Q.1

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.2

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.3

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

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

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

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

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

(i) Calculate the Value of material purchased

(ii) Prepare cost sheet showing the profit earned by the firm.

Ans. **Workings:**

1. Calculation of Sales Quantity:

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

2. Calculation of Cost of Production

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

3. Calculation of Factory Cost

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

4. Calculation of Gross Factory Cost

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

5. Calculation of Prime Cost

Particular	**Amount (₹)**

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

6. Calculation of Cost of Materials Consumed & Labour cost

Let Cost of Material Consumed = M and Labour cost = 0.5M

Prime Cost = Cost of Material Consumed + Labour Cost 78,00,000 = M + 0.5M

M = 52,00,000

Therefore, Cost of Material Consumed = ₹ 52,00,000 and Labour Cost = ₹ 26,00,000

(i) Calculation of Value of Materials Purchased

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

Cost Sheet

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

Q.4

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

Sl. No.		(₹)	(₹)
(i)	Raw materials purchased		10,00,00,000
(ii)	GST paid on the above purchases @18% (eligible for input tax credit)		1,80,00,000
(iii)	Freight inwards		11,20,600
(iv)	Wages paid to factory workers		29,20,000
(v)	Contribution made towards employees' PF & ESIS		3,60,000
(vi)	Production bonus paid to factory workers		2,90,000
(vii)	Royalty paid for production		1,72,600
(viii)	Amount paid for power & fuel		4,62,000
(ix)	Amount paid for purchase of moulds and patterns (life is equivalent to two years production)		8,96,000
(x)	Job charges paid to job workers		8,12,000
(xi)	Stores and spares consumed		1,12,000
(xii)	Depreciation on:		
	Factory building	84,000	
	Office building	56,000	
	Plant & Machinery	1,26,000	
	Delivery vehicles	86,000	3,52,000
(xiii)	Salary paid to supervisors		1,26,000
(xiv)	Repairs & Maintenance paid for: Plant & Machinery	48,000	
	Sales office building	18,000	
	Vehicles used by directors	19,600	85,600
(xv)	Insurance premium paid for:		
	Plant & Machinery	31,200	
	Factory building	18,100	
	Stock of raw materials & WIP	36,000	85,300
(xvi)	Expenses paid for quality control check activities		19,600
(xvii)	Salary paid to quality control staffs		96,200
(xviii)	Research & development cost paid for improvement in production process		18,200
(xix)	Expenses paid for pollution control and engineering & maintenance		26,600
(xx)	Expenses paid for administration of factory work		1,18,600
(xxi)	Salary paid to functional mangers:		
	Production control	9,60,000	

	Finance & Accounts	9,18,000	
	Sales & Marketing	10,12,000	28,90,000
(xxii)	Salary paid to General Manager		12,56,000
(xxiii)	Packing cost paid for:		
	Primary packing necessary to maintain quality	96,000	
	For re-distribution of finished goods	1,12,000	2,08,000
(xxiv)	Interest and finance charges paid (for usage of non-equity fund)		7,20,000
(xxv)	Fee paid to auditors		1,80,000
(xxvi)	Fee paid to legal advisors		1,20,000
(xxvii)	Fee paid to independent directors		2,20,000
(xxviii)	Performance bonus paid to sales staffs		1,80,000
(xxix)	Value of stock as on 1st April, 2022:		
	Raw materials	18,00,000	
	Work-in-process	9,20,000	
	Finished goods	11,00,000	38,20,000
(xxx)	Value of stock as on 31st March, 2023:		
	Raw materials	9,60,000	
	Work-in-process	8,70,000	
	Finished goods	18,00,000	36,30,000

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

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

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

Sl.No.	Particulars	(₹)	(₹)
(i)	Material Consumed:		
	Raw materials purchased	10,00,00,000	
	Freight inwards	11,20,600	
	Add: Opening stock of raw materials	18,00,000	
	Less: Closing stock of raw materials	(9,60,000)	10,19,60,600
(ii)	Direct employee (labour) cost:		
	Wages paid to factory workers	29,20,000	
	Contribution made towards employees' PF & ESIS	3,60,000	
	Production bonus paid to factory workers	2,90,000	35,70,000
(iii)	Direct expenses:		
	Royalty paid for production	1,72,600	
	Amount paid for power & fuel	4,62,000	
	Amortised cost of moulds and patterns	4,48,000	
	Job charges paid to job workers	8,12,000	18,94,600

	Prime Cost		**10,74,25,200**
(iv)	Works/ Factory overheads:		
	Stores and spares consumed	1,12,000	
	Depreciation on factory building	84,000	
	Depreciation on plant & machinery	1,26,000	
	Repairs & Maintenance paid for plant & machinery	48,000	
	Insurance premium paid for plant & machinery	31,200	
	Insurance premium paid for factory building	18,100	
	Insurance premium paid for stock of raw materials & WIP	36,000	
	Salary paid to supervisors	1,26,000	
	Expenses paid for pollution control and engineering & maintenance	26,600	6,07,900
	Gross factory cost		**10,80,33,100**
	Add: Opening value of W-I-P		9,20,000
	Less: Closing value of W-I-P		(8,70,000)
	Factory Cost		**10,80,83,100**
(v)	Quality control cost:		
	Expenses paid for quality control check activities	19,600	
	Salary paid to quality control staffs	96,200	1,15,800
(vi)	Research & development cost paid for improvement in production process		18,200
(vii)	Administration cost related with production:		
	-Expenses paid for administration of factory work	1,18,600	
	-Salary paid to Production control manager	9,60,000	10,78,600
(viii)	Less: Realisable value on sale of scrap and waste		(86,000)
(ix)	Add: Primary packing cost		96,000
	Cost of Production		**10,93,05,700**
	Add: Opening stock of finished goods		11,00,000
	Less: Closing stock of finished goods		(18,00,000)
	Cost of Goods Sold		**10,86,05,700**
(x)	Administrative overheads:		
	Depreciation on office building	56,000	
	Repairs & Maintenance paid for vehicles used by directors	19,600	
	Salary paid to Manager- Finance & Accounts	9,18,000	
	Salary paid to General Manager	12,56,000	
	Fee paid to auditors	1,80,000	
	Fee paid to legal advisors	1,20,000	
	Fee paid to independent directors	2,20,000	27,69,600
(xi)	Selling overheads:		

	Repairs & Maintenance paid for sales office building	18,000	
	Salary paid to Manager- Sales & Marketing	10,12,000	
	Performance bonus paid to sales staffs	1,80,000	12,10,000
(xii)	Distribution overheads:		
	Depreciation on delivery vehicles	86,000	
(xiii)	Packing cost paid for re-distribution of finished goods	1,12,000	1,98,000
(xiv)	Interest and finance charges paid		7,20,000
	Cost of Sales		**11,35,03,300**

Note:
GST paid on purchase of raw materials would not be part of cost of materials as it is eligible for ITC

Q.5

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:

Economic Order Quantity

Re-Order Level (ROL)

Maximum Stock Level

Minimum Stock Level

Average Stock Level

Number of Orders to be placed per year

Total Inventory Cost

If the supplier is willing to offer 1% discount on purchase of total annual quantity in two orders, whether offer is acceptable? 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.6

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:

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

= 3,893.3 packs or 3,893 packs.

(ii) Number of orders per year

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

(iii) Ordering and storage costs

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

(iv) Timing of next order

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

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

Supply.

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

(b) Days requirement covered by inventory

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

$\frac{10{,}033 \text{ packs}}{3{,}893 \text{ packs}}$ x 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.7

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

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

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

You are required to:

(i) Compute the Economic Order Quantity.

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

Ans. (i) Calculation of Economic Order Quantity

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

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

When EOQ is ordered

		(₹)
Purchase Cost	(12,000 units x ₹ 640)	76,80,000
Ordering Cost	$\left[\frac{A}{Q} xQ - \right.$(12,000 units/ 600 units) x 1,800$\left.\right]$	36,000
Carrying Cost	$\left[\frac{Q}{2} xCxi - \right.$600 units x 640x1/2x 18.75/100)$\left.\right]$	36,000
Total Cost		77,52,000

Q.8

Arnav Electronics manufactures electronic home appliances. It follows weighted average Cost method for inventory valuation. Following are the data of component X:

Date	Particulars	Units	Rate per unit(₹)

15-12-19	Purchase Order- 008	10,000	9,930
30-12-19	Purchase Order- 009	10,000	9,780
01-01-20	Opening stock	3,500	9,810
05-01-20	GRN*-008 (against the Purchase Order- 008)	10,000	-
05-01-20	MRN**-003 (against the Purchase Order- 008)	500	-
06-01-20	Material Requisition-011	3,000	-
07-01-20	Purchase Order- 010	10,000	9,750
10-01-20	Material Requisition-012	4,500	-
12-01-20	GRN-009 (against the Purchase Order- 009)	10,000	-
12-01-20	MRN-004 (against the Purchase Order- 009)	400	-
15-01-20	Material Requisition-013	2,200	-
24-01-20	Material Requisition-014	1,500	-
25-01-20	GRN-010 (against the Purchase Order- 010)	10,000	-
28-01-20	Material Requisition-015	4,000	-
31-01-20	Material Requisition-016	3,200	-

*GRN- Goods Received Note; **MRN- Material Returned Note

Based on the above data, you are required to CALCULATE:

(i) Re-order level

(ii) Maximum stock level

(iii) Minimum stock level

(iv) PREPARE Store Ledger for the period January 2020 and DETERMINE the value of stock as on 31-01-2020.

(v) Value of components used during the month of January, 2020.

(vi) Inventory turnover ratio.

Ans. **Workings:**

Consumption is calculated on the basis of material requisitions:

Maximum component usage = 4,500 units (Material requisition on 10-01-20)

Minimum component usage = 1,500 units (Material requisition on 24 -01-20)

Lead time is calculated from purchase order date to material received date

Maximum lead time = 21 days (15-12-2019 to 05-01-2020)

Minimum lead time = 14 days (30-12-2019 to 12-01-2020)

Calculations:

(i) Re-order level

= Maximum usage × Maximum lead time

= 4,500 units × 21 days = 94,500 units

(ii) Maximum stock level

= Re-order level + Re-order Quantity – (Min. Usage × Min. lead time)

= 94,500 units + 10,000 units – (1,500 units × 14 days)

= 1,04,500 units – 21,000 units = 83,500 units

(iii) Minimum stock level

= Re-order level – (Avg. consumption × Avg. lead time)

= 94,500 units – (3,000 units × 17.5 days)

= 94,500 units – 52,500 units

= 42,000 units

(i) Store Ledger for the month of January 2020:

Date	Receipts				Issue				Balance		
	GRN/ MRN	Units	Rate ₹	Amt.	MRN/ MR	Units	Rate ₹	Amt.	Units	Rate ₹	Amt.

				(₹ '000)				(₹ '000)			(₹ '000)
01-01-20	-	-	-	-	-	-	-	-	3,500	9,810	34,335
05-01-20	008	10,000	9,930	99,300	003	500	9,930	4,965	13,000	9,898	1,28,670
06-01-20	-	-	-	-	011	3,000	9,898	29,694	10,000	9,898	98,980
10-01-20	-	-	-	-	012	4,500	9,898	44,541	5,500	9,898	54,439
12-01-20	009	10,000	9,780	97,800	004	400	9,780	3,912	15,100	9,823	1,48,327
15-01-20	-	-	-	-	013	2,200	9,823	21,611	12,900	9,823	1,26,716
24-01-20	-	-	-	-	014	1,500	9,823	14,734	11,400	9,823	1,11,982
25-01-20	010	10,000	9,750	97,500	-	-	-	-	21,400	9,789	2,09,482
28-01-20	-	-	-	-	015	4,000	9,789	39,156	17,400	9,789	1,70,326
31-01-20	-	-	-	-	016	3,200	9,789	31,325	14,200	9,789	1,39,001

[Note: Decimal figures may be rounded-off to the nearest rupee value wherever required)
Value of stock as on 31 01-2020 ('000) = ₹1,39,001

(v) Value of components used during the month of January 2020:
Sum of material requisitions 011 to 016 ('000)
= ₹ 29,694 + ₹ 44,541 + ₹ 21,611 + ₹ 14,734 + ₹ 39,156 + ₹ 31,325 = ₹ 1,81,061

(vi) Inventory Turnover Ratio

$$= \frac{\text{Value of materialsused}}{\text{Averagestock value}} = \frac{1{,}81{,}061}{(1{,}39{,}001 + 34{,}335)\ /\ 2} = \frac{`\ 1{,}81{,}061}{86{,}668} = 2.09$$

Q.9

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.10

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.11

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.12

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 × $\frac{3}{8}$ = 45, Staff Attorney - 120 × $\frac{3}{8}$ = 45 & Associate Attorney - 120 × $\frac{2}{8}$ = 30} employees]

At the end of the year:

[Legal Secretary -(Opening 45 + 90 Joining) = 135; Staff Attorney - (Opening 45 + 30 Joined – 30 Left) = 45]

(ii) No. of Employees Separated, Replaced and newly recruited during the year

Particulars	Separations	New Recruitment	Replacement	Total Joining
Records clerk	90	1,530	90	1,620
Human Resource Manager	90	--	30	30
Legal Secretary	--	90	--	**90**
Staff Attorney	**30**	--	**30**	**30**
Associate Attorney	**15**	15	**15**	**30**
Senior Staff Attorney	--	12	--	**12**
Senior Records clerk	--	39	--	**39**
Litigation attorney	**90**	--	--	--
Total	**315**	1,686	**165**	**1,851**

(Since, HR Ltd. and its subsidiary are maintaining separate Personnel Department, so transfer-in and transfer-out are treated as recruitment and separation respectively.)

(a) Calculation of Labour Turnover rate:

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

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

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.13

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 six months (₹)
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.14

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.15

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

(i) 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

$$Y = \frac{13,24,000}{0.99}$$

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.16

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 units	5,400 x 5 hours x ₹ 20.40 = ₹ 5,50,800	Pie = 5,400 units x 1 hour x ₹ 28.80 = ₹ 1,55,520	(+) ₹ 1,36,080
			Qui = 5,400 units x 4 hours x ₹12 = ₹ 2,59,200	
Total		₹ 7,34,400	₹ 6,43,680	(+) ₹ 90,720

Use of pre-determined overhead rate has resulted in over valuation of stock by ₹ 90,720 due to which the company's income would be affected (increase) by ₹ 90,720. Profit would be affected only to the extent of Overhead contained in closing finished goods and closing WIP, if any.

(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 A = 5 hours x ₹ 20.40 per hour B = 5 hours x ₹ 20.40 per hour	102.00	102.00
Cost of production	127.00	142.00
Add: 40% of margin	50.80	56.80
	177.80	198.50

(3) If department-wise recovery rate is used

Particulars	Product A in ₹	Product B in ₹
Materials & Labour	25.00	40.00
Add: Production Overhead	127.20	76.80
A = Pie = 4 hours x ₹ 28.80 Qui = 1 hour x ₹ 12 B =Pie = 1 hour x ₹ 28.80 Qui = 4 hours x ₹ 12		
Cost of production	152.20	116.80
Add: 40% of margin	60.88	46.72
Selling Price per unit	213.08	163.52

Q.17

A Ltd. manufactures two products- A and B. The manufacturing division consists of two production departments P1 and P2 and two service departments S1 and S2.

Budgeted overhead rates are used in the production departments to absorb factory overheads to the products. The rate of Department P1 is based on direct machine hours, while the rate of Department P2 is based on direct labour hours. In applying overheads, the pre-determined rates are multiplied by actual hours.

For allocating the service department costs to production departments, the basis adopted is as follows:

(i) Cost of Department S1 to Department P1 and P2 equally, and

(ii) Cost of Department S2 to Department P1 and P2 in the ratio of 2 : 1 respectively.

The following budgeted and actual data are available:

Annual profit plan data:

Factory overheads budgeted for the year:

Departments	P1	27,51,000	S1	8,00,000
	P2	24,50,000	S2	6,00,000

Budgeted output in units: Product A50,000; B 30,000.

Budgeted raw-material cost per unit:

Product A ₹ 120; Product B ₹ 150.

Budgeted time required for production per unit:

Department P_1 : Product A : 1.5 machine hours

Product B : 1.0 machine hour

Department P_2 : Product A : 2 Direct labour hours Product B : 2.5 Direct labour hours

Average wage rates budgeted in Department P_2 are:

Product A - ₹ 72 per hour and Product B – ₹ 75 per hour.

All materials are used in Department P_1 only.

Actual data (for the month of Jan, 2020):

Units actually produced: Product A : 4,000 units

Product B : 3,000 units

Actual direct machine hours worked in Department P_1:

On Product A 6,100 hours, Product B 4,150 hours.

Actual direct labour hours worked in Department P_2:

On Product A 8,200 hours, Product B 7,400 hours.

Costs actually incurred:		Product A		Product B
		₹		₹
Raw materials		4,89,000		4,56,000
Wages		5,91,900		5,52,000
Overheads: Department	P_1	2,50,000	S_1	80,000
	P_2	2,25,000	S_2	60,000

You are required to:

(i) COMPUTE the pre-determined overhead rate for each production department.

(ii) PREPARE a performance report for Jan, 2020 that will reflect the budgeted costs and actual costs.

Ans. **(i) Computation of pre-determined overhead rate for each production department from budgeted data**

	Production Department		Service Department	
	P1	P2	S1	S2
Budgeted factory overheads for the year (₹)	27,51,000	24,50,000	8,00,000	6,00,000
Allocation of service department S1's costs to production departments P1 and P2 equally (₹)	4,00,000	4,00,000	(8,00,000)	--
Allocation of service department S2's costs to production departments P1 and P2 in the ratio of 2:1 (₹)	4,00,000	2,00,000	-	(6,00,000)
Total	35,51,000	30,50,000	--	--
Budgeted machine hours in department P1 (working note-1)	1,05,000	--		
Budgeted labour hours in department P2 (working note-1)	--	1,75,000		
Budgeted machine/ labour hour rate (₹)	33.82	17.43		

(ii) Performance report for Jan, 2020

(When 4,000 and 3,000 units of Products A and B respectively were actually produced)

	Budgeted (₹)	Actual (₹)
Raw materials used in Dept. P1:		
A : 4,000 units × ₹ 120	4,80,000	4,89,000
B : 3,000 units × ₹ 150	4,50,000	4,56,000
Direct labour cost (on the basis of labour hours worked in department P2)		
A : 4,000 units × 2 hrs. × ₹ 72	5,76,000	5,91,900
B : 3,000 units × 2.5 hrs. × ₹ 75	5,62,500	5,52,000
Overhead absorbed on machine hour basis in Dept. P1:		
A : 4,000 units × 1.5 hrs. × ₹ 33.82	2,02,920	1,96,420*
B : 3,000 units × 1 hr. × ₹ 33.82	1,01,460	1,33,630*
Overhead absorbed on labour hour basis in Dept. P2:		
A : 4,000 units × 2 hrs. × ₹ 17.43	1,39,440	1,49,814**
B : 3,000 units × 2.5 hrs. × ₹ 17.43	1,30,725	1,35,198**
	26,43,045	27,03,962

Working notes:

1.

	Product A	Product B	Total
Budgeted output (units)	50,000	30,000	
Budgeted machine hours in Dept. P1	75,000	30,000	1,05,000
	(50,000×1.5 hrs.)	(30,000×1 hr.)	
Budgeted labour hours in Dept. P2	1,00,000	75,000	1,75,000
	(50,000×2 hrs.)	(30,000×2.5 hrs.)	

2.

	Product A	**Product B**	**Total**
Actual output (units)	4,000	3,000	
Actual machine hours utilized in Dept. P_1	6,100	4,150	10,250
Actual labour hours utilised in Dept. P_2	8,200	7,400	15,600

3. **Computation of actual overhead rates for each production department from actual data**

	Production Department		**Service Department**	
	P1	**P2**	**S1**	**S2**

Actual factory overheads for the month of Jan, 2020 (₹)	2,50,000	2,25,000	80,000	60,000
Allocation of service Dept. S_1's costs to production Dept. P_1 and P_2 equally (₹)	40,000	40,000	(80,000)	-
Allocation of service Dept. S_2's costs to production Dept. P_1 and P_2 in the ratio of 2:1 (₹)	40,000	20,000	-	(60,000)
Total	3,30,000	2,85,000	--	--
Actual machine hours in Dept. P_1 (working note 2)	10,250	--		
Actual labour hours in Dept. P_2 (working note 2)	--	15,600		
Actual machine/ labour hour rate (₹)	32.20	18.27		

4. Actual overheads absorbed (based on machine hours)
   A : 6,100 hrs × ₹ 32.20 = ₹ 1,96,420
   B : 4,150 hrs × ₹ 32.20 = ₹ 1,33,630
5. Actual overheads absorbed (based on labour hours)
   A : 8,200 hrs × ₹ 18.27 = ₹ 1,49,814
   B : 7,400hrs × ₹ 18.27 = 1,35,198

Q.18

The profit margin of BABY Hairclips Company were over 20% of sales producing BROWN and BLACK hairclips. During the last year, GREEN hairclips had been introduced at 10% premium in selling price after the introduction of YELLOW hairclips earlier five years back at 10/3% premium. However, the manager of the company is disheartened with the sales figure for the current financial year as follows:

During the last year, GREEN hairclips had been introduced at 10% premium in selling price after the introduction of YELLOW hairclips earlier five years back at 10/3% premium. However, the manager of the company is disheartened with the sales figure for the current financial year as follows:

Traditional Income Statement

	Brown	Black	Yellow	Green	Total
Sales	1,50,00,000	1,20,00,000	27,90,000	3,30,000	3,01,20,000
Material Costs	50,00,000	40,00,000	9,36,000	1,10,000	1,00,46,000
Direct Labour	20,00,000	16,00,000	3,60,000	40,000	40,00,000
Overhead (3 times of direct labour)	60,00,000	48,00,000	10,80,000	1,20,000	1,20,00,000
Total Operating Income	20,00,000	16,00,000	4,14,000	60,000	40,74,000
Return on Sales (in %)	13.3%	13.3%	14.8%	18.2%	13.5%

It is a known fact that customers are ready to pay premium amount for YELLOW and GREEN hairclips for their attractiveness; and the percentage returns are also high on new products.

At present, all of the Plant's indirect expenses are allocated to the products at 3 times of the direct labour expenses. However, the manager is interested in allocating indirect expenses on the basis of activity cost to reveal real earner.

He provides support expenses category-wise as follows:

At present, all of the Plant's indirect expenses are allocated to the products at 3 times of the direct labour expenses. However, the manager is interested in allocating indirect expenses on the basis of activity cost to reveal real earner.

He provides support expenses category-wise as follows:

Support Expenses	**(₹)**

Indirect Labour	40,00,000
Labour Incentives	32,00,000
Computer Systems	20,00,000
Machinery depreciation	16,00,000
Machine maintenance	8,00,000
Energy for machinery	4,00,000
Total	1,20,00,000

He provides following additional information for accomplishment of his interest: Incentives to be allocated @ 40% of labour expenses (both direct and indirect).

Indirect labours are involved mainly in three activities. About half of indirect labour is involved in handling production runs. Another 40% is required just for the physical changeover from one color hairclip to another because YELLOW hairclips require substantial labour for preparing the machine as compared to other colour hairclips. Remaining 10% of the time is spend for maintaining records of the products in four parts.

Another amount spent on computer system of ₹ 20,00,000 is for maintenance of documents relating to production runs and record keeping of the four products. In aggregate, approx.. 80% of the amount expend is involved in the production run activity and approx.. 20% is used to keep records of the products in four parts.

Other overhead expenses i.e. machinery depreciation, machine maintenance and energy for machinery are incurred to supply machine capacity to produce all the hairclips (practical capability of 20,000 hours).

Activity Cost Drivers:

Particulars	**Brown**	**Black**	**Yellow**	**Green**	**Total**
Sales Volume (units)	1,00,000	80,000	18,000	2,000	2,00,000
Selling Price (₹)	150	150	155	165	
Material cost (₹)	50	50	52	55	
Machine hours per unit (Hrs)	0.10	0.10	0.10	0.10	20,000
Production runs	100	100	76	24	300
Setup time per run (Hrs)	4	1	6	4	

You are required to –

(i) CALCULATE operating income and operating income as per percentage of sales using activity-based costing system.

(ii) STATE the reasons for different operating income under traditional income system and activity-based costing system.

Ans (i) Calculation of operating income using Activity Based Costing

Activity	**Overhead cost (₹)**	**Allocation**	**Overhead cost (₹)**	**Cost-driver level**	**Cost driver rate (₹)**
Indirect labour + 40% for incentives	56,00,000	50%	28,00,000	300 Production runs	9,333.33
		40%	22,40,000	1052* Setup hours	2,129.28
		10%	5,60,000	4 Number of parts	1,40,000
Computer Systems	20,00,000	80%	16,00,000	300 Production runs	5,333.33
		20%	4,00,000	4 Number of parts	1,00,000
Machinery depreciation	16,00,000	100%	16,00,000	20,000 Machine hours	80
Machine Maintenance	8,00,000	100%	8,00,000	20,000 Machine hours	40

Energy for Machinery	4,00,000	100%	4,00,000	20,000 Machine hours	20

* (100 x 4) + (100 x 1) + (76 x 6) + (24 x 4)
= (400 + 100 + 456 + 96)
= 1052 setup hours

Activity Based Costing

	Brown	**Black**	**Red**	**Green**	**Total**
Quantity (units)	1,00,000	80,000	18,000	2,000	2,00,000
	(₹)	**(₹)**	**(₹)**	**(₹)**	**(₹)**
Sales	1,50,00,000	1,20,00,000	27,90,000	3,30,000	3,01,20,000
Less: Material Costs	50,00,000	40,00,000	9,36,000	1,10,000	1,00,46,000
Less: Direct labour	20,00,000	16,00,000	3,60,000	40,000	40,00,000
Less: 40% incentives on direct labour	8,00,000	6,40,000	1,44,000	16,000	16,00,000
(A)	**72,00,000**	**57,60,000**	**13,50,000**	**1,64,000**	**1,44,74,000**
Overheads					
Indirect labour + incentives					
- 50% based on Production runs	9,33,333 (9,333.33 x 100)	9,33,333 (9,333.33 x 100)	7,09,334 (9,333.33 x 76)	2,24,000 (9,333.33 x 24)	28,00,000
- 40% based	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 on number of parts	1,40,000 (1,40,000 x 1)	1,40,000	1,40,000	1,40,000	5,60,000
Computer Systems					
- 80% based on Production runs	5,33,333 (5,333.33 x 100)	5,33,333 (5,333.33 x 100)	4,05,334 (5,333.33 x76)	1,28,000 (5,333.33 x 24)	16,00,000
- 20% based on number of parts	1,00,000 (1,00,000 x 1)	1,00,000	1,00,000	1,00,000	4,00,000
Machinery depreciation	8,00,000 (80 x 0.1 x 1,00,000)	6,40,000 (80 x 0.1 x 80,000)	1,44,000 (80x0.1x18,000)	16,000 (80 x 0.1 x 2,000)	16,00,000
Machine Maintenance	4,00,000 (40 x 0.1 x 1,00,000)	3,20,000 (40 x 0.1 x 80,000)	72,000 (40x0.1x18,000)	8,000 (40 x 0.1 x 2,000)	8,00,000
Energy for Machinery	2,00,000 (20x0.1x1,00,00	1,60,000 (20x0.1x80,00	36,000 (20x0.1x18,000)	4,000 (20x0.1x2,000)	4,00,000

	0)	0)			
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.19

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 (1.70 x5)	8.50 (1.70 x 5)	10.20 (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.20

'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 (b) Rents (c) Currency Replenishment Cost	 4,00,000 2,00,000 1,00,000 7,00,000	 All fixed, no change. Fully fixed, no change. Expected to double during budget period. (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 Total	3,60,000	- Estimated to increase by 80% during the budget period. (Rs.2,00,000 x 180%)

Q.21

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.22

A Ltd. manufacture and sales its product R-9. The following figures have been collected from cost records of last year for the product R-9:

Elements of Cost	Variable Cost portion	Fixed Cost
Direct Material	30% of Cost of Goods Sold	--
Direct Labour	15% of Cost of Goods Sold	--
Factory Overhead	10% of Cost of Goods Sold	₹ 2,30,000
Administration Overhead	2% of Cost of Goods Sold	₹ 71,000
Selling & Distribution Overhead	4% of Cost of Sales	₹ 68,000

Last Year 5,000 units were sold at ₹185 per unit. From the given DETERMINE the followings:

(i) Break-even Sales (in rupees)

(ii) Profit earned during last year

(iii) Margin of safety (in %)

(iv) Profit if the sales were 10% less than the actual sales.

(Assume that Administration Overhead is related with production activity)

Ans

(1) Calculation of Cost of Goods Sold (COGS):

COGS = DM + DL + FOH + AOH

COGS = {0.3 COGS + 0.15 COGS + (0.10 COGS + ₹ 2,30,000) + (0.02 COGS + ₹ 71,000)}

Or, COGS = 0.57 COGS + ₹ 3,01,000

Or, COGS = $\frac{3,01,000}{0.43}$ = ₹ 7,00,000

(2) Calculation of Cost of Sales (COS):

COS = COGS + S&DOH

COS = COGS + (0.04 COS + ₹ 68,000)

Or, COS = ₹ 7,00,000 + (0.04 COS + ₹ 68,000)

Or, COS = $\frac{7,68,000}{0.96}$ = ₹ 8,00,000

(3) Calculation of Variable Costs:

Direct Material-	(0.30 × ₹ 7,00,000)	₹ 2,10,000
Direct Labour-	(0.15 × ₹ 7,00,000)	₹ 1,05,000
Factory Overhead-	(0.10 × ₹ 7,00,000)	₹ 70,000
Administration OH-	(0.02 × ₹ 7,00,000)	₹ 14,000
Selling & Distribution OH	(0.04 × ₹ 8,00,000)	₹ 32,000
		₹ 4,31,000

(4) Calculation of total Fixed Costs:

Factory Overhead-	₹ 2,30,000
Administration OH-	₹ 71,000
Selling & Distribution OH	₹ 68,000
	₹ 3,69,000

(5) Calculation of P/V Ratio:

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{\text{Sales} - \text{Variable Costs}}{\text{Sales}} \times 100$$

$$= \frac{(185 \times 5{,}000 \text{ units}) - 4{,}31{,}000}{185 \times 5{,}000 \text{units}} \times 100 = 53.41\%$$

(i) Break-Even Sales

$$\frac{\text{Sales} - \text{Breakeven sales}}{\text{Sales}} = \frac{3{,}69{,}000}{53.41\%} = ₹6{,}90{,}882$$

(ii) Profit earned during the last year

= (Sales – Total Variable Costs) – Total Fixed Costs

= (₹9,25,000 - ₹4,31,000) - ₹3,69,000

= ₹1,25,000

(iii) Margin of Safety (%)

$$= \frac{\text{Fixed Costs}}{\text{P / V Ratio}} \times 100$$

$$= \frac{9{,}25{,}000 - 6{,}90{,}882}{9{,}25{,}000} \times 100 = 25.31\%$$

(iv) Profit if the sales were 10% less than the actual sales:

Profit = 90% (₹9,25,000 - ₹4,31,000) - ₹3,69,000

= ₹4,44,600 - ₹3,69,000 = ₹75,600

Q.23

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.24

ABC Ltd. had prepared the following estimation for the month of April:

	Quantity	Rate (₹)	Amount (₹)
Material-A	800 kg.	45.00	36,000
Material-B	600 kg.	30.00	18,000
Skilled labour	1,000 hours	37.50	37,500
Unskilled labour	800 hours	22.00	17,600

Normal loss was expected to be 10% of total input materials and an idle labour time of 5% of expected labour hours was also estimated.

At the end of the month the following information has been collected from the cost accounting department:

The company has produced 1,480 kg. finished product by using the followings:

	Quantity	Rate (₹)	Amount (₹)
Material-A	900 kg.	43.00	38,700
Material-B	650 kg.	32.50	21,125
Skilled labour	1,200 hours	35.50	42,600
Unskilled labour	860 hours	23.00	19,780

You are required to CALCULATE:

(a) Material Cost Variance;

(b) Material Price Variance;

(c) Material Mix Variance;

(d) Material Yield Variance;

(e) Labour Cost Variance;

(f) Labour Efficiency Variance and

(g) Labour Yield Variance.

Ans

Material Variances:

Material	SQ (WN-1)	SP (₹)	SQ × SP (₹)	RSQ (WN-2)	RSQ × SP (₹)	AQ	AQ × SP (₹)	AP (₹)	AQ × AP (₹)
A	940 kg.	45.00	42,300	886 kg.	39,870	900 kg.	40,500	43.00	38,700
B	705 kg.	30.00	21,150	664 kg.	19,920	650 kg.	19,500	32.50	21,125
	1645 kg		63,450	1550 kg	59,790	1550kg	60,000		59,825

WN-1: Standard Quantity (SQ):

Material A- $\left(\dfrac{800kg}{0.9x1,400kg} x1,400g\right)$ = 939.68 or 940 kg.

Material B- $\left(\frac{600kg}{0.9x1,400kg}x1,400g\right)$=704.76 or 705 kg.

WN- 2: Revised Standard Quantity (RSQ):

Material A- $\left(\frac{800kg}{1,400kg}x1,550Kg\right)$ = 885.71 or 886 kg.

Material B- $\left(\frac{600kg}{1,400kg}x1,550Kg\right)$ = 664.28 or 664 kg.

(a) Material Cost Variance (A + B) = {(SQ × SP) – (AQ × AP)}
= {63,450 – 59,825} = 3,625 (F)

(b) Material Price Variance (A + B) = {(AQ × SP) – (AQ × AP)
= {60,000 – 59,825} = 175 (F)

(c) Material Mix Variance (A + B) = {(RSQ × SP) – (AQ × SP)}
= {59,790 – 60,000} = 210 (A)

(d) Material Yield Variance (A + B) = {(SQ × SP) – (RSQ × SP)}
= {63,450 – 59,790} = 3,660 (F)

Labour Variances:

Labour	SH (WN-3)	SR (₹)	SH × SR (₹)	RSH (WN-4)	RSH × SR (₹)	AH	AH × SR (₹)	AR (₹)	AH × AR (₹)
Skilled	1,116 hrs	37.50	41,850	1144	42,900	1,200	45,000	35.50	42,600
Unskilled	893 hrs	22.00	19,646	916	20,152	860	18,920	23.00	19,780
	2,009 hrs		61,496	2,060	63,052	2,060	63,920		62,380

WN- 3: Standard Hours (SH):

Skilled labour- $\left(\frac{0.95X1,000hr}{0.90X1,400kg.}x1,480Kg\right)$=1,115.87 or 1,116 hrs.

Unskilled labour- $\left(\frac{0.95X800hr}{0.90X1,400kg.}x1,480Kg\right)$ = 892.69 or 893 hrs.

WN- 4: Revised Standard Hours (RSH):

Skilled labour- $\left(\frac{1000hr}{1,800hr}x2,060hr\right)$=1,144.44 or 1,144 hrs.

Unskilled labour- $\left(\frac{800hr}{1,800hr}x2,060hr\right)$ = 915.56 or 916 hrs.

(e) Labour Cost Variance (Skilled + Unskilled) = {(SH × SR) – (AH × AR)}
= {61,496 – 62,380} = 884 (A)

(f) Labour Efficiency Variance (Skilled + Unskilled) = {(SH × SR) – (AH × SR)}
= {61,496 – 63,920} = 2,424 (A)

(g) Labour Yield Variance (Skilled + Unskilled) = {(SH × SR) – (RSH × SR)

Q.25

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.26

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

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

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

I. Apportion joints costs on the basis of:
 (i) Physical Quantity of each product.
 (ii) Contribution Margin method, and

II. Determine Profit or Loss under both the methods.

Ans. Total Joint Cost

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

Apportionment of Joint Costs:

			Product-A	**Product-B**
I.	(i)	Apportionment of Joint Cost on the basis of 'Physical Quantity'	**₹ 38,000** $\left(\frac{83600}{100+120\text{units}} \text{x}100\right)$	**₹ 45,600** $\left(\frac{83600}{100+120\text{units}} \text{x}120\right)$
	(ii)	Apportionment of Joint Cost on the basis of 'Contribution Margin Method':		
		- Variable Costs (on basis of physical units)	**₹ 23,455** $\left(\frac{51600}{100+120\text{units}} \text{x}100\right)$	**₹ 28,145** $\left(\frac{51600}{100+120\text{units}} \text{x}120\right)$
		Contribution Margin	**36,545**	**-4,145**

			(₹600×100 – 23,455)	(₹200×120 – 28,145)
		Fixed Costs*	₹ 32,000	
		Total apportioned cost	₹ 55,455	₹ 28,145
II.	**(iii)**	**Profit or Loss:**		
	When Joint cost apportioned on basis of physical units			
	A.	Sales Value	₹ 60,000	₹ 24,000
	B.	Apportioned joint cost on basis of 'Physical Quantity':	₹ 38,000	₹ 45,600
	A-B	**Profit or (Loss)**	**22,000**	**(21,600)**
	When Joint cost apportioned on basis of 'Contribution Margin Method'			
	C	Apportioned joint cost on basis of 'Contribution Margin Method'	₹ 55,455	₹ 28,145
	A-C	**Profit or (Loss)**	₹ 4,545	₹ (4,145)

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

Q.27

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

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

There were no opening stocks. If these products were sold at split-off stage, the selling prices of A, B and X would have been ₹ 50, ₹ 40 and ₹ 10 per kg respectively.
Required:
(i) PREPARE a statement showing the apportionment of joint costs to A, B and X.
(ii) PRESENT a statement showing the cost per kg of each product indicating joint cost and further processing cost and total cost separately.
(iii) PREPARE a statement showing the product wise and total profit for the period.
(iv) STATE with supporting calculations as to whether any or all the products should be further processed or not

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

Products	A	B	X	Total
Output (kg)	18,000	10,000	54,000	
Sales value at the point of split off (₹)	9,00,000 (₹ 50 x 18,000)	4,00,000 (₹ 40 x 10,000)	5,40,000 (₹ 10 x 54,000)	18,40,000
Joint cost apportion-	6,30,000	2,80,000	3,78,000	12,88,000

ment on the basis of sales value at the point of split off (₹)	$\left(\frac{1288000}{1840000}\times 900000\right)$	$\left(\frac{1288000}{1840000}\times 400000\right)$	$\left(\frac{1288000}{1840000}\times 540000\right)$	

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

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

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

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

Working Notes

1.

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

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

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

(iv) Calculations for processing decision

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

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

Q.28

A product passes through two distinct processes before completion. Following information are available in this respect :

	Process-1	Process-2
Raw materials used	10,000 units	-
Raw material cost (per unit)	₹ 75	-
Transfer to next process/Finished good	9,000 units	8,200 units
Normal loss (on inputs)	5%	10%
Direct wages	₹ 3,00,000	₹ 5,60,000
Direct expenses	50% of direct wages	5% of direct wages
Manufacturing overheads	25% of direct wages	15% of direct wages
Realisable value of scrap (per unit)	₹ 13.50	₹ 145

8,000 units of finished goods were sold at a profit of 15% on cost. There was no opening and closing stock of work-in-progress.

Prepare:

(i) Process-1 and Process-2 Account
(ii) Finished goods Account
(iii) Normal Loss Account
(iv) Abnormal Loss Account
(v) Abnormal Gain Account.

Ans. **(i) Process-1 Account**

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Raw Material Consumed	10,000	7,50,000	By	Normal Loss A/c @ 13.5	500	6,750
"	Direct Wages	--	3,00,000	"	Process 2 @ 133.5	9,000	12,01,500
"	Direct Expenses	--	1,50,000	"	By Abnormal Loss @ 133.5	500	66,750
"	Manufacturing Overheads		75,000				
		10,000	12,75,000			10,000	12,75,000

Cost per unit of completed units and abnormal loss:

$$= \frac{12,75,000 - 6,750}{10,000units - 500units} = 133.5$$

(ii) *Dr.* **Process-2 Account** *Cr.*

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Process-I A/c	9,000	12,01500	By	Normal Loss A/c @ 145	900	1,30,500
"	To Direct Wages	--	5,60,000	"	By Finished Stock A/c [bal fig]	8,200	21,04,667
"	Direct Expenses	--	3,64,000				
"	Manufacturing Overheads	--	84,000				
"	To Abnormal gain (₹ 256.67 × 100 units)	100	25,667				
		9,100	22,35,167			9,100	22,35,167

Cost per unit of completed units and abnormal gain:

$$\frac{22,09,500 - 130500}{8,100units} = 256.67$$

Dr. Finished Goods A/c Cr.

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Process II A/c	8,200	21,04,667	By	By Cost of Sales	8,000	20,53,333
				"	By Balance c/d	200	51,334
		8,200	**21,04,667**			**8,200**	**21,04,667**

(iii) **Normal Loss A/c**

Dr. Cr.

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Process I	500	6,750	By	By abnormal Gain II	100	14,500
	Process II	900	1,30,500		By Cash	500	6,750
					By Cash	800	1,16,000
		1400	1,37,250			1400	1,37,250

(iv) **Abnormal Loss A/c**

Dr. Cr.

	Particulars	Units	Total (`)		Particulars	Units	Total (`)
To	Process I	500	66,750	By	By Cost Ledger Control A/c	500	6,750
					By Costing P& L		60,000

					A/C (Abnormal Loss)		
			66,750				66,750

(v) **Abnormal Gain A/c**

Dr. Cr.

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Normal Loss A/c @ 145	100	14,500	By	Process II	100	25,667
To	Costing P & L A/C		11,167				
		100	25,667			100	25,667

Q.29

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 t o 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 during the month	36,04,000	4,50,000	15,18,000	55,72,000
Less: Realisable Value of normal scrap (₹ 62.50 × 1,800 units)	(1,12,500)	--	--	(1,12,500)
Total cost: (A)	**36,72,000**	**4,82,400**	**16,08,000**	57,62,400
Equivalent units: (B)	43,200	40,200	40,200	
Cost per equivalent unit: (C) = (A ÷ B)	**85.00**	**12.00**	**40.00**	137.00

Statement of Distribution of cost

Particulars	Amount (₹)	Amount (₹)
1. Value of units completed and transferred: (36,000 units × ₹ 137)		49,32,000
2. Value of Abnormal Loss:		
- Materials (3,000 units × ₹ 85)	2,55,000	
- Labour (2,100 units × ₹ 12)	25,200	
- Overheads (2,100 units × ₹ 40)	84,000	3,64,200
3. Value of Closing W-I-P:		
- Materials (4,200 units × ₹ 85)	3,57,000	
- Labour (2,100 units × ₹ 12)	25,200	
- Overheads (2,100 units × ₹ 40)	84,000	4,66,200

(iii) **Process-I A/c**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W.I.P:					
– Materials	3,000	1,80,500	By Normal Loss (₹ 62.5 × 1,800 units)	1,800	1,12,500
– Labour	--	32,400			
– Overheads	--	90,000			
To Materials introduced	42,000	36,04,000	By Abnormal loss	3,000	**3,64,200**
To Labour		4,50,000	By Process-I A/c	36,00	49,32,000

				0	
To Overheads		15,18,000	By Closing WIP	4,200	**4,66,200**
	45,000	**58,74,900**		45,000	**58,74,900**

(iv) **Normal Loss A/c**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	1,800	1,12,500	By Cost Ledger Control A/c	1,800	1,12,500
	1,800	**1,12,500**		1,800	**1,12,500**

(v) **Abnormal Loss A/c**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	3,000	3,64,200	By Cost Ledger Control A/c (₹ 62.5 × 3,000 units)	3,000	**1,87,500**
			By Costing Profit & Loss A/c (Bal. Figure)		**1,76,700**
	3,000	**3,64,200**		3,000	**3,64,200**

Q.30

Star Ltd. manufactures chemical solutions for the food processing industry. The manufacturing takes place in a number of processes and the company uses FIFO method to value work-in-process and finished goods. At the end of the last month, a fire occurred in the factory and destroyed some of paper containing records of the process operations for the month.

Star Ltd. needs your help to prepare the process accounts for the month during which the fire occurred. You have been able to gather some information about the month's operating activities but some of the information could not be retrieved due to the damage. The following information was salvaged:

- Opening work-in-process at the beginning of the month was 800 litres, 70% complete for labour and 60% complete for overheads. Opening work-in-process was valued at ₹ 26,640.
- Closing work-in-process at the end of the month was 160 litres, 30% complete for labour and 20% complete for overheads.
- Normal loss is 10% of input and total losses during the month were 1,800 litres partly due to the fire damage.
- Output sent to finished goods warehouse was 4,200 litres.
- Losses have a scrap value of ₹15 per litre.
- All raw materials are added at the commencement of the process.
- The cost per equivalent unit (litre) is ₹39 for the month made up as follows:

	(₹)
Raw Material	23
Labour	7
Overheads	9
	39

Required:

(i) CALCULATE the quantity (in litres) of raw material inputs during the month.

(ii) CALCULATE the quantity (in litres) of normal loss expected from the process and the quantity (in litres) of abnormal loss / gain experienced in the month.
(iii) CALCULATE the values of raw material, labour and overheads added to the process during the month.
(iv) PREPARE the process account for the month.

Ans. **(i) Calculation of Raw Material inputs during the month:**

Quantities Entering Process	Litres	Quantities Leaving Process	Litres
Opening WIP	800	Transfer to Finished Goods	4,200
Raw material input (balancing figure)	5,360	Process Losses	1,800
		Closing WIP	160
	6,160		6,160

(ii) Calculation of Normal Loss and Abnormal Loss/Gain

	Litres
Total process losses for month	1,800
Normal Loss (10% input)	536
Abnormal Loss (balancing figure)	1,264

(ii) 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		Overheads	
				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.31

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.32

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 = $\frac{\text{Rs.3,00,000}}{\text{Rs.10 per hour}}$ = 30,000 hours

(2) Standard Fixed Overhead rate per hour (Standard Rate):

$= \frac{\text{Budgeted fixed overheads}}{\text{Budgeted Hours}} = \frac{\text{Rs.3,00,000}}{\text{30,000hours}} = \text{Rs.10.00}$

(3) Standard hour per unit of output = $\frac{\text{30,000hours}}{\text{20,000units}}$ = 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= $\frac{\text{Rs.3,00,000}}{\text{25 days}}$ = 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 = $\frac{\text{30,000hours}}{\text{25 days}}$ = 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.