ans. **Process-X Account**

Dr. Cr.

	Particulars	Units	(₹)	Particulars	Units	(₹)
To	Material introduced	15,000	30,000	By Normal Loss A/c [(6% of 15,000 units) x ₹ 1.1]	900	990
"	Additional material	--	2,600	" Process-Y A/c (₹ 2.951* × 14,100 units)	14,100	41,610
"	Direct wages	--	4,000			
"	Production OH	--	6,000			
		15,000	42,600		15,000	42,600

***Cost per unit of completed units**

$$= \frac{\text{Total cost - Realisable value from normal loss}}{\text{Input units - Normal loss units}} = \frac{42,600 - 990}{15,000 \text{ units} - 900 \text{ units}} = 2.951$$

Dr. **Process-Y Account** Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-X A/c	14,100	41,610	By Normal Loss A/c [(#13.44% of 14,100 units) x ₹2]	1,895	3,790
" Additional material	--	2,250		12,205	48,820
" Direct wages	--	3,500	" Process-Z A/c(₹ 4 × 12,205 units)		
" Production OH	--	5,250			
	14,100	52,610		14,100	52,610

*Calculation for % of wastage in process 'Y':

Let's consider number of units lost under process 'Y' = A

Now, $\frac{\text{Total cost - Realisable value from normal loss}}{\text{Input units - Normal loss units}} = 4$

$\frac{52,610 - 2A}{14,100 \text{units} - A} = 4$

$2A = 3,790 \Rightarrow A = 1,895$ units

% of wastage = $\frac{1,895 \text{units}}{14,100 \text{units}} = 13.44\%$

Dr. **Process-Z Account** Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-Y A/c	12,205	48,820	By Normal Loss A/c [(5% of 12,205 units) x ₹ 1]	610	610
" Additional material	--	2,000		12,000	59,726
	--	3,000	" Finished Stock A/c (₹ 4.9771$ × 12,000 units)		
" Direct wages	--	4,500			
" Production OH	405	2,016			
" Abnormal gain (₹ 4.9771$ × 405 units)	12,610	60,336		12,610	60,336

Cost per unit of completed units

$$= \frac{\text{Total cost - Realisable value from normal loss}}{\text{Input units - Normal loss units}} = \frac{58,320 - 610}{12,205 \text{units} - 610 \text{units}} = 4.9771$$

Alternative Solution

Dr. **Process-X Account** Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)
To Material introduced	15,000	30,000	By Normal Loss A/c [(6% of 15,000 units) x ₹1.1]	900	990

" Additional material	--	2,600	" Process-Y A/c (₹ 2.951* × 14,100 units)	14,100	41,610
" Direct wages	--	4,000			
" Production OH	--	6,000			
	15,000	42,600		15,000	42,600

*Cost per unit of completed units

$$\frac{\text{Total cost - Realisable value from normal loss}}{\text{Inputs units - Normal loss units}} = \frac{42,600 - 990}{15,000\text{units} - 900\text{units}} = 2.951$$

Dr. **Process-Y Account** Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-X A/c	14,100	41,610	By Normal Loss A/c [(#13.44% of 14,100 units) x ₹2]	1,895	3,790
" Additional material	--	2,250		12,631	50,524
" Direct wages	--	3,500	" Process-Z A/c (₹4 × 12,631@ units)		
" Production OH	--	5,250			
" Abnormal gain (₹4 × 426 units)	426	1,704			
	14,526	54,314		14,526	54,314

Working Notes:

1. Units Transferred from Process Z Account to Finished Stock = 12,000 Units i.e 95% of Inputs. So, Input of Z or Output of Y is 12,000 x 100/95 = 12,631 Units and Normal Loss (5%) is 631 units.
2. Let's consider number of units lost under process 'Y' as:
   For Normal loss = A
   For Abnormal loss = B
   Now, A + B = 1,469 [i.e. 14,100 – 12,631] ...(I)
   (A x ₹ 2 per unit) + (B x ₹ 4 per unit) = [52,610 – 50,524]
   2A + 4B = 2,086 ...(II)
   Now, putting the values of (I) in (II), we get, 2(1,469 – B) + 4B = 2,086

   2938 – 2B + 4B = 2,086
   2B = - 852 => B = - 426 units
   Since, the figure of B is in negative, it is an abnormal gain of 426 units. Further, A (i.e. normal loss) = 1,469 + 426 = 1,895 units
3. % of wastage in Process Y Account = $\frac{1,895}{14,100\text{units}}$ = 13.44%

Dr. **Process-Z Account** Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-Y A/c	12,631	50,524	By Normal Loss A/c [(5% of 12,631 units) x ₹ 1]	631	631
" Additional material	--	2,000			
" Direct wages	--	3,000			
" Production OH	--	4,500		12,000	59,393
	12,631	60,024	"	12,631	60,024

			Finished Stock A/c (₹ 4.9494$ × 12,000 units)		

$$\text{Cost per unit of completed units} = \frac{\text{Total cost - Realisable value from normal loss}}{\text{Input units - Normal loss units}} = \frac{60,024 - 631}{12,631\text{units} - 631\text{units}} = 4.9494$$

Q.129 Process a/c & abnormal gain | PY Dec 21

A product passes through Process-I and Process-II. Particulars pertaining to the Process-I are:
Materials issued to Process-I amounted to ₹ 80,000, Wages ₹ 60,000 and manufacturing overheads were ₹ 52,500.
Normal Loss anticipated was 5% of input, 9,650 units of output were produced and transferred out from Process-I to Process-II. Input raw materials issued to Process-I were 10,000 units.
There were no opening stocks.
Scrap has realizable value of ₹ 5 per unit.
You are required to prepare:
(i) Process-I Account
(ii) Abnormal Gain/Loss Account

Ans. **(i) Process - I Account**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Materials	10,000	80,000	By Normal loss (5%of 10,000)	500	2,500
To Wages	-	60,000	By Process-II A/c (₹20*×9,650units)	9,650	1,93,000
To Manufacturing OH		52,500			
To Abnormal Gain A/c (₹20*×150units)	150	3,000			
	10,150	1,95,500		10,150	1,95,500

$$*\frac{(80,000 + 60,000 + 52,500) - 2,500}{10,000 - 500} = 20$$

(ii) Abnormal Gain - Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Normal loss A/c	150	750	By Process-I A/c	150	3,000
To Costing P&L A/c	-	2,250			
	150	3,000		150	3,000

Q.130 Process a/c & FG a/c | PY Nov 22

N Ltd. produces a product which passes through two processes – Process – I and Process-II. The company has provided following information related to the Financial Year 2021-22:

	Process-I	Process -II
Raw Material @₹ 65 per unit	6,500 units	-

Direct Wages	₹ 1,40,000	₹ 1,30,000
Direct Expenses	30% of Direct Wages	35% of Direct Wages
Manufacturing Overheads	₹ 21,500	₹ 24,500
Realisable value of scrap per unit	₹ 4.00	₹ 16.00
Normal Loss	250 units	500 units
Units transferred to Process-II / finished stock	6,000 units	5,500 units
Sales	-	5,000 units

There was no opening or closing stock of work-in progress. You are required to prepare:

(i) Process-I Account

(ii) Process -II Account

(iii) Finished Stock Account

Ans. **Process-I A/c**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Raw material used (₹ 65 × 6,500 units)	6,500	4,22,500	By Normal loss (250 units × ₹ 4)	250	1,000
To Direct wages	--	1,40,000	By Process- II A/c (₹ 100 × 6,000 units)	6,000	6,00,000
To Direct expenses (30% of ₹ 1,40,000)	--	42,000	By Abnormal loss (₹ 100 × 250 units)	250	25,000
To Manufacturing overhead		21,500			
	6,500	6,26,000		6,500	6,26,000

Cost per unit of completed units and abnormal loss: $\frac{\text{Total cost - Realisable value from normal loss}}{\text{Input Units - Normal loss units}}$

$= \frac{6,26,000 - 1,000}{6,500\text{units} - 250\text{units}}$

$= \frac{6,25,000}{6,250 \text{ units}} = 100$

Process- II A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process - I A/c	6,000	6,00,000	By Normal loss (500 units × ₹16)	500	**8,000**
To Direct wages	--	1,30,000	By Finished Stock A/c (₹144 × 5,500 units)	5,500	7,92,000
To Direct expenses (35% of ₹ 1,30,000)	--	45,500			
To Manufacturing overhead	--	24,500			
	6,000	8,00,000		6,000	8,00,000

Cost per unit of completed units and abnormal loss:

$= \frac{\text{Total cost - Realisable value from normal loss}}{\text{Input units - Normal loss units}}$

$$= \frac{8,00,000 - 8,000}{6,000 \text{ units} - 500 \text{ units}} = 144$$

Finished Goods Stock A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process II A/c	5,500	7,92,000	By Cost of Sales (₹144 × 5,000 units)	5,000	7,20,000
			By Balance c/d	500	72,000
	5,500	7,92,000		5,500	7,92,000

Q.131 Process a/c, RM a/c | RTP May 18

Star Ltd. manufactures chemical solutions for the food processing industry. The manufacturing takes place in a number of processes and the company uses FIFO method to value work-in-process and finished goods. At the end of the last month, a fire occurred in the factory and destroyed some of paper containing records of the process operations for the month.

Star Ltd. needs your help to prepare the process accounts for the month during which the fire occurred. You have been able to gather some information about the month's operating activities but some of the information could not be retrieved due to the damage. The following information was salvaged:

- Opening work-in-process at the beginning of the month was 800 litres, 70% complete for labour and 60% complete for overheads. Opening work-in-process was valued at ₹ 26,640.
- Closing work-in-process at the end of the month was 160 litres, 30% complete for labour and 20% complete for overheads.
- Normal loss is 10% of input and total losses during the month were 1,800 litres partly due to the fire damage.
- Output sent to finished goods warehouse was 4,200 litres.
- Losses have a scrap value of ₹15 per litre.
- All raw materials are added at the commencement of the process.
- The cost per equivalent unit (litre) is ₹39 for the month made up as follows:

	(₹)
Raw Material	23
Labour	7
Overheads	9
	39

Required:

(i) CALCULATE the quantity (in litres) of raw material inputs during the month.

(ii) CALCULATE the quantity (in litres) of normal loss expected from the process and the quantity (in litres) of abnormal loss / gain experienced in the month.

(iii) CALCULATE the values of raw material, labour and overheads added to the process during the month.

(iv) PREPARE the process account for the month.

Ans.

(i) Calculation of Raw Material inputs during the month:

Quantities Entering Process	Litres	Quantities Leaving Process	Litres
Opening WIP	800	Transfer to Finished Goods	4,200
Raw material input	5,360	Process Losses	1,800

(balancing figure)			
		Closing WIP	160
	6,160		6,160

(ii) Calculation of Normal Loss and Abnormal Loss/Gain

	Litres
Total process losses for month	1,800
Normal Loss (10% input)	536
Abnormal Loss (balancing figure)	1,264

(iii) Calculation of values of Raw Material, Labour and Overheads added to the process:

	Material	Labour	Overheads
Cost per equivalent unit	₹23.00	₹7.00	₹9.00
Equivalent units (litre) (refer the working note)	4,824	4,952	5,016
Cost of equivalent units	₹1,10,952	₹34,664	₹45,144
Add: Scrap value of normal loss (536 units × ₹ 15)	₹8,040	--	--
Total value added	₹1,18,992	₹34,664	₹45,144

Workings:

Statement of Equivalent Units (litre):

Input Details	Units	Output details	Units	Equivalent Production					
				Material		Labour		Overhead s	
				Units	(%)	Units	(%)	Units	(%)
Opening WIP	800	Units completed:							
Units introduced	5,360	- Opening WIP	800	--	--	240	30	320	40
		- Fresh inputs	3,400	3,400	100	3,400	100	3,400	100
		Normal loss	536	--	--	--	--	--	--
		Abnormal loss	1,264	1,264	100	1,264	100	1,264	100
		Closing WIP	160	160	100	48	30	32	20
	6,160		6,160	4,824		4,952		5,016	

(iv) Process Account for Month

	Litres	Amount (₹)		Litres	Amount (₹)
To Opening WIP	800	26,640	By Finished goods	4,200	1,63,800
To Raw Materials	5,360	1,18,992	By Normal loss	536	8,040
To Wages	--	34,664	By Abnormal loss	1,264	49,296
To Overheads	--	45,144	By Closing WIP	160	4,304

	6,160	2,25,440		6,160	2,25,440

Q.132 Process iii a/c | RTP Nov 18

From the following information for the month of January, 20X9, PREPARE Process-III cost accounts.

Opening WIP in Process-III	1,600 units at ₹ 24,000
Transfer from Process-II	55,400 units at ₹ 6,23,250
Transferred to warehouse	52,200 units
Closing WIP of Process-III	4,200 units
Units Scrapped	600 units
Direct material added in Process-III	₹ 2,12,400
Direct wages	₹ 96,420
Production overheads	₹ 56,400

Degree of completion:

	Opening Stock	Closing Stock	Scrap
Material	80%	70%	100%
Labour	60%	50%	70%
Overheads	60%	50%	70%

The normal loss in the process was 5% of the production and scrap was sold @ ₹ 5 per unit.

(Students may treat material transferred from Process – II as Material – A and fresh material used in Process – III as Material B)

Ans.

Statement of Equivalent Production
Process III

Input Details	Units	Output Particulars	Units	Equivalent Production					
				Material-A		Material-B		Labour & Overhead	
				%	Units	%	Units	%	Units
Opening WIP	1,600	Work on Op. WIP	1,600	-	-	20	320	40	640
Process-II Transfer	55,400	Introduced & completed during the month	50,600	100	50,600	100	50,600	100	50,600
		Normal loss (5% of 52,800 units)	2,640	-	-	-	-	-	-
		Closing WIP	4,200	100	4,200	70	2,940	50	2,100
		Abnormal Gain	(2,040)	100	(2,040)	100	(2,040)	100	(2,040)
	57,000		57,000		52,760		51,820		51,300

Working note:

Production units = Opening units + Units transferred from Process-II – Closing Units

= 1,600 units + 55,400 units – 4,200 units

= 52,800 units

Statement of Cost

	Cost (₹)	Equivalet units	Cost per equivalent units (₹)
Material A (Transferred from previous process)	6,23,250		
Less: Scrap value of normal loss (2,640 units × ₹ 5)	(13,200)		
	6,10,050	52,760	11.5627
Material B	2,12,400	51,820	4.0988
Labour	96,420	51,300	1.8795
Overheads	56,400	51,300	1.0994
	9,75,270		18.6404

		Amount (₹)	Amount (₹)
Opening WIP	Material A		24,000
Completed opening WIP units-1600	Material B (320 units × ₹ 4.0988)	1311.62	
	Wages (640 units × ₹ 1.8795)	1202.88	
	Overheads (640 units × ₹ 1.0994)	703.62	3,218.12
Introduced & Completed-units 50,600	50,600 units × ₹ 18.6404		9,43,204.24
Total cost of 52,200 finished goods units			9,70,422.36
Closing WIP units-4,200	Material A (4,200 units × ₹ 11.5627)		48,563.34
	Material B (2,940 units × ₹ 4.0988)		12,050.47
	Wages (2,100 units × ₹ 1.8795)		3,946.95
	Overheads (2,100 units × ₹ 1.0994)		2,308.74
			66,869.50
Abnormal gain units - 2,040	(2,040 units × ₹ 18.6404)		38026.42

Process III A/c

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Balance b/d	1,600	24,000	By Normal loss	2,640	13,200
To Process II A/c	55,400	6,23,250	By Finished goods	52,200	9,70,422.36
To Direct material		2,12,400	By Closing WIP	4,200	66,874.06*

To	Direct wages		96,420			
To	Production overheads		56,400			
To	Abnormal gain	2,040	38,026.42			
		59,040	10,50,496.42		59,040	10,50,496.42

* Difference in figure due to rounding off has been adjusted with closing WIP

Q.133 Process A/c | MTP May 18

The following are the details in respect of Process A and Process B of a processing factory:

	Process A (₹)	Process B (₹)
Materials	40,000	--
Labour	40,000	56,000
Overheads	16,000	40,000

The output of Process A is transferred to Process B at a price calculated to give a profit of 20% on the transfer price and the output of Process B is charged to finished stock at a profit of 25% on the transfer price. The finished stock department realized ₹ 4,00,000 for the finished goods received from Process B.

PREPARE process accounts and CALCULATE total profit, assuming that there was no opening or closing work-in-progress.

Ans.

Dr. Cr.

	₹		₹
To Materials	40,000	By Process B A/c (Transfer to Process B)	1,20,000
To Labour	40,000		
To Overheads	16,000		
	96,000		
To Profit (20% of transfer price, i.e., 25% of cost)	24,000		
	1,20,000		1,20,000

Dr. **Cr.**

	₹		₹
To Process A A/c (Transferred from Process A)	1,20,000	By Finished Stock A/c (Transfer to finished stock)	2,88,000
To Labour	56,000		
To Overhead	40,000		
	2,16,000		
To Profit (25% of transfer price i.e., 33.33% of cost)	72,000		
	2,88,000		2,88,000

Statement of Total Profit

	₹

Profit from Process A	24,000
Profit from Process B	72,000
Profit on Sales (₹ 4,00,000 - ₹ 2,88,000)	1,12,000
Total Profit	2,08,000

Q.134 Eq. Production / Cost Per unit | MTP May 19(2)

The following data are available in respect of Process-I for January 20X9:
(1) Opening stock of work in process: 600 units at a total cost of Rs. 4,20,000.
(2) Degree of completion of opening work in process: Material 100%
Labour 60%
Overheads 60%
(3) Input of materials at a total cost of Rs.55,20,000 for 9,200 units.
(4) Direct wages incurred Rs.18,60,000
(5) Production overhead Rs.8,63,000.
(6) Units scrapped 200 units. The stage of completion of these units was: Materials 100%
Labour 80%
Overheads 80%
(7) Closing work in process; 700 units. The stage of completion of these units was: Material 100%
Labour 70%
Overheads 70%
(8) 8,900 units were completed and transferred to the next process.
(9) Normal loss is 4% of the total input (opening stock plus units put in)
(10) Scrap value is Rs.60 per unit. You are required to:
(i) COMPUTE equivalent production,
(ii) CALCULATE the cost per equivalent unit for each element.
(iii) CALCULATE the cost of abnormal loss (or gain), closing work in process and the units transferred to the next process using the FIFO method.

Ans. **(i) Statement of Equivalent Production (FIFO Method)**

Input		Output		Equivalent Production					
				Materials		Labour		Production Overhead	
Details	Units	Details	Units	%	Units	%	Units	%	Units
Opening Stock	600	From opening stock	600	-	-	40	240	40	240
		- From fresh materials	8,300	100	8,300	100	8,300	100	8,300
		Closing W-I-P	700	100	700	70	490	70	490
Fresh inputs	9,200	Normal loss	392	-	-	-	-	-	-
			9,992		9,000		9,030		9,030
		Less: Abnormal Gain	(192)	100	(192)	100	(192)	100	(192)
	9,800		9,800		8,808		8,838		8,838

(ii) Statement of Cost per equivalent units

Elements	(Rs.)	Cost (Rs.)	Equivalent units (EU)	Cost per EU (Rs.)
Material Cost	55,20,000			
Less: Scrap realisation 392units @ Rs. 60/- p.u.	(2,3520)	54,96,480	8,808	624.03
Labour cost		18,60,000	8,838	210.45
Production OH Cost		8,63,000	8,838	97.65
Total Cost		82,19,480		932.13

(iii) Cost of Abnormal Gain – 192 Units

	(Rs.)	(Rs.)
Material cost of 192 units @ Rs. 624.03 p.u.	1,19,813.76	
Labour cost of 192 units @ Rs. 210.45 p.u.	40,406.40	
Production OH cost of 192 units @ Rs. 97.65 p.u.	18,748.80	1,78,968.96

Cost of closing WIP – 700 Units

Material cost of 700 equivalent units @ Rs. 624.03p.u.	4,36,821.00	
Labour cost of 490 equivalent units @ Rs. 210.45 p.u.	1,03,120.50	
Production OH cost of 490 equivalent @ Rs. 97.65p.u.	47,848.50	5,87,790.00

Cost of 8,900 units transferred to next process

(i) Cost of opening W-I-P Stock b/f – 600 units 4,20,000.00

(ii) Cost incurred on opening W-I-P stock

Material cost —

Labour cost 240 equivalent units @ Rs. 210.45 p.u. 50,508.00

Production OH cost 240 equivalent units @ Rs 97.65 p.u . 23,436.00

4,93,944.00

(iii) Cost of 8,300 completed units

8,300 units @ Rs. 932.13 p.u. 77,36,679.00

Total cost [(i) + (ii) + (iii))] 86,50,623.00

Q.135 Process I/II/III & Costing PL | MTP May 20

G K Ltd. produces a product "XYZ" which passes through two processes, viz. Process-A and Process-B.The details for the year ending 31st March, 2020 are as follows:

	Process A	Process - B
40,000 units introduced at a cost of	Rs. 3,60,000	-
Material consumed	Rs. 2,42,000	2,25,000

Direct wages	Rs. 2,58,000	1,90,000
Manufacturing expenses	Rs. 1,96,000	1,23,720
Output in units	37,000	27,000
Normal wastage of inputs	5%	10%
Scrap value (per unit)	Rs. 15	20
Selling price (per unit)	Rs. 37	61

Additional Information:

(a) 80% of the output of Process-A, was passed on to the next process and the balance was sold. The entire output of Process- B was sold.

(b) Indirect expenses for the year was Rs. 4,48,080.

(c) It is assumed that Process-A and Process-B are not responsibility centre.

Required:

(i) PREPARE Process-A and Process-B Account.

(ii) PREPARE Costing Profit & Loss Account showing the net profit/ net loss for the year.

Ans. (i) Process- A Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Inputs	40,000	3,60,000	By Normal wastage (2,000 units × Rs.15)	2,000	30,000
To Material	---	2,42,000	By Abnormal loss A/c (1,000 units × Rs.27)	1,000	27,000
To Direct wages	---	2,58,000	By Process- B (29,600 units × Rs.27)	29,600	7,99,200
To Manufacturing Exp.	---	1,96,000	By Profit & Loss A/c (7,400 units × Rs.27)	7,400	1,99,800
	40,000	10,56,000		40,000	10,56,000

Cost per unit = $\frac{10,56,000 - 30,000}{40,000 units - 2,000 units}$ = **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 x 80% = 29,600 units

Sale = 37,000 units × 20% = 7,400 units

Process- B Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process- A A/c	29,600	7,99,200	By Normal wastage (2,960 units × Rs. 20)	2,960	59,200
To Material	---	2,25,000	By Profit & Loss A/c (27,000 units × Rs. 48)	27,000	12,96,000
To Direct Wages	---	1,90,000			
To Manufacturing Exp.	---	1,23,720			
To Abnormal Gain A/c (360 units × Rs. 48)	360	17,280			
	29,960	13,55,200		29,960	13,55,200

Cost per unit = $\frac{13,37,920 - 59,200}{29,600 units - 2,960 units}$ = 48 per unit

Normal wastage = 29,600 units × 10% = 2,960 units

Abnormal gain = (27,000 units + 2,960 units) – 29,600 units = 360 units

(ii) Costing Profit & Loss Account

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Process- A A/c	1,99,800	By Sales:	
To Process- B A/c	12,96,000	- Process-A (7,400 units × Rs. 37)	2,73,800
To Abnormal loss A/c	12,000	- Process- B (27,000 units × Rs. 61)	16,47,000
To Indirect Expenses	4,48,080	By Abnormal gain	10,080
		By Net loss	25,000
	19,55,880		19,55,880

Working Notes:

Normal wastage (Loss) Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process- A A/c	2,000	30,000	By Abnormal Gain A/c (360 units × Rs. 20)	360	7,200
To Process- B A/c	2,960	59,200	By Bank (Sales)	4,600	82,000
	4,960	89,200		4,960	89,200

Abnormal Loss Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process- A A/c	1,000	27,000	By Bank A/c (1,000 units × Rs. 15)	1,000	15,000
			By Profit & Loss A/c	---	12,000
	1,000	27,000		1,000	27,000

Abnormal Gain Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Normal loss A/c (360 units × Rs. 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.136 Process a/c & By Product A/c | MTP May 21

MP Ltd. produces a Product-X, which passes through three processes, I, II and III. In Process -III a by-product arises, which after further processing at a cost of Rs. 85 per unit, product Z is produced. The information related for the month of September 2020 is as follows:

	Process-I	Process-II	Process-III
Normal loss	5%	10%	5%
Materials introduced (7,000 units)	1,40,000	-	-
Materials added	62,000	1,36,000	84,200
Direct wages	42,000	54,000	48,000
Direct expenses	14,000	16,000	14,000

Production overhead for the month is Rs. 2,88,000, which is absorbed as a percentage of direct wages.

The scraps are sold at Rs. 10 per unit

Product-Z can be sold at Rs. 135 per unit with a selling cost of Rs. 15 per unit

No. of units produced:

Process-I- 6,600; Process-II- 5,200, Process-III- 4,800 and Product-Z- 600

There is no stock at the beginning and end of the month. You are required to PREPARE accounts for:

(i) Process-I, II and III
(ii) By-product-Z

Ans. (a) Total direct wages

= Rs. 42,000 + Rs. 54,000 + Rs. 48,000 = Rs. 1,44,000

Percentage absorption of production overhead on the basis of direct wages

$$= \frac{2,88,000}{1,44,000} x100 = 200\%$$

(i) Process-I A/c

Particulars	Units	Amt. (Rs.)	Particulars	Units	Amt. (Rs.)
To Materials	7,000	1,40,000	By Normal loss	350	3,500
To Other materials	-	62,000	(5% of 7,000	6,600	3,35,955
To Direct wages	-	42,000	units) By	50	2,545
To Direct expenses	-	14,000	Process-II*		
To Production OH	-	84,000	By Abnormal loss*		
(200% of Rs.42,000)					
	7,000	3,42,000		7,000	3,42,000

***Cost per unit** = $\frac{(3,42,000 - 3500)}{(7000 - 350) units}$ = 50.9022

Process-II A/c

Particulars	Units	Amt.(Rs.)	Particulars	Units	Amt.(Rs.)
To Process-I A/c	6,600	3,35,955	By Normal loss	660	6,600
To Other materials	-	1,36,000	(10% of 6,600	5,200	5,63,206
To Direct wages	-	54,000	units) By Process-	740	80,149
To Direct expenses	-	16,000	III**		
To Production OH	-	1,08,000	By Abnormal loss**		
(200% of Rs.54,000)					
	6,600	6,49,955		6,600	6,49,955

** Cost per unit = $\frac{(6,49,955-6,600)}{(6,600-660)units}=108.3089$

Process-III A/c

Particulars	Units	Amt. (Rs.)	Particulars	Units	Amt. (Rs.)
To Process-I A/c	5,200	5,63,206	By Normal loss	260	2,600
To Other materials	-	84,200	By Product-X***	4,800	8,64,670
To Direct wages	-	48,000			
To Direct expenses	-	14,000	By Product-Z# (Rs.35 × 600 units)	600	21,000
To Production OH	-	96,000			
To Abnormal gain***	460	82,864			
	5,660	8,88,270		5,660	8,88,270

*** Cost per unit = $\frac{(8,05,406-2,600-21,000)}{(5,200-260-600)units}=180.1396$

Realisable value = Rs. 135 – (85+15) = Rs. 35

(ii) **By-Product Process A/c**

Particulars	Units	Amt. (Rs.)	Particulars	Units	Amt. (Rs.)
To Process-III A/c	600	21,000	By Product-Z	600	81,000
To Processing cost	-	51,000			
To Selling expenses	-	9,000			
	600	81,000		600	81,000

Q.137 Process I/II/III a/c | MTP May 23(1)

SM Pvt. Ltd. manufactures their products in three consecutive processes. The details are as below:

	Process X	Process Y	Process Z
Transferred to next Process	60%	50%	
Transferred to warehouse for sale	40%	50%	100%

In each process, there is a weight loss of 2% and scrap of 4% of input of each process. The realizable value of scrap of each process is as below:

Process X @ ₹ 3 per ton Process Y @ ₹ 5 per ton Process Z @ ₹ 7 per ton.

The following particulars relate to January 2023:

	Process X	Process Y	Process Z
Materials used (in Tons)	1,500	454	189
Rate per ton	₹ 21.5	₹ 14	₹ 12
Direct Wages	₹ 5,000	₹ 3,260	₹ 2,540
Direct Expenses	₹ 3,820	₹ 2,775	₹ 1,900

PREPARE Process Accounts- X, Y and Z & calculate cost per ton at each process.

Ans.

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Materials	1,500	32,250	By Weight Loss	30	---
To Wages		5,000	By Scrap	60	180
To Direct Expenses		3,820	By Process Y	846	24,534
			By Warehouse	564	16,356
Total	**1,500**	**41,070**	**Total**	**1,500**	**41,070**

Cost per Ton = (41,070 - 180)/(1,500-30-60) = ₹ 29 per ton

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Process X	846	24,534	By Weight Loss	26	---
To Materials	454	6,356	By Scrap	52	260
To Wages		3,260	By Process Z	611	18,332.5
To Direct Expenses		2,775	By Warehouse	611	18,332.5
Total	**1300**	**36,925**	**Total**	**1300**	**36,925**

Cost per Ton = (36,925-260)/(1,300-26-52)= ₹30 per ton

Process Z Accounts

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Process Y	611	18332.5	By Weight Loss	16	---
To Materials	189	2,268	By Scrap	32	224
To Wages		2,540	By Warehouse	752	24,817
To Direct Expenses		1,900			
Total	**800**	**25,041**	**Total**	**800**	**25041**

Cost per Ton = (25,041-224)/(800-16-32) = ₹ 33 per ton

BUDGET AND BUDGETORY CONTROL

Q.138 Budget Ratio | PY May 19

Following data is available for ABC Ltd.:

Standard working hours	8 hours per day of 5 days per week
Maximum Capacity	60 employees
Actual working	50 employees
Actual hours expected to be worked per four week	8,000 hours
Standard hours expected to be earned per four week	9,600 hours
Actual hours worked in the four week period	7,500 hours
Standard hours earned in the four week period	8,800 hours

The related period is of four weeks. Calculate the following Ratios :

(i) Efficiency Ratio
(ii) Activity Ratio
(iii) Standard Capacity Usage Ratio
(iv) Actual Capacity Usage Ratio
(v) Actual Usage of Budgeted Capacity Ratio

Ans.

(i) Efficiency Ratio:

$$= \frac{\text{Standard Hrs}}{\text{Actual Hrs}} \times 100 \qquad = \frac{8800 \text{ hours}}{7500 \text{ hours}} \times 100 \qquad = \mathbf{117.33\%}$$

(ii) Activity Ratio:

$$= \frac{\text{Standard Hrs}}{\text{Budgeted Hrs}} \times 100 \qquad = \frac{8800 \text{ hours}}{8000 \text{ hours}} \times 100 \qquad = \mathbf{110\%}$$

(iii) Standard Capacity Usage Ratio:

$$= \frac{\text{Budgeted Hours}}{\text{Max. possible hours in the budgeted period}} \times 100$$

$$= \frac{8000 \text{ hours}}{9600 \text{ hours}} \times 100 = 83.33\%$$

(iv) Actual Capacity Usage Ratio:

$$= \frac{\text{Actual Hours worked}}{\text{Max. possible working hours in a period}}$$

$$= \frac{7500 \text{hours}}{9600 \text{hours}} \times 100 \quad = \mathbf{78.125\%}$$

(v) Actual Usage of Budgeted Capacity Ratio:

$$= \frac{\text{Actual working Hours}}{\text{Budgeted Hours}} \times 100 \qquad = \frac{7500 \text{hours}}{8000 \text{hours}} \times 100 \quad = \mathbf{93.75\%}$$

Working Notes:

1. Maximum Capacity in a budget period
   = 60 Employees × 8 Hrs. × 5 Days × 4 Weeks = 9,600 Hrs.
2. Budgeted Hours (Hrs)
   = 50 Employees × 8 Hrs. × 5 Days × 4 Weeks = 8,000 Hrs.
3. Actual Hrs. = 7,500 Hrs. (given)
4. Standard Hrs. for Actual Output = 8,800 Hrs.

Q.139 Budget ratios | MTP May 20

ZX Ltd. has furnished the following information:

	Budgeted	Actual March 2020
Number of working days	25	27
Production (in units)	20,000	22,000
Fixed Overheads	Rs. 3,00,000	Rs. 3,10,000

Budgeted fixed overhead rate is Rs. 10.00 per hour. In March 2020, the actual hours worked were 31,500. In relation to fixed overheads, CALCULATE:

(i) Efficiency Variance
(ii) Capacity Variance
(iii) Calendar Variance
(iv) Volume Variance
(v) Expenditure Variance

Ans.

(1) Budgeted Hours = $\frac{Rs.3,00,000}{Rs.10 \text{ per hour}}$ = 30,000 hours

(2) Standard Fixed Overhead rate per hour (Standard Rate):
$= \frac{\text{Budgeted fixed overheads}}{\text{Budgeted Hours}} = \frac{Rs.3,00,000}{30,000 hours}$ = Rs.10.00

(3) Standard hour per unit of output = $\frac{30,000 hours}{20,000 units}$ = 1.5 hours

(4) Standard hours for Actual Output = 22,000 units × 1.5 hours = 33,000 Hours

(5) Budgeted Overhead per day for budgeted days= $\frac{Rs.3,00,000}{25 \text{ days}}$ = Rs.12, 000

(6) Budgeted Overhead for actual days worked = Rs.12,000 × 27 days = Rs.3,24,000

(7) Budgeted Hours for Actual days worked = $\frac{30,000 hours}{25 \text{ days}}$ = 32,400 hours

Computation of Variances in relation to Fixed Overheads:

(i) Efficiency Variance
= Standard Rate × (Standard hours for actual output – Actual hours worked)
= Rs.10 (33,000 hours – 31,500 hours) = Rs.15,000 (Favourable)

(ii) Capacity Variance
= Standard Rate × (Actual Hours – Budgeted Hours for actual days worked)
= Rs.10 (31,500 hours – 32,400 hours) = Rs.9,000 (Adverse)

(iii) Calendar Variance
= Standard/Budgeted Fixed Overhead Rate per day × (Actual Working days – Budgeted working days)
= Rs.12,000 (27 days – 25 days) = Rs.24,000 (Favourable)

(iv) Volume Variance
= Standard Rate × (Standard hours – Budgeted hours)
= Rs.10 (33,000 hours – 30,000 hours) = Rs.30,000 (Favourable)

(v) Expenditure Variance
= Budgeted Overheads – Actual Overheads
= Rs.3,00,000 – Rs.3,10,000 = Rs.10,000 (Adverse)

Note: Overhead Variances may also be calculated based on output.

Q.140 Budget & Productwise profit | RTP Nov 20

The information of Z Ltd. for the year ended 31st March 2020 is as below:

	Amount (₹)
Direct materials	17,50,000
Direct wages	12,50,000
Variable factory overhead	9,50,000
Fixed factory overhead	12,00,000
Other variable costs	6,00,000
Other fixed costs	4,00,000
Profit	8,50,000
Sales	70,00,000

During the year, the company manufactured two products, X and Y, and the output and cost were:

	X	Y
Output (units)	8,000	4,000
Selling price per unit (₹)	600	550
Direct material per unit (₹)	140	157.50
Direct wages per unit (₹)	90	132.50

Variable factory overheads are absorbed as a percentage of direct wages and other variable costs are computed as:

Product X – ₹40 per unit and Product Y- ₹70 per unit.

For the FY 2020-21, due to a pandemic, it is expected that demand for product X and Y will fall by 20% & 10% respectively. It is also expected that direct wages cost will raise by 20% and other fixed costs by 10%. Products will be required to be sold at a discount of 20%.

You are required to:

(i) PREPARE product- wise profitability statement on marginal costing method for the FY 2019-20 and

(ii) PREPARE a budget for the FY 2020-21.

Ans. **(i) Product-wise Profitability Statement for the FY 2019-20:**

Particulars	Product-X (₹)	Product-Y (₹)	Total (₹)
Output (units)	8,000	4,000	
Selling price per unit	600	550	
Sales value	48,00,000	22,00,000	70,00,000
Direct material	11,20,000	6,30,000	17,50,000
	(₹140×8,000)	(₹157.50×4,000)	
Direct wages	7,20,000	5,30,000	12,50,000
	(₹90×8,000)	(₹132.5×4,000)	
Variable factory overheads	5,47,200	4,02,800	9,50,000
	(76%of 7,20,000)	(76%of 5,30,000)	
Other variable costs	3,20,000	2,80,000	6,00,000
	(₹40×8,000)	(₹70×4,000)	
Contribution	20,92,800	3,57,200	24,50,000
Fixed factory overheads	-	-	12,00,000

Other fixed costs	-	-	4,00,000
Profit			8,50,000

(ii) Preparation of Budget for the FY 2020-21:

Particulars	Product-X (₹)	Product-Y (₹)	Total (₹)
Output (units)	6,400 (8,000×80%)	3,600 (4,000×90%)	
Selling price per unit	480 (600×80%)	440 (550×80%)	
Sales value	30,72,000	15,84,000	46,56,000
Direct material	8,96,000 (₹140×6,400)	5,67,000 (₹157.50×3,600)	14,63,000
Direct wages per unit	6,91,200 (₹108×6,400)	5,72,400 (₹159×3,600)	12,63,600
Variable factory overheads	5,25,312 (76%of 6,91,200)	4,35,024 (76%of 5,72,400)	9,60,336
Other variable costs	2,56,000 (₹40×6,400)	2,52,000 (₹70×3,600)	5,08,000
Contribution	7,03,488	(2,42,424)	4,61,064
Fixed factory overheads	-	-	12,00,000
Other fixed costs (110%of ₹4,00,000)	-	-	4,40,000
Profit/ (Loss)			**(11,78,936)**

Q.141 Current Year & next year | PY May 23

PQR Limited manufactures three products - Product X, Product Y and Product Z. The output for the current year is 2,50,000 units of Product X, 2,80,000 units of Product Y and 3,20,000 units of Product Z respectively.
Selling price of Product X is 1.25 times of Product Z whereas Product Y can be sold at double the price at which product Z can be sold. Product Z can be sold at a profit of 20% on its marginal cost.
Other information are as follows:

	Product X	Product Y	Product Z
Direct Material Cost (Per unit)	₹ 20	₹ 20	₹ 20
Direct Wages Cost (per unit)	₹ 16	₹ 24	₹ 16

Raw material used for manufacturing all the three products is the same. Direct Wages are paid @ ₹ 4 per labour hour, Total overhead cost of the company is ₹ 52,80,000 for the year, out of which ₹ 1 per labour hour is variable and the rest is fixed.
In the next year it is expected that sales of product X and product Z will increase by 12% and 15% respectively and sale of product Y will decline by 5%. The total overhead cost of the company for the next year is estimated at ₹ 55,08,000. The variable cost of ₹ 1 per labour hour remains unchanged.
It is anticipated that all other costs will remain same for the next year and there is opening and closing stock. Selling Price per unit of each product will remain unchanged in the next year.
Required:

Prepare a budget showing the current position and the position for the next year clearly indicating the total product-wise contribution and profit for the company as a whole.

Ans. **(i) Budget showing current position of total product wise contribution and profitability**

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)
A	Direct material cost (per unit)	20	20	20	
B	Direct wages cost (per unit)	16	24	16	
C	Variable overhead per unit (Refer WN-1)	4	6	4	
D	Total variable cost/ Marginal cost per unit [A+B+C]	40	50	40	
E	Add: Profit [20% of D]	-	-	8	
F	Selling price unit [D+E]	-	-	48	
G	Price weight	1.25	2	1	
H	Selling price per unit [Selling price of Product Z × G]	60	96	48	
I	Contribution per unit [H-D]	20	46	8	
J	Quantity to be sold	2,50,000	2,80,000	3,20,000	
K	Total Contribution [J×I]	50,00,000	1,28,80,000	25,60,000	2,04,40,000
L	Fixed Overheads [Refer WN-1]				13,20,000
M	Profit				1,91,20,000

Working Notes:

1. Segregation of Overheads into variable and fixed in current year

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)
A	Total overhead cost	-	-	-	52,80,000
B	Labour hour per unit [Direct wages Cost ÷ Re.1]	4	6	4	
C	Quantity produced	2,50,000	2,80,000	3,20,000	
D	Total variableoverhead cost [B×C]	10,00,000	16,80,000	12,80,000	39,60,000
E	Fixed overhead cost[A-D]				13,20,000

(ii) Budget showing next year's position of total product wise contribution and Profitability

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)
A	Selling price per unit	60	96	48	
B	Contribution per unit	20	46	8	

C	Quantity to be sold	2,80,000 [112% of 2,50,000]	2,66,000 [95% of 2,80,000]	3,68,000 [115% of 3,20,000]	
D	Total Contribution [B×C]	56,00,000	1,22,36,000	29,44,000	2,07,80,000
	Fixed Overheads [Refer WN 2]				13,20,000
	Profit				1,94,60,000

Working Notes:

2. Segregation of Overheads into variable and fixed in next year

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)
A	Total overhead cost	-	-	-	55,08,000
B	Labour hour per unit [Direct wages Cost ÷ Re.1]	4	6	4	
C	Quantity produced	2,80,000	2,66,000	3,68,000	
D	Total variableoverhead cost [B×C]	**11,20,000**	**15,96,000**	**14,72,000**	**41,88,000**
E	Fixed overhead cost[A-D]				13,20,000

Q.142 Current r/s New Budget | RTP Dec 21

The accountant of manufacturing company provides you the following details for year 2019- 20:

Particulars	(₹)
Direct materials	28,00,000
Direct Wages	16,00,000
Fixed factory overheads	16,00,000
Variable factory overheads	16,00,000
Other variable costs	12,80,000
Other fixed costs	12,80,000
Profit	18,40,000
Sales	1,20,00,000

During the year, the company manufactured two products A and B and the output and costs were:

Particulars	A	B
Output (units)	2,00,000	1,00,000
Selling price per unit	₹ 32.00	₹ 56.00
Direct materials per unit	₹ 8.00	₹ 12.00
Direct wages per unit	₹ 4.00	₹ 8.00

Variable factory overhead is absorbed as a percentage of direct wages. Other variable costs have been computed as: Product A ₹ 4.00 per unit; and B ₹ 4.80 per unit.

During 2020-21, it is expected that the demand for product A will fall by 25% and for B by 50%. It is decided to manufacture a new product C, the cost for which is estimated as follows:

Particulars	Product C
Output (units)	2,00,000
Selling price per unit	₹ 28.00
Direct materials per unit	₹ 6.40
Direct wages per unit	₹ 4.00

It is anticipated that the other variable costs per unit of Product C will be same as for product A.
PREPARE a budget to present to the management, showing the current position and the position for 2020-21.
COMMENT on the comparative results.

Ans. **Budget Showing Current Position and Position for 2020-21**

	Position for 2019-20			Position for 2020-21			
	A	B	Total (A+B)	A	B	C	Total (A+B+C)
Sales (units)	2,00,000	1,00,000	-	1,50,000	50,000	2,00,000	-
	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)
(A) Sales	**64,00,000**	**56,00,000**	**1,20,00,000**	**48,00,000**	**28,00,000**	**56,00,000**	**1,32,00,000**
Direct Material	16,00,000	12,00,000	28,00,000	12,00,000	6,00,000	12,80,000	30,80,000
Direct wages	8,00,000	8,00,000	16,00,000	6,00,000	4,00,000	8,00,000	18,00,000
Factory overhead (variable)	8,00,000	8,00,000	16,00,000	6,00,000	4,00,000	8,00,000	18,00,000
Other variable costs	800,000	4,80,000	12,80,000	6,00,000	240,000	8,00,000	16,40,000
(B) Marginal Cost	40,00,000	32,80,000	72,80,000	30,00,000	16,40,000	36,80,000	83,20,000
(C) Contribution (A-B)	**24,00,000**	**23,20,000**	**47,20,000**	**18,00,000**	**11,60,000**	**19,20,000**	**48,80,000**
Fixed costs							
- Factory			16,00,000				16,00,000
- Others			12,80,000				12,80,000
(D) Total fixed cost			28,80,000				28,80,000
Profit (C - D)			**18,40,000**				**20,00,000**

Comments: Introduction of Product C is likely to increase profit by ₹ 1,60,000 (i.e. from ₹ 18,40,000 to ₹ 20,00,000) in 2020-21 as compared to 2019-20 even if the demand for Product A & B falls. Therefore, introduction of product C is recommended.

Q.143 Flexible budget | PY Dec 21

The Accountant of KPMR Ltd. has prepared the following budget for the coming year 2022 for its two products 'AYE' and 'ZYE':

Particulars	Product 'AYE'	Product 'ZYE'
Production and Sales (in Units)	4,000	3,000
	Amount (in ₹)	Amount (in ₹)
Selling Price per unit	200	180
Direct Material per unit	80	70
Direct Labour per unit	40	35

Variable Overhead per unit	20	25
Fixed Overhead per unit	10	10

After reviewing the above budget, the management has called the marketing team for suggesting some measures for increasing the sales. The marketing team has suggested that by promoting the products on social media, the sales quantity of both the products can be increased by 5%. Also, the selling price per unit will go up by 10%. But this will result in increase in expenditure on variable overhead and fixed overhead by 20% and 5% respectively for both the products.

You are required to prepare flexible budget for both the products:

(i) Before promotion on social media,

(ii) After promotion on social media.

Ans. (i) Flexible Budget (before promotion)

	Particulars	Product 'AYE'	Product 'ZYE'	Total
	Production & Sales (units)	4,000	3,000	
		Amount (₹)	Amount (₹)	Amount (₹)
A.	Sales Value	8,00,000 (₹ 200×4,000)	5,40,000 (₹ 180×3,000)	13,40,000
B.	Direct Materials	3,20,000 (₹ 80 × 4,000)	2,10,000 (₹70 × 3,000)	5,30,000
C.	Direct labour	1,60,000 (₹ 40 × 4,000)	1,05,000 (₹ 35 × 3,000)	2,65,000
D.	Variable Overheads	80,000 (₹ 20 × 4,000)	75,000 (₹ 25 × 3,000)	1,55,000
E.	Total Variable Cost (B+C+D)	5,60,000	3,90,000	9,50,000
F.	Contribution (A-E)	2,40,000	1,50,000	3,90,000
G.	Fixed Overhead	40,000 (₹10 × 4,000)	30,000 (₹10 × 3,000)	70,000
H.	Profit (F-G)	2,00,000	1,20,000	3,20,000
	Profit per unit	50	40	

(ii) Flexible Budget (after promotion)

	Particulars	Product 'AYE'	Product 'ZYE'	Total
	Production & Sales (units)	4,200 (4,000×105%)	3,150 (3,000×105%)	
		Amount (₹)	Amount (₹)	Amount (₹)
A.	Sales Value	9,24,000 (₹ 220 × 4,200)	6,23,700 (₹ 198 × 3,150)	15,47,700
B.	Direct Materials	3,36,000 (₹ 80 × 4,200)	2,20,500 (₹ 70 × 3,150)	5,56,500
C.	Direct labour	1,68,000 (₹ 40 × 4,200)	1,10,250 (₹ 35 × 3,150)	2,78,250
D.	Variable Overheads	1,00,800	94,500	1,95,300

		(₹ 24 × 4,200)	(₹ 30 × 3,150)	
E.	Total Variable Cost (B+C+D)	6,04,800	4,25,250	10,30,050
F.	Contribution (A-E)	3,19,200	1,98,450	5,17,650
G.	Fixed Overhead	42,000 (₹ 40,000 × 105%)	31,500 (₹ 30,000 × 105%)	73,500
H.	Profit (F-G)	2,77,200	1,66,950	4,44,150
	Profit per unit	66	53	

Q.144 Flexible budget | RTP May 19

S Ltd. has prepared budget for the coming year for its two products A and B.

	Product A (₹)	Product B (₹)
Production & Sales unit	6,000 units	9,000 units
Raw material cost per unit	60.00	42.00
Direct labour cost per unit	30.00	18.00
Variable overhead per unit	12.00	6.00
Fixed overhead per unit	8.00	4.00
Selling price per unit	120.00	78.00

After some marketing efforts, the sales quantity of the Product A & B can be increased by 1,500 units and 500 units respectively but for this purpose the variable overhead and fixed overhead will be increased by 10% and 5% respectively for the both products.

You are required to PREPARE flexible budget for both the products:

(a) Before marketing efforts

(b) After marketing efforts.

Ans. **(a) Flexible Budget before marketing efforts:**

	Product A (₹) 6,000 units		Product B (₹) 9,000 units	
	Per unit	Total	Per unit	Total
Sales	120.00	7,20,000	78.00	7,02,000
Raw material cost	60.00	3,60,000	42.00	3,78,000
Direct labour cost per unit	30.00	1,80,000	18.00	1,62,000
Variable overhead per unit	12.00	72,000	6.00	54,000
Fixed overhead per unit	8.00	48,000	4.00	36,000
Total cost	110.00	6,60,000	70.00	6,30,000
Profit	10.00	60,000	8.00	72,000

(b) Flexible Budget after marketing efforts:

	Product A (₹)	Product B (₹)

	7,500 units		9,500 units	
	Per unit	Total	Per unit	Total
Sales	120.00	9,00,000	78.00	7,41,000
Raw material cost	60.00	4,50,000	42.00	3,99,000
Direct labour cost per unit	30.00	2,25,000	18.00	1,71,000
Variable overhead per unit	13.20	99,000	6.60	62,700
Fixed overhead per unit	6.72	50,400	3.98	37,800
Total cost	109.92	8,24,400	70.58	6,70,500
Profit	10.08	75,600	7.42	70,500

Q.145 Flexible Sales Budget | RTP May 22

Maharatna Ltd., a public sector undertaking (PSU), produces product A. The company is in process of preparing its revenue budget for the year 2022. The company has the following information which can be useful in preparing the budget:

(i) It has anticipated 12% growth in sales volume from the year 2021 of 4,20,000 tonnes.

(ii) The sales price of ₹23,000 per tonne will be increased by 10% provided Wholesale Price Index (WPI) increases by 5%.

(iii) To produce one tonne of product A, 2.3 tonnes of raw material are required. The raw material cost is ₹4,500 per tonne. The price of raw material will also increase by 10% if WPI increase by 5%.

(iv) The projected increase in WPI for 2022 is 4%

(v) A total of 6,000 employees works for the company. The company works 26 days in a month.

(vi) 85% of employees of the company are permanent and getting salary as per 5- year wage agreement. The earnings per manshift (means an employee cost for a shift of 8 hours) is ₹ 3,000 (excluding terminal benefits). The new wage agreement will be implemented from 1st July 2022 and it is expected that a 15% increase in pay will be given.

(vii) The casual employees are getting a daily wage of ₹ 850. The wages in linked to Consumer Price Index (CPI). The present CPI is 165.17 points and it is expected to be 173.59 points in year 2022.

(viii) Power cost for the year 2021 is ₹ 42,00,000 for 7,00,000 units (1 unit = 1 Kwh). 60% of power is used for production purpose (directly related to production volume) and remaining are for employee quarters and administrative offices.

(ix) During the year 2021, the company has paid ₹ 60,00,000 for safety and maintenance works. The amount will increase in proportion to the volume of production.

(x) During the year 2021, the company has paid ₹ 1,20,000 for the purchase of diesel to be used in car hired for administrative purposes. The cost of diesel will increase by 15% in year 2022.

(xi) During the year 2021, the company has paid ₹ 6,00,000 for car hire charges (excluding fuel cost). In year 2022, the company has decided to reimburse the diesel cost to the car rental company. Doing this will attract 5% GST on Reverse Charge Mechanism (RCM) basis on which the company will not get GST input credit.

(xii) Depreciation on fixed assets for the year 2021 is ₹ 80,40,00,000 and it will be 15% lower in 2022.

Required:

From the above information PREPARE Revenue (Flexible) budget for the year 2022 and also show the budgeted profit/ loss for the year.

Ans. **Revenue Budget (Flexible Budget) of Maharatna Ltd. for the Year 2022**

	Particulars	PY 2021	CY 2022
A	Sales Volume (Tonnes)	4,20,000	4,70,400 [112%×4,20,000]

B	Selling Price per tonne (₹)	23,000	23,000
		(₹ in lakh)	**(₹ in lakh)**
C	**Sales value [A×B]**	**96,600**	**1,08,192**
D	**Raw material Cost:**		
(i)	Qty. of Material [2.3 tonnes × A] (tonnes)	9,66,000	10,81,920
(ii)	Price per tonne (₹)	4,500	4,500
(iii)	**Total raw material cost (₹ in lakh) [(i)×(ii)]**	**43,470**	**48,686.40**
E	**Wages & Salary Cost:**		
(i)	Wages to casual employees (15% × 6,000 = 900 employees)	2,386.80 [900 × 26 × 12 × ₹ 850]	2,508.47 [900 × 26 × 12 × ₹ 893.33]
(ii)	Salary to permanent employees (85% × 6,000 = 5,100 employees)	47,736 [5100 × 26 × 12 × ₹ 3,000]	51,316.20 [(5100 × 26 × 6 × ₹ 3,000) + (5100 × 26 × 6 × ₹ 3,450)]
(iii)	**Total wages & salary [(i)+(ii)]**	**50,122.80**	**53,824.67**
F	**Power cost:**		
(i)	For production (units)	4,20,000 [60% × 7,00,000]	4,70,400 [112% × 4,20,000]
(ii)	For employees & offices (units) [40% × 7,00.000]	2,80,000	2,80,000
(iii)	Total Power consumption (units) [(i)+(ii)]	7,00,000	7,50,400
(iv)	Power rate per unit (₹) [₹42,00,000 ÷ 7,00,000]	6.00	6.00
(v)	Total power cost [(iii)×(iv)]	**42**	**45.024**
G	**Safety and maintenance Cost**	**60**	**67.20 [112% × 60,00,000]**
H	**Diesel cost**	**1.2**	**-**
I	**Car Hire charge:**		
(i)	Car hire charge	6	6
(ii)	Fuel reimbursement cost	-	1.38 [115% × 1.2]
(iii)	GST@5% on RCM basis [5%×(i+ii)]	-	0.369
(iv)	**Total Car hire charge cost [(i)+(ii)+(iii)]**	**6**	**7.749**
J	**Depreciation**	**8,040**	**6,834 [85% × 8040]**
K	**Total Cost [Sum of D to J]**	**1,01,742**	**1,09,465.043**
L	**Profit/ (Loss) [C-L]**	**(5,142)**	**(1273.043)**

Q.146 Master Budget | MTP May 22

F Ltd. requires you to PREPARE the Master budget for the next year from the following information:

Sales	₹ 1,20,00,000
Direct material cost	60% of sales
Direct wages	20 workers @ ₹ 2,250 per month

Factory overheads:	
Indirect labour –	
Works manager	₹ 7,500 per month
Foreman	₹ 6,000 per month
Stores and spares	2.5% on sales
Depreciation on machinery	₹ 1,89,000
Light and power (fixed)	₹ 45,000
Repairs and maintenance	₹ 1,20,000
Other sundries	10% on direct wages
Administration, selling and distribution expenses	₹ 5,40,000 per year

Ans. **Master Budget for the year ending**

Particulars		Amount (₹)	Amount (₹)
Sales			1,20,00,000
Less: Cost of production:			
Direct materials (60% of ₹ 1,20,00,000)		72,00,000	
Direct wages (20 workers × ₹ 2,250 × 12 months)		5,40,000	
Prime Cost		77,40,000	
Fixed Factory Overhead:			
Works manager's salary (7,500 × 12)	90,000		
Foreman's salary (6,000 × 12)	72,000		
Depreciation	1,89,000		
Light and power	45,000	3,96,000	
Variable Factory Overhead:			
Stores and spares (2.5% of ₹ 1,20,00,000)	3,00,000		
Repairs and maintenance	1,20,000		
Sundry expenses (10% of ₹ 5,40,000)	54,000	4,74,000	
Works Cost			86,10,000
Gross Profit (Sales – Works cost)			33,90,000
Less: Adm., selling and distribution expenses			5,40,000
Net Profit			28,50,000

Q.147 Production & Purchase budge | RTP May 18 

G Ltd. manufactures two products called 'M' and 'N'. Both products use a common raw material Z. The raw material Z is purchased @ ₹ 36 per kg from the market. The company has decided to review inventory management policies for the forthcoming year.

The following information has been extracted from departmental estimates for the year ended 31st March 2018 (the budget period):

	Product M	Product N

Sales (units)	28,000	13,000
Finished goods stock increase by year-end	320	160
Post-production rejection rate (%)	4	6
Material Z usage (per completed unit, net of wastage)	5 kg	6 kg
Material Z wastage (%)	10	5

Additional information:

- Usage of raw material Z is expected to be at a constant rate over the period.
- Annual cost of holding one unit of raw material in stock is 11% of the material cost.
- The cost of placing an orders is ₹ 320 per order.
- The management of G Ltd. has decided that there should not be more than 40 orders in a year for the raw material Z.

Required:

(i) PREPARE functional budgets for the year ended 31st March 2018 under the following headings:

(a) Production budget for Products M and N (in units).

(b) Purchases budget for Material Z (in kgs and value).

(ii) CALCULATE the Economic Order Quantity for Material Z (in kgs).

(iii) If there is a sole supplier for the raw material Z in the market and the supplier do not sale more than 4,000 kg. of material Z at a time. Keeping the management purchase policy and production quantity mix into consideration, CALCULATE the maximum number of units of Product M and N that could be produced.

Ans. **(i) (a) Production Budget (in units) for the year ended 31st March 2016**

	Product M	Product N
Budgeted sales (units)	28,000	13,000
Add: Increase in closing stock	320	160
No. good units to be produced	28,320	13,160
Post production rejection rate	4%	6%
No. of units to be produced	29,500 $\left(\frac{28320}{0.96}\right)$	14,000 $\left(\frac{13160}{0.94}\right)$

(b) Purchase budget (in kgs and value) for Material Z

	Product M	Product N
No. of units to be produced	29,500	14,000
Usage of Material Z per unit of production	5 kg.	6 kg.
Material needed for production	1,47,500 kg.	84,000 kg.
Materials to be purchased	1,63,889 kg. $\left(\frac{147500}{0.90}\right)$	88,421 kg. $\left(\frac{84000}{0.95}\right)$
Total quantity to be purchased	2,52,310 kg.	
Rate per kg. of Material Z	₹36	
Total purchase price	₹90,83,160	

(ii) Calculation of Economic Order Quantity for Material Z

$$EOQ = \sqrt{\frac{2x252310kg.x320}{36x11\%}} = \sqrt{\frac{161478400}{3.96}} = 6385.72kg.$$

(iii) Since, the maximum number of order per year can not be more than 40 orders and the maximum quantity per order that can be purchased is 4,000 kg. Hence, the total quantity of Material Z that can be available for production:
= 4,000 kg. × 40 orders = 1,60,000 kg.

	Product M	Product N
Material needed for production to maintain the same production mix	1,03,929 kg. $\left(160000x\frac{163889}{252310}\right)$	56,071 kg. $\left(160000x\frac{88421}{252310}\right)$
Less: Process wastage	10,393 kg.	2,804 kg.
Net Material available forproduction	93,536 kg.	53,267 kg.
Units to be produced	18,707 units $\left(\frac{93536kg.}{5kg.}\right)$	8,878 units $\left(\frac{53267kg.}{6kg.}\right)$

Q.148 Material Purchase Budget | RTP May 23

EDF Ltd. produces two products using Skilled labour and two types of materials. Shown below the information for the next month's budget:

	Product- A	Product-B
Budgeted sales (in units)	4,080	6,120
Budgeted material consumption per unit (in kg):		
Material-X	8.5	5.1
Material-Y	6.8	10.2
Standard labour hours allowed per unit of product	5.1	8.5

Material-X and Material-Y cost ₹8 and ₹10 per kg and labours are paid ₹30 per hour. Overtime premium is 75% and is payable, if a worker works for more than 45 hours a week. There are 400 direct workers.
The target efficiency ratio for the productive hours worked by the direct workers in actually manufacturing the products is 85%. In addition the non-productive down-time is budgeted at 15% of the productive hours worked.
There are four 6-days weeks in the budgeted period and it is anticipated that sales and production will occur evenly throughout the whole period.
It is anticipated that stock at the beginning of the period will be:

Product-A	550 units
Product-B	350 units
Material-X	1,200 kgs.
Material-Y	600 kgs.

The anticipated closing stocks for budget period are as below:

Product-A	5 days sales
Product-B	5 days sales
Material-X	10 days consumption
Material-Y	5 days consumption

CALCULATE the Material Purchase Budget and the Wages Budget for the direct workers, showing the quantities and values, for the next month.

Ans. Number of days in budget period = 4 weeks × 6 days = 24 days

Number of units to be produced

	Product-A (units)	Product-B (units)
Budgeted Sales	4,080	6,120
Add: Closing stock	850	1275
	$\left(\frac{4080 \text{ units}}{24 \text{ days}} \times 5 \text{ days}\right)$	$\left(\frac{6120 \text{ units}}{24 \text{ days}} \times 5 \text{ days}\right)$
	550	350
Less: Opening stock	4,380	7,045
(i) Material Purchase Budget	**Material-X (Kg.)**	**Material-Y (Kg.)**
Material required:		
Product-A	37,230	
	(4,380 units × 8.5 kg.)	29,784
Product-B	35,930	(4,380 units × 6.8 kg.)
	(7,045 units × 5.1 kg.)	71,859
	73,160	(7,045 units × 10.2 kg.)
Add: Closing stock	30,483	1,01,643
	$\left(\frac{73160 \text{ kgs.}}{24 \text{ days}} \times 10 \text{days}\right)$	21,176
Less: Opening stock Quantity to be purchased Rate per kg. of Material	1,200	$\left(\frac{101643 \text{ kgs.}}{24 \text{ days}} \times 5 \text{ days}\right)$
	1,02,443	600
	8	1,22,219
	8,19,541	10
Total Cost	**Product-A (Hours)**	12,22,186
(ii) Wages Budget	4,380	**Product-B (Hours)**
Units to be produced	5.1	7,045
Standard hours allowed per unit	22,338	8.5
Total Standard Hours allowed		59,883
Productive hours required for production	$\frac{22338 \text{ hours}}{85\%} \times 26280$	$\frac{59883 \text{ hours}}{85\%} \times 70450$
Add: Non-Productive down time hours	3942 (15% of 26,280 hours)	10568 (15% of 70,450 hours)
Hours to be paid	30,222	81,018
Total Hours to be paid =	1,11,240	
Hours to be paid at normal rate (4 weeks × 45 hours × 400 workers) =	72000	
Hours to be paid at premium rate	39,240	
Total wages to be paid = (72,000 hours × ₹30 + 39,240 hours × ₹ 52.5)	= ₹ 21,60,000 + ₹ 20,60,100 = ₹ 42,20,100	

Q.149 Production/Purchase Rm Bud | MTP Nov 19

V Ltd. produces and markets a very popular product called 'X'. The company is interested in presenting its budget for the second quarter of 2019.

The following information are made available for this purpose:

(i) It expects to sell 50,000 bags of 'X' during the second quarter of 2019 at the selling price of Rs. 900 per bag.

(ii) Each bag of 'X' requires 2.5 kgs. of a raw – material called 'Y' and 7.5 kgs. of raw – material called 'Z'.

(iii) Stock levels are planned as follows:

Particulars	Beginning of Quarter	End of Quarter
Finished Bags of 'X' (Nos.)	15,000	11,000
Raw – Material 'Y' (Kgs.)	32,000	26,000
Raw – Material 'Z' (Kgs.)	57,000	47,000
Empty Bag (Nos.)	37,000	28,000

(iv) 'Y' cost Rs.120 per Kg., 'Z' costs Rs.20 per Kg. and 'Empty Bag' costs Rs.80 each.

(v) It requires 9 minutes of direct labour to produce and fill one bag of 'X'. Labour cost is Rs.50 per hour.

(vi) Variable manufacturing costs are Rs.45 per bag. Fixed manufacturing costs Rs.30,00,000 per quarter.

(vii) Variable selling and administration expenses are 5% of sales and fixed administration and selling expenses are Rs.20,50,000 per quarter.

Required

(i) PREPARE a production budget for the said quarter.

(ii) PREPARE a raw – material purchase budget for 'Y', 'Z' and 'Empty Bags' for the said quarter in quantity as well as in rupees.

(iii) COMPUTE the budgeted variable cost to produce one bag of 'X'.

(iv) PREPARE a statement of budgeted net income for the said quarter and show both per unit and total cost data.

Ans.

(i) Production Budget of 'X' for the Second Quarter

Particulars	Bags (Nos.)
Budgeted Sales	50,000
Add: Desired Closing stock	11,000
Total Requirements	61,000
Less: Opening stock	15,000
Required Production	46,000

(ii) Raw-Materials Purchase Budget in Quantity as well as in Rs. for 46,000 Bags of 'X'

Particulars	'Y' Kgs.	'Z' Kgs.	Empty Bags Nos.
Production Requirements Per bag of 'X'	2.5	7.5	1.0
Requirement for Production	1,15,000 (46,000 × 2.5)	3,45,000 (46,000 × 7.5)	46,000 (46,000 × 1)
Add: Desired Closing Stock	26,000	47,000	28,000

Total Requirements	1,41,000	3,92,000	74,000
Less: Opening Stock	32,000	57,000	37,000
Quantity *to be purchased*	1,09,000	3,35,000	37,000
Cost per Kg./Bag	Rs.120	Rs.20	Rs.80
Cost of Purchase (Rs.)	1,30,80,000	67,00,000	29,60,000

(iii) Computation of Budgeted Variable Cost of Production of 1 Bag of 'X'

Particulars	(Rs.)
Raw – Material	
Y 2.5 Kg @120	300.00
Z 7.5 Kg. @20	150.00
Empty Bag	80.00
Direct Labour(Rs.50× 9 minutes / 60 minutes)	7.50
Variable Manufacturing Overheads	45.00
Variable Cost of Production *per bag*	582.50

(iv) Budgeted Net Income for the Second Quarter

Particulars	Per Bag (Rs.)	Total (Rs.)
Sales Value (50,000 Bags)	900.00	4,50,00,000
Less: Variable Cost:		
Production Cost	582.50	2,91,25,000
Admn. & Selling Expenses (5% of Sales Price)	45.00	22,50,000
Budgeted Contribution	272.50	1,36,25,000
Less: Fixed Expenses:		
Manufacturing		30,00,000
Admn. & Selling		20,50,000
Budgeted Net Income		85,75,000

Q.150 Sales Budget | RTP Nov 23

XY Co. Ltd manufactures two products viz., X and Y and sells them through two divisions, East and West. For the purpose of Sales Budget to the Budget Committee, following information has been made available for the year 2022-23:

Product	Budgeted Sales		Actual Sales	
	East Division	West Division	East Division	West Division
X	400 units at ₹ 9	600 units at ₹ 9	500 units at ₹ 9	700 units at ₹ 9
Y	300 units at ₹ 21	500 units at ₹ 21	200 units at ₹ 21	400 units at ₹ 21

Adequate market studies reveal that product X is popular but underpriced. It is expected that if the price of X is increased by ₹ 1, it will, find a ready market. On the other hand, Y is overpriced and if the price of Y is reduced

by ₹ 1 it will have more demand in the market. The company management has agreed for the aforesaid price changes. On the basis of these price changes and the reports of salesmen, following estimates have been prepared by the Divisional Managers:

Percentage increase in sales over budgeted sales

Product	East Division	West Division
X	+ 10%	+ 5%
Y	+ 20%	+ 10%

With the help of intensive advertisement campaign, following additional sales (over and above the above mentioned estimated sales by Divisional Mangers) are possible:

Product	East Division	West Division
X	**60 units**	**70 units**
Y	40 units	50 units

You are required to prepare Sales Budget for 2023-24 after incorporating above estimates and also show the Budgeted Sales and Actual Sales of 2022-23.

Ans. **Statement Showing Sales Budget for 2023-24**

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	5001	10	5,000	4003	20	8,000	13,000
West	7002	10	7,000	6004	20	12,000	19,000
Total	1,200		12,000	1,000		20,000	32,000

Workings

1. 400 × 110% + 60 = 500 units
2. 600 × 105% + 70 = 700 units
3. 300 × 120% + 40 = 400 units
4. 500 × 110% + 50 = 600 units

Statement Showing Sales Budget for 2022-23

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	400	9	3,600	300	21	6,300	9,900
West	600	9	5,400	500	21	10,500	15,900
Total	1,000		9,000	800		16,800	25,800

Statement Showing Actual Sales for 2022-23

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	500	9	4,500	200	21	4,200	8,700
	700	9	6,300	400	21	8,400	14,700
Total	1,200		10,800	600		12,600	23,400

Q.151 Sales/ Production/ Rm budget | PY July 21

PSV Ltd. manufactures and sells a single product and estimated the following related information for the period November, 2020 to March, 2021.

Particulars	November, 2020	Decembe, 2020	January, 2021	February, 2021	March, 2021
Opening Stock of Finished Goods (in Units)	7,500	3,000	9,000	8,000	6,000
Sales (in Units)	30,000	35,000	38,000	25,000	40,000
Selling Price per unit (in ₹)	10	12	15	15	20

Additional Information:

- Closing stock of finished goods at the end of March, 2021 is 10,000 units.
- Each unit of finished output requires 2 kg of Raw Material 'A' and 3 kg of Raw Material 'B'.

You are required to prepare the following budgets for the period November, 2020 to March, 2021 on monthly basis:

(i) Sales Budget (in ₹)
(ii) Production budget (in units) and
(iii) Raw material Budget for Raw material 'A' and 'B' separately (in units)

Ans.

(i) Sales Budget **(in ₹)**

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Sales (in Units)	30,000	35,000	38,000	25,000	40,000	1,68,000
Selling Price per unit (₹)	10	12	15	15	20	-
Total Sales (₹)	3,00,000	4,20,000	5,70,000	3,75,000	8,00,000	24,65,000

(ii) Production Budget (in units)

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Sales	30,000	35,000	38,000	25,000	40,000	1,68,000
Add: Closing stock of finished goods	3,000	9,000	8,000	6,000	10,000	36,000
Total quantity required	33,000	44,000	46,000	31,000	50,000	2,04,000
Less: Opening stock of finished goods	7,500	3,000	9,000	8,000	6,000	33,500
Units to be produced	**25,500**	**41,000**	**37,000**	**23,000**	**44,000**	1,70,500

(iii) Raw material budget (in units) For Raw material 'A'

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Units to be produced: (a)	25,500	41,000	37,000	23,000	44,000	1,70,500
Raw material consumption p.u. (kg.): (b)	2	2	2	2	2	-
Total raw material consumption (Kg.): (a × b)	51,000	82,000	74,000	46,000	88,000	3,41,000

For Raw material 'B'

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Units to be produced: (a)	25,500	41,000	37,000	23,000	44,000	1,70,500
Raw material consumption p.u. (kg.): (b)	3	3	3	3	3	-
Total raw material consumption (Kg.): (a × b)	**76,500**	**1,23,000**	**1,11,000**	**69,000**	**1,32,000**	5,11,500

SERVICE COSTING

Q.152 Passenger (Bus) Ques | Py Nov 18

M/s XY Travels has been given a 25 km. long route to run an air- conditioned Mini Bus.
The cost of bus is ₹ 20,00,000. It has been insured @3% premium per annum while annual road tax amounts to ₹ 36,000. Annual repairs will be ₹ 50,000 and the bus is likely to last for 5 years. The driver's salary will be ₹2,40,000 per annum and the conductor's salary will be ₹ 1,80,000 per annum in addition to 10% of the takings as commission (to be shared by the driver and the conductor equally). Office and administration overheads will be ₹ 18,000 per annum. Diesel and oil will be ₹ 1,500 per 100 km. The bus will make 4 round trips carrying on an average 40 passengers on each trip.
Assuming 25% profit on takings and considering that the bus will run on an average 25 days in a month, you are required to:
(i) prepare operating cost sheet (for the month).
(ii) calculate fare to be charged per passenger km.

Ans. **(i) Statement showing the Operating Cost per Passenger-km.**

	Yearly (₹.)	Monthly (₹.)
(A) Standing Charges:		
Insurance Charge ₹. 20,00,000 × 3%	60,000	5,000
Road Tax	36,000	3,000
Depreciation (20,00,000/5)	4,00,000	33,333.33
Total	4,96,000	41,333.33
(B) Maintenance Charges:		
Annual Repairs	50,000	4166.67
Office and administration overheads	3,18,000	26,500
Total	3,68,000	30666.67
(C) Running Cost/Charges:		
Driver's Salary	2,40,000	20,000
Conductor's Salary	1,80,000	15,000
Diesel & Oil 60,000× 1, 500	9,00,000	75,000
Total	13,20,00	41,333.33
Total (A+B+C) Cost before commission and	21,84,00	1,82,000
Commission (33,60,000 × 10%) (working note	3,36,000	28,000
Profit (33,60,000 × 25%) (working note 2)	8,40,000	70,000
Takings (working note 1)	33,60,00	2,80,000

(ii) $$\text{Fare per Passenger-km.} = \frac{\textit{Total collection / Takings}}{\textit{Total} \text{ Passenger-km(Working note 3)}}$$

$$= \frac{33,60,000}{24,00,000} = 1.40$$

OR

Fare per Passenger-km. (monthly) = $\frac{2,80,000}{2,00,000}$ = 1.40

Working note:

1. Cost before commission (10%) and profit (25%) is 21,84,000 which is 65% of total takings. So total takings is (21,84000÷65) ×100=₹ 33,60,000

2. Commission is 10% of ₹ 33,60,000=₹ 3,36,000 and Profit is 25% of ₹ 33,60,000=₹ 8,40,000

3. Total Km is (4 Round Trips × Days in a month × Month = (4×2×25 ×25×12) = 60,000 km

Passenger km is 60,000 km×40 passenger= 24,00,000

Q.153 Lorry Ques | MTP May 21 

GMCS Ltd. collects raw milk from the farmers of Ramgarh, Pratapgarh and Devgarh panchayats and processes this milk to make various dairy products. GMCS Ltd. has its own vehicles (tankers) to collect and bring the milk to the processing plant. Vehicles are parked in the GMCS Ltd.'s garage situated within the plant compound.

Following are the information related with the vehicles:

	Ramgarh	Pratapgarh	Devgarh
No. of vehicles assigned	4	3	5
No. of trips a day	3	2	4
One way distance from the processing plant	24 k.m.	34 k.m.	16 k.m.
Fess & taxes per month (Rs.)	5,600	6,400	---

All the 5 vehicles assigned to Devgarh panchayat, were purchased five years back at a cost of Rs. 9,25,000 each. The 4 vehicles assigned to Ramgarh panchayat, were purchased two years back at a cost of Rs. 11,02,000 each and the remaining vehicles assigned to Pratapgarh were purchased last year at a cost of Rs. 13,12,000 each. With the purchase of each vehicle a two years free servicing warranty is provided. A vehicle gives 10 kmpl mileage in the first two year of purchase, 8 kmpl in next two years and 6 kmpl afterwards. The vehicles are subject to depreciation of 10% p.a. on straight line basis irrespective of usage. A vehicle has the capacity to carry 10,000 litres of milk but on an average only 70% of the total capacity is utilized.

The following expenditures are related with the vehicles:

Salary of Driver (a driver for each vehicle)	Rs. 24,000 p.m.
Salary to Cleaner (a cleaner for each vehicle)	Rs. 12,000 p.m.
Allocated garage parking fee	Rs. 4,200 per vehicle per month
Servicing cost	Rs. 15,000 for every complete 5,000 k.m. run.
Price of diesel per litre	Rs. 78.00

From the above information you are required to CALCULATE

(i) Total operating cost per month for each vehicle. (Take 30 days for the

(ii) Vehicle operating cost per litre of milk.

Ans. **(i) Calculation of Operating Cost per month for each vehicle**

	Ramgarh (Rs.)	Pratapgarh (Rs.)	Devgarh (Rs.)	Total (Rs.)

A. Running Costs:				
- Cost of diesel (Working Note- 2)	1,68,480	95,472	2,49,600	5,13,552
- Servicing cost (Working Note- 3)	2,13,480	95,472	2,94,600	6,03,552
B. Fixed Costs:				
- Salary to drivers	96,000 (4 drivers × Rs. 24,000)	72,000 (3 drivers × Rs. 24,000)	1,20,000 (5 drivers × Rs. 24,000)	2,88,000
- Salary to cleaners	48,000 (4 cleaners × Rs. 12,000)	36,000 (3 cleaners × Rs. 12,000)	60,000 (5 cleaners × Rs. 12,000)	1,44,000
- Allocated garage parking fee	16,800 (4 vehicles × Rs.4,200)	12,600 (3 vehicles × Rs.4,200)	21,000 (5 vehicles × Rs.4,200)	50,400
	36,733	32,800	38,542	
	2,03,133	1,59,800	2,39,542	6,02,475
	4,16,613	2,55,272	5,34,142	12,06,027
- Depreciation (Working	1,04,153 (Rs.4,16,613 ÷ 4 vehicles)	85,091 (Rs.2,55,272 ÷ 3 vehicles)	1,06,828 (Rs.5,34,142 ÷ 5 vehicles)	1,00,502 (Rs.12,06,027 ÷ 12 vehicles)

(ii) **Vehicle operating cost per litre of milk**

$$\frac{Total Operating Cost per month}{Total milk carried a month} = \frac{12,06,027}{79,80,000 Litres (working Note - 5)} = 0.15$$

Working Notes:

1. **Distance covered by the vehicles in a month**

Route		Total Distance (in K.M.)
Ramgarh	(4 vehicles × 3 trips × 2 × 24 km. × 30 days)	17,280
Pratapgarh	(3 vehicles × 2 trips × 2 × 34 km. × 30 days)	12,240
Devgarh	(5 vehicles × 4 trips × 2 × 16 km. × 30 days)	19,200

2. **Cost of diesel consumption**

	Ramgarh	Pratapgarh	Devgarh
Total distance travelled (K.M.)	17,280	12,240	19,200
Mileage per litre of diesel	8 kmpl	10 kmpl	6 kmpl

Diesel consumption (Litre)	2,160 (17,2	1,224 (12,2	3,200 (19,200 ÷
Cost of diesel consumption @ Rs. 78 per litre (Rs.)	1,68,4	95,47	2,49,600

3. Servicing Cost

	Ramgarh	Pratapgarh	Devgarh
Total distance travelled (K.M.)	17,280	12,240	19,200
Covered under free service warranty	No	Yes	No
No. of required	3 (17,280 k.m. ÷ 5,000 k.m.)	2 (12,240 k.m. ÷ 5,000 k.m.)	3 (19,200 k.m. ÷ 5,000
Total Service (Rs.)	45,000 (Rs. 15,000 × 3)	---	45,000 (Rs. 15,000 ×

4. Calculation of Depreciation

	Ramgarh	Pratapgarh	Devgarh
No. of vehicles	4	3	5
Cost of a vehicle (Rs.)	11,02,000	13,12,000	9,25,000
Total Cost of vehicles	44,08,000	39,36,000	46,25,000
Depreciation Month(Rs.)	36,733 $\left(\frac{44,08,000 x 10\%}{12 months}\right)$	32,800 $\left(\frac{39,36,000 x 10\%}{12 months}\right)$	38,542 $\left(\frac{46,25,000 x 10\%}{12 months}\right)$

Q.154 Compare 3 Different Situation | MTP Nov 22(1)

A company has the following three alternative proposals for conveyance facilities for its sales personnel who has to do substantial traveling, approximately 20,000 kilometers yearly:

(i) Purchasing and maintaining its own fleet of cars. The average cost of a car is ₹ 7,20,000

(ii) Allow the Executive to use their own car and reimburse the expenses @ ₹ 12 per kilometer and also bear insurance costs.

(iii) Hire cars from an agency at ₹ 2,16,000 per year per car. The company will have to bear costs of petrol, taxes and tyres.

The following further details are available:

Petrol	₹ 7.20 per km.
Tyre	₹ 0.144 per km.
Taxes	₹ 960 per car per annum

Repairs and maintenance	₹ 0.24 per km.
Insurance	₹ 1,440 per car per annum
Life of the car	5 years with annual mileage of 20,000 km.
Resale value	₹ 96,000 at the end of the fifth year.

WORK OUT the relative costs of three proposals and rank them.

Ans. Calculation of relative costs of three proposals and their ranking

	I- Use of company's car	II- Use of own car	III- Use of hired car
Reimbursement	--	12.00	--
Hire Charges	--	--	10.80*
Fixed cost:			
Insurance	0.072	0.072	--
Taxes	0.048	--	0.048
Depreciation	6.24	--	--
Running and Maintenance Cost:			
Petrol	7.20	--	7.20
Repairs and Maintenance	0.24	--	--
Tyre	0.144	--	0.144
Total cost per km.	13.944	12.072	18.192
Cost for 20,000 km.	2,78,880	2,41,440	3,63,840
Ranking of proposals	II	I	III

(₹ 2,16,000 ÷ 20,000 km.) = ₹ 10.80

[(₹ 7,20,000 - ₹ 96,000) ÷ 5 years] ÷ 20,000 km. = ₹ 6.24

The Second alternative i.e., use of own car by the executive and reimbursement of expenses by the company is the best alternative from company's point of view.

Q.155 BOT New Ques | MTP Nov 19

SLS Infrastructure builts and operates a 110 k.m. long highway on the basis of Built-Operate- Transfer (BOT) model for a period of 25 years. A traffic assessment has been carried out to estimate the traffic flow per day. The details are as below:

Sl. No.	Type of vehicle	Daily traffic volume
1.	Two wheelers	44,500
2.	Car and SUVs	3,450

3.	Bus and LCV	1,800
4.	Heavy commercial vehicles	816

The following is the estimated cost of the project:

Sl. no.	Activities	Amount (Rs. in lakh)
1	Site clearance	170.70
2	Land development and filling work	9,080.35
3	Sub base and base courses	10,260.70
4	Bituminous work	35,070.80
5	Bridge, flyovers, underpasses, Pedestrian subway, footbridge, etc.	29,055.60
6	Drainage and protection work	9,040.50
7	Traffic sign, marking and road	8,405.00
8	appurtenance Maintenance, repairing and rehabilitation Environmental management	12,429.60
9	Total Project cost	982.00
	Total	1,14,495.25

An average cost of Rs.1,120 lakh has to be incurred on administration and toll plaza operation. On the basis of the vehicle specifications (i.e. weight, size, time saving etc.), the following weights has been assigned to the passing vehicles:

Sl. No.	Type of vehicle	
1.	Two wheelers	5%
2.	Car and SUVs	20%
3.	Bus and LCV	30%
4.	Heavy commercial vehicles	45%

CACULATE the total project cost per day of concession period.

(ii) COMPUTE toll fee to be charged for per vehicle of each type, if the company wants to earn a profit of 15% on total cost.

[Note: Concession period is a period for which an infrastructure is allowed to operate and recovers its investment]

Ans. **School Contract Account**

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Plant	2,40,000	By Material returned	47,000
To Hire of plant	77,000	By Plant c/d	1,65,000
To Materials	6,62,000	By Materials c/d	50,000
To Direct wages 9,60,000		By WIP c/d:	
Add: Accrued 40,000	10,00,000	Value of work certified	24,00,000
To Wages related costs	1,32,000	Cost of work not certified	1,80,000
To Direct expenses	34,000		
To Supervisory staff:			
Direct 90,000			
Indirect 20,000	1,10,000		
To Regional office expenses	50,000		
To Head office expenses	30,000		
To Surveyors' fees	27,000		
To Notional profit c/d	4,80,000		
	28,42,000		28,42,000

Q.156 Toll Road MTP May 20

KR Resorts (P) Ltd. offers three types of rooms to its guests, viz deluxe room, super deluxe room and luxury suite. You are required to DETERMINE the tariff to be charged to the customers for different types of rooms on the basis of following information:

Types of Room	Number of Rooms	Occupancy
Deluxe Room	100	90%
Super Deluxe Room	60	75%
Luxury Suite	40	60%

Rent of 'super deluxe' room is to be fixed at 2 times of 'deluxe room' and that of 'luxury suite' is 3 times of 'deluxe room'. Annual expenses are as follows:

Particulars	Amount (Rs. lakhs)
Staff salaries	780.00
Lighting, Heating and Power	350.00
Repairs, Maintenance and Renovation	220.00
Linen	60.00
Laundry charges	34.00
Interior decoration	85.00
Sundries	36.28

An attendant for each room was provided when the room was occupied and he was paid Rs. 500 per day towards wages. Dep is to be provided on building @ 5% on Rs. 900 lakhs, furniture and fixtures @ 10% on Rs. 90 lakhs and air conditioners @ 10% on Rs. 75 lakhs. Profit is to be provided @ 25% on total taking & assume 360 days in a year.

Ans. **Total cost statement of KR Resort (P) Limited**

Particulars	Cost per annum (Rs. in lakhs)
Staff Salaries	780.00
Room Attendant's Wages (Refer working note 3)	286.20
Lighting, Heating & Power	350.00
Repairs, Maintenance & Renovation	220.00
Linen	60.00
Laundry charges	34.00
Interior Decoration	85.00
Sundries	36.28
- Building	45.00
- Furniture & Fixture	9.00
- Air Conditioners	7.50
Total cost for the year	1912.98

Computation of profit:

Let Rs. x be the rent for deluxe from.

Equivalent deluxe room days are 90,720 (Refer working note 2) Total takings = Rs. 90,720x

Profit is 25% of total takings.

Profit = 25% of Rs. 90,720x = Rs. 22,680x

Total takings = Total Cost + Profit

Rs. 90,720x = Rs. 19,12,98,000 + Rs. 22,680x

Rs. 90,720x -Rs. 22,680x = Rs. 19,12,98,000

Rs. 68,040x = Rs. 19,12,98,000

$$X = \frac{Rs19,12,98,000}{Rs68,040} \times Rs\ 2,811.55$$

Rent to be charged for deluxe room	Rs. 2,811.55
Rent to be charged for super deluxe room = Rent of deluxe room x 2 = Rs. 2,811.55 x 2	Rs. 5,623.10
Rent to be charged for luxury suite = Rent of Super Deluxe room x 1.5 = Rs. 5,623.10 x 1.5	Rs. 8,434.65

Working Notes:

(1) Computation of Room Occupancy

Type of Room	No. of rooms x no. of days x occupancy %	Room days
Deluxe Room	100 rooms x 360 days x 90% occupancy	32,400

Super Deluxe Room	60 rooms x 360 days x 75% occupancy	16,200
Luxury Suite	40 rooms x 360 days x 60% occupancy	8,640
	Total	57,240

(2) Computation of equivalent deluxe room days

Rent of 'super deluxe' room is to be fixed at 2 times of 'deluxe room' and luxury suite' is 3 times of 'deluxe room'. Therefore, equivalent room days would be:

Type of Room	Room days	Equivalent deluxe room days
Deluxe Room	32,400 x 1	32,400
Super Deluxe Room	16,200 x 2	32,400
Luxury Suite	8,640 x 3	25,920
	Total	90,720

(3) Computation of room attendant's wages

Room occupancy days @ Rs. 500 per day = 286.2 lakhs (i.e. 57,240 days ×Rs. 500)

(4) Computation of Depreciation per annum

Particulars	Cost (Rs.)	Rate of Depreciation	Depreciation (Rs.)
Building	9,00,00,000	5%	45,00,000
Furniture & Fixtures	90,00,000	10%	9,00,000
Air Conditioners	75,00,000	10%	7,50,000

Q.157 School Bus Ques (Passenger) RTP July 21

VPS is a public school having 25 buses each plying in different directions for the transport of its school students. In view of large number of students availing of the bus service, the buses work two shifts daily both in the morning and in the afternoon. The buses are garaged in the school. The workload of the students has been so arranged that in the morning, the first trip picks up senior students and the second trip plying an hour later picks

up junior students. Similarly, in the afternoon, the first trip takes the junior students and an hour later the second trip takes the senior students home.

The distance travelled by each bus, one way is 8 km. The school works 22 days in a month and remains closed for vacation in May and June. The bus fee, however, is payable by the students for all the 12 months in a year.

The details of expenses for a year are as under:

Driver's salary – payable for all the 12 in months ₹ 12,000 per month per driver Cleaner's salary payable for all the 12 months ₹ 8,000 per month per cleaner License fees, taxes etc. ₹ 8,400 per bus per annum

Insurance Premium ₹ 15,600 per bus per annum

Repairs and Maintenance ₹ 20,500 per bus per annum

Purchase price of the bus ₹ 20,00,000 each

Life of the bus 16 years

Scrap value ₹ 1,60,000

Diesel Cost ₹ 78. 50 per litre

Each bus gives an average of 5 km. per litre of diesel. The seating capacity of each bus is 40 students.

The school follows differential transportation fees based on distance travelled as under:

Students picked up and dropped within the range of distance from the school	Transportation fee	Percentage of students availing this facility
2 km.	25% of Full	15%
4 km.	50% of Full	30%
8 km.	Full	55%

Due to a pandemic, lockdown imposed on schools and the school remained closed from April 2020 to December 2020. Drivers and cleaners were paid 75% of their salary during the lockdown period. Repairing cost reduced to 75% for the year 2020.

Ignore the interest cost. Required:

(i) PREPARE a statement showing the expenses of operating a single bus and the fleet of 25 buses for a year.

(ii) FIND OUT transportation fee per student per month in respect of:

(a) Students coming from a distance of upto 2 km. from the school.

(b) Students coming from a distance of upto 4 km. from the school; and

(c) Students coming from a distance of upto 8 km. from the school.

(iii) CALCULATE the minimum bus fare that must be recovered from the students for the year 2020.

Ans.

(i) Statement showing the expenses of operating a single bus and the fleet of 25 buses for a year

Particulars	Per bus per annum (₹)	Fleet of 25 buses per annum (₹)
Running costs : (A)		
Diesel (Refer to working note 1)	2,21,056	55,26,400
Repairs & maintenance costs: (B)	20,500	5,12,500
Fixed charges:		
Driver's salary (₹ 12,000 × 12 months)	1,44,000	36,00,000
Cleaners salary (₹ 8,000 × 12 months)	96,000	24,00,000
Licence fee, taxes etc.	8,400	2,10,000
Insurance	15,600	3,90,000
Depreciation $\left(\frac{20,00,000-1,60,000}{16 years}\right)$	1,15,000	28,75,000
Total fixed charges: (C)	3,79,000	94,75,000

Total expenses: (A+B+C)	6,20,556	1,55,13,900

(ii) Average cost per student per month in respect of students coming from a distance of:

	(a) 2 km. from the school {₹ 6,20,556 / (236 students × 12 months)}(Refer to Working Note 2)	₹ 219.12
(b)	4 km. from the school (₹ 219.12 × 2)	₹ 438.24
(c)	8 km. from the school (₹ 219.12 × 4)	₹ 876.48

(iii) Calculation of minimum bus fare to be recovered from the students during the year 2020:

Statement showing the expenses of operating a single bus in year 2020

Particulars	Per bus per annum (₹)
Running costs : (A)	
Diesel (Refer to working note 3)	66,316.80
Repairs & maintenance costs: (B)	15,375
(₹ 20,500 x 0.75)	
Fixed charges:	
Driver's salary	1,17,000
{₹ 12,000 × 3 months + (75% of ₹ 12,000 × 9 months)}	
Cleaners salary	78,000
{₹ 8,000 × 3 months + (75% of ₹ 8,000 × 9 months)}	
Licence fee, taxes etc.	8,400
Insurance	15,600
Depreciation $\frac{20,00,000-1,60,000}{16 years}$	1,15,000
Total fixed charges: (C)	3,34,000
Total expenses: (A+B+C)	4,15,691.80

Minimum bus fare to be recovered:

(a)	2 km. from the school {₹ 4,15,691.8 / (236 students × 12 months)} (Refer to Working Note 2)	₹ 146.78
(b)	4 km. from the school (₹ 146.78 × 2)	₹ 293.56
(c)	8 km. from the school (₹146.78 × 4)	₹ 587.12

Working Notes:

1. Calculation of diesel cost per bus:

No. of trips made by a bus each day	4
Distance travelled in one trip both ways (8 km. × 2 trips)	16 km.
Distance travelled per day by a bus (16 km. × 4 shifts)	64 km.
Distance travelled during a month (64 km. × 22 days)	1,408 km.
Distance travelled per year (1,408 × 10 months)	14,080 km.
No. of litres of diesel required per bus per year (14,080 km. ÷ 5 km.)	2,816 litres
Cost of diesel per bus per year (2,816 litres × ₹ 78.50)	₹ 2,21,056

2. Calculation of equivalent number of students per bus:

Bus capacity of 2 trips (40 students × 2 trips)	80 students
$^1/_4{}^{th}$ fare students (15% × 80 students)	12 students
½ fare students (30% × 80 students × 2) (equivalent to $^1/_4{}^{th}$ fare students)	48 students
Full fare students (55% × 80 students × 4) (equivalent to $^1/_4{}^{th}$ fare students)	176 students
Total students equivalent to $^1/_4{}^{th}$ fare students	236 students

3. Calculation of diesel cost per bus in Year 2020:

Distance travelled during a month (64 km. × 22 days)	1,408 km.
Distance travelled during the year 2020 (1,408 × 3 months)	4,224 km.
No. of litres of diesel required per bus per year (4,224 km. ÷ 5 km.)	844.8 litres
Cost of diesel per bus per year (844.8 litres × ₹ 78.50)	₹ 66,316.80

Q.158 Bus Ques (Passenger) | RTP Dec 21

Mr. PS owns a bus which runs according to the following schedule:

(i)	Delhi to Hisar and back, the same day	
	Distance covered:	160 km. one way
	Number of days run each month:	9
	Seating capacity occupied	90%.
(ii)	Delhi to Aligarh and back, the same day	
	Distance covered:	160 km. one way
	Number of days run each month:	12
	Seating capacity occupied	95%
(iii)	Delhi to Alwar and back, the same day	
	Distance covered:	170 km. one way
	Number of days run each month:	6

	Seating capacity occupied	100%
(iv)	Following are the other details:	
	Cost of the bus	₹ 15,00,000
	Salary of the Driver	₹ 30,000 p.m.
	Salary of the Conductor	₹ 26,000 p.m.
	Salary of the part-time Accountant	₹ 7,000 p.m.
	Insurance of the bus	₹ 6,000 p.a.
	Diesel consumption 5 km. per litre at	₹ 90 per litre
	Road tax	₹ 21,912 p.a.
	Lubricant oil	₹ 30 per 100 km.
	Permit fee	₹ 500 p.m.
	Repairs and maintenance	₹ 5,000 p.m.
	Depreciation of the bus	@ 30% p.a.
	Seating capacity of the bus	50 persons

Passenger tax is 20% of the total takings.

CALCULATE the bus fare to be charged from each passenger to earn a profit of 30% on total takings.

The fares are to be indicated per passenger for the journeys: (i) Delhi to Hisar (ii) Delhi to Aligarh and (iii) Delhi to Alwar.

Ans. **Working Notes:**

1. Total Distance (in km.) covered per month

Bus route	Km. per trip	Trips per day	Days per month	Km. per month
Delhi to Hisar	160	2	9	2,880
Delhi to Aligarh	160	2	12	3,840
Delhi to Alwar	170	2	6	2,040
Total				8,760

2. Passenger- km. per month

	Total seats available per month (at 100% capacity)	Capacity utilised		Km. per trip	Passenger-Km. per month
		(%)	Seats		
Delhi to Hisar & Back	900 (50 seats x 2 trips x 9 days)	90	810	160	1,29,600 (810 seats × 160 km.)

Delhi to Aligarh& Back	1,200 (50 seats x 2 trips x 12 days)	95	1,140	160	1,82,400 (1,140 seats × 160 km.)
Delhi to Alwar & Back	600 (50 seats x 2 trips x 6 days)	100	600	170	1,02,000 (600 seats × 170 km.)
Total					4,14,000

Monthly Operating Cost Statement

Particulars	(₹)	(₹)
(i) Running Costs		
Diesel {(8,760 km x 5 km) x ₹ 90}	1,57,680.00	
Lubricant oil {(8,760 km x 100) x ₹ 30}	2,628.00	1,60,308.00
(ii) Maintenance Costs		
Repairs & Maintenance		5,000.00
(iii) Standing charges		
Salary to driver	30,000.00	
Salary to conductor	26,000.00	
Salary of part-time accountant	7,000.00	
Insurance (₹ 6,000 ÷12)	500.00	
Road tax (₹ 21,912 ÷12)	1,826.00	
Permit fee	500.00	
Depreciation {(₹ 15,00,000 x 30%) x 12}	37,500.00	1,03,326.00
Total costs per month before Passenger Tax (i)+(ii)+(iii)		2,68,634.00
Passenger Tax*		1,07,453.60
Total Cost		3,76,087.60
Add: Profit*		1,61,180.40
Total takings per month		5,37,268.00

***Let total takings be X then,**

X = Total costs per month before passenger tax + 0.2 X (passenger tax) + 0.3 X (profit) X = ₹ 2,68,634 + 0.2 X + 0.3 X

0.5 X = ₹ 2,68,634 or, X = ₹ 5,37,268

Passenger Tax = 20% of ₹ 5,37,268 = ₹ 1,07,453.60 Profit = 30% of ₹ 5,37,268 = ₹ 1,61,180.40

Calculation of Rate per passenger km. and fares to be charged for different routes

Rate per Passenger-Km.

$$= \frac{Totaltakingspermonth}{TotalPassenger-Km \text{ per month}}$$

$$= \frac{5,37,268}{4,14,000 Passenger-km.} = 1.30 \text{ [approx.]}$$

Bus fare to be charged per passenger:

Delhi to Hisar	=	₹ 1.30 x 160 km	=	₹ 208.00
Delhi to Aligarh	=	₹ 1.30 x 160 km	=	₹ 208.00
Delhi to Alwar	=	₹ 1.30 x 170 km	=	₹ 221.00

Q.159 Airline/ Passenger Ques | MTP Nov 18(2)

DKG Airlines owns single passenger aircraft and operates between Melbourne and Delhi only. Flight leaves Melbourne on Monday and Thursday and departs from Delhi on Wednesday and Saturday. DKG Airlines cannot afford any more flight between Melbourne and Delhi. Only economical class seats are available on its flight and all tickets are booked by travel agents. The following information are collected.

Seating capacity per plane	360
Average passengers per flight	250
Flights per week	4
Flights per year	208
Average one-way fare	Rs.50,000
Variable fuel cost	Rs.28,00,000 per flight
Food service to passengers (not charged to Passengers)	Rs.2,600 per passenger
Commission to travel agents	15% of fare
Fixed annual lease cost allocated to each flight	Rs. 15,30,000 per flight
Fixed ground services (maintenance, check in, Baggage handling cost) allocated to each flight	Rs.1,70,000 per flight
Fixed salaries of flight crew allocated to each flight	Rs.6,50,000 per flight

For the sake of simplicity assume that fuel cost is unaffected by the actual number of passengers on a flight.

Required:

(i) CALCULATE the operating income that DKG Airlines makes on each way flight between Melbourne and Delhi?

(ii) The market research department of DKG Airlines indicates that lowering the average one-way fare to Rs. 48,000 and increase in agents' commission to 17.5% will increase the average number of passenger per flight to 275. DECIDE whether DKG Airlines should lower its fare or not?

Ans (i) **Statement of operating income of DKG Airlines for Melbourne-Delhi flight (one way)**

Particulars	Amount (Rs.)	Amount (Rs.)
Fare received (per flight): 250 passengers × Rs. 50,000		1,25,00,000
Variable costs (per flight):		
- Fuel cost	28,00,000	

- Food (250 × Rs. 2,600)	6,50,000	
- Commission to Travel Agents (15% of Rs. 1,25,00,000)	18,75,000	(53,25,000)
Contribution per flight		71,75,000
Fixed cost (per flight):		
Annual lease cost	15,30,000	
Fixed ground service costs	1,70,000	
Salaries of flight crew	6,50,000	(23,50,000)
Operating income per flight		48,25,000

(ii) Operating income of DKG Airlines per Melbourne-Delhi flight (one way) after reduction in fare

Fare received (per flight): 275 passengers × Rs. 48,000		1,32,00,000
Variable costs (per flight):		
Fuel cost	28,00,000	
Food (275 × Rs.2,600)	7,15,000	
Commission to Travel Agents (17.5% of Rs.1,32,00,000)	23,10,000	(58,25,000)
Contribution per flight		73,75,000

Excess contribution due to lowering of fare (Rs.73,75,000 – Rs.71,75,000) = Rs.2,00,000. DKG Airlines should lower its fare as it would increase its contribution by Rs. 2,00,000

Q.160 Insurance Co. RTP Nov 18

Sanziet Lifecare Ltd. operates in life insurance business. Last year it has launched a new term insurance policy for practicing professionals 'Professionals Protection Plus'. The company has incurred the following expenditures during the last year for the policy:

Policy development cost	₹11,25,000
Cost of marketing of the policy	₹45,20,000
Sales support expenses	₹11,45,000
Policy issuance cost	₹10,05,900
Policy servicing cost	₹35,20,700
Claims management cost	₹1,25,600
IT cost	₹74,32,000
Postage and logistics	₹10,25,000
Facilities cost	₹15,24,000
Employees cost	₹ 5,60,000
Office administration cost	₹16,20,400

Number of policy sold- 528

Total insured value of policies- ₹1,320 crore

Required:

(i) CALCULATE total cost for Professionals Protection Plus' policy segregating the costs into four main activities namely (a) Marketing and Sales support, (b) Operations, (c) IT and (d) Support functions.

(ii) CALCULATE cost per policy. (iii) CACULATE cost per rupee of insured value.

Ans. **Calculation of total cost for 'Professionals Protect Plus' policy**

	Particulars	Amount (₹)	Amount (₹)
1.	**Marketing and Sales support:**		
	- Policy development cost	11,25,000	
	- Cost of marketing	45,20,000	
	- Sales support expenses	11,45,000	67,90,000
2.	**Operations:**		
	- Policy issuance cost	10,05,900	
	- Policy servicing cost	35,20,700	
	- Claims management cost	1,25,600	46,52,200
3.	**IT Cost**		74,32,000
4.	**Support functions**		
	- Postage and logistics	10,25,000	
	- Facilities cost	15,24,000	
	- Employees cost	5,60,000	
			47,29,400
	- Office administration cost	16,20,400	
	Total Cost		2,36,03,600

(ii) **Calculation of cost per policy** = $\frac{Total\,cost}{No\,of\,policies} = \frac{2,36,03,600}{528} =$ 44,703.79

(iii) **Cost per rupee of insured value** = $\frac{Total\,cost}{Total\,insured\,value} = \frac{2.36\,crore}{1,320\,crore} = 0.0018$

Q.161 Hotel Rent Ques | PY May 19

A company runs a holiday home. For this purpose, it has hired a building at a rent of ₹10,00,000 per month alongwith 5% of total taking. It has three types of suites for its customers, viz., single room, double rooms and triple rooms.

Following information is given:

Type of suite	Number	Occupancy percentage
Single room	100	100%
Double rooms	50	80%
Triple rooms	30	60%

The rent of double rooms suite is to be fixed at 2.5 times of the single room suite and that of triple rooms suite as twice of the double rooms suite.

The other expenses for the year 20X9 are as follows:

	(₹)
Staff salaries	14,25,00,000
Room attendants' wages	4,50,00,000
Lighting, heating and power	2,15,00,000
Repairs and renovation	1,23,50,000
Laundry charges	80,50,000

Interior decoration	74,00,000
Sundries	1,53,00,000

Provide profit @ 20% on total taking and assume 360 days in a year.

You are required to CALCULATE the rent to be charged for each type of suite.

Ans.

(i) Total equivalent single room suites

Nature of suite	Occupancy (Room-days)	Equivalent single room suites (Room-days)
Single room suites	36,000 (100 rooms x 360 days x 100%)	36,000 (36,000 x 1)
Double rooms suites	14,400 (50 rooms x 360 days x 80%)	36,000 (14,400 x 2.5)
Triple rooms suites	6,480 (30 rooms x 360 days x 60%)	32,400 (6,480 x 5)
		1,04,400

(ii) Statement of total cost:

	(₹)
Staff salaries	14,25,00,000
Room attendant's wages	4,50,00,000
Lighting, heating and power	2,15,00,000
Repairs and renovation	1,23,50,000
Laundry charges	80,50,000
Interior decoration	74,00,000
Sundries	1,53,00,000
	25,21,00,000
Building rent {(₹10,00,000 □ 12 months) + 5% on total taking}	1,20,00,000+ 5% on total takings
Total cost	26,41,00,000 + 5% on total takings

Profit is 20% of total takings

∴ Total takings = ₹ 26,41,00,000 + 25% (5% +20%) of total takings Let x be rent for single room suite

Then 1,04,400 x = 26,41,00,000 + 0.25 × 1,04,400 x

Or, 1,04,400 x = 26,41,00,000 + 26,100 x

Or, 78,300 x = 26,41,00,000

Or, x = 3,373

(iii) Rent to be charged for single room suite = ₹ 3,373 Rent for double rooms suites ₹ 3,373 x 2.5 = ₹ 8,432.5 Rent for triple rooms suites ₹ 3,373 x 5 = ₹ 16,865

Q.162 Lorry/ Truck Ques | RTP Nov 19

A transport company has a fleet of four trucks of 10 tonne capacity each plying in different directions for transport of customer's goods. The trucks run loaded with goods and return empty. The distance travelled, number of trips made and the load carried per day by each truck are as under:

Truck No.	One way Distance Km	No. of trips per day	Load carried per trip / day tonnes
1	48	4	6
2	120	1	9
3	90	2	8
4	60	4	8

The analysis of maintenance cost and the total distance travelled during the last two years is as under

Year	Total distance travelled	Maintenance Cost ₹
1	1,60,200	1,38,150
2	1,56,700	1,35,525

The following are the details of expenses for the year under review:

Diesel	₹ 60 per litre. Each litre gives 4 km per litre of diesel on an average.
Driver's salary	₹ 22,000 per truck per month
Licence and taxes	₹ 15,000 per annum per truck
Insurance	₹ 80,000 per annum for all the four trucks
Purchase Price pertruck	₹30,00,000, Life 10 years. Scrap value at the end of life is ₹1,00,000.
Oil and sundries	₹ 525 per 100 km run.
General Overhead	₹ 1,10,840 per annum

The trucks operate 24 days per month on an average.

Required

(i) PREPARE an Annual Cost Statement covering the fleet of four trucks.

(ii) CALCULATE the cost per km. run.

(iii) DETERMINE the freight rate per tonne km. to yield a profit of 30% on freight.

Ans. **(i) Annual Cost Statement of four vehicles**

	(₹)
Diesel {(4,21,632 km. ÷ 4 km) × ₹ 60) (Refer to Working Note 1)	63,24,480
Oil & sundries {(4,21,632 km. ÷ 100 km.) × ₹ 525}	22,13,568
Maintenance {(4,21,632 km. × ₹ 0.75) + ₹ 18,000}(Refer to Working Note 2)	3,34,224
Drivers' salary {(₹22,000 × 12 months) × 4 trucks}	10,56,000

Licence and taxes (₹ 15,000 × 4 trucks)	60,000
Insurance	80,000
Depreciation {(₹29,00,000 ÷ 10 years) × 4 trucks}	11,60,000
General overhead	1,10,840
Total annual cost	**1,13,39,112**

(ii) Cost per km. run

$$\text{Cost per kilometer run} = \frac{\text{Total annual cost of vehicles}}{\text{Total kilometre travelled annually}}$$ (Refer to Working Note 1)

$$= \frac{1,13,39,112}{4,21,632 kms} = 26.89$$

(iii) Freight rate per tonne km (to yield a profit of 30% on freight)

$$\text{Cost per tonne km} = \frac{\text{Total annual cost of three vehicles}}{\text{Total effectiveness tonnes kms per annum}}$$ = (Refer to Working Note 1)

$$= \frac{1,13,39,112}{16,10,496 kms} = 7.04$$

Freight rate per tonne km. $\frac{7.04}{0.7} x1 = 10.06$

Working Notes:

1. Total kilometre travelled and tonnes kilometre (load carried) by four trucks in one year

Truck number	One way distance in kms	No. of trips	Total distance covered in km per day	Load carried per trip / day in tonnes	Total effective tonnes km
1	48	4	384	6	1,152
2	120	1	240	9	1,080
3	90	2	360	8	1,440
4	60	4	480	8	1,920
Total			1,464		5,592

Total kilometre travelled by four trucks in one year

(1,464 km. × 24 days × 12 months) = 4,21,632

Total effective tonnes kilometre of load carried by four trucks during one year (5,592 tonnes km. × 24 days × 12 months) = 16,10,496

2. Fixed and variable component of maintenance cost:

$$\text{Variable maintenance cost per km} = \frac{\text{Difference in maintenance cost}}{\text{Difference in distance travelled}}$$

$$= \frac{1,38,150 - 1,35,525}{1,60,200 kms - 1,56,700 kms}$$

= 0.75

Fixed maintenance cost = Total maintenance cost-Variable maintenance cost

= 1,38,150-1,60,200 kms x 0.75 = 18,000

Q.163 Lorry/Transport Co. | RTP Nov 20

A transport company has 20 vehicles, the capacities are as follows:

No. of Vehicles	Capacity per vehicle
5	9 MT
6	12 MT
7	15 MT
2	20 MT

The company provides the goods transport service between stations 'A' to station 'B'. Distance between these stations is 100 kilometers. Each vehicle makes one round trip per day on an average. Vehicles are loaded with an average of 90 per cent of capacity at the time of departure from station 'A' to station 'B' and at the time of return back loaded with 70 per cent of capacity. 10 per cent of vehicles are laid up for repairs every day. The following information is related to the month of August, 2020:

Salary of Transport Manager	₹ 60,000
Salary of 30 drivers	₹ 20,000 each driver
Wages of 25 Helpers	₹ 12,000 each helper
Loading and unloading charges	₹ 850 each trip
Consumable stores (depends on running of vehicles)	₹ 1,35,000
Insurance (Annual)	₹ 8,40,000
Road Licence (Annual)	₹ 6,00,000
Cost of Diesel per litre	₹ 78
Kilometres run per litre each vehicle	5 Km.
Lubricant, Oil etc.	₹ 1,15,000
Cost of replacement of Tyres, Tubes, other parts etc. (on running basis)	₹ 4,25,000
Garage rent (Annual)	₹ 9,00,000
Routine mechanical services	₹ 3,00,000
Electricity charges (for office, garage and washing station)	₹ 55,000
Depreciation of vehicles (on time basis)	₹ 6,00,000

There is a workshop attached to transport department which repairs these vehicles and other vehicles also. 40 per cent of transport manager's salary is debited to the workshop. The transport department has been apportioned ₹88,000 by the workshop during the month. During the month operation was for 25 days.

You are required:

(i) CALCULATE per ton-km operating cost.

(ii) DETERMINE the freight to be charged per ton-km, if the company earned a profit of 25 per cent on freight.

Ans. **(i) Operating Cost Sheet for the month of August, 2020**

	Particulars	Amount (₹)
A.	**Fixed Charges:**	

	Manager's salary (₹60,000 × 60%)	36,000
	Drivers' Salary (₹20,000 x 30 drivers)	6,00,000
	Helpers' wages (₹12,000 x 25 helpers)	3,00,000
	Insurance (₹8,40,000 ÷ 12 months)	70,000
	Road licence (₹6,00,000 ÷ 12 months)	50,000
	Garage rent (₹9,00,000 ÷ 12 months)	75,000
	Routine mechanical services	3,00,000
	Electricity charges (for office, garage and washing station)	55,000
	Depreciation of vehicles	6,00,000
	Apportioned workshop expenses	88,000
	Total (A)	21,74,000
	Variable Charges:	
	Loading and unloading charges (Working Note 1)	7,65,000
	Consumable Stores	1,35,000
	Cost of diesel (Working Note 2)	14,04,000
	Lubricant, Oil etc.	1,15,000
	Replacement of Tyres, Tubes & other parts	4,25,000
	Total (B)	28,44,000
	Total Cost (A + B)	50,18,000
	Total Ton-Kms. (Working Note 3)	9,43,200
	Cost per ton-km. (C ÷ D)	5.32

(ii) Calculation of Chargeable Freight

Cost per ton-km.	₹ 5.32
Add: Profit @ 25% on freight or 33⅓% on cost	₹ 1.77
Chargeable freight per ton-km.	**₹ 7.09**

Working Notes:

1. Wages paid to loading and unloading labours

Numbers of vehicles available per day × No. of days × trips × wages per trip (20 vehicles × 90%) × 25 days × 2 trips × ₹850

18 × 25 × 2 × 850 = ₹7,65,000

2. Cost of Diesel:

Distance covered by each vehicle during August, 2020

= 100 k.m. x 2 x 25 days x 90% = 4,500 km.

$$\text{Consumption of diesel} = \frac{4{,}500 km x 20 vehicles}{5 k.m.} = 18{,}000 litres$$

Cost of diesel = 18,000 litres x 78 = 14,04,000

3. Calculation of total ton-km:

Total Ton-Km. = Total Capacity x Distance covered by each vehicle x Average Capacity Utilisation ratio.

= **[(5 x 9MT) +(6x12MT) + (7x15MT) +(2x20MT)] x** 4,500 k.m. x $\frac{(90\% + 70\%)}{2}$

= (45+72+105+40) x 4,500 k.m. x 80%

= 262 x 4,500 x 80%.

= 9,43,200 ton-km

Q.164 Passenger (Bus) Ques | PY Dec 21

Paras Travels provides mini buses to an IT company for carrying its employees from home to office and dropping back after office hours. It runs a fleet of 8 mini buses for this purpose. The buses are parked in a garage adjoining the company's premises. Company is operating in two shifts (one shift in the morning and one shift in the afternoon). The distance travelled by each mini bus one way is 30 kms. The company works for 20 days in a month.

The seating capacity of each mini bus is 30 persons. The seating capacity is normally 80% occupied during the year. The details of expenses incurred for a year are as under:

Particulars	
Driver's salary	₹ 20,000 per driver per month
Lady attendant's salary (mandatorily required for each mini bus)	₹ 10,000 per attendant per month
Cleaner's salary (One cleaner for 2 mini buses)	₹ 15,000 per cleaner per month
Diesel (Avg. 8 kms per litre)	₹ 80 per litre
Insurance charges (per annum)	2% of Purchase Price
License fees and taxes	₹ 5,080 per mini bus per month
Garage rent paid	₹ 24,000 per month
Repair & maintenance including engine oil and lubricants (for every 5,760 kms)	₹ 2,856 per mini bus
Purchase Price of mini bus	₹ 15,00,000 each
Residual life of mini bus	8 Years
Scrap value per mini bus at the end of residual life	₹ 3,00,000

Paras Travels charges two types of fare from the employees. Employees coming from a distance of beyond 15 kms away from the office are charged double the fare which is charged from employees coming from a distance of up-to 15 kms. away from the office. 50% of employees travelling in each trip are coming from a distance beyond 15 kms. from the office. The charges are to be based on average cost.

You are required to:

(i) Prepare a statement showing expenses of operating a single mini bus for a year,

(ii) Calculate the average cost per employee per month in respect of:

(a) Employees coming from a distance upto 15 kms. from the office.

(b) Employees coming from a distance beyond 15 kms. from the office.

Ans. **(i) Statement of Expenses of operating a mini bus in a year**

	Particulars	Rate (₹)	Per Bus per annum (₹)
(A)	**Standing Charges:**		
	Driver's salary	20,000 p.m	2,40,000
	Lady attendant's salary	10,000 p.m	1,20,000
	Average Cleaner's salary (50%)	15,000 p.m	90,000
	Insurance charge	30,000 p.a.	30,000
	License fee, taxes etc.	5,080 p.m.	60,960
	Average Garage Rent	24,000 p.m	36,000
	Depreciation {(15,00,000 – 3,00,000) ÷ 8}	1,50,000 p.a.	1,50,000
(B)	**Maintenance Charges:**		
	Repairs & maintenance including engine oil and lubricants (Working Note 1)	28,560 p.a.	
(C)	**Operating Charges:**		
	Diesel (Working Note 2)		5,76,000
	Total Cost (A + B + C)		13,31,520
	Cost per month		1,10,960

(ii) Average cost per employee per month:

(a) Employee coming from distance of upto 15 km

$$= \frac{Total\ cost\ per\ month}{Total\ no\ of\ equivalent\ employee} = \frac{1,10,960}{72*} = 1,541.11$$

(b) Employee coming from a distance beyond 15 km

= 1541.11 × 2 = ₹ 3,082.2

* Considering half fare employees as a base

Full fare employees (12 × 2)

Add: Half fare employees (Working Note 3)

Total Equivalent number of employees per month

Total Equivalent number of employees per month (morning + afternoon shift of company)

Working Notes:

1. **Calculation of Repairs and maintenance cost of a bus :**

   Distance travelled in a year:

   (4 trip × 2 shifts × 30 km. × 20 days × 12 months) Distance travelled p.a.: 57,600 km.

   Repairs and maintenance cost per Bus per annum:

2. **Calculation of diesel cost per bus per annum: Distance travelled in a year** = 57,600 km

Diesel cost per Bus per annum:

57,600 km.

3. Calculation of equivalent number of employees per bus:

Seating capacity of a bus 30 employees

Occupancy (80% of capacity) 24 employees

Half fare employees (50% of 24 employees) 12 employees

Full fare employees (50% of 24 employees) 12 employee

[Note: Total Equivalent number of employees per month (morning + afternoon shift of company can also be calculated considering full fare employees as a base. In that case the number will be 36. Then fare for employees coming from distance beyond 15km will be

$\frac{1,10,960}{36}$ = 3,082.22 and employees coming from distance upto 15 km will be

3,082.22 / 2 = ₹ 1,541.11]

Q.165 Lorry running Ques/rail run | PY May 22

Coal is transported from two mines X & Y and unloaded at plots in a railway station. X is at distance of 15 kms and Y is at a distance of 20 kms from the rail head plots. A fleet of lorries having carrying capacity of 4 tonnes is used to transport coal from the mines. Records reveal that average speed of the lorries is 40 kms per hour when running and regularly take 15 minutes to unload at the rail head.

At Mine X average loading time is 30 minutes per load, while at mine Y average loading time is 25 minutes per load.

Additional Information:

Drivers' wages, depreciation, insurance and taxes, etc. ₹ 12 per hour Operated Fuel, oil tyres, repairs and maintenance, etc. ₹ 1.60 per km

You are required to prepare a statement showing the cost per tonne kilometre of carrying coal from each mine 'X' and 'Y'.

Ans. **Statement showing the cost per tonne-kilometre of carrying mineral from each mine**

	Mine X (₹)	Mine Y (₹)
Fixed cost per trip: (Refer to working note 1)		
(Driver's wages, depreciation, insurance and taxes)	18.00	
X: 1 hour 30 minutes @ ₹ 12 per hour		
Y: 1 hour 40 minutes @ ₹ 12 per hour		20.00
Running and maintenance cost:		
(Fuel, oil, tyres, repairs and maintenance)	48.00	
X: 30 km. ₹ 1.60 per km.		
Y: 40 km. ₹ 1.60 per km.		64.00
Total cost per trip (₹)	66.00	84.00
Cost per tonne – km (Refer to working note 2)	1.1 $\left(\frac{66}{60 tonne-km}\right)$	1.05 $\left(\frac{84}{80 tonne-km}\right)$

Working notes:

	Mine- X	Mine- Y
(1) Total operated time taken pertrip		
Running time to & fro	**45 minutes** $\left(30km.x\frac{60minutes}{40km.}\right)$	**60 minutes** $\left(40km.x\frac{60minutes}{40km.}\right)$
Un-loading time	15 minutes	15 minutes
Loading time	30 minutes	25 minutes
Total operated time	**90 minutes or** 1 hour 30 minutes	**100 minutes or** 1 hour 40 minutes
(2) Effective tones – km.	60 (4 tonnes × 15 km.)	80 (4 tonnes × 20 km.)

Q.166 Loan Process Ques. | PY Nov 22

ABC Bank is having a branch which is engaged in processing of 'Vehicle Loan' and 'Education Loan' applications in addition to other services to customers. 30% of the overhead costs for the branch are estimated to be applicable to the processing of 'Vehicle Loan' applications and 'Education Loan' applications each.

Branch is having four employees at a monthly salary of ₹ 50,000 each, exclusively for processing of Vehicle Loan applications and two employees at a monthly salary of ₹ 70,000 each, exclusively for processing of Education Loan applications.

In addition to above, following expense are incurred by the Branch:

- Branch Manager who supervises all the activities of branch, is paid at ₹ 90,000 per month.
- Legal charges, Printing & stationery and Advertising Expenses are incurred at ₹ 30,000, ₹ 12,000 and ₹ 18,000 respectively for a month.
- Other expenses are ₹ 10,000 per month. You are required to:

(i) Compute the cost of processing a Vehicle Loan application on the assumption that 496 Vehicle Loan applications are processed each month.

(ii) Find out the number of Education Loan Applications processed, if the total processing cost per Education Loan Application is same as in the Vehicle Loan Application as computed in (i) above.

Ans.

Particulars	Vehicle loan Applications (₹)	Education loan Application (₹)	Total (₹)
Employee Cost	2,00,000 (₹ 50,000 × 4)	1,40,000 (₹ 70,000 × 2)	3,40,000
Apportionment of Branch manager's salary	27,000	27,000	54,000

Legal charges, Printing & stationery and Advertising expenses	18,000	18,000	36,000
Other expenses	3,000	3,000	6,000
Total cost	2,48,000	1,88,000	4,36,000

(i) Computation of cost of processing a vehicle loan application:

Total Cost ÷ No. of applications

₹ 2,48,000 ÷ 496 = ₹ 500

(ii) Computation of no. of Education loan Processed

Total Cost = No. of applications × Processing cost per application

₹ 1,88,000 = No. of applications × ₹ 500

No. of education loan applications = ₹1,88,000 ÷ ₹500 = 376 applications

Q.167 Toll Plaza Ques | PY May 23

RST Toll Plaza Limited built an 80-kilometre-long highway between two cities and operates a toll plaza to collect tolls from passing vehicles using the highway. The company has estimated that 50,000 light weight, 12,000 medium weight and 10,000 heavy weight vehicles will be using the highway in one month in outward journey and the same number for return journey.

As per government notification, vehicles used for medical emergencies, Members of Parliament, and essential services are exempt from toll charges. It is estimated that 10% of light weight vehicles will pass the highway for such use.

It is the policy of the company that if vehicles return within 24 hours of their outward journey, the toll fare will be reduced by 25 percent automatically. It is estimated that 30% of chargeable light weight vehicles return within the specified time frame.

The toll charges for medium weight vehicles is to be fixed as 2.5 times of the light weight vehicles and that of heavy weight vehicles as 2 times of the medium weight vehicles.

The toll and maintenance cost for a month is ₹ 59,09,090, The company requires a profit of 10% over the total cost to cover interest and other costs.

Required:

(i) Calculate the toll rate for each type of vehicle if concession facilities are not available on the return journey.

(ii) Calculate the toll rate that will be charged from light weight vehicles if a return journey concession facility is available, assuming that the revenue earned from light weight vehicles calculated in option (i) remains the same.

Ans.

Working Notes:

(1) Calculation of equivalent numbers of Light weight vehicles (when no concession is provided on return journey)

Type of vehicle	Monthly traffic (A)	Return traffic (B)	Ratio (C)	Equivalent light weight [(A + B) × C]
Light weight	45,000*	45,000	1	90,000
Medium weight	12,000	12,000	2.5	60,000
Heavy weight	10,000	10,000	5	1,00,000

				2,50,000

*50,000 light vehicles less 10% exempted vehicles

(2) Calculation of equivalent numbers of Light weight vehicles (when concession is provided on return journey)

Type of vehicle	Monthly traffic (A)	Return traffic (B)	Ratio (C)	Equivalent light weight [(A + B) × C]
Light weight	45,000*	41,625 [45,000- (45,000 × 30% × 25%)]	1	86,625
Medium weight	12,000	12,000	2.5	60,000
Heavy weight	10,000	10,000	5	1,00,000
				2,46,625

(i) Calculation of toll rate for each type of vehicle:

Total cost to cover ÷ Equivalent type of vehicles

(₹ 59,09,090 + 10% of ₹ 59,09,090) ÷ 2,50,000 equivalent vehicles (Refer working note 1)

= 65,00,000 ÷ 2,50,000 = ₹ 26

Toll rate for:

Light weight vehicle = ₹ 26

Medium weight vehicle = ₹ 26 × 2.5 = ₹ 65 Heavy weight vehicle = ₹ 26 × 5 = ₹ 130

(ii) Calculation of toll rate for each type of vehicle:

Revenue earned from Light weight vehicle in (i) above

= 90,000 vehicles × ₹ 26 = ₹ 23,40,000

New toll rate to maintain the same revenue from Light weight vehicle

= ₹ 23,40,000 ÷ 86,625 (Refer working note-2) = ₹ 27.01 Light weight vehicle = ₹ 27.01

Rate to be charged from 13,500 light weight vehicles = 27.01 × 0.75 = 20.26

Alternative presentation

(ii) Toll rate to be charged from light weight vehicles if concession applicable

Revenue share in light vehicles = 90,000 × 26 = ₹ 23,40,000

Suppose rate is x, then outward journey 45,000 x; return journey (45,000 - 30% of 45,000) + 13,500 (x - 0.25)

45,000x + 31,500x + 13500 (0.75x) = ₹ 23,40,000

Toll rate to be charged from light weight vehicles : 86,625x = ₹ 23,40,000 =

₹ 27.01

Rate to be charged from 76,500 light weight vehicles @ 27.01; revenue will be

₹ 20,66,494

Rate to be charged from 13,500 light weight vehicles = 27.01 × 0.75 = 20.26 revenue will be ₹ 2,73,506

Q.168 Students/ School Ques | RTP May 18

AD Higher Secondary School (AHSS) offers courses for 11th & 12th standard in three streams i.e. Arts, Commerce and Science. AHSS runs higher secondary classes along with primary and secondary classes but for accounting purpose it treats higher secondary as a separate responsibility centre. The Managing committee of the school wants to revise its fee structure for higher secondary students. The accountant of the school has provided the following details for a year:

	Amount (₹)
Teachers' salary (15 teachers × ₹35,000 × 12 months)	63,00,000
Principal's salary	14,40,000
Lab attendants' salary (2 attendants × ₹15,000 × 12 months)	3,60,000
Salary to library staff	1,44,000
Salary to peons (4 peons × ₹10,000 × 12 months)	4,80,000
Salary to other staffs	4,80,000
Examinations expenditure	10,80,000
Office & Administration cost	15,20,000
Annual day expenses	4,50,000
Sports expenses	1,20,000

Other information:

(i)

	Standard 11 & 12			Primary & Secondary
	Arts	Commerce	Science	
No. of students	120	360	180	840
Lab classes in a year	0	0	144	156
No. of examinations in a year	2	2	2	2
Time spent at library per student per year	180 hours	120 hours	240 hours	60 hours
Time spent by principal for administration	208 hours	312 hours	480 hours	1,400 hours
Teachers for 11 & 12 standard	4	5	6	-

(ii) One teacher who teaches economics for Arts stream students also teaches commerce stream students. The teacher takes 1,040 classes in a year, it includes 208 classes for commerce students.

(iii) There is another teacher who teaches mathematics for Science stream students also teaches business mathematics to commerce stream students. She takes 1,100 classes a year, it includes 160 classes for commerce students.

(iv) One peon is fully dedicated for higher secondary section. Other peons dedicate their 15% time for higher secondary section.

(v) All school students irrespective of section and age participates in annual functions and sports activities.

Required:

(i) CALCULATE cost per student per annum for all three streams.

(ii) If the management decides to take uniform fee of ₹ 1,000 per month from all higher secondary students, CALCULATE stream wise profitability.

(iii) If management decides to take 10% profit on cost, COMPUTE fee to be charged from the students of all three streams respectively.

Ans. **Calculation of Cost per annum**

Particulars	Arts (₹)	Commerce (₹)	Science (₹)	Total (₹)
Teachers' salary (W.N-1)	16,80,000	21,00,000	25,20,000	63,00,000
R-apportionment of Economics & Mathematics teachers' salary (W.N-2)	(84,000)	1,45,091	(61,091)	-
Principal's salary (W.N-3)	1,24,800	1,87,200	2,88,000	6,00,000
Lab assistants' salary (W.N-4)	-	-	1,72,800	1,72,800
Salary to library staff (W.N-5)	43,200	28,800	57,600	1,29,600
Salary to peons (W.N-6)	31,636	94,909	47,455	1,74,000
Salary to other staffs (W.N-7)	38,400	1,15,200	57,600	2,11,200
Examination expenses (W.N- 8)	86,400	2,59,200	1,29,600	4,75,200
Office & Administration expenses (W.N- 7)	1,21,600	3,64,800	1,82,400	6,68,800
Annual Day expenses (W.N-7)	36,000	1,08,000	54,000	1,98,000
Sports expenses (W.N- 7)	9,600	28,800	14,400	52,800
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400

(i) Calculation of cost per student per annum

Particulars	Arts (₹)	Commerce (₹)	Science (₹)	Total (₹)
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400
No. of students	120	360	180	660
Cost per student per annum	17,397	9,533	19,238	13,610

(ii) **Calculation of profitability**

Particulars	Arts (₹)	Commerce (₹)	Science (₹)	Total (₹)
Total Fees per annum	12,000	12,000	12,000	
Cost per student per annum	17,397	9,533	19,238	
Profit/ (Loss) per student per annum	(5,397)	2,467	(7,238)	
No. of students	120	360	180	
Total Profit/ (Loss)	(6,47,640)	8,88,120	(13,02,840)	(10,62,360)

(iii) Computation of fees to be charged to earn a 10% profit on cost

Particulars	Arts (₹)	Commerce (₹)	Science (₹)
Cost per student per annum	17,397	9,533	19,238
Add: Profit @10%	1,740	953	1,924
Fees per annum	19,137	10,486	21,162
Fees per month	1,595	874	1,764

Working Notes:

(1) Teachers' salary

Particulars	Arts	Commerce	Science
No. of teachers	4	5	6
Salary per annum (₹)	4,20,000	4,20,000	4,20,000
Total salary	16,80,000	21,00,000	25,20,000

(2) Re-apportionment of Economics and Mathematics teachers' salary

	Economics		Mathematics	
Particulars	Arts	Commerce	Science	Commerce
No. of classes	832	208	940	160
Salary re-apportionment (₹)	(84,000)	84,000	(61,091)	61,091
	$\left(\frac{4,20,000}{1,040} x 208\right)$		$\left(\frac{4,20,000}{1,140} x 160\right)$	

Q.169 Hotel Ques (Room rent/day) | PY Nov 19

A hotel is being run in a Hill station with 200 single rooms. The hotel offers concessional rates during six off-season months in a year.

During this period, half of the full room rent is charged. The management's profit margin is targeted at 20% of the room rent. The following are the cost estimates and other details for th e year ending 31st March ,2019:

(i) Occupancy during the season is 80% while in the off-season it is 40%.

(ii) Total investment in the hotel is ₹ 300 lakhs of which 80% relates to Buildings and the balance to Furniture and other Equipment.

(iii) Room attendants are paid ₹ 15 per room per day on the basis of occupancy of rooms in a month.

(iv) Expenses:

- Staff salary (excluding that of room attendants) ₹ 8,00,000
- Repairs to Buildings ₹ 3,00,000
- Laundry Charges ₹ 1,40,000
- Interior Charges ₹ 2,50,000
- Miscellaneous Expenses ₹ 2,00,200

(v) Annual Depreciation is to be provided on Buildings @ 5% and 15% on Furniture and other Equipments on straight line method.

(vi) Monthly lighting charges are ₹ 110, except in four months in winter when it is ₹ 30 per room and this cost is on the basis of full occupancy for a month.

Ans.

Working Notes:

(i) Total Room days in a year

Season	Occupancy (Room-days)	Equivalent Full Room charge days
Season – 80% Occupancy	200 Rooms × 80% × 6 months × 30 days in a month = 28,800 Room Days	28,800 Room Days × 100% = 28,800
Off-season – 40% Occupancy	200 Rooms × 40% × 6 months × 30 days in a month = 14,400 Room Days	14,400 Room Days × 50% = 7,200
Total Room Days	28,800 + 14,400 = 43,200 Room Days	36,000 Full Room days

(ii) Lighting Charges:

It is given in the question that lighting charges for 8 months is ₹110 per month and during winter season of 4 months it is ₹30 per month. Further it is also given that peak season is 6 months and off season is 6 months.

It should be noted that – being Hill station, winter season is to be considered as part of Off season. Hence, the non-winter season of 8 months include – Peak season of 6 months and Off season of 2 months.

Accordingly, the lighting charges are calculated as follows:

Season	Occupancy (Room-days)
Season & Non-winter – 80%Occupancy	200 Rooms × 80% × 6 months × ₹ 110 per month = ₹ 1,05,600
Off- season & Non-winter – 40% Occupancy (8 – 6 months)	200 Rooms × 40% × 2 months × ₹110 per month = ₹ 17,600
Off- season & -winter – 40%Occupancy months)	200 Rooms × 40% × 4 months × ₹ 30 per month = ₹ 9,600
Total Lighting charges	₹ 1,05,600+ ₹ 17,600 + ₹ 9,600 = ₹ 132,800

Statement of total cost:

	(₹)
Staff salary	8,00,000
Repairs to building	3,00,000
Laundry	1,40,000
Interior	2,50,000
Miscellaneous Expenses	2,00,200

Depreciation on Building (₹ 300 Lakhs × 80% × 5%)	**12,00,000**
Depreciation on Furniture & Equipment (₹ 300 Lakhs × 20% × 15%)	**9,00,000**
Room attendant's wages (₹ 15 per Room Day for 43,200 Room Days)	**6,48,000**
Lighting charges	1,32,800
Total cost	**45,71,000**
Add: Profit Margin (20% on Room rent or 25% on Cost)	11,42,750
Total Rent to be charged	**57,13,750**

Calculation of Room Rent per day:

Total Rent / Equivalent Full Room days = ₹ 57,13,750/ 36,000 = ₹ 158.72

Room Rent during Season = ₹ 158.72

Room Rent during Off season = ₹ 158.72 × 50% = ₹ 79.36

Q.170 Hospital Ques + BED | PY Jan 21

ABC Health care runs an Intensive Medical Care Unit. For this purpose, it has hired a building at a rent of ₹ 50,000 per month with the agreement to bear the repairs and maintenance charges also.

The unit consists of 100 beds and 5 more beds can comfortably be accommodated when the situation demands. Though the unit is open for patients all the 365 days in a year, scrutiny of accounts for the year 2020 reveals that only for 120 days in the year, the unit had the full capacity of 100 patients per day and for another 80 days, it had, on an average only 40 beds occupied per day. But, there were occasions when the beds were full, extra beds were hired at a charge of ₹ 50 per bed per day. This did not come to more than 5 beds above the normal capacity on any one day. The total hire charges for the extra beds incurred for the whole year amounted to ₹ 20,000.

The unit engaged expert doctors from outside to attend on the patients and the fees were paid on the basis of the number of patients attended and time spent by them which on an average worked out to ₹ 30,000 per month in the year 2020.

The permanent staff expenses and other expenses of the unit were as follows:

	₹
2 Supervisors each at a per month salary of	*5,000*
4 Nurses each at a per month salary of	*3,000*
2 Ward boys each at a per month salary of	*1,500*
Other Expenses for the year were as under:	
Repairs and Maintenance	*28,000*
Food supplied to patients	*4,40,000*
Caretaker and Other services for patients	*1,25,000*
Laundry charges for bed linen	*1,40,000*
Medicines supplied	*2,80,000*
Cost of Oxygen etc. other than directly borne for treatment of patients	*75,000*

General Administration Charges allocated to the unit	*71,000*

Required:

(i) What is the profit per patient day made by the unit in the year 2020, if the unit recovered an overall amount of ₹ 200 per day on an average from each patient.

(ii) The unit wants to work on a budget for the year 2021, but the number of patients requiring medical care is a very uncertain factor. Assuming that same revenue and expenses prevail in the year 2021 in the first instance, work out the number of patient days required by the unit to break even.

Ans.

Workings:

Calculation of number of Patient days

100 Beds × 120 days = 12000

40 Beds × 80 days = 3,200

Extra beds = 400

Total = 15,600

(i) Statement of Profitability

Particulars	**Amount (₹)**	**Amount (₹)**
Income for the year (₹ 200 per patient per day × 15,600 patient days)		31,20,000
Variable Costs:		
Doctor Fees (₹ 30,000 per month × 12)	3,60,000	
Food to Patients (Variable)	4,40,000	
Caretaker Other services to patients (Variable)	1,25,000	
Laundry charges (Variable)	1,40,000	
Medicines (Variable)	2,80,000	
Bed Hire Charges (₹ 50 × 400 Beds)	20,000	
Total Variable costs		(13,65,000)
Contribution		17,55,000
Fixed Costs:		
Rent (₹ 50,000 per month × 12)	6,00,000	
Supervisor (2 persons × ₹ 5,000 × 12)	1,20,000	
Nurses (4 persons × ₹ 3,000 × 12)	1,44,000	
Ward Boys (2 persons x ₹ 1500 x12)	36,000	
Repairs (Fixed)	28,000	
Cost of Oxygen	75,000	
Administration expenses allocated	71,000	
Total Fixed Costs		(10,74,000)
Profit		**6,81,000**

Calculation of Contribution and profit per Patient day

Total Contribution = 17,55,000

Total Patient days = 15,600 days

Contribution per Patient day = 17,55,000 / 15,600 days = 112.50

Total Profit = 6,81,000

Total Patient days = 15,600 days

Profit per Patient day = 6,81,000 / 15,600 days = 43.65

(ii) Breakeven Point = Fixed Cost / Contribution per Patient day

= ₹ 10,74,000 / ₹ 112.50

= 9,547 patient days

Q.171 Insurance Co. PY July 21

MRSL Healthcare Ltd. has incurred the following expenditure during the last year for its newly launched 'COVID-19' Insurance policy:

Office administration cost	*48,00,000*
Claim management cost	*3,80,000*
Employees cost	*16,20,000*
Postage and logistics	*32,40,000*
Policy issuance cost	*29,50,000*
Facilities cost	*46,75,000*
Cost of marketing of the policy	*1,38,90,000*
Policy development cost	*35,00,000*
Policy servicing cost	*96,45,000*
Sales support expenses	*32,00,000*
I.T. Cost	*?*

Number of Policy sold: 2,800

Total insured value of policies - ₹ 3,500 Crores Cost per rupee of insured value - ₹ 0.002

You are required to:

(i) Calculate Total Cost for "COVID-19" Insurance policy segregating the costs into four main activities namely (a) Marketing and Sales support (b) Operations (c) I.T. Cost and (d) Support functions.

(ii) Calculate Cost Per Policy.

Ans. **(i) Calculation of total cost for 'COVID-19' Insurance policy**

	Particulars	Amount (₹)	Amount (₹)
a.	**Marketing and Sales support:**		
	- Policy development cost	35,00,000	
	- Cost of marketing	1,38,90,000	
	- Sales support expenses	32,00,000	**2,05,90,000**
b.	**Operations:**		

	- Policy issuance cost	29,50,000	
	- Policy servicing cost	96,45,000	
	- Claim management cost	3,80,000	**1,29,75,000**
c.	**IT Cost***		**2,21,00,000**
	Support functions		
d.	- Postage and logistics	32,40,000	
	- Facilities cost	46,75,000	
	- Employees cost	16,20,000	
	- Office administration cost	48,00,000	**1,43,35,000**
	Total Cost		**7,00,00,000**

IT cost

= (₹ 3,500 crores x 0.002) – ₹ 4,79,00,000 = ₹ 2,21,00,000

(ii) Calculation of cost per policy = $\frac{Total\,cost}{No\,of\,policies}$ = $\frac{7,00,00,000}{2,800}$ = 25,000