CA INTER

COSTING BOOSTER BATCH

By

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This book is dedicated to my Wife

CS. RUCHI ARORA

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CHAPTER 1 MATERIAL COST

1. ***Re-order quantity (ROQ):*** *Order size repeated by any business organization.*

2. ***Ordering cost:*** *Cost associated with placement of orders (handling, freight etc.).*

Annual Ordering Cost = $\frac{A}{ROQ} \times O$

Here,

A	=	*Annual requirement of raw material to be purchased in quantity*
O	=	*Cost per order*

Note: Number or orders should be positively rounded off.

3. ***Carrying cost:*** *Cost associated with holding of average raw material stock (storage, interest, obsolescence etc.).*

Annual Carrying Cost:

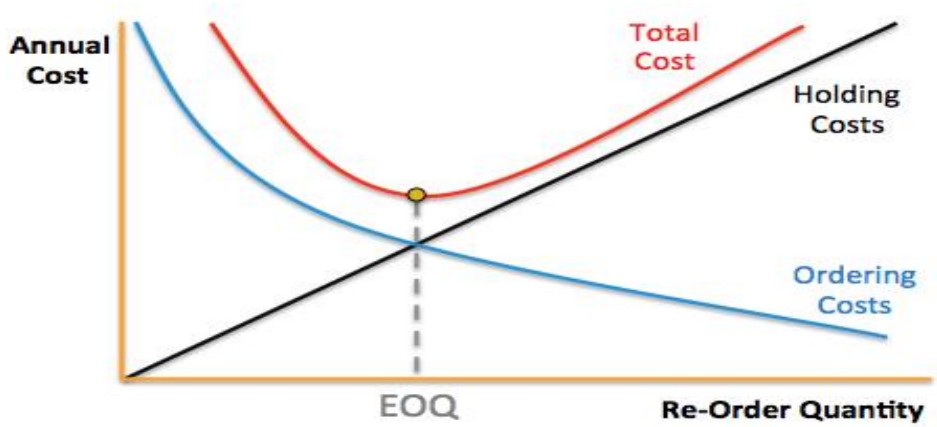
Alternative 1: *When there is no Safety Stock* = $\frac{1}{2} \times ROQ \times C$

Alternative 2: *When there is Safety Stock* = $\left(\frac{1}{2} \times ROQ \times C\right)$ + *Safety Stock units* × C

Here,

C	=	*Carrying cost per unit per annum*

4. ***Economic order quantity (EOQ):*** *Order size (Unique ROQ) at which total of ordering and carrying cost will be lowest. Order size (Unique ROQ) at which total annual ordering cost equal to annual carrying cost.*



Economic order quantity (EOQ) = $\sqrt{\frac{2AO}{C}}$

Here,

A	=	*Annual requirement of raw material to be purchased in quantity*
O	=	*Cost per order*
C	=	*Carrying cost per unit per annum*

5. **Re-order Level/ Ordering Level/ Re-order Point:**

Alternative 1 = Maximum usage × Maximum re-order period

Alternative 2 = Average usage × Average re-order period + Minimum stock/Safety stock

6. **Minimum Stock Level** = ROL – (Average usage × Average re-order period)

7. **Maximum Stock Level** = ROL + ROQ – (Minimum usage × Minimum re-order period)

8. **Average Stock level:**

Alternative 1 = ½ (Minimum stock level + Maximum stock level)

Alternative 2 = ½ of ROQ + Minimum stock level

9. **Danger Stock Level** = Average usage × Emergency re-order period

10. **ABC analysis:**

	% Value	% Quantity	Control
A	70%	10%	High
B	20%	20%	Medium
C	10%	70%	Low

11. **Valuation of Material:**

Statement Showing Cost Per Unit

Particulars	₹
Purchase price/Invoice price/Listed Price	XXX
Less: Trade or Quantity discount (× Cash discount)	(XXX)
Less: Subsidy/grant/incentives from government	(XXX)
Add: Road tax/toll tax	XXX
Add: IGST/CGST/SGST (when ITC is not available)	XXX
Add: Custom duty	XXX
Add: Insurance	XXX
Add: Commission/Brokerage on purchase	XXX
Add: Freight inward	XXX
Add: Net cost of Containers/Drums or packing material (when not returnable or returnable at low value)	XXX
Total cost	XXX
÷ Number of Effective units (Total units – Normal shortage – Provision for further Shortage)	÷ XXX
Cost per unit	XXX

Notes:

- Cash discount, Indirect tax if ITC is available and demurrage, detention charges, penalty etc. do not form part of cost.
- GST is payable on Net purchase price (Listed price less Trade or Quantity discount)
- Freight is distributed on the basis of weight among various materials.
- GST, Custom Duty and Insurance are distributed on the basis of value among various materials.

12. Normal Loss/Standard Loss/Unavoidable Loss:

- *Average/ standard loss of concern industry,*
- *Customer will suffer this loss due to increase in cost.*

Particulars	Quantity	Rate	Value
Purchase	100	10.00	1,000
Less : Normal Loss	(10)	-	-
Total Cost	90	11.11	1,000

13. Abnormal loss:

- *Loss over and above normal loss*
- *Businessmen will suffer this loss by debiting it in Costing P/L and profit will decrese*
- *No impact on cost per unit*

Particulars	Quantity	Rate	Value
Purchase	100	10.00	1,000
Less : Abnormal Loss	(10)	10.00	(100)
Total Cost	90	10.00	900

14. Inventory Turnover Ratio (ITR) = Raw Materials Consumed ÷ Average Inventory

15. Inventory Holding Period (in days) = 365 ÷ ITR

BBQ 1

G Ltd. produces a product which has a monthly demand of 4,000 units. The product requires a component X which is purchased at ₹20. For every finished product, one unit of component is required. The ordering cost is ₹120 per order and holding costs is 10% p.a.

You are required to calculate:

1. Economic order quantity.
2. If the minimum lot size to be supplied is 4,000 units, what is the extra cost, the company has to incur?
3. What is the minimum carrying cost, the company has to incur?

Answer

1. Computation of Economic Ordering Quantity:

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 4{,}000 \text{ units} \times 12 \times 120}{20 \times 10\%}} = 2{,}400 \text{ units}$$

2. Calculation of extra cost:

(a) Ordering & carrying cost (when order size is 2,400 units i.e. at EOQ):

Ordering Cost	=	No. of orders × Cost per order	=	$\frac{48{,}000}{2{,}400} \times 120$	=	₹2,400
Carrying Cost	=	½ × ROQ × C	=	½ × 2,400 × 2	=	₹2,400
Total	=	₹2,400 + 2,400			=	₹4,800

(b) Ordering & carrying cost (when order size is 4,000 units):

Ordering Cost	=	No. of orders × Cost per order	=	$\frac{48,000}{4,000} \times 120$	=	₹1,440
Carrying Cost	=	½ × ROQ × C	=	½ × 4,000 × 2	=	₹4,000
Total	=	₹2,400 + 2,400			=	₹5,440

Extra cost (a) - (b) = ₹5,440 - ₹4,800 = ***₹640***

3. Minimum Carrying Cost:

Minimum carrying cost = ½ × 2,400 units × 10% of ₹20 = ***₹2,400***

BBQ 2

A Company manufactures a special product which requires a component 'Alpha'. The following particulars are collected for the year 2023-24:

Annual demand of Alpha	8,000 units
Cost of placing an order	₹200 per order
Cost per unit of Alpha	₹400
Carrying cost p.a.	20%

The company has been offered a quantity discount of 4% on the purchase of 'Alpha' provided the order size is 4,000 components at a time.

Required:

1. Compute the economic order quantity
2. Advise whether the quantity discount offer can be accepted.

Answer

1. EOQ = $\sqrt{\frac{2AO}{C}}$ = $\sqrt{\frac{2 \times 8,000 \times 200}{20\% \times 400}}$ = ***200 units***

2. Evaluation of 4% discount offer

Particulars	*At EOQ (order size 200 units)*	*At order size 4,000 units*
Purchase cost 8,000 units @ ₹400/₹384 per unit	32,00,000	30,72,000
Ordering cost ($A/_{ROQ}$ × ₹200)	8,000	400
Carrying cost (½ × ROQ × C) (C = 20% of ₹400/₹384)	8,000	1,53,600
Total cost	***32,16,000***	***32,26,000***

Advise: The total cost of inventory is lower if EOQ is adopted. Hence, the company is advised not to accept the quantity discount.

BBQ 3

A company manufactures a product from a raw material, which is purchased at ₹80 per kg. The company incurs a handling cost of ₹370 plus freight of ₹380 per order. The incremental carrying cost of inventory of raw material is ₹0.25 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is ₹12 per kg per annum. The annual production of the product is 1,00,000 units and 2.5 units are obtained from one kg of raw material.

Required:

(a) Calculate the economic order quantity of raw materials.
(b) Advice, how frequently should order for procurement be placed.

(c) If the company proposes to rationalize placement of orders on quarterly basis, what percentage of discount in the price of raw materials should be negotiated?

Answer

(a) EOQ = $\sqrt{\frac{2AO}{C}}$ = $\sqrt{\frac{2\times 40,000\times 750}{15}}$ = ***2,000 kgs***

Where,

A = Annual usage of raw Material
= 1 unit of raw material gives 2.5 units of Finished Goods
Therefore, for 1,00,000 units of finished goods, material required
= $\frac{1,00,000}{2.5}$ = ***40,000 Kgs***

O = Ordering cost per order = handling cost per order + freight per order
= ₹370 + ₹380 = ***₹750***

C = Carrying cost and holding cost of inventory per unit p.a.
= Carrying cost per unit p.a. + Interest cost of investment in inventory per unit p.a.
= (₹0.25 per kg per month × 12 months) + ₹12 per kg p.a.
= ₹3 + ₹12 = ***₹15 per kg p.a.***

(b) Frequency of placing order/time interval between order:

= $\frac{365 \text{ days or } 12 \text{ months}}{\text{*No. of orders}}$ = $\frac{12 \text{ months}}{20 \text{ orders}}$ = ***0.6 month***

Or

= $\frac{365 \text{ days}}{20 \text{ orders}}$ = ***18 days (approx.)***

Working Notes:

*No. of orders = $\frac{\text{Annual requiremen t}}{EOQ}$ = $\frac{40,000 \text{ kgs}}{2,000 \text{ kgs}}$ = ***20 Orders***

(c) Statement of % of Discount to be Negotiated for Placing Quarterly Orders

Particulars	***At EOQ (order size 2,000 kgs)***	***At order size 10,000 kgs***
Ordering cost ($^{A}/_{ROQ}$ × O)	15,000	3,000
Carrying cost (½ × ROQ × C)	15,000	75,000
Total cost	30,000	78,000
Extra Cost or Discount to be negotiated	***-***	***48,000***
% of Discount {(48,000 ÷ 40,000 × 80) × 100}	***-***	***1.5%***

BBQ 4

From the details given below, calculate:

(i) Re-ordering level, ***(ii)*** Maximum level, ***(iii)*** Minimum level and ***(iv)*** Danger level.

Re-ordering quantity is to be calculated on the basis of following information:

Cost of placing a purchase order is	₹4,000
Number of units to be purchased during the year is	5,00,000
Purchase price per unit inclusive of transportation cost is	₹50
Annual cost of storage per unit is	₹10

Details of lead time: Average 10 days, Maximum 15 days, Minimum 5 days and for emergency purchases 4 days

Rate of consumption: Average 1,500 units per day and Maximum 2,000 units per day

Answer

(i) Re-ordering Level = Maximum usage × Maximum lead time
= 2,000 units per day × 15 days = ***30,000 units***

(ii) Maximum Level = ROL + ROQ – (Minimum usage × Minimum lead time)
= 30,000 units + 20,000 units – (1,000 units per day × 5 days)
= ***45,000 units***

(iii) Minimum Level = ROL – (Average usage × Average lead time)
= 30,000 units – (1,500 units per day × 10 days) = ***15,000 units***

(iv) Danger Level = Average usage × Lead time for emergency purchases
= 1,500 units per day × 4 days = ***6,000 units***

Working Notes:

1. ROQ = $\sqrt{\frac{2AO}{C}}$ = $\sqrt{\frac{2\times 5,00,000\times 4,000}{10}}$ = ***20,000 units***

2. Average usage = $\frac{\text{Minimum usage} + \text{Maximum usage}}{2}$

1,500 units = $\frac{\text{Minimum usage} + 2,000 \text{ units}}{2}$

Minimum usage = ***1,000 units per day***

BBQ 5

A Company uses three raw materials A, B, and C for a particular product for which the following data apply:

RM	Usage for one unit of product	ROQ (in kg)	Price per kg	Delivery period (in weeks)			ROL (in kg)	Mini. level
				Mini.	Average	Max.		
A	10 kg	10,000	0.10	1	2	3	8,000	-
B	4 kg	5,000	0.30	3	4	5	4,750	-
C	6 kg	10,000	0.15	2	3	4	-	2,000 kg

Weekly production varies from 175 to 225 units, averaging 200 units of the said product.

What would be the following quantities?

(i) Minimum stock of A ***(ii)*** Maximum stock of B ***(iii)*** Re-order level of C ***(iv)*** Average stock level of A

Answer

(i) Minimum stock of A = ROL – (Average usage × Average lead time)
= 8,000 kg – [(200 units × 10 kg) × 2 weeks] = ***4,000 kg***

(ii) Maximum stock of B = ROL – (Minimum usage × Minimum lead time) + ROQ
= 4,750 – [(175 units × 4 kg) × 3 weeks] + 5,000
= 9,750 – 2,100 = ***7,650 kg***

(iii) Re-order Level of C = Maximum re-order period × Maximum usage
= 4 weeks × 1,350 (225 units × 6 kg) = ***5,400 kg***

Or

= Minimum stock of C + (Average usage × Average lead time)

= 2,000 + [(200 units × 6 kg) × 3 weeks] = ***5,600 kg***

(iv) Average level of A = Minimum stock level + ½ ROQ
= 4,000 + ½ × 10,000
= 4,000 + 5,000 = ***9,000 kg***

Or

$$= \frac{\text{Minimum stock} + \text{Maximum stock}}{2}$$

$$= \frac{4{,}000 + 16{,}250}{2} = \textbf{10,125 kg}$$

Working Notes:

Max. Stock of A = ROL (Minimum usage × Minimum re-order period) + ROQ
= 8,000 kg – [(175 units × 10 kg) × 1 week] + 10,000 = ***16,250 kg***

BBQ 6

Shri Ram Enterprises manufactures a special product ZED. The following particulars were collected for the year:

(a) Monthly demand of ZED 1,000 units
(b) Cost of placing an order ₹100
(c) Inventory Carrying cost 15% per annum
(d) Re-order period 4 to 6 weeks.
(e) Minimum usage 25 units per week
(f) Maximum usage 75 unit per week
(g) Cost of material ₹100 per unit
(h) Normal usage 50 units per week

Calculate from the above:

1. Re-order-quantity. If the supplier is willing to supply 1,500 units at a discount of 5%, is it worth accepting.
2. Re-order level ***3.*** Minimum Level ***4.*** Maximum Level ***5.*** Average Stock Level.

Answer

1. Re-order quantity = $\sqrt{\frac{2 \times *2{,}600 \times 100}{15}}$ = ***186 units***

****Annual Requirement*** = 52 weeks × Normal usage of input units per week
= 52 weeks × 50 units per week = ***2,600 units***

Evaluation of 5% discount offer

Particulars	***At EOQ 186 units***	***At ROQ 1,500 units***
1. Purchase cost 2,600 units @ ₹100/₹95 p.u.	2,60,000	2,47,000
2. Ordering cost:		
Number of orders	2,600 ÷ 186 = 13.97 or 14	2,600 ÷ 1,500 = 1.73 or 2
Ordering cost (number of orders × ₹100)	1,400	200
3. Carrying cost (½ × ROQ × C) (C = 15% of ₹100/₹95)	1,395	10,688
Total cost (1+2+3)	***2,62,795***	***2,57,888***

Advise: The total cost of inventory is lower if discount is adopted. Hence, it is worth accepting.

2. Re-order Level = Maximum Re-order period × Maximum Usage
= 6 weeks × 75 units = ***450 units***

3. Minimum Level = ROL - (Normal usage × Average re-order period)
= 450 units - (50 units × 5 weeks)

= 450 units - 250 units = ***200 units***

4. Maximum Level = ROL - (Minimum usage × Minimum re-order period) + ROQ
= 450 units - (25 units × 4 weeks) + 186 units = ***536 units***

5. Average Stock Level = ½ × (Minimum Stock Level + Maximum Stock Level)
= ½ × (200 units + 536 units) = ***368 units***

Or

= ½ × ROQ + Minimum Stock Level
= ½ × 186 + 200 units = ***293 units***

BBQ 7

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

1. The Re-order quantity is 200 kg. less than the Economic Order Quantity (EOQ).
2. Maximum consumption per day is 20 kg. more than the average consumption per day.
3. There is an opening stock of 1,000 kg.
4. Time required to get the raw materials from the suppliers is 4 to 8 days.
5. The purchase price is ₹125 per kg.

There is an opening stock of 900 units of the finished product Exe. The rate of interest charged by bank on Cash Credit facility is 13.76%. To place an order company has to incur ₹720 on paper and documentation work.

From the above information find out the followings in relation to raw material Dee:

(a) Re-order Quantity
(b) Re-order level
(c) Maximum Stock level
(d) Minimum Stock level
(e) Average Stock level
(f) Calculate the impact on the profitability of the company by not ordering the EOQ.
[Take 364 days for a year]

Answer

(a) Re-order quantity = EOQ – 200 kg = $\sqrt{\frac{2 \times 17{,}200 \times 720}{125 \times 13.76\%}}$ - 200 kg = ***1,000 kg***

(b) Re-order Level = Maximum consumption per day × Maximum lead time
= 70 kg × 8 days = ***560 kg***

(c) Maximum Level = ROL + ROQ - (Minimum consumption per day × Minimum lead time)
= 560 kg + 1,000 kg - (30 kg × 4 days) = ***1,440 kg***

(d) Minimum Level = ROL - (Average consumption per day × Average lead time)
= 560 kg - (50 kg × 6 days) = ***260 kg***

(e) Average Stock Level = ½ × (Minimum Stock Level + Maximum Stock Level)
= ½ × (1,440 kg + 260 kg) = ***850 kg***

Or

= ½ × ROQ + Minimum Stock Level
= ½ × 1,000 kg + 260 kg = ***760 kg***

(f) Impact on Profitability

Particulars	At ROQ (1,000 kg)	At EOQ (1,200 kg)
Number of orders	$\frac{17,200}{1,000} = 17.20$ or 18	$\frac{17,200}{1,200} = 14.33$ or 15
Ordering cost	18 × 720 = 12,960	15 × 720 = 10,800
Carrying cost (½× ROQ × C)	8,600 (½ × 1,000 × 125 × 13.76%)	10,320 (½ × 1,200 × 125 × 13.76%)
Total ordering and carrying cost	**21,560**	**21,120**
Impact on profit	**-**	**440**

Working notes:

1. Calculation of annual consumption and purchase of raw materials 'Dee':

Sales forecast of the product 'Exe'	10,000 units
Less: Opening stock of 'Exe'	(900 units)
Fresh units of 'Exe' to be produced	9,100 units
Raw material required to produce 9,100 units of 'Exe' (9,100 units × 2 kg.)	**18,200 kg.**
Less: Opening Stock of 'Dee'	1,000 kg.
Annual purchase for raw material 'Dee'	**17,200 kg.**

2. Minimum consumption per day of raw material 'Dee':

Average consumption per day	=	18,200 kg ÷ 364 days	=	50 kg
Hence, Maximum consumption per day	=	50 kg + 20 kg	=	70 kg
So minimum consumption per day	=	Average × 2 – Max.	=	50 × 2 – 70
	=	30 kg		

BBQ 8

EXE Limited has received an offer of quantity discounts on its order of materials as under::

Price per ton (₹)	Ton (Nos.)
₹1,200	Less than 500
₹1,180	500 and less than 1000
₹1,160	1000 and less than 2000
₹1,140	2000 and less than 3000
₹1,120	3000 and above

The annual requirement for the materials is 5,000 tons. The delivery cost per order is ₹1,200 and the stock holding cost is estimated at 20% of material cost per annum.

(1) You are required to calculate the most economical purchase level, and (2) What will be your answer to the above question if there are no discounts offered and the price per ton is ₹1,500?

Answer

(1) Statement of Most Economical Purchase Level

Order Size (ROQ)	Total Ordering Cost (A/ROQ × 1,200)	Total Carrying Cost (½ × ROQ × 20% of Price)	Purchase Cost (5,000 × Price)	Total Cost
400	{(5,000/400) 12.5 or 13 × 1,200} = 15,600	48,000 (½ × 400 × 20% × 1,200)	60,00,000 (5,000 × 1,200)	60,63,600
500	{(5,000/500) 10 × 1,200} = 12,000	59,000 (½ × 500 × 20% × 1,180)	59,00,000 (5,000 × 1,180)	59,71,000
1,000	{(5,000/1,000) 5 × 1,200} = 6,000	1,16,000 (½ × 1,000 × 20% × 1,160)	58,00,000 (5,000 × 1,160)	59,22,000

2,000	{(5,000/2,000) 2.5 or 3 × 1,200} = 3,600	2,28,000 (½ × 2,000 × 20% × 1,140)	57,00,000 (5,000 × 1,140)	59,31,600
3,000	{(5,000/3,000) 1.6 or 2 × 1,200} = 2,400	3,36,000 (½ × 3,000 × 20% × 1,120)	56,00,000 (5,000 × 1,120)	59,38,400

The above table shows that the total cost of 5,000 units including ordering and carrying cost is minimum (₹59,22,000) when the order size is 1,000 units. ***Hence the most economical purchase level is 1,000 units.***

(2) If there will are no discount offer then the purchase quantity should be equal to EOQ. The EOQ is as follows:

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2\times 5,000\times 1,200}{20\% \text{ of } 1,500}} = \textbf{200 tons}$$

BBQ 9

IPL Limited uses a small casting in one of its finished products. The castings are purchased from a foundry. IPL Limited purchases 54,000 castings per year at a cost of ₹800 per casting.

The castings are used evenly throughout the year in the production process on a 360-day-per-year basis. The company estimates that it costs ₹9,000 to place a single purchase order and about ₹300 to carry one casting in inventory for a year.

The high carrying costs result from the need to keep the castings in carefully controlled temperature and humidity conditions, and from the high cost of insurance. Delivery from the foundry generally takes 6 days, but it can take as much as 10 days.

The days of delivery time and percentage of their occurrence are shown in the following tabulation:

Delivery time (days)	:	6	7	8	9	10
Percentage of occurrence	:	75	10	5	5	5

Required

1. Compute the economic order quantity (EOQ).
2. Assume the company is willing to assume a 15% risk of being out of stock. What would be the safety stock? The re-order point?
3. Assume the company is willing to assume a 5% risk of being out of stock. What would be the safety stock? The re-order point?
4. Assume 5% stock-out risk. What would be the total cost of ordering and carrying inventory for one year?
5. Refer to the original data. Assume that using process re-engineering the company reduces its cost of placing a purchase order to only ₹600. In addition, company estimates that when the waste and inefficiency caused by inventories are considered, the true cost of carrying a unit in stock is ₹720 per year.
   - ***(a)*** Compute the new EOQ.
   - ***(b)*** How frequently would the company be placing an order, as compared to the old purchasing policy?

Answer

1. Computation of economic order quantity (EOQ):

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2\times 54,000\times 9,000}{300}} = \textbf{1,800 castings}$$

2. Assuming a 15% risk of being out of stock:

From the probability table given in the question, we can see that 85% certainty in delivery time is achieved when delivery period is 7 days i.e. at 15% risk level of being out of stock, the maximum delivery period should not exceed 7 days.

Safety stock = $\frac{\text{Annual Demand}}{360}$ × (Maximum lead time – Average lead time)

= $\frac{54,000}{360}$ × (7 days – 6 days) = ***150 castings***

Re-order point = Safety stock + Average lead time consumption

= 150 castings + (6 days × 150 casting) = ***1,050 castings***

3. Assuming a 5% risk of being out of stock:

From the probability table given in the question, we can see that 95% certainty in delivery time is achieved when delivery period is 9 days i.e. at 5% risk level of being out of stock, the maximum delivery period should not exceed 9 days.

Safety stock = $\frac{\text{Annual Demand}}{360}$ × (Maximum lead time – Average lead time)

= $\frac{54,000}{360}$ × (9 days – 6 days) = ***450 castings***

Re-order point = Safety stock + Average lead time consumption

= 450 castings + (6 days × 150 casting) = ***1,350 castings***

4. At 5% stock-out risk the total cost of ordering and carrying cost is as follows:

Total cost of ordering = $\frac{\text{Annual Demand}}{\text{EOQ}}$ × Cost per order

= $\frac{54,000}{1,800}$ × ₹9,000 = ***₹2,70,000***

Total cost of carrying = (Safety stock + ½ EOQ) × Carrying cost per unit p.a.

= (450 units + ½ × 1,800 units) × ₹300 = ***₹4,05,000***

5. (a) Computation of new EOQ = $\sqrt{\frac{2 \times 54000 \times 600}{720}}$ = ***300 castings***

(b) Total number of orders to be placed in a year = $\frac{54,000}{300}$ = ***180 orders***

Under new purchasing policy IPL Ltd. has to place order in every 2nd day (360 days ÷ 180 orders), however under the old purchasing policy it was every 12th day.

BBQ 10

M/s Tyrotubes trades in four wheeler tyres and tubes. It stocks sufficient quantity of tyres of almost every vehicle. In year end 2023-24, the report of sales manager revealed that M/s Tyrotubes experienced stock-out of tyres.

Stock-out of tyres	*No. of times*
100	2
80	5
50	10
20	20
10	30
0	33

M/s Tyrotubes losses ₹150 per unit due to stock-out and spends ₹50 per unit on carrying of inventory.

Determine optimum safety stock level.

Answer

Computation of Stock-out and Inventory Carrying Cost

Safety stock (1)	*Stock-out (units) (2)*	*Probability (3)*	*Stock-out cost (4) = (2) × ₹150*	*Expected stock-out cost (5) = (3) × (4)*	*Inventory carrying cost (6) = (1) × ₹50*	*Total cost (7) = (5) + (6)*
100	0	0	0	0	5,000	***5,000***
80	20	0.02	3,000	60	4,000	***4,060***
50	50	0.02	7,500	150		
	30	0.05	4,500	225		
			12,000	375	2,500	***2,875***
20	80	0.02	12,000	240		
	60	0.05	9,000	450		
	30	0.10	4,500	450		
			25,500	1,140	1,000	***2,140***
10	90	0.02	13,500	270		
	70	0.05	10,500	525		
	40	0.10	6,000	600		
	10	0.20	1,500	300		
			31,500	1,695	500	***2,195***
0	100	0.02	15,000	300		
	80	0.05	12,000	600		
	50	0.10	7,500	750		
	20	0.20	3,000	600		
	10	0.30	1,500	450		
			39,000	2,700	0	***2,700***

At safety stock level of 20 units, total cost is least i.e ₹2,140. Hence optimum safety stock is 20 units.

Working Notes:

Computation of Probability of Stock-out

Stock-out(units)	100	80	50	20	10	0	Total
No. of times	2	5	10	20	30	33	100
Probability	0.02	0.05	0.10	0.20	0.30	0.33	1.00

BBQ 11

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

Item Code Number	*Units*	*Unit Cost (₹)*
101	25	50
102	300	1
103	50	80
104	75	8
105	225	2
106	75	12

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

You are required to:

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

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

Answer

(1) Statement Showing % of Total Inventory Cost and Rank

Item Code Number	Units	Unit Cost (₹)	Total Cost (₹)	% of Total Inventory Cost	Rank
101	25	50	1,250	16.67	***2***
102	300	1	300	4	***6***
103	50	80	4,000	53.33	***1***
104	75	8	600	8	***4***
105	225	2	450	6	***5***
106	75	12	900	12	***3***
-	***750***	***-***	***7,500***	***100***	***-***

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

Basis for ABC Classification as % of Total Inventory Cost

15% & above	:	'A' items
7% to 14%	:	'B' items
6% and less	:	'C' items

Rank	Item Code Number	Total Cost (₹)	% of Total Inventory Cost	Category
1	103	4,000	53.33	
2	101	1,250	16.67	
Total	***2***	***5,250***	***70.00***	***A***
3	106	900	12	
4	104	600	8	
Total	***2***	***1,500***	***20.00***	***B***
5	105	450	6	
6	102	300	4	
Total	***2***	***750***	***10.00***	***C***
Grand Total	***6***	***7,500***	***100***	

BBQ 12

From the following data for the year ended 31.03.24, Calculate the inventory turnover ratio for the two items and put forward your comments on them:

Particulars	Material A	Material B
Opening stock 01.04.2023	10,000	9,000
Purchases	52,000	27,000
Closing stock 31.03.2024	6,000	11,000

Answer

Statement Showing Inventory Turnover Ratio

Particulars	Material A	Material B
Opening stock	10,000	9,000
Add: Purchases	52,000	27,000
	62,000	36,000
Less: Closing stock	(6,000)	(11,000)

Materials consumed	56,000	25,000
Average inventory (Opening stock + Closing stock) ÷ 2	8,000	10,000
Inventory turnover ratio (Materials consumed ÷ Average inventory)	***7 times***	***2.5 times***
Inventory turnover (365 ÷ IT Ratio)	***52 days***	***146 days***

Comment: Material A is moving faster than Material B.

BBQ 13

SKD Company Ltd., not registered under GST, purchased material P from a company which is registered under GST. The following information is available for the one lot of 1,000 units of material purchased:

Listed price of one lot	₹50,000
Trade discount	@ 10% on listed price
CGST and SGST (Credit Not available)	12% (6% CGST + 6% SGST)
Cash discount	@10%
(Will be given only if payment is made within 30 days.)	
Freight and Insurance	₹3,400
Toll Tax paid	₹1,000
Demurrage	₹1,000
Commission and brokerage on purchases	₹2,000
Amount deposited for returnable containers	₹6,000
Amount of refund on returning the container	₹4,000
Other Expenses	@ 2% of total cost

20% of material shortage is due to normal reasons. The payment to the supplier was made within 20 days of the purchases.

You are required to calculate cost per unit of material purchased to SKD Company Ltd.

Answer

Computation of Total cost of material purchased of SKD Manufacturing Company

Particulars		***Units***	***₹***
Listed Price of Materials		1,000	50,000
Less: Trade discount @ 10% on invoice price			(5,000)
			45,000
Add: CGST @ 6% of ₹ 45,000			2,700
Add: SGST @ 6% of ₹ 45,000			2,700
			50,400
Add: Toll Tax			1,000
Freight and Insurance			3,400
Commission and Brokerage Paid			2,000
Add: Cost of returnable containers:			
Amount deposited	₹6,000		
Less: Amount refunded	(₹4,000)		2,000
			58,800
Add: Other Expenses @ 2% of Total Cost (₹58,800 × 2/98)			1,200
Total Cost of Material		1,000	60,000
Less: Shortage due to Normal Loss @ 20%		(200)	-
Total cost of material of good units		800	60,000
Cost per unit (₹60,000/800 units)		***1***	***75***

Note:

1. GST is payable on net price i.e., listed price less discount.
2. Cash discount is treated as interest and finance charges; hence it is ignored.

3. Demurrage is penalty imposed by the transporter for delay in uploading or off-loading of materials. It is an abnormal cost and not included.
4. Shortage due to normal reasons should not be deducted from cost to ascertain total cost of good units.

BBQ 14

An invoice in respect of a consignment of chemicals A and B provides following information:

Invoice	₹
Chemical A: 10,000 kgs. at ₹10 per kg.	1,00,000
Chemical B: 8,000 kgs. at ₹13 per kg.	1,04,000
Basic custom duty @10% (Credit is not allowed)	20,400
Railway freight	3,840
Total cost	**2,28,240**

A shortage of 500 kgs. in chemical A and 320 kgs. in chemical B is noticed due to normal breakages.

You are required to determine the rate per kg. of each chemical, assuming a provision of 2% for further deterioration.

Answer

Statement Showing the Computation of Rate per kg. of each Chemical

Particulars	Chemical A	Chemical B
Purchase price	1,00,000	1,04,000
Add: Basic custom duty @10%	10,000	10,400
Add: Railway freight in 5 : 4 (Quantity ratio)	2,133	1,707
Total cost	1,12,133	1,16,107
÷ Effective quantity	÷ 9,310	÷ 7,526.4
Rate per kg	**12.04**	**15.43**

Working notes:

Calculation of Effective Quantity of each Chemical Available for Use

Particulars	Chemical A	Chemical B
Quantity purchased	10,000	8,000
Less: Shortage due to normal breakages	500	320
	9,500	7,680
Less: Provision for deterioration @ 2%	190	153.6
Quantity available	**9,310**	**7,526.4**

CHAPTER 2 EMPLOYEE COST

1. **Wages under Straight Time Rate System** = Working hours × Time Rate per hour

2. **Wages under Straight Piece Rate System** = Number of units produced × Piece Rate

3. **Wages under Piece Rate System with Guaranteed Time Wages:**

   Step 1: Calculate wages as per Piece Rate System
   Step 2: Calculate wages as per Time Rate System
   Step 3: Payment to worker (whichever is higher between Step 1 and Step 2)

4. **Wages under Halsey system** = (AH × R) + 50% (SH - AH) × R

   Here,

AH	=	Actual hours worked for actual production
SH	=	Standard hours for actual production
SH – AH	=	Time saved by the worker
R	=	Time rate

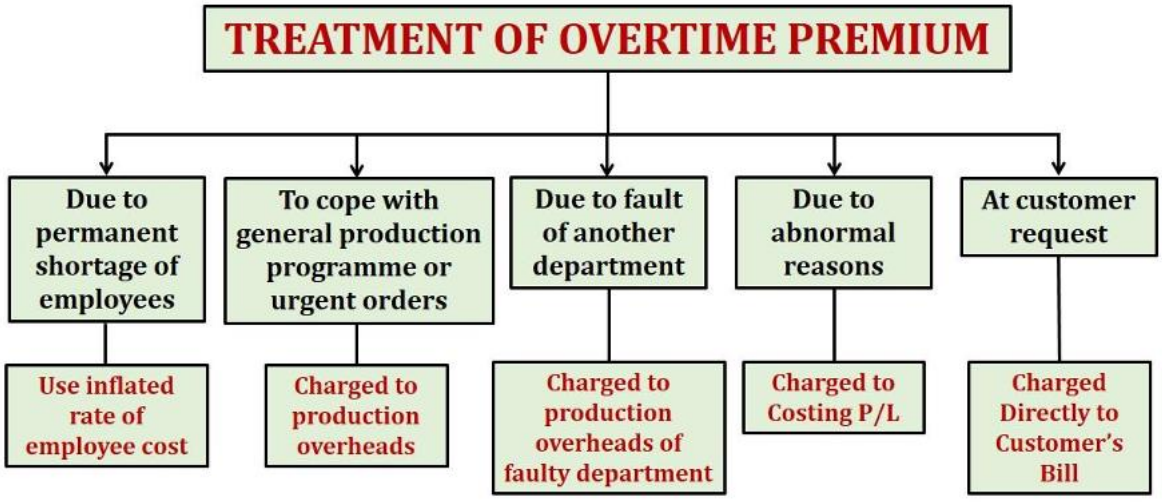
5. **Wages under Rowan system** = (AH × R) + AH/SH (SH - AH) × R

6. **Effective hourly rate** = Wages ÷ AH

7. **Overtime:** Working over and above normal working hours

   Overtime premium: Payment in excess of normal wage rate

   Overtime payment = Payment as per normal rate + Overtime premium



8. **Idle time:** Worker in factory without work but eligible for wages.

Normal idle time: It is the time which cannot be avoided or reduced in the normal course of business.

Causes

- The time lost between factory gate and the place of work,

- The interval between one job and another,
- The setting up time for the machine,
- Normal rest time (fatigue), break for lunch etc.

Treatment

- Increase employee rate
- Charged to production overheads

Abnormal idle time: Apart from normal idle time, there may be factors which give rise to abnormal idle time

Causes

- Idle time may also arise due to abnormal factors like lack of coordination
- Power failure, breakdown of machines
- Non-availability of raw materials, strikes, lockouts, poor supervision, fire, flood etc.

Treatment

- Transfer to costing P/L

9. Statement Showing Gross Wages:

Particulars	Amount
Basic Wages	XXX
Dearness Allowance	XXX
Basic plus D.A.	XXX
Bonus	XXX
Various Allowances	XXX
Other Payments	XXX
Gross Wages	XXX

10. Statement Showing Net Wages:

Particulars	Amount
Gross Wages	XXX
Less: Employee's contribution to Provident Fund	(XXX)
Less: Employee's contribution to Pension Fund	(XXX)
Less: Employee's contribution to E.S.I.	(XXX)
Less: T.D.S.	(XXX)
Less: Professional Tax	(XXX)
Less: Loan Deduction	(XXX)
Less: Any other Deduction	(XXX)
Net Wages	XXX

11. Statement Showing Employee Cost Per Hour:

Particulars	Amount
Gross Wages	XXX
Add: Employer's contribution to P.F.	XXX
Add: Employer's contribution to E.S.I.	XXX
Employee Cost	XXX
÷ Effective Labour Hours	÷XXX
(Working Hours – Eligible Holidays – Normal Idle Time)	
Employee Cost Per Hour	XXX

Note: *If nothing is specified in the question, contribution of employer towards Provident Fund, Pension Fund and E.S.I. equals to employee contribution.*

12. Labour Turnover Rates:

Separation Method	=	$\frac{\text{Number of separations}}{\text{Average workers}} \times 100$
Replacement Method	=	$\frac{\text{Number of replacements}}{\text{Average workers}} \times 100$
New Accession Method	=	$\frac{\text{Number of new joinings}}{\text{Average workers}} \times 100$
Accession Method	=	$\frac{\text{Number of total joinings}}{\text{Average workers}} \times 100$
Flux Method (without new accession)	=	$\frac{\text{No. of separations + replacements}}{\text{Average workers}} \times 100$
Flux Method (with new accession)	=	$\frac{\text{No. of separations + accessions}}{\text{Average workers}} \times 100$
Average Workers	=	$\frac{\text{Opening workers + Closing workers}}{2}$

13. Equivalent Annual Turnover Rate = Employee Turnover Rate × 365/52/12

14. Statement Showing Profit Foregone on Account of Labour Turnover

Particulars	Amount
Contribution foregone due to delay in filling the vacancies	XXX
Contribution foregone due to unproductive training hours (If these hours are excluded)	XXX
Settlement cost due to leaving	XXX
Recruitment costs	XXX
Selection costs	XXX
Training costs	XXX
Profit Foregone	XXX

BBQ 15

Mr. A is working by employing 10 skilled workers. He is considering the introduction of some incentive scheme either Halsey scheme (with 50% bonus) or Rowan scheme of wage payment for increasing the labour productivity to cope with the increased demand for the product by 25%. He feels that if the proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers, it could act as sufficient incentive for them to produce more and he has accordingly given this assurance to the workers.

As a result of the assurance, the increase in productivity has been observed as revealed by the following figures for the current month:

Hourly rate of wages (guaranteed)	₹40.00
Average time for producing 1 piece by one worker (This may be taken as time allowed)	2 hours
No. of working days in the month	25 days
No. of working hours per day for each worker	8 hours
Actual production during the month	1,250 units

Required:

1. Calculate effective rate of earnings per hour under Halsey scheme and Rowan scheme.
2. Calculate the savings to Mr. A in terms of direct labour cost per piece under the schemes.

Answer

1. Computation of effective rate of earnings under the Halsey and Rowan schemes:

Total earnings under Halsey scheme = (AH × R) + 50% (SH – AH) × R
= (2,000 × ₹40) + 50% (2,500 – 2,000) × ₹40
= ***₹90,000***

Total earnings under Rowan scheme = $(AH \times R) + \frac{AH}{SH} \times (SH - AH) \times R$
= $(2{,}000 \times ₹40) + \frac{2{,}000}{2{,}500} \times (2{,}500 - 2{,}000) \times ₹40$
= ***₹96,000***

Effective rate under Halsey Plan = ₹90,000 ÷ 2,000 hours = ***₹45 per hour***

Effective rate under Rowan Plan = ₹96,000 ÷ 2,000 hours = ***₹48 per hour***

Actual hours (AH) = 10 workers × 25 days × 8 hours per day
= 2,000 hours

Standard hours (SH) = 1,250 units × 2 hours per unit = 2,500 hours

2. Savings to Mr. A in terms of direct labour cost per piece:

Direct labour cost per unit:

Under time wages	=	2 hours × ₹40 per hour	= ₹80 per unit
Under Halsey Plan	=	₹90,000 ÷ 1,250 units	= ₹72 per unit
Under Rowan Plan	=	₹96,000 ÷ 1,250 units	= ₹76.8 per unit

Savings of direct labour cost per unit under:

Halsey Plan	=	₹80 – ₹72	= ***₹8.00 per unit***
Rowan Plan	=	₹80 – ₹76.80	= ***₹3.20 per unit***

BBQ 16

A skilled worker in XYZ Ltd. is paid a guaranteed wage rate of ₹30 per hour. The standard time per unit for a particular product is 4 hours. Mr. P, a machine man, has been paid wages under the Rowan Incentive Plan and he had earned an effective hourly rate of ₹37.50 on the manufacture of that particular product.

What could have been his total earnings and effective hourly rate, had he been put on Halsey Incentive Scheme (50%)?

Answer

The following equation can be made:

Effective Earnings per hour	=	[(AH × R) + AH/SH (SH - AH) × R] ÷ AH
37.50	=	[30 AH + AH/4 (4 - AH) × 30] ÷ AH
37.50 AH	=	30 AH + AH/4 (4 - AH) × 30
7.50 AH	=	AH/4 (4 - AH) × 30
7.50 AH	=	AH (4 - AH) × 7.50
1	=	4 - AH
AH	=	3 hours

Total earnings and effective hourly rate of skilled worker under Halsey Incentive Scheme:

Total earnings	=	(AH × R) + 50% (SH – AH) × R		
	=	(3 × 30) + 50% (4 – 3) × 30	=	***₹105***
Effective hourly rate	=	Total earning ÷ hours worked		
	=	₹105 ÷ 3 hours	=	***₹35***

BBQ 17

Calculate the earnings of A and B from the following particulars for a month and allocate the labour cost to each job X, Y and Z:

	A	***B***
Basic wages	₹10,000	₹16,000
Dearness Allowance	50%	50%
Contribution to Provident Fund (on basic wages)	8%	8%
Contribution to Employee State Insurance (on basic wages)	2%	2%
Overtime hours	10 hours	-

The normal working hours for the month are 200. Overtime is paid at double the total of normal wages and dearness allowance. Employer's contributions to state insurance and provident fund are at equal rates with employee's contribution. The two workers were employed on jobs X, Y and Z in the following proportions:

Jobs	***X***	***Y***	***Z***
Workers A	40%	30%	30%
Workers B	50%	20%	30%

Overtime was done on job Y.

Answer

Statement Showing Earnings of Worker A and B

Particulars	***A***	***B***
Basic Wages	₹10,000	₹16,000
Dearness Allowance (50% of Basic)	₹5,000	₹8,000
Overtime Wages (W.N.)	₹1,500	-

Gross Wages Earned	***₹16,500***	***₹24,000***
Less: Employee's Contribution to Provident Fund (8% of basic)	(₹800)	(₹1,280)
Less: Employee's Contribution ESI (2% of basic)	(₹200)	(₹320)
Net Wages Earned	***₹15,500***	***₹22,400***

Statement Showing Labour Cost Chargeable to Jobs

Particulars	***Job X***	***Job Y***	***Job Z***
Worker A:			
Ordinary Wages ₹16,000 in 4 : 3 : 3	₹6,400	₹4,800	₹4,800
Overtime ₹1,500 for Job Y	-	₹1,500	-
Worker B:			
Ordinary Wages ₹25,600 in 5 : 2 : 3	₹12,800	₹5,120	₹7,680
Labour Cost chargeable	***₹19,200***	***₹11,420***	***₹12,480***

Working Note:

1. Statement Showing Employee Cost Excluding Overtime

Particulars	***A***	***B***
Basic Wages	₹10,000	₹16,000
Dearness Allowance (50% of Basic)	₹5,000	₹8,000
Add: Employer's Contribution to Provident Fund (8% of basic)	₹800	₹1,280
Add: Employer's Contribution ESI (2% of basic)	₹200	₹320
Employee Cost (Excluding overtime)	***₹16,000***	***₹25,600***

2. Overtime wages of worker A = (₹15,000 ÷ 200 hours) × 2 × 10 hours = ***₹1,500***

BBQ 18

It is seen from the job card for repair of the customer's equipment that a total of 154 hours have been put in as detailed below:

Day	***Worker A paid @ ₹200 per day for 8 hours***	***Worker B paid @ ₹100 per day for 8 hours***	***Worker C paid @ ₹300 per day for 8 hours***
Monday (Hours)	10 - ½ hours	8 hours	10 - ½ hours
Tuesday (Hours)	8 hours	8 hours	8 hours
Wednesday (Hours)	10 - ½ hours	8 hours	10 - ½ hours
Thursday (Hours)	9 - ½ hours	8 hours	9 - ½ hours
Friday (Hours)	10 - ½ hours	8 hours	10 - ½ hours
Saturday (Hours)	-	8 hours	8 hours
Total	***49 hours***	***48 hours***	***57 hours***

In terms of an award in a labour conciliation, the workers are to be paid dearness allowance on the basis of cost of living index figures relating to each month which works out @ ₹968 for the relevant month. The dearness allowance is payable to all workers irrespective of wage rate if they are present or are on leave with wages on all working days.

Each worker has to work for 8 hours on weekdays. Saturday and Sunday will be weekly holiday, however workers may work on Saturdays due to exigency (urgent need) of work for 4 hours, though full payment of 8 hours will be made with no other payments.

Overtime is paid twice of ordinary wage rate if a worker works more than nine hours in a day. Excluding holidays, the total number of hours works out to 176 in the relevant month. The company's contribution to Provident Fund and Employees State Insurance Premium are absorbed into overheads.

Calculate the wages payable to each worker.

Answer

(1) Calculation of hours to be paid to worker A:

Days	Normal hours	Extra hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours
Monday	8	1	1.5	3	12
Tuesday	8	-	-	-	8
Wednesday	8	1	1.5	3	12
Thursday	8	1	.5	1	10
Friday	8	1	1.5	3	12
Saturday	-	-	-	-	-
Total	***40***	***4***	***5***	***10***	***54***

(2) Calculation of hours to be paid to worker B:

Days	Normal hours	Extra hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours
Monday	8	-	-	-	8
Tuesday	8	-	-	-	8
Wednesday	8	-	-	-	8
Thursday	8	-	-	-	8
Friday	8	-	-	-	8
Saturday	4	*4	-	-	8
Total	***44***	***4***	***-***	***-***	***48***

*Worker-B has not worked more than 9 hours in any day.

(3) Calculation of hours to be paid to worker C:

Days	Normal hours	Extra hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours
Monday	8	1	1.5	3	12
Tuesday	8	-	-	-	8
Wednesday	8	1	1.5	3	12
Thursday	8	1	.5	1	10
Friday	8	1	1.5	3	12
Saturday	4	*4	-	-	8
Total	***44***	***8***	***5***	***10***	***62***

*Worker-C will be paid for equivalent 8 hours, though 4 hours of working is required on Saturday. Further, no overtime will be paid for working beyond 4 hours since it is paid for working beyond 9 hours.

Statement Showing Wages Payable

Particulars	A	B	C
Basic wages per hour	₹200 ÷ 8 = ₹25.00	₹100 ÷ 8 = ₹12.50	₹300 ÷ 8 = ₹37.50
Dearness allowance per hour (₹968 ÷ 176 hours)	₹5.50	₹5.50	₹5.50
Hourly rate	₹30.50	₹18.00	₹43.00
Total normal hours	54	48	62
Total Wages Payable	***₹1,647.00***	***₹864.00***	***₹2,666.00***

BBQ 19

No of workers on the payroll:

At the beginning of the month	900 workers
At the end of the month	1,100 workers

During the month 10 workers left, 40 persons were discharged and 150 workers were recruited. Of these 25 workers are recruited in the vacancies of those leaving, while the rest were engaged for an expansion scheme.

Calculate the various labour turnover rates.

Answer

Separation method = $\frac{\text{No. of separation}}{\text{Average no. of workers}} \times 100 = \frac{10+40}{1{,}000} \times 100$ = ***5%***

Replacement method = $\frac{\text{No. of workers replaced}}{\text{Average no. of workers}} \times 100 = \frac{25}{1{,}000} \times 100$ = ***2.5%***

New Accession method = $\frac{\text{No. of new accessions}}{\text{Average no. of workers}} \times 100 = \frac{125}{1{,}000} \times 100$ = ***12.5%***

Accession method = $\frac{\text{No. of accessions}}{\text{Average no. of workers}} \times 100 = \frac{150}{1{,}000} \times 100$ = ***15%***

Flux method = $\frac{\text{No. of accessions + No. of separation}}{\text{Average no. of workers}} \times 100 = \frac{150+50}{1{,}000} \times 100$

= ***20%***

****Average no of workers*** = $\frac{900+1{,}100}{2}$ = ***1,000 workers***

BBQ 20

RST Company Ltd. had computed labour turnover rates for the quarter ended 31st March, 2017 as 20%, 10% and 5% under Flux method, Replacement method and Separation method respectively. If the number of workers replaced during the quarter is 50, find out ***(i)*** Workers recruited and joined, ***(ii)*** Workers left and discharged and ***(iii)*** Average number of workers on roll.

Answer

(i) Calculation of workers recruited and joined:

Number of accessions = Replaced + New Joined
= (10% + 5%) 15% of average workers
= 15% of 500 = ***75 workers***

Or

Number of accessions = Flux - Separated
= (20% - 5%) 15% of average workers
= 15% of 500 = ***75 workers***

(ii) Calculation of workers left and discharged:

Number of workers separated = 5% of average workers
= 5% of 500 = ***25 workers***

(iii) Calculation of average number of workers on roll:

Number of workers replaced = 10% of average workers = 50 workers
Therefore, Average workers = 50 ÷ 10% = ***500 workers***

BBQ 21

The management of Company are worried about their increasing labour turnover in the factory and before analyzing the causes and taking remedial steps, they want to have an idea of the profit foregone as a result

of labour turnover in the last year.

Last year sales amounted to ₹83,03,300 and P/V ratio was 20 per cent. The total number of actual hours worked by the direct labour force was 4,45,000. As a result of the delays by the personnel department in filling vacancies due to labour turnover 1,00,000 potentially productive hours (excluding unproductive training hours) were lost. The actual direct labour hours included 30,000 hours attributable to training on new recruits, out of which half of the hours were unproductive.

The costs incurred consequent on labour turnover revealed, on analysis the following:

Settlement cost due to leaving	₹43,820	Recruitment Costs	₹26,740
Selecting costs	₹12,750	Training costs	₹30,490

Assuming that the potential production lost as a consequence of labour turnover could have been sold at prevailing prices, find the profit foregone last year on account of labour turnover.

Answer

Statement Showing Profit Foregone on Account of Labour Turnover

Particulars	***Amount***
Contribution Foregone (1,00,000 hours + 15,000 hours) × ₹3.862 per hour	4,44,130
Settlement Cost due to leaving	43,820
Recruitment Costs	26,740
Selection Costs	12,750
Training Costs	30,490
Profit Foregone	***5,57,930***

Working Notes:

1. Calculation of productive hours:

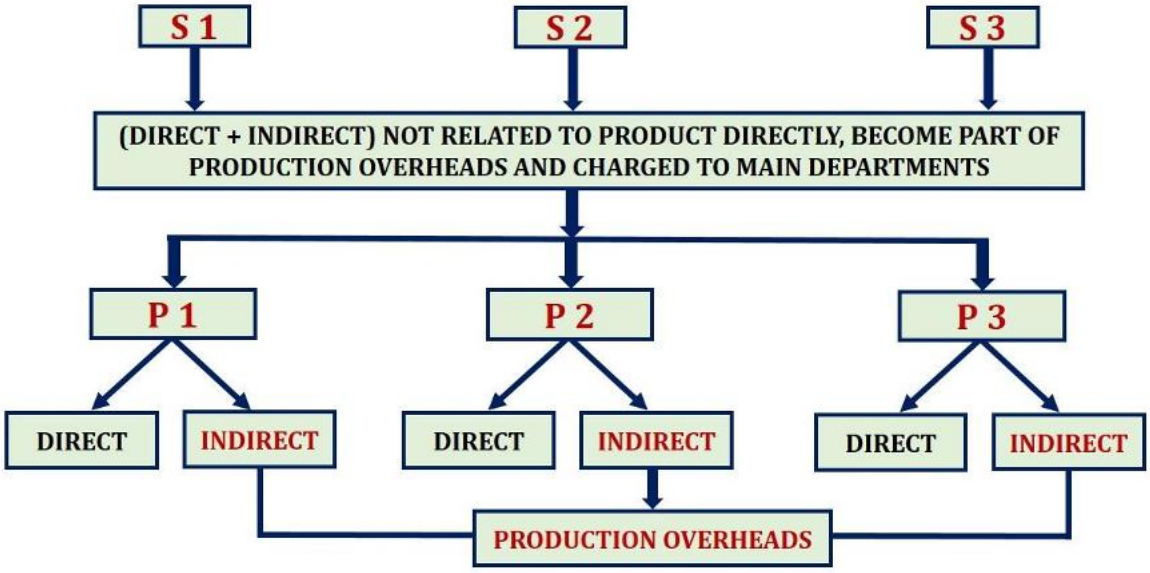
Actual hours worked	4,45,000
Less: Unproductive training hours (½ of 30,000 hours)	(15,000)
Actual productive hours	***4,30,000***

2. Contribution earned per productive hours:

Sales value	83,03,300
Contribution (20% of 83,03,300)	16,60,660
Contribution per productive hour (16,60,660 ÷ 4,30,000)	***₹3.862***

CHAPTER 3 OVERHEADS – ABSORPTION COSTING METHOD

1. ***Production Overheads:*** *All indirect cost related to production.*



2. ***Types of Departments:***

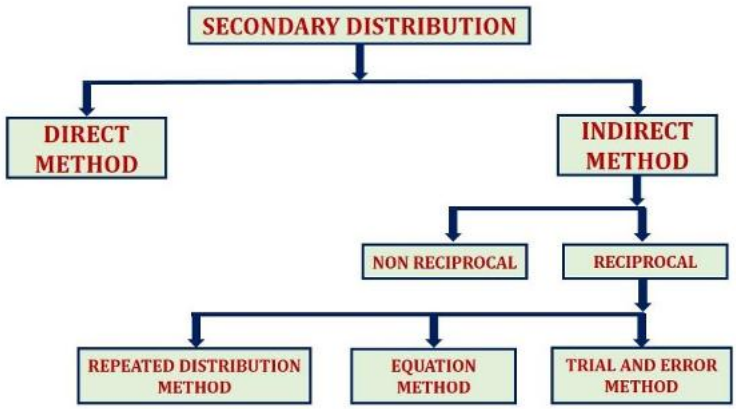
- ***Main/production departments:*** *Product is produced in these departments.*
- ***Support/service departments:*** *Product is not produced in these departments but these departments help to main departments.*

3. ***Types of Cost:***

4. Statement Showing Primary Distribution:

Particulars	Basis	Production dept.		Service dept.	
		P1	P2	S1	S2
Specific Cost:					
Direct material	Allocation	No	No	Yes	Yes
Direct labour	Allocation	No	No	Yes	Yes
Direct expenses	Allocation	No	No	Yes	Yes
Indirect material	Allocation	Yes	Yes	Yes	Yes
Indirect labour	Allocation	Yes	Yes	Yes	Yes
Indirect expenses	Allocation	Yes	Yes	Yes	Yes
Other specific cost	Allocation	Yes	Yes	Yes	Yes
Common Cost:					
Rent	Area	Yes	Yes	Yes	Yes
Insurance etc.	Value	Yes	Yes	Yes	Yes
Total OH		XXX	XXX	XXX	XXX

5. Secondary Distribution:



6. Direct Method: Under this method cost of service departments are directly apportioned to production departments. [Service departments are Bhai Bhai]

7. Non Reciprocal Method or Step Ladder Method or Step Down Method:

Step 1: Apportion expenses of largest service department [Big Brother] to all other departments (Production departments and service departments [Younger Brothers]).

Step 2: Apportion expenses (including expenses received from largest service departments) of second largest service department to all other departments (Production departments and service departments excluding largest service department [Big Brother]) and so on.

8. Reciprocal Method: Under this method we can distribute expenses by using:

- Repeated Distribution Method or Continuous Allotment Method
- Simultaneous Equation Method
- Trial and Error Method

9. Repeated Distribution Method:

Step 1: Apportion expenses of any service department to all other departments first (Production departments and service departments).

Step 2: Apportion expenses (including expenses received from service departments in step 1) of another service department to all other departments (Production departments and service departments including service department in step 1).

Step 3: Repeat the process until 100% apportionment (to finish the process of repeated distribution, apportion the expenses of last distribution directly to production departments when distribution amount is very less).

10. Simultaneous Equation Method:

Step 1: Calculate adjusted expenses of service departments with the help of equation.
Step 2: Apportion adjusted expenses.

11. Trial and Error Method:

Step 1: Calculate adjusted expenses of service departments with the help of repeated distribution.
Step 2: Apportion adjusted expenses.

12. Predetermined Absorption Rate $= \frac{\text{Budgeted Overheads}}{\text{Budgeted Recovery Base}}$

- Overheads absorption rate is also known as overheads charging rate, overheads application rate and overheads recovery rate.

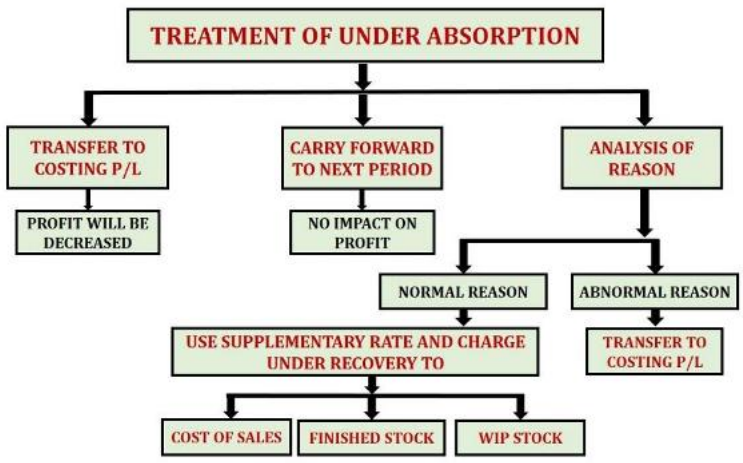
13. Types of Recovery Base:

- Direct Material Cost
- Direct Employee Cost
- Prime Cost
- Labour Hours
- Machine Hours
- Number of Physical Units
- Number of Orders or Jobs

14. Under or Over Absorption: Difference between absorbed overheads and actual overheads.

1. Absorbed OH > Actual OH — Over Absorption
2. Absorbed OH < Actual OH — Under Absorption
3. Absorbed OH = Actual OH — Equal Absorption

15. Treatment of Under Absorption:



16. Blanket Overheads Rate:

- Blanket overhead rate refers to the computation of one single overhead rate for the whole factory.
- The use of blanket rate may be proper in certain factories producing only one major product in a continuous process or where the work performed in every department is fairly uniform or standardised.

17. Statement of Machine Hour Rate (MHR):

Particulars	Amount
(A) Standing Charges or Fixed Cost:	
Rent	XXX
Heat and light	XXX
Forman's salary	XXX
Depreciation (not related to activity)	XXX
Wages	XXX
Bonus	XXX
Other fixed cost	XXX
Total Standing Charges (A)	XXX
(B) Running Expenses or Variable Cost:	
Repairs and maintenance	XXX
Consumable stores	XXX
Power	XXX
Depreciation (related to activity)	XXX
Other variable cost	XXX
Total Running Expenses (B)	XXX
Total Expenses(A+B)	XXX
÷ Effective Machine Hours	÷ XX
Machine Hour Rate (MHR)	XXX

18. Machine Hours includes:

1. Running Hours — Always Productive or Effective Machine Hours
2. Set up Hours — As per question or assumption
3. Maintenance Hours — Always Unproductive Hours

BBQ 22

A company's production for the year ending 30.06.2022 is given below:

Items	Production Departments			Service Departments			Total
	P1	P2	P3	Office	Stores	Work Shop	
Direct wages	20,000	25,000	30,000	-	-	-	75,000
Direct materials	30,000	35,000	45,000	-	-	-	1,10,000
Indirect materials	2,000	3,000	3,000	1,000	2,000	2,000	13,000
Indirect wages	3,000	3,000	4,000	10,000	10,000	5,000	35,000
Area (Square Meters)	200	250	300	150	100	250	1,250
Book value of machinery	30,000	35,000	25,000	-	-	15,000	1,05,000
Machine capacity (H.P.)	15	20	25	-	-	5	65
Machine hours worked	10,000	20,000	15,000	-	-	5,000	50,000

General Expenses:

Rent	:	₹12,500
Insurance (Machine)	:	₹1,050
Depreciation	:	15% of value of machinery
Power	:	₹3,800
Light	:	₹1,250

You are required to prepare an overhead analysis sheet for the departments showing clearly the basis of apportionment when necessary.

Answer

Overhead Analysis Sheet

Items	Basis of Charge	Production Departments			Service Departments		
		P1	P2	P3	Office	Stores	Work Shop
Indirect materials	Allocation	2,000	3,000	3,000	1,000	2,000	2,000
Indirect wages	Allocation	3,000	3,000	4,000	10,000	10,000	5,000
Rent	Area	2,000	2,500	3,000	1,500	1,000	2,500
Insurance	Value	300	350	250	-	-	150
Depreciation	Value	4,500	5,250	3,750	-	-	2,250
Power	H.P. used	600	1,600	1,500	-	-	100
Light	Area	200	250	300	150	100	250
Total	**-**	**12,600**	**15,950**	**15,800**	**12,650**	**13,100**	**12,250**

BBQ 23

SNS Trading Company has three Main Departments and two Service Departments. The data for each department is given below:

Departments	Expenses (in ₹)	Area in (Sq. Mtr)	No. of Employees
Main Departments:			
Purchase Department	5,00,000	12	800
Packing Department	8,00,000	15	1700
Distribution Department	3,50,000	7	700
Service Departments:			
Maintenance Department	6,40,000	4	200
Personnel Department	3,20,000	6	250

The cost of Maintenance Department and Personnel Department is distributed on the basis of 'Area in Square Metres' and 'Number of Employees' respectively.

You are required to:

(1) Prepare a statement showing the distribution of expenses of Service departments to Main departments using "Step Ladder Method" of overhead distribution.

(2) Compute the rate per hour of each Main departments, given that, the Purchase department, Packing department and Distribution department works for 12 hours a day, 24 hours a day and 8 hours a day respectively. Assume that there are 365 days in a year and there are no holidays.

Answer

(1) Statement Showing Distribution of Expenses of Service Departments

Particulars	Basis	Production Departments			Service Departments	
		Purchase	Packing	Distribution	Maintenance	Personnel
Expenses	Allocation	5,00,000	8,00,000	3,50,000	6,40,000	3,20,000
Re-apportionment:						
Maintenance Dept.	Area	1,92,000	2,40,000	1,12,000	(6,40,000)	96,000
Personnel Dept.	No. of Employees	1,04,000	2,21,000	91,000	-	(4,16,000)
Total OH	-	***7,96,000***	***12,61,000***	***5,53,000***	-	-

(2) Calculation of rate per hour:

Rate per hour	=	Total Overheads ÷ Total Hours		
Purchase Department	=	7,96,000 ÷ (12 hours × 365 days)	=	***₹181.74***
Packing Department	=	12,61,000 ÷ (24 hours × 365 days)	=	***₹143.95***
Distribution Department	=	5,53,000 ÷ (8 hours × 365 days)	=	***₹189.38***

BBQ 24

Modern Manufactures Ltd. has three Production Departments P1, P2, P3 and two Service Departments S1 and S2 details pertaining to which are as under:

Items	Production Departments			Service Departments	
	P1	P2	P3	S1	S2
Direct wages	3,000	2,000	3,000	1,500	195
Working hours	3,070	4,475	2,419	-	-
Value of machines (₹)	60,000	80,000	1,00,000	5,000	5,000
H.P. of machines	60	30	50	10	-
Light points	10	15	20	10	5
Floor space (sq. ft.)	2,000	2,500	3,000	2,000	500

The following figures extracted from the Accounting records are relevant:

Rent and rates	:	₹5,000
General lighting	:	₹600
Indirect wages	:	₹1,939
Power	:	₹1,500
Depreciation on machines	:	₹10,000
Sundries	:	₹9,695

The expenses of the Service Departments are allocated as under:

Departments	P1	P2	P3	S1	S2
S1	20%	30%	40%	-	10%
S2	40%	20%	30%	10%	-

Find out the total cost of product X which is processed for manufacture in Departments P1, P2 and P3 for 4, 5 and 3 hours respectively, given that its Direct Material Cost is ₹50 and Direct Labour Cost is ₹30.

Answer

Statement Showing Overhead Rate per Hour

Items	Basis of Charge	Production Departments			Service Departments	
		P1	P2	P3	S1	S2
Direct wages	Allocation	-	-	-	1,500	195
Rent and rates	Area	1,000	1,250	1,500	1,000	250
General lighting	Light points	100	150	200	100	50
Indirect wages	Direct wages	600	400	600	300	39
Power	H.P.	600	300	500	100	-
Depreciation on machines	Value of machines	2,400	3,200	4,000	200	200
Sundries	Direct wages	3,000	2,000	3,000	1,500	195
Total overheads	***Primary Dist.***	***7,700***	***7,300***	***9,800***	***4,700***	***929***
Re-apportionment:						
Department S1	2 : 3 : 4 : 1	940	1,410	1,880	(4,700)	470
Department S2	4 : 2 : 3 : 1	559	280	420	140	(1,399)
Department S1	2 : 3 : 4 : 1	28	42	56	(140)	14
Department S2	4 : 2 : 3	6	3	5	-	(14)
Total OH	-	***9,233***	***9,035***	***12,161***	-	-
÷ Working hours	-	3,070	4,475	2,419	-	-
OH rate per hour		***₹3.01***	***₹2.02***	***₹5.03***	-	-

Calculation of cost of product X:

Direct material cost	₹50.00
Direct labour cost	₹30.00
Overheads: Department P1 (4 hours × ₹3.01)	₹12.04
Department P2 (5 hours × ₹2.02)	₹10.10
Department P3 (3 hours × ₹5.03)	₹15.09
Cost of product X	***₹117.23***

BBQ 25

Delta Ltd. Is a manufacturing concern having two production departments P_1 and P_2 and two service departments S_1 and S_2. After making a primary distribution of factory overheads of all departments are as under:

P_1	=	₹4,02,000
P_2	=	₹2,93,000
S_1	=	₹3,52,000
S_2	=	₹33,000

Overheads of service departments are apportioned as below:

	P_1	P_2	S_1	S_2
Department S_1	40%	50%	-	10%
Department S_2	50%	40%	10%	-

A product 'Z' passes through all the two production departments – P_1 and P_2 and each unit of product remain in process for 2 and 3 hours respectively. The material and labour cost of one unit of product 'Z' is ₹500 and ₹350 respectively. The company run for all 365 days of the year and 16 hours per day.

You are required to:

(1) To make secondary distribution of overheads of service departments by applying Simultaneous Equation method and

(2) Determine the total cost of one unit of product Z.

Answer

(1) Statement Showing Secondary Distribution

Particulars	***Basis***	***Production Departments***		***Service Departments***	
		P_1	***P_2***	***S_1***	***S_2***
Overheads	Primary distribution	4,02,000	2,93,000	3,52,000	33,000
Apportionment:					
Department S_1	(40:50:10)	1,43,555	1,79,445	(3,58,889)	35,889
Department S_2	(50:40:10)	34,445	27,555	6,889	(68,889)
Total Overheads		***5,80,000***	***5,00,000***	-	-
÷ Production Hours		5,840	5,840	-	-
Recovery rate per hour	-	***99.32***	***85.62***	-	-

Calculation of adjusted expenses of service department by using Simultaneous Equation method:

Expenses of Department S_1 = 3,52,000 + 10% of Expenses of S_2
Expenses of Department S_2 = 33,000 + 10% of Expenses of S_1

Now:

Expenses of Department S_1 = 3,52,000 + 10% (33,000 + 10% of S_1)
Expenses of Department S_1 = 3,52,000 + 3,300 + 1% of S_1

Expenses of Department S_1 = 3,55,300 ÷ 99% = ***3,58,889***

Expenses of Department S_2 = 33,000 + 10% of S_1
= 33,000 + 10% of 3,58,889
= 33,000 + 35,889 = ***68,889***

(2) Statement Showing Cost Per Unit of 'Z'

Particulars	***Amount***
Direct Materials	500
Direct Labour	350
Prime Cost	***850***
Production Overheads:	
Department P_1 (2 hours × 99.32)	198.64
Department P_2 (3 hours × 85.62)	256.86
Total Cost	***1,305.50***

Working Notes:

Calculation of production hours = 365 × 16 hours = 5,840 hours

BBQ 26

USP Ltd. is the manufacture of 'double grip motorcycle tyres. In the manufacturing process, it undertakes three different job namely, Vulcanising, Brushing and Striping. All of these jobs requires 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 month is ₹2,70,000, An estimated 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 line basis.

- 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 aid of the robot*
Vulcanising	500	400
Brushing	1,000	400
Striping	-	1,200

You are required to:

(a) 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.

(b) Compute the Machine Hour Rate for the individual jobs i.e. Vulcanising, Brushing and Striping.

Answer

(a) Machine hour rate for the company as a whole for a month:

(A) When the Robot is used = $\frac{69,000}{2,000 \text{ hrs}}$ = ₹34.50

(B) When the Robot is not used = $\frac{18,000}{1,500 \text{ hrs}}$ = ₹12.00

(b) Machine hour rate for individual jobs:

Particulars	*Vulcanising*		*Brushing*		*Striping*	
	Hours	*₹*	*Hours*	*₹*	*Hours*	*₹*
Without Robot @ ₹12.00 per hour	500	6,000	1,000	12,000	-	-
With Robot @ ₹34.50 per hour	400	13,800	400	13,800	1,200	41,400
Total Overheads	-	19,800	-	25,800	-	41,400
÷ Hours	-	÷900	-	÷1,400	-	÷1,200
Machine Hour Rate	***-***	***22.00***	***-***	***18.43***	***-***	***34.50***

Working note:

1. Total machine hours used (500 + 1,000 + 400 + 400 + 1,200) 3,500

2. Total machine hours without the use of robot (500 + 1,000) 1,500

3. Total machine hours with the use of robot (400 + 400 + 1,200) 2,000

4. Total overheads of the machine per month:

Rent (₹18,000 ÷ 3 months)	₹6,000.00
Depreciation (₹19,20,000 × 10%) ÷ 12 months	₹16,000.00
Indirect Charges (₹12,00,000 × 20% ÷ 12 months)	₹20,000.00
Total	***₹42,000.00***

5. Robot hire charges for a month (₹2,70,000 ÷ 6 months) = ₹45,000

6. Overheads for using machines without Robot = $\frac{42,000}{3,500 \text{ hrs}}$ × 1,500 hrs. = ₹18,000

7. Overheads for using machines with Robot = $\frac{42,000}{3,500 \text{ hrs}}$ × 2,000 hrs. + ₹45,000

= ₹69,000

BBQ 27

RJS produces a single product and absorbs the production overheads at a pre determined rate. Information relating to a period is as under:

Production overheads actually incurred	₹4,84,250
Overheads recovery rate at production	₹1.45 per hour
Actual hours worked	2,65,000 hours

Production:

Finished goods	17,500 units
Work-in-progress (50% complete in all respects)	5,000 units

Sales:

Finished goods	12,500 units

At the end of the period, it was discovered that the actual production overheads incurred included ₹40,000 on account of 'written off obsolete stores' and wages paid for the strike period under an award. It was also found that 30% of the under absorption of production overheads was due to production inefficiency and the rest was attributable to normal increase in costs.

Required to calculate:

(1) The amount of under absorbed production overheads during the period.
(2) Show the accounting treatment of under absorption of production overheads.

Answer

(1) Computation of under absorption of Production Overheads during the period:

Particulars	***Amount***
Total production overheads actually incurred during the period	4,84,250
Less: Written off obsolete stores and wages paid for strike period	(40,000)
Net production overheads actually incurred	***4,44,250***
Production overheads absorbed (2,65,000 hours × ₹1.45)	3,84,250
Under Recovery of production overheads	***₹60,000***

(2) Accounting treatment of under-absorption of production overheads:

a. ₹18,000 (i.e. ₹60,000 × 30%) of under absorbed overheads were due to lack of production planning. This being abnormal should be debited to Costing Profit and Loss Account.

b. The balance of ₹42,000 (i.e. ₹60,000 × 70%) of under absorbed overheads should be distributed over work in progress, finished goods and cost of sales by using supplementary rate.

$$\textbf{Supplementary OH Rate} = \frac{\text{Under Absorbed Overhead}}{\text{Equivalent Units}} = \frac{42,000}{12,500 + 5,000 + 2,500}$$

$$= \textbf{₹2.10 per unit}$$

Distribution of unabsorbed overheads of ₹42,000:

Work-in-Progress (2,500 units × ₹2.10)	=	₹5,250
Finished goods (5,000 units × ₹2.10)	=	₹10,500
Cost of sales (12,500 units × ₹2.10)	=	₹26,250

BBQ 28

A light engineering factory fabricates machine parts to customers. The factory commenced fabrication of 12

Nos. machine parts to customers' specifications and the expenditure incurred on the job for the week ending 21st August, 20X1 is given below:

Particulars	₹	₹
Direct materials (all items)		780
Direct labour (manual) 20 hours @ ₹15 per hour		300
Machine facilities:		
Machine No I: 4 hours @ ₹45	180	570
Machine No II: 6 hours @ ₹65	390	
Total		1650
Overheads @ ₹8 per hour on 20 manual hours		160
Total cost		***1810***

The overhead rate of ₹8 per hour is based on 3,000 man hours per week; similarly, the machine hour rates are based on the normal working of Machine Nos. I and II for 40 hours out of 45 hours per week (45 maximum working hours and 40 hours normal working hours per week for both machines).

After the close of each week, the factory levies a supplementary rate for the recovery of full overhead expenses on the basis of actual hours worked during the week. During the week ending 21st August, 20X1, the total labour hours worked was 2,400 and Machine Nos. I and II had worked for 30 hours and 32.5 hours respectively.

Prepare a Cost Sheet for the job for the fabrication of 12 Nos. machine parts duly levying the supplementary rates.

Answer

Fabrication of 12 Nos. machine parts (job No.....) Date of commencement: 16 August, 20X1 Date of Completion. Cost sheet for the week ending, August 21, 20X1:

Particulars	₹	₹
Direct materials (all items)		780
Direct labour (manual) 20 hours @ ₹15 per hour		300
Machine facilities:		
Machine No I: 4 hours @ ₹45	180	
Machine No II: 6 hours @ ₹65	390	570
Total		1650
Overheads @ ₹8 per hour on 20 manual hours		160
Total cost		***1810***
Supplementary Rates		
Overheads @ ₹2 per hour on 20 manual hours	40	
Machine No I: 4 hours @ ₹15	60	
Machine No II: 6 hours @ ₹15	90	190
Total cost		***2,000***

Working notes:

Calculation of Supplementary rate:

(a) Overheads:

Overheads budgeted	3,000 hours × ₹8	=	₹24,000
Actual hours		=	2,400
Actual rate per hour	₹24,000 ÷ 2,400 hours	=	₹10
Supplementary charge		=	***₹2 (₹10 – ₹8) per hour***

(b) Machine facilities:

Machine No I:

Overheads budgeted	40 hours × ₹45	=	₹1,800
Actual hours		=	30
Actual rate per hour	₹1,800 ÷ 30 hours	=	₹60
Supplementary charge		=	***₹15 (₹60 – ₹45) per hour***

Machine No II:

Overheads budgeted	40 hours × ₹65	=	₹2,600
Actual hours		=	32.5
Actual rate per hour	₹2,600 ÷ 32.5 hours	=	₹80
Supplementary charge		=	***₹15 (₹80 – ₹65) per hour***

BBQ 29

A factory has three production departments. The policy of the factory is to recover the production overheads of the entire factory by adopting a single blanket rate based on the percentage of total factory overheads to total factory wages. The relevant data for a month are given below:

Department	*Direct Materials (₹)*	*Direct Wages (₹)*	*Factory OH (₹)*	*Direct Labour hours*	*Machine hours*
Budget:					
Machining	6,50,000	80,000	3,60,000	20,000	80,000
Assembly	1,70,000	3,50,000	1,40,000	1,00,000	10,000
Packing	1,00,000	70,000	1,25,000	50,000	-
Actual:					
Machining	7,80,000	96,000	3,90,000	24,000	96,000
Assembly	1,36,000	2,70,000	84,000	90,000	11,000
Packing	1,20,000	90,000	1,35,000	60,000	-

The details of one of the representative jobs produced during the month are as under:

Job No. CW 7083

Department	*Direct Materials (₹)*	*Direct Wages (₹)*	*Direct Labour hours*	*Machine hours*
Machining	1,200	240	60	180
Assembly	600	360	120	30
Packing	300	60	40	-

The factory adds 30% on the factory cost to cover administration and selling overheads and profit.

Required:

(i) Calculate the overhead absorption rate as per the current policy of the company and determine the selling price of the Job No. CW 7083.

(ii) Suggest any suitable alternative method(s) of absorption of the factory overheads and calculate the overhead recovery rates based on the method(s) so recommended by you.

(iii) Determine the selling price of Job CW 7083 based on the overhead application rates calculated in (ii) above.

(iv) Calculate the department-wise and total under or over recovery of overheads based on the company's current policy and the method(s) recommended by you.

Answer

(i) Calculation of overhead absorption rate as per current policy of the company (blanket rate):

Blanket rate $= \frac{\text{Budgeted Factory Overheads}}{\text{Budgeted Direct Wages}} \times 100 = \frac{3,60,000 + 1,40,000 + 1,25,000}{80,000 + 3,50,000 + 70,000} \times 100$

$=$ ***125% of Direct Wages***

Calculation of Selling Price of the Job No. CW-7083:

Particulars	Amount
Direct materials (₹1,200 + ₹600 + ₹300)	2,100
Direct wages (₹240 + ₹360 + ₹60)	660
Prime Cost	***2,760***
Overheads (125% × ₹660)	825
Factory Cost	***3,585***
Mark-up (30% × ₹3,585)	10,75.50
Selling Price	***4,660.50***

(ii) Methods available for absorbing factory overheads and their overhead recovery rates in different departments:

1. Machining Department:

In the machining department, the use of machine time is the predominant factor of production. Hence machine hour rate should be used to recover overheads in this department. The overhead recovery rate based on machine hours has been calculated as under:

Machine hour rate $= \frac{\text{Budgeted Factory Overheads}}{\text{Budgeted Machine Hours}} = \frac{3,60,000}{80,000 \text{ hours}} =$ ***₹4.50 per hour***

2. Assembly Department:

In this department direct labour hours is the main factor of production. Hence direct labour hour rate method should be used to recover overheads in this department. The overheads recovery rate in this case is:

Direct labour hour rate $= \frac{\text{Budgeted Factory Overheads}}{\text{Budgeted Direct Labour Hours}} = \frac{1,40,000}{1,00,000 \text{ hours}} =$ ***₹1.40 per hour***

3. Packing Department:

Labour is the most important factor of production in this department. Hence direct labour hour rate method should be used to recover overheads in this department. The overhead recovery rate in this case comes to:

Direct labour hour rate $= \frac{\text{Budgeted Factory Overheads}}{\text{Budgeted Direct Labour Hours}} = \frac{1,25,000}{50,000 \text{ hours}} =$ ***₹2.50 per hour***

(iii) Selling Price of Job CW-7083 [based on the overhead application rates calculated in (ii) above]

Particulars	Amount
Direct materials (₹1,200 + ₹600 + ₹300)	2,100
Direct wages (₹240 + ₹360 + ₹60)	660
Prime Cost	***2,760***
Overheads:	
Machining (180 machine hours × ₹4.50)	810
Assembly (120 labour hours × ₹1.40)	168
Packing (40 labour hours × ₹2.50)	100
Factory Cost	***3,838***
Mark-up (30% × ₹3,838)	1,151.40
Selling Price	***4,989.40***

(iv) Department-wise statement of total under or over recovery of overheads:

(a) Under Current Policy (Blanket Rate)

Details	Machining	Assembly	Packing	Total
Direct wages (Actual)	96,000	2,70,000	90,000	
Overheads recovered @ 125% of Direct wage (1)	1,20,000	3,37,500	1,12,500	5,70,000
Actual overheads (2)	3,90,000	84,000	1,35,000	6,09,000
(Under)/over recovery (1 - 2)	***(2,70,000)***	***2,53,500***	***(22,500)***	***(39,000)***

(b) Under Method Suggested (Department-Wise Rate)

Details	Machining	Assembly	Packing	Total
Actual Machine Hours	96,000	-	-	
Actual Direct Labour Hours	-	90,000	60,000	
Recovery rate per machine hour/labour hour	4.50	1.40	2.50	
Overheads recovered (1)	4,32,000	1,26,000	1,50,000	7,08,000
Actual overheads (2)	3,90,000	84,000	1,35,000	6,09,000
(Under)/over recovery (1 - 2)	***42,000***	***42,000***	***15,000***	***99,000***

BBQ 30

A machine costing ₹1,00,00,000 is expected to run for 10 years. At the end of this period its scrap value is likely to be ₹9,00,000. Repairs during the whole life of the machine are expected to be ₹18,00,000 and the machine is expected to run 4,380 hours per year on the average. Its electricity consumption is 15 units per hour, the rate per unit being ₹5. The machine occupies one-fourth of the area of the department and has two points out of a total of ten for lighting. The foreman has to devote about one sixth of his time to the machine. The monthly rent of the department is ₹30,000 and the lighting charges amount to ₹8,000 per month. The foreman is paid a monthly salary of ₹19,200. Insurance is @ 1% p.a. and the expenses on oil, etc., are ₹900 per month.

Find out the machine hour rate.

Answer

Machine Hour Rate

Particulars		Amount
(A) Standing charges/ Fixed costs		
Depreciation	[(₹1,00,00,000 – 9,00,000) × 1/10 years × 1/12]	75,833.33
Rent	(₹30,000 × ¼)	7,500
Lighting charges	(₹8,000 × 2/10)	1,600
Foreman's salary	(₹19,200 × 1/6)	3,200
Insurance Premium	(₹1,00,00,000 × 1% × 1/12)	8,333.33
Total (A)		***96,466.66***
(B) Running charges/ Variable costs		
Repairs	(₹18,00,000 × 1/10 years × 1/12)	15,000
Electricity	[(15 units × 4,380 hours × ₹5) × 1/12]	27,375
Sundry expenses (oil etc.)		900
Total (B)		***43,275***
Total Cost (A + B)		***1,39,741.66***
÷ Productive Machine Hours in a month (4,380 ÷ 12)		***÷ 365***
Machine Hour Rate		***₹382.85***

BBQ 31

A machine shop has 8 identical drilling machines manned by 6 operators. The machine cannot be worked without an operator wholly engaged on it. The original cost of all these machines works out to ₹32 lakhs.

These following particulars are furnished for a 6 month period:

Normal available hours per month	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 & indirect labour	₹16,500
Lighting and electricity	₹6,000

The following particulars are given for a year:

Repairs and maintenance (including consumables)	5% of value of machines
Insurance	₹3,60,000
Depreciation	10% of original cost
Sundry work expenses	₹50,000
Management expenses allocated	₹5,00,000

Prepare a statement showing the comprehensive machine hour rate for the machine shop.

Answer

Computation of Comprehensive Machine Hour Rate for the "Machine Shop"

Particulars		***Amount***
(A) Standing Charges:		
Operators wages	(100 ÷ 8) × 7,380 hours	92,250
Production bonus	(92,250 × 10%)	9,225
Supervision & indirect labour		16,500
Lighting and electricity		6,000
Insurance	(3,60,000 × 6/12)	1,80,000
Depreciation	(32,00,000 × 10% × 6/12)	1,60,000
Sundry works expense	(50,000 × 6/12)	25,000
Management expenses allocated	(5,00,000 × 6/12)	2,50,000
Total (A)		***7,38,975***
(B) Running Charges		
Repairs and maintenance	(32,00,000 × 5% × 6/12)	80,000
Power consumed		40,250
Total (B)		***1,20,250***
Total OH for the shop (i.e. for all machineries) for 6 month (A+B)		***8,59,225***
÷ Total machine hours		÷ 7,200
Machine Hour Rate		***₹119.34***

Working Notes:

Calculation of effective productive hours available to the machine shop and paid hours for 6 months:

Particulars	***6 Operators (Hours)***
Normal Available hours (208 hours × 6 months × 6 operators)	7,488
Less: Absenteeism hours (18 hours × 6 operators)	(108)
Paid Hours per month	***7,380***
Less: Leave hours (20 hours × 6 operators)	(120)
Less: Normal idle time (10 hours × 6 operators)	(60)
Effective Productive Hours	***7,200***

As machines cannot be worked without an operator wholly engaged on them therefore, hours for which 6 operators are available for 6 months are the hours for which machines can be used. Hence 7,200 hours represent effective working hours.

CHAPTER 4 COST SHEET & UNIT COSTING

1. **Cost Sheet:** A cost sheet or cost statement is a document which provides a detailed cost information (functional classification).

2. **Proforma Cost Sheet:**

Particulars	Total Cost
Direct Material Consumed:	
Raw Materials Purchased	
Add: Opening stock of Raw Materials	
Less: Closing stock of Raw Materials	
Add: Carriage Inward	
Less: Rebate or Discount	
Less: Recovery From Sale of Scrap of Raw Materials	
Less: Cost of Abnormal Loss of Raw Materials	
Direct Wages or Labour or Employee Cost:	
Wages and salaries	
Allowance and incentives	
Payment for overtime	
Bonus	
Employer's contribution in P.F, E.S.I. etc.	
Other benefits	
Direct Expenses:	
Cost of utilities such as power & fuel, steam etc.	
Royalty paid/ payable for production or provision of service	
Hire charges paid for hiring specific equipment	
Fee for technical assistance and know-how	
Amortised cost of moulds, patterns, patents etc.	
Cost for product/ service specific design or drawing;	
Cost of product/ service specific software	
Consumable Material	
Job Charges paid to job workers	
Prime Cost	XXX
Factory/Works/Production/Manufacturing Overheads:	
Consumable stores and spares	
Depreciation of plant and machinery, factory building etc.	
Lease rent of production assets	
Repair and maintenance of plant and machinery, factory building etc.	
Indirect employees cost related with production activities	
Drawing and Designing department cost	
Insurance of plant and machinery, factory building, stock of RM & WIP etc.	
Amortized cost of jigs, fixtures, tooling etc.	
Service department cost such as Tool Room, Engineering & Maintenance, and Pollution Control etc.	
Carriage on material return	
Gross Works Cost/Factory Cost	XXX
Add: Opening WIP	
Less: Closing WIP	

Works/Factory Cost	**XXX**
Add: Quality Control Cost	
Add: Research and Development Cost	
Add: Administrative Overheads (relating to production activity)	
Less: Credit for recoveries/Scrap/By-Products	
Add: Packing Cost (Primary)	
Cost of Production	**XXX**
Add: Opening Finished Goods	
Less: Closing Finished Goods	
Cost of Goods Sold	**XXX**
Add: Administrative OH (General/not related to production):	
Depreciation and maintenance of, building, furniture etc. of corporate or general management.	
Salary of administrative employees, accountants, directors, secretaries etc.	
Rent, rates & taxes, insurance, lighting, office expenses etc.	
Indirect materials- printing and stationery, office supplies etc.	
Legal charges, audit fees, corporate office expenses like directors' sitting fees, remuneration and commission, meeting expenses etc.	
Add: Selling Overheads:	
Salary and wages related with sales department and employees directly related with selling of goods.	
Rent, depreciation, maintenance and other cost related with sales department.	
Cost of advertisement, maintenance of website for online sales, market research etc.	
Expenses for participation in Industrial exhibition	
Add: Distribution Overheads:	
Salary and wages of employees engaged in distribution of goods.	
Transportation and insurance costs related with distribution.	
Depreciation, hire charges, maintenance and other operating costs related with distribution vehicles etc.	
Packing Cost (Secondary)	
Cost of Sales (Excluding Interest)	**XXX**
Add: Interest or Financing Charges	
Cost of Sales (Including Interest)	**XXX**
Add: Profit	
Sales	**XXX**

Note:

- **Abnormal Costs:** Any abnormal cost, where it is material and quantifiable, **shall not form part of cost** of production or acquisition or supply of goods or provision of service. Examples of abnormal costs are:
  (a) Cost pertaining to or arising out of a pandemic e.g. COVID-19
  (b) Cost associated with employees due to sudden lockdown.

- **Subsidy or Grant or Incentives:** Any such type of payment received/ receivable are **reduced** from the cost objects to which such amount pertains.

- **Penalty, Fine, Damages, and Demurrage:** These types of expenses are **not form part of cost.**

- ***Interest and Other Finance Costs:*** ***Interest, including any payment in the nature of interest for use of non-equity funds and incidental cost that an entity incurs in arranging those funds. Interest and finance charges are not included in cost of production. Interest and Financing Charges shall be presented in the cost statement as a separate item of cost of sales.***

- ***Income tax, Donations, Cash Discount and Bad Debts:*** ***These items are not form part of cost.***

BBQ 32

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

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

Machine hours worked	21,600 hours
Machine hour rate	₹ 8.00 per hour
Units sold	1,60,000
Units produced	1,94,000
Desired profit	15% on sales

Answer

Cost Sheet of Aditya Industries

Particulars	*Total Cost*	*Cost Per Unit*
Raw materials purchased	1,44,00,000	-
Add: Opening value of raw materials	12,00,000	-
Less: Closing value of raw materials	(14,00,000)	-
Materials consumed	***1,42,00,000***	***73.19***
Wages paid to production workers	36,64,000	18.89
Expenses paid for utilities	1,45,600	0.75
Prime Cost	***1,80,09,600***	***92.83***
Factory overheads (₹8 × 21,600 hours)	1,72,800	0.89
Add: Opening value of WIP	18,00,000	-
Less: Closing value of WIP	(16,04,000)	-
Cost of Production	***1,83,78,400***	***94.73***
Add: Value of opening finished stock	9,60,000	-
Less: Value of closing finished stock (₹94.734× 44,000)	(41,68,296)	-
Cost of Goods Sold	***1,51,70,104***	***94.81***
Office and administration expenses paid	26,52,000	16.58
Travelling allowance paid to office staffs	1,21,000	0.76
Selling expenses	6,46,000	4.03

Cost of Sales	***1,85,89,104***	***116.18***
Add: Profit @15% on sales	32,80,430	20.50
Sales (1,85,89,104÷85%)	***2,18,69,534***	***136.68***

Note:

(a) Units produced: 1,94,000; Opening Units: 10,000; Total available units: 2,04,000 & units sold 1,60,000.

(b) FIFO method is used for valuation of stock, alternatively student can solve the problem with weighted average method.

BBQ 33

The following details are available from the books of R Ltd. for the year ending 31st March 2023:

Particulars	***Amount (₹)***
Purchase of raw materials	84,00,000
Consumable materials	4,80,000
Direct wages	60,00,000
Carriage inward	1,72,600
Wages to foreman and store keeper	8,40,000
Other indirect wages to factory staffs	1,35,000
Expenditure on research and development on new production technology	9,60,000
Salary to accountants	7,20,000
Employer's contribution to EPF & ESI	7,20,000
Cost of power & fuel	28,00,000
Production planning office expenses	12,60,000
Salary to delivery staffs	14,30,000
Income tax	2,80,000
Fees to statutory auditor	1,80,000
Fees to cost auditor	80,000
Fees to independent directors	9,40,000
Donation to PM-national relief fund	1,10,000
Value of sales	2,82,60,000
Position of inventories as on 01-04-2022:	
Raw Material	6,20,000
WIP	7,84,000
Finished goods	14,40,000
Position of inventories as on 31-03-2023:	
Raw Material	4,60,000
WIP	6,64,000
Finished goods	9,80,000

From the above information prepare a cost sheet for the year ended 31st March 2023.

Answer

Cost Sheet of R Ltd.
(for the year ended at 31st March, 2023)

Particulars	***Amount (₹)***	***Amount (₹)***
Material Consumed:		
Raw materials purchased	84,00,000	
Add: Carriage inward	1,72,600	
Add: Opening stock of raw materials	6,20,000	
Less: Closing stock of raw materials	(4,60,000)	87,32,600
Direct employee (labour) cost:		

Direct wages	60,00,000	
Employer's Contribution towards PF & ESIS	7,20,000	67,20,000
Direct expenses:		
Consumable materials	4,80,000	
Cost of power & fuel	28,00,000	32,80,000
Prime Cost		***1,87,32,600***
Works/ Factory overheads:		
Wages to foreman and store keeper	8,40,000	
Other indirect wages to factory staffs	1,35,000	9,75,000
Gross Factory Cost		***1,97,07,600***
Add: Opening value of WIP		7,84,000
Less: Closing value of WIP		(6,64,000)
Factory Cost		***1,98,27,600***
Research & development cost paid for improvement in production process		9,60,000
Production planning office expenses		12,60,000
Cost of Production		***2,20,47,600***
Add: Opening stock of finished goods		14,40,000
Less: Closing stock of finished goods		(9,80,000)
Cost of Goods Sold		***2,25,07,600***
Administrative Overheads:		
Salary to accountants	7,20,000	
Fees to statutory auditor	1,80,000	
Fees to cost auditor	80,000	
Fee paid to independent directors	9,40,000	19,20,000
Selling and Distribution Overheads:		
Salary to delivery staffs		14,30,000
Cost of Sales		***2,58,57,600***
Add: Profit (b.f.)		24,02,400
Sales		***2,82,60,000***

Notes: Income tax and Donation to PM National Relief Fund is avoided in the cost sheet.

BBQ 34

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

Sl. No.	*Particulars*	*Amount (₹)*	*Amount (₹)*
1	Raw materials purchased		10,00,00,000
2	GST paid on the above purchases @18% (eligible for input tax credit)		1,80,00,000
3	Freight inward		11,20,600
4	Wages paid to factory workers		29,20,000
5	Contribution made towards employees' PF & ESIS		3,60,000
6	Production bonus paid to factory workers		2,90,000
7	Royalty paid for production		1,72,600
8	Amount paid for power & fuel		4,62,000
9	Amount paid for purchase of moulds and patterns (life is equivalent to two year production)		8,96,000
10	Job charges paid to job workers		8,12,000
11	Stores and spares consumed		1,12,000
12	Depreciation on:		
	Factory building	84,000	

	Office building	56,000	
	Plant & machinery	1,26,000	
	Delivery vehicles	86,000	3,52,000
13	Salary paid to supervisors		1,26,000
14	Repairs & maintenance paid for:		
	Plant & machinery	48,000	
	Sales office building	18,000	
	Vehicles used by directors	19,600	85,600
15	Insurance premium paid for:		
	Plant & machinery	31,200	
	Factory building	18,100	
	Stock of raw materials & WIP	36,000	85,300
16	Expenses paid for quality control check activities		19,600
17	Salary paid to quality control staffs		96,200
18	Research & development cost paid improvement in production process		18,200
19	Expense paid for pollution control and engineering & maintenance		26,600
20	Expense paid for administration of factory work		1,18,600
21	Salary paid to functional mangers:		
	Production control	9,60,000	
	Finance & accounts	9,18,000	
	Sales & marketing	10,12,000	28,90,000
22	Salary paid to general manager		12,56,000
23	Packing cost paid for:		
	Primary packing necessary to maintain quality	96,000	
	For re-distribution of finished goods	1,12,000	2,08,000
24	Wages of employees engaged in distribution of goods		7,20,000
25	Fee paid to auditors		1,80,000
26	Fee paid legal advisors		1,20,000
27	Fee paid to independent directors		2,20,000
28	Performance bonus paid to sales staffs		1,80,000
29	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
30	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 requested to prepare statement of cost for Arnav Ispat Udyog Ltd. for the year ended 31st March, 2023, showing:

(a) Prime cost,
(b) Factory cost,
(c) Cost of production,
(d) Cost of goods sold and
(e) Cost of sales.

Answer

Statement of Cost of Arnav Ispat Udyog Ltd
For the year ended 31st March, 2023

Particulars	Amount	Amount
Material consumed:		
Raw materials purchased	10,00,00,000	
Freight inward	11,20,600	
Add: Opening stock of raw materials	18,00,000	
Less: Closing stock of raw materials	(9,60,000)	10,19,60,600
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
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***
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 for pollution control & engineering & maintenance	26,600	6,07,900
Gross factory cost		10,80,33,100
Add: Opening value of WIP		9,20,000
Less: Closing value of WIP		(8,70,000)
Works / Factory Cost		***10,80,83,100***
Quality control cost:		
Expenses paid for quality control check activities	19,600	
Salary paid to quality control staffs	96,200	1,15,800
Research & development cost paid improvement in production process		18,200
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
Less: Realisable value on sale scrap and waste		(86,000)
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***
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	
Selling overheads:		27,69,600
Repairs & maintenance paid for sales office building	18,000	
Salary paid to manager of sales & marketing	10,12,000	
Performance bonus paid to sales staffs	1,80,000	
Distribution overheads:		12,10,000
Depreciation on delivery vehicles	86,000	
Packing cost paid for re-distribution of finished goods	1,12,000	
Wages of employees engaged in distribution of goods	7,20,000	9,18,000
Cost of Sales		***11,35,03,300***

Notes:
GST paid of purchase of raw materials would not be part of cost of materials as it eligible for input credit.

BBQ 35
A Ltd. Co. has capacity to produce 1,00,000 units of a product every month. Its works cost at varying levels of production is as under:

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

Its fixed administration expenses amount to ₹1,50,000 and fixed marketing expenses amount to ₹2,50,000 per month respectively. The variable distribution cost amounts to ₹30 per unit.

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

(a) It gives gift items costing Rs. 30 per unit of sale.
(b) It has lucky draws every month giving the first prize of Rs. 50,000; 2nd prize of ₹25,000; 3rd prize of ₹10,000 and three consolation prizes of ₹5,000 each to customers buying the product.
(c) It spends ₹1,00,000 on refreshments served every month to its customers.
(d) It sponsors a television programme every week at a cost of ₹20,00,000 per month.

It can market 30% of its output at ₹550 per unit without incurring any of the expenses referred to in (a) to (d) above.

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

Answer

A Ltd. Co
Cost Sheet (for the month)

Particulars	***30% (30,000 units)***	***100% (1,00,000 units)***

Works Cost @ ₹380/₹310 per unit	1,14,00,000	3,10,00,000
Administrative overheads (Fixed)	1,50,000	1,50,000
Fixed marketing expenses	2,50,000	2,50,000
Variable distribution cost @ ₹30 per unit	9,00,000	30,00,000
Additional expenses:		
Gifts @ ₹30 per unit	-	30,00,000
Customers prizes	-	1,00,000
Refreshment	-	1,00,000
Sponsorship cost	-	20,00,000
Cost of Sales	***1,27,00,000***	***3,96,00,000***
Profit	38,00,000	1,04,00,000
Sales @ ₹550/₹500 per unit	***1,65,00,000***	***5,00,00,000***

Advice: At 100% capacity utilization, profit of A Ltd Company is ₹1,04,00,000 whereas at 30% profit is only ₹38,00,000. Therefore, it is advisable to the company to work at 100% capacity and incur special marketing cost.

BBQ 36

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

Direct Expenses	₹1,80,000
Direct Wages being 175% of Factory Overheads	₹2,57,250
Cost of Goods Sold	₹18,75,000
Selling and Distribution Overheads	₹60,000
Sales	₹22,10,000
Administration Overheads are 10% of Factory Overheads	

Stock details as per Stock register:

	30.06.2018	***30.09.2018***
Raw Materials	₹2,45,600	₹2,08,000
Work-in-progress	₹1,70,800	₹1,90,000
Finished Goods	₹3,10,000	₹2,75,000

You are required to prepare a Cost Sheet showing:

(1) Raw Material Consumed
(2) Prime Cost
(3) Factory Cost
(4) Cost of Goods Sold
(5) Cost of Sales and Profit

Answer

Cost Sheet

Particulars	***Amount***
Raw Materials Purchased (W.N.)	12,22,650
Add: Opening stock of Raw Materials	2,45,600
Less: Closing stock of Raw Materials	(2,08,000)
Materials Consumed	***12,60,250***
Direct Wages	2,57,250
Direct Expenses	1,80,000
Prime Cost	***16,97,500***
Factory Overheads (2,57,250 ÷ 175%)	1,47,000
Add: Opening WIP	1,70,800

Less: Closing WIP	(1,90,000)
Factory Cost	***18,25,300***
Administrative Overheads (10% of 1,47,000)	14,700
Add: Opening Finished Goods	3,10,000
Less: Closing Finished Goods	(2,75,000)
Cost of Goods Sold	***18,75,000***
Selling and Distribution Overheads	60,000
Cost of Sales	***19,35,000***
Profit (b.f.)	2,75,000
Sales	***22,10,000***

Working Note:

Statement Showing Material Purchased

Particulars	***Amount***
Cost of Goods Sold	***18,75,000***
Add: Closing Finished Goods	2,75,000
Less: Opening Finished Goods	(3,10,000)
Cost Of Production	***18,40,000***
Less: Administrative Overheads	(14,700)
Factory Cost	***18,25,300***
Add: Closing WIP	1,90,000
Less: Opening WIP	(1,70,800)
Gross Factory Cost	***18,44,500***
Less: Factory Overheads	(1,47,000)
Prime Cost	***16,97,500***
Less: Direct Expenses	(1,80,000)
Less Direct Wages	(2,57,250)
Raw Material Consumed	***12,60,250***
Add: Closing Raw Materials	2,08,000
Less Opening Raw Materials	(2,45,600)
Raw Materials Purchased	***12,22,650***

BBQ 37

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:

(a) Direct material ₹40 per unit

(b) Direct labour ₹30 per unit (subject to a minimum of ₹48,000 p.m.)

(c) Factory overheads:

Fixed	₹3,60,000 per annum
Variable	₹10 per unit
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.

(d) Administrative overheads ₹5,18,400 per annum (fixed)

(e) Selling overheads ₹8 per unit

(f) Each unit of raw material yields scrap which is sold at the rate of ₹5 per unit.

(g) In year 2019, the factory worked at 50% capacity for the first three month but it was expected that it would work at 80% capacity for the remaining nine month.

(h) During the first three months, the selling price per unit was ₹145.

You are required to:

(1) Prepare a cost sheet showing prime cost, works cost, cost of production and cost of sales.
(2) Calculate the selling price per unit for remaining nine month to achieve the total annual profit of ₹8,76,600.

Answer

(1) Cost Sheet

Particulars	First 3 Months	Next 9 Months	Total
Number of Units (W.N. 1)	***4,500***	***21,600***	***26,100***
Raw Materials @ ₹40 per unit	1,80,000	8,64,000	10,44,000
Less: Sale of Scrap of Material @ ₹5 per unit	(22,500)	(1,08,000)	(1,30,500)
Raw Materials Consumed	***1,57,500***	***7,56,000***	***9,13,500***
Direct Labour (W.N. 2)	1,44,000	6,48,000	7,92,000
Prime Cost	***3,01,500***	***14,04,000***	***17,05,500***
Factory Overheads:			
Fixed	90,000	2,70,000	3,60,000
Variable @ ₹10 per unit	45,000	2,16,000	2,61,000
Semi Variable (W.N. 3)	27,000	1,51,200	1,78,200
Works Cost	***4,63,500***	***20,41,200***	***25,04,700***
Administrative Overheads	1,29,600	3,88,800	5,18,400
Cost of Production	***5,93,100***	***24,30,000***	***30,23,100***
Selling and Distribution OH @ ₹8 per unit	36,000	1,72,800	2,08,800
Cost of Sales	***6,29,100***	***26,02,800***	***32,31,900***

(2) Statement Showing Selling Price Per Unit

Particulars	Amount
Sales Value for First Three Months (4,500 × 145)	6,52,500
Less: Cost of Sales for First Three Months	(6,29,100)
Profit for First Three Months	***23,400***
Required Profit from Next Nine Months (8,76,600 – 23,400)	8,53,200
Cost of Sales for Next Nine Months	26,02,800
Sales Value for Next Nine months	***34,56,000***
÷ Number of Units for Next Nine Months	÷ 21,600
Selling Price Per Unit for Next Nine Months	***₹160.00***

Working Notes:

1. Calculation of production per annum:

50% for 3 months (36,000 units × 50% × 3/12)	=	4,500 units
80% for 9 months (36,000 units × 80% × 9/12)	=	21,600 units
Total production for the year	=	***26,100 units***

2. Calculation of Labour cost:

First Three Months (4,500 × 30 or 48,000 × 3) whichever is higher	=	1,44,000
Next Nine Months (21,600 × 30 or 48,000 × 9) whichever is higher	=	6,48,000

3. Calculation of Semi-variable cost:

First Three Months (1,08,000 × 3/12)	=	27,000
Next Nine Months [(1,08,000 + 46,800 + 46,800) × 9/12]	=	1,51,200

Note:

1. Administrative overheads is assumed to be related to production.

BBQ 38

The Fancy Toys Company are manufacturer of two types of toys, x and y. The manufacturing costs for the year ended 31st March, 2023 were:

Direct material	2,00,000
Direct wages	1,12,000
Production Overhead	48,000
	3,60,000

There was no work-in-progress at the beginning or at the end of the year.

It is ascertained that:

(i) Direct materials in type x costs twice as much as direct material in type y.
(ii) The direct wages for type y were 60% of those for type x.
(iii) Production overhead was 30 paise, the same per toy of x and y types.
(iv) Administration overhead for each grade was 200% of direct labour (related to production).
(v) Selling cost was 25 paise per toy for each type of toy.
(vi) Production during the year was:

- ***(a)*** Type x 40,000 toys of which 36,000 were sold and
- ***(b)*** Type y 1,20,000 toys of which 1,00,000 were sold.

(vii) Selling price were ₹7 per toy for type x and ₹5 per toy for type y.

Prepare a statement showing the total cost and cost per toy for each type of toy and the profit made on each type of toy.

Answer

The Fancy Toys Company
Cost Sheet for the year ending 31.03.2023

Particulars	***Toy 'x'***		***Toy 'y'***	
	Total	***Per unit***	***Total***	***Per unit***
Direct Materials	***80,000***	***2.00***	***1,20,000***	***1.00***
Direct Labour	40,000	1.00	72,000	0.60
Prime Cost	***1,20,000***	***3.00***	***1,92,000***	***1.60***
Production overheads	12,000	0.30	36,000	0.30
Factory Cost	***1,32,000***	***3.30***	***2,28,000***	***1.90***
Administrative overheads @ 200% of wages	80,000	2.00	1,44,000	1.20
Cost of Production	***2,12,000***	***5.30***	***3,72,000***	***3.10***
Less: Closing stock	(21,200)	-	(62,000)	-
Cost of Goods Sold	***1,90,800***	***5.30***	***3,10,000***	***3.10***
Selling Expenses	9,000	0.25	25,000	0.25
Cost of Sales	***1,99,800***	***5.55***	***3,35,000***	***3.35***
Profit	52,200	1.45	1,65,000	1.65
Sales	***2,52,000***	***7.00***	***5,00,000***	***5.00***

CHAPTER 5 JOB & BATCH COSTING

1. Job Costing:

- In this method costs are collected and accumulated for specific jobs/work order
- Each job is treated as a separate entity for the purpose of costing
- This method is used to ascertain cost and profit of each job and takes into account the cost of materials, employees and overhead etc.

2. Proforma Job Cost Sheet:

Particulars	Total Cost
Direct Material Consumed Direct Wages or Labour or Employee Cost Direct Expenses	
Prime Cost	XXX
Factory/Works/Production/Manufacturing Overheads Add: Opening WIP (if any)	
Works/Factory Cost	XXX
Add: Administrative Overheads (relating to production activity)	
Cost of Production/Cost of Goods Sold	XXX
Add: Administrative OH (General/not related to production) Add: Selling Overheads Add: Distribution Overheads	
Cost of Sales	XXX
Add: Profit	XXX
Sales	XXX

3. Valuation of Closing WIP:

Particulars	Total Cost
Direct Material Consumed Direct Wages or Labour or Employee Cost Direct Expenses	
Prime Cost	XXX
Factory/Works/Production/Manufacturing Overheads Add: Opening WIP (if any)	
Value of Closing WIP	XXX

4. Batch Costing:

- Batch costing is a type of specific order costing where articles are manufactured in predetermined lots, known as batch
- This method is used to ascertain cost and profit of specific batch or units in specific batch

5. Economic Batch Quantity (EBQ):

$$EBQ = \sqrt{\frac{2DS}{C}}$$

Where,

D = Annual demand for the product
S = Setting up cost per batch
C = Carrying cost per unit of production

BBQ 39

A factory used job costing. The following cost data is obtained from its books for the year ended 31st December 2022:

Direct materials	9,00,000
Direct wages	7,50,000
Selling & distribution overheads	5,25,000
Administrative overheads	4,20,000
Factory overheads	4,50,000
Profit	6,09,000

(a) Prepare a job sheet indicating the Prime cost, Work cost, Cost of production, Cost of sales & the Sales value.

(b) In 2023, the factory receives an order for a number of jobs. It is estimated that direct materials required will be ₹12,00,000 and direct labour will cost ₹7,50,000. What should be the price for the jobs if the factory intends to earn the same rate of profit on sales assuming that the selling and distribution overheads have gone by up by 15%? The factory recovers factory overheads as a percentage of direct wages and administration & selling and distribution overheads as a percentage of works cost, based on cost rates prevailing in the previous year.

Answer

(a) Cost sheet for the year ending on 31.12.2022

Particulars	Amount
Direct material	9,00,000
Direct wages	7,50,000
Prime cost	**16,50,000**
Factory overhead	4,50,000
Works cost	**21,00,000**
Administration overhead	4,20,000
Selling and distribution overhead	5,25,000
Cost of sales	**30,45,000**
Profit	6,09,000
Sales value	**36,54,000**

Working Notes:

1. % of Factory OH to direct wages = (4,50,000/7,50,000) × 100 = **60%**
2. % of Administration OH to works cost = (4,20,000/21,00,000) × 100 = **20%**
3. % of Selling & distribution OH to works cost = (5,25,000/21,00,000) × 100 = **25%**
4. % of Profit to sales = (6,09,000/36,54,000) × 100 = **16.67%**

(b) Cost Sheet for the job order in 2023

Particulars	Amount
Direct material	12,00,000
Direct wages	7,50,000
Prime cost	**19,50,000**
Factory overhead (60% on direct wages)	4,50,000
Works cost	**24,00,000**
Administration overhead (20% on works cost)	4,80,000
Selling and distribution overhead (25% on works cost + 15%)	6,90,000
Cost of sales	**35,70,000**

Profit (16.6.7% on sales or 20% on cost of sales)	7,14,000
Sales value (35,70,000 ÷ 83.33%)	***42,84,000***

BBQ 40

The following data presented by the supervisor of a factory for a job.

	₹Per unit
Direct Material	120
Direct Wages @ ₹4 per hour	60
(Departments A - 4 hrs., B - 7 hrs., C - 2 hrs & D - 2 hrs)	
Chargeable Expenses	20
Total	***200***

Analysis of the profit and loss account for the year ended 31st March, 2019:

Particulars		***₹***	***Particulars***	***₹***
Material		2,00,000	Sales	4,30,000
Direct Wages				
Dept. A	12,000			
Dept. B	8,000			
Dept. C	10,000			
Dept. D	20,000	50,000		
Special store items		6,000		
Overheads				
Dept. A	12,000			
Dept. B	6,000			
Dept. C	9,000			
Dept. D	17,000	44,000		
Gross profit c/d		1,30,000		
		4,30,000		***4,30,000***
Selling expenses		90,000	Gross profit b/d	1,30,000
Net profit		40,000		
		1,30,000		***1,30,000***

It is also to be noted that average hourly rates for all the four departments are similar.

Required:

(a) Prepare a job cost sheet.

(b) Calculate the entire revised cost using the above figures as the base.

(c) Add 20% profit on selling price to determine the selling price.

Answer

Job Cost Sheet

Particulars		***Amount***
Direct Materials		120.00
Direct Wages:		
Department A	(4 hours × ₹4)	16.00
Department B	(7 hours × ₹4)	28.00
Department C	(2 hours × ₹4)	8.00
Department D	(2 hours × ₹4)	8.00
Chargeable Expenses		20.00
Prime Cost		***200.00***
Overheads:		
Department A @ 100% of direct wages		16.00

Department B @ 75% of direct wages	21.00
Department C @ 90% of direct wages	7.20
Department D @ 85% of direct wages	6.80
Works Cost	***251.00***
Selling Expenses @ 30% on works cost	75.30
Total Cost	***326.30***
Profit @ 20% on selling price or 25% on cost	81.575
Sales	***407.875***

Working note:

(1) Calculation of recovery rate of Overheads:

Recovery rate of overheads $= \frac{\text{Overheads}}{\text{Direct Wages}} \times 100$

Department A $= \frac{12,000}{12,000} \times 100 =$ 100% of direct wages

Department B $= \frac{6,000}{8,000} \times 100 =$ 75% of direct wages

Department C $= \frac{9,000}{10,000} \times 100 =$ 90% of direct wages

Department D $= \frac{17,000}{20,000} \times 100 =$ 85% of direct wages

(2) Calculation of recovery rate of Selling Expenses:

Recovery rate of selling overheads $= \frac{\text{Selling Expenses}}{\text{Works Cost}} \times 100 = \frac{90,000}{4,30,000 - 1,30,000} \times 100$

$=$ ***30% of works cost***

BBQ 41

In a factory following the job costing method, an abstract from the work in process as at 30th September was prepared as under:

Job no.	***Materials cost***	***Labour hours***	***Labour cost***	***Factory OH Applied***
115	1,325	400	800	640
118	810	250	500	400
120	765	300	475	380
Total	***2,900***	***950***	***1,775***	***1,420***

Materials used in October were as follows:

Material Requisition	***Job No.***	***Cost***
54	118	300
55	118	425
56	118	515
57	120	665
58	121	910
59	124	720
		3,535

A summary of Labour Hours deployed during October is as under:

Job No.	***Numbers of hours***	
	Shop A	***Shop B***
115	25	25

118	90	30
120	75	10
121	65	-
124	20	10
Indirect labour:		
Waiting for Material	120	10
Machine breakdown	10	5
Idle time	5	6
Overtime Premium	6	5

A shop credit slip was issued in October that material issued under requisition no. 54 was returned back to stores as being not suitable. A material transfer note issued in October indicated that material issued under requisition no. 55 for Job 118 was directed to Job 124.

The hourly rate in Shop A per labour is ₹3 per hour while at Shop B it is ₹2 per hour. The factory overhead is applied at the same rate as in September. Jobs 115, 118 and 120 were completed in October.

It is the practice of the management to put a 10% on the factory cost to cover administration and selling overheads and invoice the job to the customer on a total cost plus 20% basis. What would be the invoice price of these three jobs?

You are asked to compute the factory cost of the completed jobs.

Answer

Factory Cost Statement for Completed Jobs

Month	*Job No.*	*Materials*	*Direct Labour*	*Factory OH*	*Factory Cost*
September	115	1,325	800	640	2,765
October	115	-	125	100	225
Total	-	1,325	925	740	***2,990***
September	118	810	500	400	1,710
October	118	515	330	264	1,109
Total	-	1,325	830	664	***2,819***
September	120	765	475	380	1,620
October	120	665	245	196	1,106
Total	-	1,430	720	576	***2,726***

Statement Showing Invoice Price of Completed Jobs

Particulars	*Job 115*	*Job 118*	*Job 120*
Factory Cost	2,999.00	2,819.00	2,726.00
Admin and selling OH @10% of Factory Cost	299.00	281.90	272.60
Total Cost	3,289.00	3,100.90	2,998.60
Profit @ 20% on Cost	657.80	620.18	599.72
Invoice Price	***3,946.80***	***3,721.08***	***3,598.32***

Working Note:

Recovery rate of Factory Overheads $= \frac{\text{Factory OH}}{\text{Direct Labour Cost}} \times 100$

$= \frac{1,420}{1,775} \times 100$ = 80% of Direct Labour Cost

Assumption: Indirect labour costs have been included in the factory overhead.

BBQ 42

In a manufacturing company, the overhead is recovered as follows:

Factory Overheads:	a fixed percentage basis on direct wages and
Administrative overheads:	a fixed percentage basis on factory cost.

The company has furnished the following data relating to two jobs undertaken by it in a period.

Particulars	Job 1 (₹)	Job 2 (₹)
Direct Materials	1,08,000	75,000
Direct Wages	84,000	60,000
Selling Price	3,33,312	2,52,000
Profit percentage on total cost	12%	20%

You are required to:

(a) Compute the percentage recovery rates of factory overheads and administrative overheads.
(b) Calculate the amount of factory overheads, administrative overheads and profit for each of the two jobs.
(c) Using the above recovery rates, determine the selling price to be quoted for job 3. Additional data pertaining to Job 3 is as follows:

Direct Materials	₹68,750
Direct Wages	₹22,500
Profit percentage on selling price	15%

Answer

(a) Computation of percentage recovery rates of factory overheads and administration overheads:

Let % of factory overheads to direct wages be F and % of administrative overheads to factory cost be A

Jobs Cost Sheet

Particulars	Job 1	Job 2
Direct materials	1,08,000	75,000
Direct wages	84,000	60,000
Prime cost	**1,92,000**	**1,35,000**
Factory overheads	84,000F	60,000F
Factory cost	**1,92,000+84,000F**	**1,35,000+60,000F**
Administration overheads	(1,92,000+84,000F)A	(1,35,000+60,000F)A
Total cost	(1,92,000+84,000F)+ (1,92,000+84,000F)A **= 2,97,600**	(1,35,000+60,000F)+ (1,35,000+60,000F)A **= 2,10,000**

*** Computation of total cost of jobs:**

Total cost of Job 1 when 12% is the profit on cost $= \frac{3,33,312}{112\%} =$ **₹2,97,600**

Total cost of Job 2 when 20% is the profit on cost $= \frac{2,52,000}{120\%} =$ **₹2,10,000**

Now, we have the following equations:

1,92,000 + 84,000 F + 1,92,000A + 84,000 FA	=	2,97,600	(1)
1,35,000 + 60,000F + 1,35,000A + 60,000FA	=	2,10,000	(2)

Multiply equation (1) by 5 and equation (2) by 7

9,60,000 + 4,20,000 F + 9,60,000A + 4,20,000 FA	=	14,88,000	(3)
9,45,000 + 4,20,000F + 9,45,000A + 4,20,000FA	=	14,70,000	(4)

By subtracting equation (4) from (3):

15,000 + 15,000 A	=	18,000
15,000A	=	3,000
A	=	***0.2 or 20%***

Now putting the value of A in equation (1) to find the value of F:

1,92,000 + 84,000F + 1,92,000 × 0.2 + (84,000F × .2	=	2,97,600
84,000 F + 16,800 F	=	67,200
F	=	***0.6667 or 66.67%***

(b) Statement Showing Amount of Factory Overheads, Administrative Overheads and Profit

Particulars	***Job 1***	***Job 2***
Direct materials	1,08,000	75,000
Direct wages	84,000	60,000
Prime cost	***1,92,000***	***1,35,000***
Factory overheads (66.67% of wages)	56,000	40,000
Factory cost	***2,48,000***	***1,75,000***
Administration overheads (20% of factory cost)	49,600	35,000
Total cost	***2,97,600***	***2,10,000***
Profit	35,712	42,000
Selling Price	***3,33,312***	***2,52,000***

(c) Selling Price of the Job 3

Particulars	***Amount***
Materials	68,750
Productive Wages	22,500
Prime Cost	***91,250***
Factory Overheads (66.67% of 22,500)	15,000
Factory Cost	***1,06,250***
Admin Overheads (20% of 1,06,250)	21,250
Total Cost	***1,27,500***
Profit	22,500
Sale Price (1,27,500 ÷ 85%)	***1,50,000***

BBQ 43

Arnav Confectioners (AC) owns a bakery which is used to make bakery items like pastries, cakes and muffins. AC use to bake at least 50 units of any item at a time.

A customer has given an order for 600 muffins. To process a batch of 50 muffins, the following cost would be incurred:

Direct materials	₹500
Direct wages	₹50
Oven set- up cost	₹150

AC absorbs production overheads at a rate of 20% of direct wages cost. 10% is added to the total production cost of each batch to allow for selling, distribution and administration overheads. AC requires a profit margin of 25% of sales value.

Determine the selling price for 600 muffins.

Answer

Statement of Cost per Batch and per Order

Particulars	Cost per Batch	Total Cost
Direct material cost	500.00	6,000.00
Direct wages	50.00	600.00
Oven set-up cost	150.00	1,800.00
Prime cost	**700.00**	**8,400.00**
Add: Production overhead (20% on direct wages)	10.00	120.00
Total Production Cost	**710.00**	**8,520.00**
Add: S & D and Administration overhead (10% of Total Production Cost)	71.00	852.00
Total Cost	**781.00**	**9,372.00**
Add : Profit (⅓ of Total Cost)	260.33	3,124
Selling Price	**1,041.33**	**12,496.00**

No. of batch = 600 units ÷ 50 units = **12 batches**

BBQ 44

A jobbing factory has undertaken to supply 200 pieces of a component per month for the ensuing six months. Every month a batch order is opened against which materials and labour hours are booked at actual. Overheads are levied at a rate per labour hour. The selling price contracted for is ₹8 per piece. From the following data present the cost and profit per piece of each batch order and overall position of the order for 1,200 pieces.

Month	Batch output	Material cost (₹)	Direct wages (₹)	Direct labour hours
January	210	650	120	240
February	200	640	140	280
March	220	680	150	280
April	180	630	140	270
May	200	700	150	300
June	220	720	160	320

The other details are:

Month	Chargeable expenses	Direct labour hours
January	12,000	4,800
February	10,560	4,400
March	12,000	5,000
April	10,580	4,600
May	13,000	5,000
June	12,000	4,800

Answer

Statement Showing Cost and Profit

Particulars	Jan.	Feb.	March	April	May	June	Total
Batch output (in units)	210	200	220	180	200	220	1,230
Sales value (₹)	**1,680**	**1,600**	**1,760**	**1,440**	**1,600**	**1,760**	**9,840**
Material cost (₹)	650	640	680	630	700	720	4,020
Direct wages (₹)	120	140	150	140	150	160	860
Chargeable expenses (₹)	600	672	672	621	780	800	4,145
Total cost	**1,370**	**1,452**	**1,502**	**1,391**	**1,630**	**1,680**	**9,025**
Profit per batch (₹)	**310**	**148**	**258**	**49**	**(30)**	**80**	**815**

Total cost per unit (₹)	6.52	7.26	6.83	7.73	8.15	7.64	7.34
Profit per unit (₹)	1.48	0.74	1.17	0.27	(0.15)	0.36	0.66

Overall position of the order for 1,200 units:

Sales value of 1,200 units @ ₹8 per unit = ₹9,600

Total cost of 1,200 units @ ₹7.34 per unit = ₹8,808

Profit = ₹792

Note:

$$\text{Chargeable expenses} = \frac{\text{Chargeable expenses}}{\text{Direct labour hour for the month}} \times \text{Direct labour hours for batch}$$

BBQ 45

A customer has been ordering 90,000 special design metal columns at the rate of 18,000 columns per order during the past years. The production cost comprises ₹2,120 for material, ₹60 for labour and ₹20 for fixed overheads. It costs ₹1,500 to set up for one run of 18,000 column and inventory carrying cost is 5%.

(i) Find the most economic production run.
(ii) Calculate the extra cost that company incur due to processing of 18,000 columns in a batch.

Answer

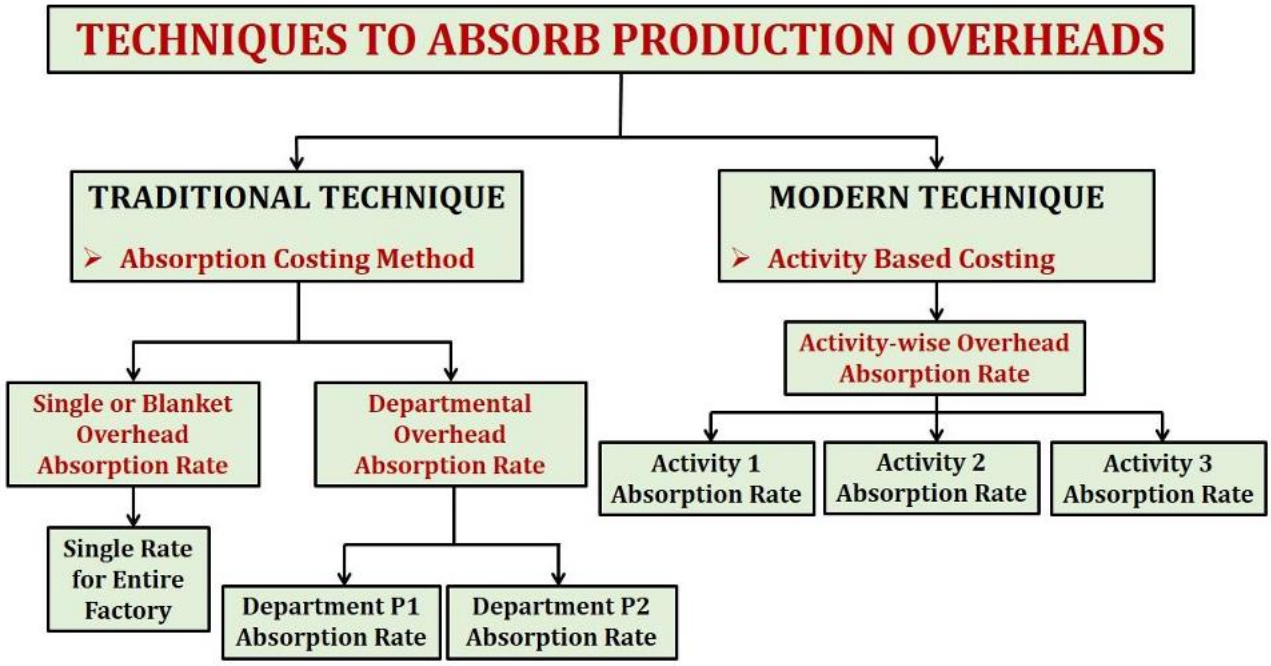
(i) Economic Run size $= \sqrt{\frac{2\,DS}{C}} = \sqrt{\frac{2 \times 90{,}000 \times 1{,}500}{5\%\text{ of }2{,}200}}$ = ***1,567 bearings***

(ii) Calculation of Extra Cost at Run Size 6,000 bearings:

Particulars	***At EBQ 1,567***	***At RBQ 18,000***
Set up Cost ($^{D}/_{RBQ} \times S$)	(90,000 ÷ 1,567) 57.4 or 58 set ups × 1,500 = 87,000	(90,000 ÷ 18,000) 5 set ups × 1,500 = 7,500
Carrying cost (RBQ × ½ × C)	½ × 1,567 × 110 = 86,185	½ × 18,000 × 110 = 9,90,000
Total Cost	***1,73,185***	***9,97,500***
Extra Cost	***-***	***8,24,315***

CHAPTER 6 ACTIVITY BASED COSTING

1. Traditional Absorption Costing V/S Activity Based Costing:



2. Activity Based Costing:

Activity Based Costing is an accounting methodology that assigns costs to activities rather than products or services. This enables resources & overhead costs to be more accurately assigned to products & services that consume them. ABC is a technique which involves identification of cost with each cost driving activity and making it as the basis for apportionment of costs over different cost objects/ jobs/ products/ customers or services.

3. Proforma Statement Showing Unit Cost and Total Cost Using ABC Method:

Particulars	(₹)
Direct Material Cost	XXX
Direct Labour Cost	XXX
Direct Expenses	XXX
Prime Cost	XXX
Production Overhead:	
Activity 1 say Material procurement @ XXX per order	XXX
Activity 2 say Maintenance @ XXX per hour	XXX
Activity 3 say Set up @ per set	XXX
Total Cost	XXX
÷ Number of units	XXX
Cost per unit	XXX

4. Proforma Statement Showing Determination of Cost Driver Rate:

Activity Cost Pool	Amount	Cost Driver	Volume	Cost Driver Rate
Activity 1 Material procurement	XXX	Material orders	XXX	XXX per order
Activity 2 Maintenance	XXX	Maintenance hours	XXX	XXX per hour
Activity 3 Set up	XXX	No. of Set-ups	XXX	XXX per set-up

BBQ 46

ABC Ltd. is a multiproduct company, manufacturing three products A, B and C. The budgeted costs and production for the year ending 31st March, 2023 are as follows:

Particulars	A	B	C
Production quantity (in units)	4,000	3,000	1,600
Resources per unit:			
Direct materials (kg.)	4	6	3
Direct labour (minutes)	30	45	60

The budgeted direct labour rate was ₹10 per hour, and the budgeted material cost was ₹2 per kg. Production overheads were budgeted at ₹99,450 and were absorbed to products using the direct labour hour rate. ABC Ltd. followed an Absorption Costing System.

ABC Ltd. is now considering to adopt an Activity Based Costing system. The following additional information is made available for this purpose.

1. Budgeted overheads were analysed into the following:

Particulars	(₹)
Material handling	29,100
Storage costs	31,200
Electricity	39,150

2. The cost drivers identified were as follows:

Material handling	Weight of material handled
Storage costs	Number of batches of material
Electricity	Number of Machine operations

3. The cost drivers identified were as follows:

Particulars	A	B	C
For complete production:			
Batches of material	10	5	15
Per unit of production:			
Number of Machine operations	6	3	2

You are requested to:

(1) Prepare a statement for management showing the unit costs and total costs of each product using the absorption costing method.

(2) Prepare a statement for management showing the product costs of each product using the ABC approach.

(3) What are the reasons for the different product costs under the two approaches?

Answer

(1) Statement Showing Unit Cost and Total Cost Using Absorption Costing Method

Particulars	A (₹)	B (₹)	C (₹)
Direct Material	8.00	12.00	6.00
Direct Labour	5.00	7.50	10.00
Production Overhead @ ₹17.00 per hour	8.50	12.75	17.00
Total Unit Cost	(17 × 30/60)	(17 × 45/60)	(17 × 60/60)
Number of units	**21.50**	**32.25**	**33.00**
Total Cost (total unit cost × number of units)	4,000	3,000	1,600
	86,000	**96,750**	**52,800**

Calculation of overhead rate per direct labour hour:

Overhead recovery rate	=	Budgeted overheads ÷ Budgeted labour hours		
	=	₹99,450 ÷ 5,850 hours	=	₹17 per hour
Budgeted labour hours	=	4,000 A × 30/60 + 3,000 B × 45/60 + 1,600 C × 60/60		
	=	5,850 hours		

(2) Statement Showing Unit Cost and Total Cost Using ABC Method

Particulars	***A (₹)***	***B (₹)***	***C (₹)***
Direct Material	8.00	12.00	6.00
Direct Labour	5.00	7.50	10.00
Production Overhead:			
Material handling @ ₹0.75 per kg	3.00 (4 × 0.75)	4.50 (6 × 0.75)	2.25 (3 × 0.75)
Electricity @ ₹1.082 per operation	6.49 (6 × 1.082)	3.25 (3 × 1.082)	2.16 (2 × 1.082)
Storage @ ₹1,040 per batch	2.60 $\left(10 \times \frac{1,040}{4,000}\right)$	1.73 $\left(5 \times \frac{1,040}{3,000}\right)$	9.75 $\left(15 \times \frac{1,040}{1,600}\right)$
Total Unit Cost	***25.09***	***28.98***	***30.16***
Number of units	4,000	3,000	1,600
Total Cost (total unit cost × number of units)	***1,00,360***	***86,940***	***48,256***

Calculation of Activity rate:

Activity Cost Pool	***Amount***	***Cost Driver***	***Volume***	***Cost Driver Rate***
Material handling	₹29,100	Weight of material handled	38,800	₹0.75 per kg
Storage costs	₹31,200	No. of batches of material	30	₹1,040 per batch
Electricity	₹39,150	No. of Machine operations	36,200	₹1.082 per operation

Total weight	=	4,000 × 4 kg + 3,000 × 6 kg + 1,600 × 3 kg	=	38,800 kgs
Total machine operations	=	4,000 × 6 + 3,000 × 3 + 1,600 × 2	=	36,200 oper.
Total batches	=	10 + 5 + 15	=	30 batches

(3) Comment: 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.

BBQ 47

Woolmark Ltd. manufactures three types of products namely P, Q and R. The data relating to a period are as under:

Particulars	***P***	***Q***	***R***
Machine hours per unit	10	18	14
Direct Labour hours per unit	4	12	8
Direct Material per unit (₹)	90	80	120
Production (units)	3,000	5,000	20,000

Currently the company uses traditional costing method and absorbs all production overheads on the basis of machine hours. The machine hour rate of overheads is ₹6 per hour. Direct labour hour rate is ₹20 per hour. The company proposes to use activity based costing system and the activity analysis is as under:

Particulars	P	Q	R
Batch size (units)	150	500	1,000
Number of purchase orders per batch	3	10	8
Number of inspections per batch	5	4	3

The total production overheads are analysed as under:

Machine set up costs	20%
Machine operation costs	30%
Inspection costs	40%
Material procurement related costs	10%

Required:

1. Calculate the cost per unit of each product using traditional method of absorbing all production overheads on the basis of machine hours.
2. Calculate the cost per unit of each product using activity based costing principles.

Answer

1. Statement Showing "Cost per unit as per Traditional Method"

Particulars	P (₹)	Q (₹)	R (₹)
Direct Materials	90	80	120
Direct Labour [(4, 12, 8 hours) × ₹20]	80	240	160
Production Overheads [(10, 18, 14 hours) × ₹6]	60	108	84
Cost per unit	230	428	364

2. Statement Showing "Cost per unit as per ABC Method"

Particulars	P (₹)	Q (₹)	R (₹)
Production (units)	3,000	5,000	20,000
Direct Materials @ ₹90/₹80/₹120 per unit	2,70,000	4,00,000	24,00,000
Direct Labour @ ₹80/₹240/₹160 per unit	2,40,000	12,00,000	32,00,000
Production Overhead:			
Machine Related Costs @ ₹1.80 per hour of 30,000/ 90,000/2,80,000 hours	54,000	1,62,000	5,04,000
Setup Costs @ ₹9,600 per setup of 20/10/20 set ups	1,92,000	96,000	1,92,000
Inspection Costs @ ₹4,800 per inspection of 100/40/60 inspection	4,80,000	1,92,000	2,88,000
Purchase Related Costs @ ₹750 per purchase of 60/100/160 purchases	45,000	75,000	1,20,000
Total Costs	***12,81,000***	***21,25,000***	***67,04,000***
Cost per unit (Total Cost ÷ Units)	***427.00***	***425.00***	***335.20***

Working Notes:

(a) Total Machine Hours = 3,000 × 10 + 5,000 × 18 + 20,000 × 14 = ***4,00,000 hours***

(b) Total Production OH = 4,00,000 machine hours × ₹6 = ***₹24,00,000***

(c) Total no. of Batches = (3,000 ÷ 150) + (5,000 ÷ 500) + (20,000 ÷ 1,000)
= 20 batches + 10 batches + 20 batches = ***50 batches***

(d) Total no. of Inspections = 5 × 20 batches + 4 × 10 batches + 3 × 20 batches
= ***200 inspections***

(e) Total no. of Purchase Order = 3 × 20 batches + 10 × 10 batches + 8 × 20 batches
= ***320 orders***

(f) Statement Showing Cost Driver Rate:

Cost Pool	*%*	*Overheads*	*Cost Driver Basis*	*Volume*	*Cost Driver Rate*
Setup	20%	4,80,000	Number of batches	50	9,600/Setup
Inspection	40%	9,60,000	Number of inspections	200	4,800/Inspection
Purchases	10%	2,40,000	Number of purchases	320	750/Purchase
Machine Hours	30%	7,20,000	Machine Hours	4,00,000	1.80/Machine Hour
Total	-	24,00,000	-	-	-

BBQ 48

BABYSOFT is a global brand created by Bio-organic Ltd. The company manufactures three ranges of beauty soaps i.e. BABYSOFT- Gold, BABYSOFT- Pearl, and BABYSOFT- Diamond. The budgeted costs and production for the month of December, 2022 are as follows:

	BABYSOFT- Gold		*BABYSOFT- Pearl*		*BABYSOFT- Diamond*	
Production (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 operations 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:

1. Prepare a statement showing the unit costs and total costs of each product using the absorption costing method.
2. Prepare a statement showing the product costs of each product using the ABC approach.
3. State what are the reasons for the different product costs under the two approaches?

Answer

1. Statement Showing "Unit Cost and Total Cost as per Absorption Costing"

Particulars	BABYSOFT-Gold	BABYSOFT-Pearl	BABYSOFT-Diamond
Number of units	4,000	3,000	2,000
Direct Materials	167.50	215.50	248.50
Direct Labour [(30, 40, 60 minutes) @ ₹10 per hour	5.00	6.67	10.00
Production OH [(30, 40, 60 minutes) @ ₹33 per hour	16.50	22.00	33.00
Cost per unit	***189.00***	***244.17***	***291.50***
Total cost (Cost per unit × number of units)	***7,56,000***	***7,32,510***	***5,83,000***

Working notes:

(a) Total Direct labour hours = 4,000 units × 30/60 + 3,000 × 40/60 + 2,000 × 1 hour
= 2,000 hours + 2,000 hours + 2,000 hours
= ***6,000 hours***

(b) Overhead rate = Budgeted overheads ÷ Budgeted labour hours
= ₹1,98,000 ÷ 6,000 hours
= ***₹33/direct labour hour***

(c) Calculation of Direct material cost

	BABYSOFT- Gold (₹)	BABYSOFT- Pearl (₹)	BABYSOFT- Diamond (₹)
Essential oils	$120.00 \left(\frac{200 \times 60}{100}\right)$	$165.00 \left(\frac{300 \times 55}{100}\right)$	$195.00 \left(\frac{300 \times 65}{100}\right)$
Cocoa Butter	$40.00 \left(\frac{200 \times 20}{100}\right)$	$40.00 \left(\frac{200 \times 20}{100}\right)$	$40.00 \left(\frac{200 \times 20}{100}\right)$
Filtered water	$4.50 \left(\frac{30 \times 15}{100}\right)$	$4.50 \left(\frac{30 \times 15}{100}\right)$	$4.50 \left(\frac{30 \times 15}{100}\right)$
Chemicals	$3.00 \left(\frac{30 \times 10}{100}\right)$	$6.00 \left(\frac{50 \times 12}{100}\right)$	$9.00 \left(\frac{60 \times 15}{100}\right)$
Total cost	***167.50***	***215.50***	***248.50***

2. Statement Showing "Unit Cost and Total Cost as per ABC Costing"

Particulars	BABYSOFT- Gold	BABYSOFT- Pearl	BABYSOFT-Diamond
Number of units	4,000	3,000	2,000
Direct Materials	167.50	215.50	248.50
Direct Labour	5.00	6.67	10.00
Production OH:			
Forklifting cost	6.48 (0.06 × 108)	6.36 (0.06 × 106)	7.02 (0.06 × 117)
Supervising cost	5.00 (10 × 30/60)	6.67 (10 × 40/60)	10.00 (10 × 60/60)
Utilities	8.50 (1.70 × 5)	8.50 (1.70 × 5)	10.20 (1.70 × 6)
Cost per unit	***192.48***	***243.70***	***285.72***
Total cost	***7,69,920***	***7,31,100***	***5,71,440***

Working notes:

(a) Forklifting rate = ₹58,000 ÷ 9,84,000 grams = ***₹0.06 per gram***

(b) Supervising rate = ₹60,000 ÷ 6,000 hours labour hour = ***₹10 labour hour***

(c) Utilities rate = ₹80,000 ÷ 47,000 machine operations = ***₹1.70/machine operations***

(d) Calculation of Total Weight and Total Operations:

	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 (grams)	4,32,000 (4,000 × 108)	3,18,000 (3,000 × 106)	2,34,000 (2,000 × 117)	9,84,000
Total operations	20,000 (4,000 × 5)	15,000 (3,000 × 5)	12,000 (2,000 × 6)	47,000

3. 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 accurate.

BBQ 49

Family Store wants information about the profitability of individual product lines: Soft drinks, Fresh produce and Packaged food. Family store provides the following data for the year 2022-23 for each product line:

	Soft drinks	***Fresh produce***	***Packaged food***
Revenues	₹39,67,500	₹1,05,03,000	₹60,49,500
Cost of goods sold	₹30,00,000	₹75,00,000	₹45,00,000
Cost of bottles returned	₹60,000	₹0	₹0
Number of purchase orders placed	360	840	360
Number of deliveries received	300	2,190	660
Hours of shelf-stocking time	540	5,400	2,700
Items sold	1,26,000	11,04,000	3,06,000

Family store also provides the following information for the year 2022-23:

Activity	***Description of activity***	***Total Cost***	***Cost-allocation base***
Bottles returns	Returning of empty bottles	₹60,000	Direct tracing to soft drink line
Ordering	Placing of orders for purchases	₹7,80,000	1,560 purchase orders
Delivery	Physical delivery and receipt of goods	₹12,60,000	3,150 deliveries
Shelf stocking	Stocking of goods on store shelves and ongoing restocking	₹8,64,000	8,640 hours of shelf-stocking time
Customer Support	Assistance provided to customers including check-out	₹15,36,000	15,36,000 items sold

Required:

1. Family store currently allocates support cost (all cost other than cost of goods sold) to product lines on the basis of cost of goods sold of each product line. Calculate the operating income and operating income as a % of revenues for each product line.

2. If Family Store allocates support costs (all costs other than cost of goods sold) to product lines using an activity-based costing system, Calculate the operating income and operating income as a % of revenues for each product line.

Answer

1. Statement of Operating income and Operating income as a % of revenues for each product line

(When support costs are allocated to product lines on the basis of cost of goods sold of each product)

	Soft Drinks (₹)	Fresh Produce (₹)	Packaged Foods (₹)	Total (₹)
Revenues	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost of Goods sold (COGS)	30,00,000	75,00,000	45,00,000	1,50,00,000
Support cost (30% of COGS)	9,00,000	22,50,000	13,50,000	45,00,000
Total cost	39,00,000	97,50,000	58,50,000	1,95,00,000
Operating income (Sales – Total cost)	67,500	7,53,000	1,99,500	10,20,000
% of Operating income to Sales	*1.70%*	*7.17%*	*3.30%*	*4.97%*

Working notes:

(a) Calculation of Cost Driver Rate

Activity (1)	Total cost (₹) (2)	Cost allocation base (3)	Cost driver rate (4) = [(2)÷(3)]
Ordering	7,80,000	1,560 purchase orders	₹500 per purchase order
Delivery	12,60,000	3,150 deliveries	₹400 per delivery
Shelf-stocking	8,64,000	8,640 hours	₹100 per stocking hour
Customer support	15,36,000	15,36,000 items sold	₹1 per item sold

(b) Total support cost = 60,000 + 7,80,000 + 12,60,000 + 8,64,000 + 15,36,000
= ***45,00,000***

(c) Percentage of support cost to COGS = $\frac{45,00,000}{1,50,00,000} \times 100$ = ***30%***

2. Statement of Operating income and Operating income as a % of revenues for each product line (When support costs are allocated to product lines using an activity based costing system)

	Soft Drinks (₹)	Fresh Produce (₹)	Packaged Foods (₹)	Total (₹)
Revenues	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost of Goods sold (COGS)	30,00,000	75,00,000	45,00,000	1,50,00,000
Bottle return costs	60,000	-	-	60,000
Ordering cost (360 : 840 : 360)	1,80,000	4,20,000	1,80,000	7,80,000
Delivery cost (300 : 2190 : 660)	1,20,000	8,76,000	2,64,000	12,60,000
Shelf stocking cost (540 : 5400 : 2700)	54,000	5,40,000	2,70,000	8,64,000
Customer Support cost (1,26,000 : 11,04,000 : 3,06,000)	1,26,000	11,04,000	3,06,000	15,36,000
Total cost	35,54,000	1,04,40,000	55,20,000	1,95,00,000
Operating income (Sales – Total cost)	4,27,500	63,000	5,29,500	10,20,000
% of Operating income to Sales	*10.78%*	*0.60%*	*8.75%*	*4.97%*

BBQ 50

ABC Ltd. manufactures two types of machinery equipment Y and Z and applies/absorbs overheads on the basis of direct labour hours. The budgeted overheads and direct labour hours for the month of December, 2023 are ₹12,42,500 and 20,000 hours respectively.

The information about Company's products is as follows:

Particulars	Equipment Y	Equipment Z
Budgeted Production volume	2,500 units	3,125 units
Direct material cost	₹300 per unit	₹450 per unit
Direct labour cost:		

Y : 3 hours @ ₹150 per hour	₹450	-
Z : 4 hours @ ₹150 per hour	-	₹600

ABC Ltd.'s overheads of ₹12,42,500 can be identified with three major activities: Order Processing (₹2,10,000), machine processing (₹8,75,000), and product inspection (₹1,57,500). These activities are driven by number of orders processed, machine hours worked, and inspection hours, respectively. The data relevant to these activities is as follows:

Equipments	*Orders processed*	*Machine hours worked*	*Inspection hours*
Y	350	23,000	4,000
Z	250	27,000	11,000
Total	600	50,000	15,000

Required:

(1) Assuming use of direct labour hours to absorb/apply overheads to production, compute the unit manufacturing cost of the equipment Y and Z, if the budgeted manufacturing volume is attained.

(2) Assuming use of activity based costing, compute the unit manufacturing costs of the equipment Y and Z, if the budgeted manufacturing volume is achieved.

(3) ABC Ltd.'s selling prices are based heavily on cost. By using direct labour hours as an application base, calculate the amount of cost distortion (under-costed or overcosted) for each equipment.

Answer

(1) Statement Showing Unit Manufacturing Cost Using Absorption Costing Method

Particulars	*Equipment Y*	*Equipment Z*
Direct material cost	₹300	₹450
Direct labour cost	₹450	₹600
Overheads @ ₹62.125 per hour for 3 hours and 4 hours	₹186.38	₹248.50
Manufacturing cost per unit	***₹936.38***	***₹1,298.50***

Predetermined overhead rate = Budgeted overheads ÷ Budgeted labour hours
= ₹12,42,500 ÷ 20,000 hours = ₹62.125/hour

Total labour hours = 2,500 units of Y × 3 hours + 3,125 units of Y × 4 hours
= 20,000 hours

(2) Statement Showing Unit Manufacturing Cost Using ABC Method

Particulars	*Equipment Y*	*Equipment Z*
Direct material cost	₹300	₹450
Direct labour cost	₹450	₹600
Overheads per unit (W.N.)	₹226.80	₹216.16
Manufacturing cost per unit	***₹976.80***	***₹1,266.16***

(3) Statement Showing Cost Distortion

Particulars	*Equipment Y*	*Equipment Z*
Unit manufacturing cost:		
Using direct labour hours as an application base	936.38	1298.50
Using activity based costing	976.80	1,266.16
Cost distortion	***(-) 40.42***	***+ 32.34***

Low volume product Y is under-costed and high volume product Z is over-costed using direct labour hours for overhead absorption.

Working note:

Calculation of overheads cost per unit under ABC costing

Activity	Overhead cost	Cost driver	Ratio	Overheads	
				Y	Z
Order processing	₹2,10,000	Orders processed	350 : 250	₹1,22,500	₹87,500
Machine processing	₹8,75,000	Machine hours	23,000 : 27,000	₹4,02,500	₹4,72,500
Inspection	₹1,57,500	Inspection hours	4,000 : 11,000	₹42,000	₹1,15,500
Total overheads				₹5,67,000	₹6,75,500
÷ Number of units				÷ 2,500	÷ 3,125
Overhead per unit				**₹226.80**	**₹216.16**

BBQ 51

Alpha Limited has decided to analyse the profitability of its five new customers. It buys bottled water at ₹90 per case and sells to retail customers at a list price of ₹108 per case. The data pertaining to five customers are:

Particulars	Customers				
	A	B	C	D	E
Cases sold	4,680	19,688	1,36,800	71,550	8,775
List Selling Price (₹)	108	108	108	108	108
Actual Selling Price (₹)	108	106.20	99	104.40	97.20
Number of Purchase orders	15	25	30	25	30
Number of Customer visits	2	3	6	2	3
Number of deliveries	10	30	60	40	20
Kilometres travelled per delivery	20	6	5	10	30
Number of expedited deliveries	0	0	0	0	1

Its five activities and their cost drivers are:

Activity	Cost Driver Rate
Order taking	₹750 per purchase order
Customer visits	₹600 per customer visit
Deliveries	₹5.75 per delivery Km travelled
Product handling	₹3.75 per case sold
Expedited deliveries	₹2,250 per expedited delivery

Required:

(1) Compute the customer-level operating income of each of five retail customers now being examined (A, B, C, D and E). Comment on the results.

(2) What insights are gained by reporting both the list selling price and the actual selling price for each customer?

Answer

(1) Computation of Customer Level Operating Income

Particulars	Customers				
	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)
Cases sold	4,680	19,688	1,36,800	71,550	8,775
Revenue at list price @ ₹108 p.u.	5,05,440	21,26,304	1,47,74,400	77,27,400	9,47,700
Less: Discount	-	35,438	12,31,200	2,57,580	94,770
Revenue net of discount	5,05,440	20,90,866	1,35,43,200	74,69,820	8,52,930
Less: COGS @ ₹90 p.u.	4,21,200	17,71,920	1,23,12000	64,39,500	7,89,750
Gross Margin	84,240	3,18,946	12,31,200	10,30,320	63,180
Less: Customer level operating activities cost (W.N.)	31,150	95,415	5,40,825	2,90,563	62,906
Customer level Operating income	***53,090***	***2,23,531***	***6,90,375***	***7,39,757***	***274***

Comment on the results: Customer D is the most profitable customer. D's profits are even higher than C (whose revenue is the highest) despite having only 52.30% of the unit volume of customer C. The main reason is that C receives a discount of ₹ 9 per case while customer D receives only a ₹ 3.60 discount per case.

Customer E is the least profitable. The profits of E is even less than A (whose revenue is least) Customer E received a discount of ₹ 10.80 per case, makes more frequent orders, requires more customer visits and requires more delivery kms. in comparison with customer A.

Working note:

Computation of customer level operating activities costs:

Particulars	Customers				
	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)
Order taking costs (₹) (No. of purchase × ₹750)	11,250	18,750	22,500	18,750	22,500
Customer visits costs (₹) (No. of customer visits × ₹600)	1,200	1,800	3,600	1,200	1,800
Delivery vehicles travel costs (₹) (Kms travelled × ₹5.75 per km.)	1,150	1,035	1,725	2,300	3,450
Product handling costs (₹) (units × ₹3.75)	17,550	73,830	5,13,000	2,68,313	32,906
Cost of expediting deliveries (₹) (No. of expedited deliveries × ₹2,250)	-				2,250
Total cost of customer level operating activities (₹)	***31,150***	***95,415***	***5,40,825***	***2,90,563***	***62,906***

(2) Insight gained by reporting both the list selling price and the actual selling price for each customer:

Separate reporting of both-the listed and actual selling prices enables Alpha Ltd. To examine which customer has received what discount per case, whether the discount received has any relationship with the sales volume. The data given below provides us with the following information;

Sales volume	Discount per case (₹)
C (1,36,800 cases)	9.00
D (71,550 cases)	3.60
B (19,688 cases)	1.80
E (8,775 cases)	10.80
A (4,680 cases)	0

The above data clearly shows that the discount given to customers per case has a direct relationship with sales volume, except in the case of customer E. The reasons for ₹10.80 discount per case for customer E should be explored.

BBQ 52

'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 (₹)	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	 All fixed, no change. Fully fixed, no change. Expected to double during budget period.
Total	7,00,000	(This activity is driven by no. of ATM transactions)
Computer Processing	5,00,000	Half this amount is fixed and no change is expected. The variable portion is expected to increase to three times the current level. (This activity is driven by the number of computer transactions)
Issuing Statements	18,00,000	Presently, 3 lakh statements are made. In the budget period, 5 lakh statements are expected. For every increase of one lakh statement, one lakh rupees is the budgeted increase. (This activity is driven by the number of statements)
Computer Inquiries	2,00,000	Estimated to increase by 80% during the budget period. (This activity is driven by telephone minutes)

The activity drivers and their budgeted quantifies are given below:

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

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

Required:

1. Calculate the budgeted rate for each activity.
2. Prepare the budgeted cost statement activity wise.
3. Compute the budgeted product cost per account for each product using ***(1)*** and ***(2)*** above.

Answer

Statement Showing "Budgeted Cost per unit of the Product"

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

CHAPTER 7 SERVICE COSTING

1. **Operating costing:** This method is used to calculate cost and determine price of one service unit.

2. **Transport Service:** Cost and fare per passenger-km. and ton-km (Bus, Taxi and Truck etc.)

Proforma Operating Cost Sheet for Transport Service

Particulars	Amount
(A) Standing Charges or Fixed Cost:	
Depreciation (life related to period, like: 5 years)	XXX
Insurance	XXX
License	XXX
Salary of manager, driver, conductor, cleaner etc.	XXX
Taxes	XXX
Permit fee	XXX
Garage rent	XXX
Stationery	XXX
Administration expenses, General overheads etc.	XXX
Interest	XXX
Any other fixed cost	XXX
Total (A)	XXX
(B) Running Charges or Variable Cost:	
Diesel/petrol/CNG/Electricity for EV	XXX
Lubricants, oil etc.	XXX
Depreciation (life related to activity, like: 50,000 kms)	XXX
Commission	XXX
Any other variable cost	XXX
Total (B)	XXX
(C) Maintenance Charges or Semi Variable Cost:	
Repairs and maintenance	XXX
Tyres	XXX
Spares etc.	XXX
Total (C)	XXX
Total Operating Cost (A + B + C)	XXX
Add: profit	XXX
Net Collections or Taking	XXX
Add: Indirect taxes (Passenger tax, GST etc.)	XXX
Gross Collections or Taking	XXX
÷ Total passenger-kms or ton-kms	XXX
Fare/Charges for Per Passenger-Km or Ton-Kms	XXX

Notes:

a. Depreciation when life of asset is related with activity level (like: 50,000 kms) : Variable

b. Depreciation when life of asset is not related with activity level : Fixed

c. Tyres or battery 'replacement after 5 years'

Step 1: Calculate lifetime cost of replacement of tyres or battery (no replacement at the end of useful life of asset)

Step 2: Calculate amortization cost of tyres or battery for accounting period.

d. Service cost at 'every completed 5,000 kms.'

Step 1: Calculate number of complete 5,000 kms during the accounting period.

Step 2: Calculate service cost = No of complete 5,000 kms. × Cost per service

3. Differential Fare: In case of different charges for different categories of service, concept of differential fare is applied on the basis of equivalent units of service.

4. Absolute ton-km or Weighted average ton-km = D1 × W1 + D2 × W2 + D3 × W3……..

5. Commercial ton-km or Simple average ton-km = Total Distance × Average Weight

- During the computation of average weight, zero weight is ignored while distance is considered.

6. Insurance Service: Cost and charges per policy.

Proforma Operating Cost Sheet for Insurance Service

Particulars	Amount
(a) Product Development, Marketing and Sales support:	
Policy development cost	XXX
Cost of marketing of the policy	XXX
Sales support expenses	XXX
Total (A)	XXX
(b) Operations:	
Policy issuance cost	XXX
Policy servicing cost	XXX
Claims management cost	XXX
Total (B)	XXX
(c) IT Cost:	
IT cost	XXX
Total (C)	XXX
(d) Support functions:	
Postage and logistics	XXX
Facilities cost	XXX
Employees cost	XXX
Office administration cost	XXX
Total (D)	XXX
Total Cost (A + B + C + D)	XXX
÷ Number of Policies	÷ XXX
Cost Per Policy	XXX

BBQ 53

ABC Transport Company has been given a route 40 km long to run a bus. The bus costs the company a sum of ₹10,00,000. It has been insured at 3% p.a. and the annual tax will amount to ₹20,000. Garage rent is ₹20,000 p.m. Annual repairs will be ₹2,04,000 and the bus is likely to last for 2.5 years.

The driver's salary will be ₹30,000 p.m. and the conductor's salary will be ₹25,000 p.m. in addition to 10% of takings as commission (to be shared by the driver and the conductor equally). Cost of stationery will be ₹1,000 p.m. Manager cum Accountant's salary is ₹17,000 p.m. Petrol and oil will be ₹500 per 100 km.

The bus will make 3 up and down trips carrying on an average 40 passengers on each trip.

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

Answer

Statement of Cost Per Passenger Km

Particulars		Amount
(A) Standing Charges:		
Depreciation per month	(10,00,000 ÷ 2.5 Years × $^{1}/_{12}$)	33,333
Insurance per month	[(10,00,000 × 3%) × $^{1}/_{12}$]	2,500
Annual Tax for one month	(20,000 × $^{1}/_{12}$)	1,667
Garage Rent		20,000
Manager-cum accountant's salary		17,000
Stationery		1,000
Driver's salary		30,000
Conductor's salary		25,000
Total (A)		***1,30,500***
(B) Running Charges:		
Petrol and oil	($^{500}/_{100}$ × 6,000 kms)	30,000
Commission @ 10% of collections		23,667
Total (B)		***53,667***
(C) Maintenance Charges:		
Repairs and maintenance	(2,04,000 × $^{1}/_{12}$)	17,000
Total (C)		***17,000***
Total operating cost (A + B + C)		***2,01,167***
Add: Profit @ 15% of collections		35,500
Collections (WN 3)		***2,36,667***
÷ Total Passenger-kms		÷ 2,40,000
Fare for per passenger-km		***₹0.9861***

WN 1: Calculation of total travelling of bus in one month:

= 2 × No of round trips daily × Distance one way × No of days
= 2 × 3 × 40 × 25 = ***6,000 kms***

WN 2: Calculation of passenger-kms per month:

= No of kms travelled per month × No of passengers
= 6,000 × 40 = ***2,40,000 passenger-kms***

WN 3: Calculation of collections:

Total collections = Operating cost (excluding commission on collections) + 10% for commission + 15% for profit
= 1,30,500 + 30,000 + 17,000 + 25% of collections
Collections = ***₹2,36,667***

BBQ 54

Mr. X owns a bus which runs according to the following schedule:

(i) Delhi to Chandigarh and back the same day

Distance covered	:	250 kms one way
Number of days runs each month	:	8
Seating capacity occupied	:	90%

(ii) Delhi to Agra and back the same day:

Distance covered	:	210 kms one way
Numbers of days run each month	:	10
Seating capacity occupied	:	85%

(iii) Delhi to Jaipur and back the same day

Distance covered	:	270 kms one way
Numbers of days run each month	:	6
Seating capacity occupied	:	100%

(iv) Following are the other details

Cost of the bus	:	₹12,00,000
Salary of the driver	:	₹24,000 p.m.
Salary of the Conductor	:	₹21,000 p.m.
Salary of the part-time Accountant	:	₹5,000 p.m.
Insurance of the bus	:	₹4,800 p.a.
Diesel consumption	:	4 kms per litre
Diesel rate	:	₹56 per liter
Road tax	:	₹15,915 p.a.
Lubricant Oil	:	₹10 per 100 kms
Permit fee	:	₹315 p.m.
Repairs and maintenance	:	₹1,000 p.m.
Depreciation of the bus	:	20% p.a.
Seating capacity of the bus	:	50 persons
Passenger tax	:	20% of the total taking

Calculate the bus fare to be charged from each passenger to earn a profit of 30% on total taking, fares are to be indicated per passenger for the journeys (i) Delhi to Chandigarh, (ii) Delhi to Agra and (iii) Delhi to Jaipur

Answer

Statement of Fare to be Charged

Particulars	Amount
(A) Standing Charges:	
Salary of driver	24,000
Salary of conductor	21,000
Salary of part time accountant	5,000
Insurance (4,800 ÷ 12)	400
Road tax (15,915 ÷ 12)	1,326.25
Permit fee	315
Depreciation (₹12,00,000 × 20%) ÷ 12	20,000
Total (A)	**72,041.25**
(B) Running Costs:	
Diesel (11,440 km ÷ 4 km) × ₹56	1,60,160
Lubricant oil (11,440 km. ÷ 100) × ₹10	1,144
Total (B)	**1,61,304**

(C) Maintenance Costs:	
Repairs and Maintenance	1,000
Total (C)	***1,000***
Total Operating Cost (A + B + C)	***2,34,345.25***
Add: Profit @ 30% on Taking	1,40,604.15
Net Taking	***3,74,952.40***
Add: Passenger tax @ 20 % on Taking	93,738.10
Taking per month	***4,68,690.50***
÷ Total passenger kms	÷ 5,20,500
Fare per passenger per km	***0.90***
Fare Delhi to Chandigarh (250 × 0.90)	***₹225***
Fare Delhi to Agra (210 × 0.90)	***₹189***
Fare Delhi to Jaipur (270 × 0.90)	***₹243***

Working Notes:

1. Calculation of taking:

Taking	=	Total operating cost + Profit + Passenger tax
	=	2,34,345.25 + 30% of taking + 20% of taking
Taking	=	2,34,345.25 + 50% of taking
Taking	=	***4,68,690.50***

2. Calculation of total km runs per month:

Bus route	***Kms per trip***	***Trips per day***	***Days per month***	***Kms per month***
Delhi to Chandigarh	250	2	8	4,000 kms
Delhi to Agra	210	2	10	4,200 kms
Delhi to Jaipur	270	2	6	3,240 kms
				11,440 kms

3. Calculation of total passenger kms:

= (4,000 kms × 50 persons × 90%) + (4,200 kms × 50 persons × 85%) + (3,240 kms × 50 persons × 100%) = ***5,20,500***

BBQ 55

EPS is a public school having 25 buses each plying in different directions for the transport of its school students. In view of large number of students availing of the bus service, the buses work two shifts daily both in the morning and in the afternoon. The buses are garaged in the school.

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

The distance travelled by each bus, one way is 16 kms. The school works 24 days in a month and remains closed for vacation in May and June. The bus fee, however is payable by the students for all the 12 months in a year.

The details of expenses for the year 2003-2004 are as under:

Driver's salary payable (for all the 12 months)	₹5,000 per month per driver
Cleaner's salary payable (for all the 12 months) (One cleaner has been employed for every five buses)	₹3,000 per month per cleaner
Licence fees, Taxes etc.	₹2,300 per bus per annum
Insurance premium	₹15,600 per bus per annum

Repairs and maintenance	₹16,400 per bus per annum
Purchase price of the bus	₹16,50,000 each bus
Life of the bus	16 years
Scrap value	₹1,50,000
Diesel cost	₹18.50 per litre

Each bus gives an average of 10 kms per litre of diesel. The seating capacity of each bus is 60 students. The seating capacity is fully occupied during the whole year.

The school follows differential bus fees based on distance travelled as under:

Distance from the school	*Bus Fee*	*% of students availing facility*
4 kms	25% of Full	15%
8 kms	50% of Full	30%
16 kms	Full	55%

Ignore interest. Since the bus fee has to be based on average cost, you are required to:

(i) Prepare a statement showing the expenses of operating a single bus and the fleet of 25 buses for a year.
(ii) Work out average cost per student per month in respect of:
- ***a.*** Students coming from a distance of upto 4 kms from the School;
- ***b.*** Students coming from a distance of upto 8 kms from the School; and
- ***c.*** Students coming from a distance of upto 16 kms from the School.

Answer

(i) Statement showing the expenses of operating a single bus and the fleet of 25 buses

Particulars	*1 Bus*	*25 Buses*
(A) Standing Charges:		
Driver's salary	60,000	15,00,000
Cleaner's salary	7,200	1,80,000
Licence fee, Taxes etc	2,300	57,500
Insurance	15,600	3,90,000
Depreciation	93,750	23,43,750
Total (A)	***1,78,850***	***44,71,250***
(B) Maintenance Charges:		
Repairs and maintenance	16,400	4,10,000
Total (B)	***16,400***	***4,10,000***
(C) Running Charges:		
Diesel	56,832	14,20,800
Total (C)	***56,832***	***14,20,800***
Total operating cost (A + B + C)	***2,52,082***	***63,02,050***

(ii) Average cost per student per month in respect of students coming from a distance of:

(a)	4 kms from the school	=	(2,52,082 ÷ 12) ÷ 354 students	=	***₹59.34***
(b)	8 kms from the school	=	₹59.34 × 2	=	***₹118.68***
(c)	16 kms from the school	=	₹59.34 × 4	=	***₹237.36***

Working notes:

1. Calculation of diesel cost per bus:

No of trips made by a bus each day	=	4
Distance travelled in one trip both ways	=	32 kms (16 kms × 2 trips)
Distance travelled per day by a bus	=	128 kms (32 kms × 4 shifts)
Distance travelled during a month	=	3,072 kms (128 kms × 24 days)

Distance travelled per year	=	30,720 kms (3,072 × 10 months)
No of litres of diesel required	=	3,072 litres (30,720 kms ÷ 10 kms)
Cost of diesel per bus per year	=	***₹56,832 (3,072 litres × ₹18.50)***

2. Calculation of number of 25% equivalent students per bus:

Bus capacity of 2 trips	=	120 students
25% Fare students	=	18 students (120 × 15%)
50% Fare students	=	36 students (120 × 30%)
Full Fare students	=	66 students (120 × 55%)
Total 25% equivalent students	=	18 + (36 × 2) + (66 × 4) = ***354 students***

BBQ 56

A company is considering three alternative proposals for conveyance facilities for its sales personnel who have to do considerable travelling approximately 20,000 Kms every year. ***The proposals are as follows:***

(i) Purchase and maintain it's own fleet of cars. The average cost of a car is ₹6,00,000.
(ii) Allow the executive to use his own car and reimburse expenses at the rate of ₹10 per kilometer and also bear insurance costs.
(iii) Hire cars from an agency at ₹1,80,000 per year per car. The Company will have to bear costs of petrol, taxes and tyres.

The following further details are available:

(a) Petrol ₹6 per km.
(b) Repairs and maintenance ₹0.20 per km.
(c) Tyres ₹0.12 per km.
(d) Insurance ₹1,200 per car per annum.
(e) Taxes ₹800 per car per annum.
(f) Life of the car 5 years with annual mileage of 20,000 kms.
(g) Resale value ₹80,000 at the end of the fifth year.

Work out the relative costs of three proposals and rank them.

Answer

Calculation of Relative Costs of Three Proposals and their Ranking

Particulars	***Own Car***	***Reimbursement***	***Hire***
(A) Standing Charges:			
Insurance	1,200	1,200	-
Taxes	800	-	800
Depreciation (6,00,000 – 80,000) × 1/5	1,04,000	-	-
Hire Charges	-	-	1,80,000
Total (A)	***1,06,000***	***1,200***	***1,80,800***
(B) Running Charges:			
Petrol (20,000 × 6)	1,20,000	-	1,20,000
Reimbursement (20,000 × 10)	-	2,00,000	-
Total (B)	***1,20,000***	***2,00,000***	***1,20,000***
(C) Maintenance Charges:			
Repairs and maintenance (20,000 × 0.20)	4,000	-	-
Tyres (20,000 × .12)	2,400	-	2,400
Total (C)	***6,400***	***-***	***2,400***
Total Cost (A + B + C)	***2,32,400***	***2,01,200***	***3,03,200***
Rank	***II***	***I***	***III***

Analysis:

The Second alternative i.e., use of own car by the executive and reimbursement of expenses by the company is the best alternative from company's point of view.

BBQ 57

Navya LMV Pvt. Ltd, operates cab/ car rental service in Delhi/NCR. It provides its service to the offices of Noida, Gurugram and Faridabad. At present it operates CNG fuelled cars but it is also considering to upgrade these into Electric vehicle (EV). The details related with the owning of CNG & EV propelled cars are as tabulated below:

Particulars	*CNG Car*	*EV Car*
Car purchase price (₹)	9,20,000	15,20,000
Govt. subsidy to purchase car (₹)	-	1,50,000
Life of the car	15 Years	10 Years
Residual value (₹)	95,000	1,70,000
Mileage	20 km/kg	240 km/charge
Electricity consumption per full charge	-	30 KWH
CNG cost per kg (₹)	60	-
Power cost per KWH (₹)	-	7.60
Annual maintenance cost (₹)	8,000	5,200
Annual insurance (₹)	7,600	14,600
Tyre replacement cost in every 5 year (₹)	16,000	16,000
Battery replacement cost in every 8 year (₹)	12,000	5,40,000

Apart from the above, the following are the additional information:

Particulars	
Average distance covered by a car in a month	1,500 km
Driver's salary (₹)	20,000 p.m.
Garage rent per car (₹)	4,500 p.m.
Share of Office and administration cost per car (₹)	1,500 p.m.

Calculate the operating cost of vehicle per month per car for both CNG & EV options.

Answer

Operating Cost Sheet

Particulars	*CNG Car (₹)*	*EV Car (₹)*
(A) Running Charges:		
Fuel cost/ Power consumption cost	4,500	1,425
Total (A)	***4,500***	***1,425***
(B) Standing Charges		
Depreciation	4,583.33	10,000
Monthly insurance cost (7,600 ÷ 12)/ (14,600 ÷ 12)	633.33	1,216.67
Driver's salary	20,000	20,000
Garage rent	4,500	4,500
Share of office and administration cost	1,500	1,500
Total (B)	***31,216.66***	***37,216.67***
(C) Maintenance Charges:		
Monthly maintenance cost (8,000 ÷ 12)/ (5,200 ÷ 12)	666.67	433.33
Amortised cost of tyre replacement [(16,000 ÷ 5 years) ÷ 12]	177.78	133.33
Amortised cost of battery replacement	66.67	4,500
Total (C)	***911.12***	***5,066.66***
Total Cost (A + B + C)	***36,627.78***	***43,708.33***

Working notes:

(a)	***Fuel cost per month***	=	(₹60 ÷ 20 kms) × 1,500 kms	=	***₹4,500***
	Power cost per month	=	(₹7.6 × 30 KWH ÷ 240 kms) × 1,500 kms	=	***₹1,425***
(b)	***Depreciation CNG Car***	=	(₹9,20,000 – ₹95,000) ÷ 15 Years × 1/12	=	***₹4,583.33***
	Depreciation EV Car	=	(₹15,20,000 – ₹1,50,000 – ₹1,70,000) ÷ 10 Years × 1/12		
		=	***₹10,000***		

(c) Amortised cost of tyre CNG Car:

Life of car	=	15 years		
Replacement of tyres	=	after 5 years		
Total replacements	=	only 2 replacements during 15 years (no replacement at the end of useful life, sold as scrap)		
Amortised cost	=	[(₹16,000 × 2) ÷ 15 Years] × 1/12	=	***₹177.78***

(d) Amortised cost of tyre EV Car:

Life of car	=	10 years		
Replacement of tyres	=	after 5 years		
Total replacements	=	only 1 replacement during 10 years (no replacement at the end of useful life, sold as scrap)		
Amortised cost	=	(₹16,000 ÷ 10 Years) × 1/12	=	***₹133.33***

(e) Amortised cost of battery CNG Car:

Life of car	=	15 years		
Replacement of battery	=	after 8 years		
Total replacements	=	only one replacement during 15 years		
Amortised cost	=	(₹12,000 ÷ 15 Years) × 1/12	=	***₹66.67***

(f) Amortised cost of battery EV Car:

Life of car	=	10 years		
Replacement of battery	=	after 8 years		
Total replacements	=	only one replacement during 10 years		
Amortised cost	=	(₹5,40,000 ÷ 10 Years) × 1/12	=	***₹4,500***

BBQ 58

A Factory which uses a large amount of coal is situated between two collieries X and Y, the former being 5 kms and the latter being 10 kms far from the factory. A fleet of lorries of 5 tonnes carrying capacity is used for the collection coal from the pitheads. The lorry averages a speed of 20 kms per hour when running and regularly takes 10 minutes in the factory premises to unload. At colliery X the loading time averages 30 minutes per load and at colliery Y 20 minutes per load.

Driver's wages, license, insurance, depreciation, garage rent and similar charges are noticed to cost ₹6 per hour operated. Fuel oil, tyres, repairs and similar charges are noticed to cost ₹0.60/km run.

Draw a statement showing the cost per tonne km of carrying coal from each colliery if the coal is equal quality and price. From which colliery should the purchase be made?

Answer

Statement Showing Cost per Tonne-Km

Particulars	***Colliery X***	***Colliery Y***

Drivers wages, license, insurance, depreciation, garage rent and similar charges @ ₹6 per hour	(6.00 × 70/60) 7.00	(6.00 × 90/60) 9.00
Fuel oil, tyres, repairs similar charges @ ₹0.60 per Km	(0.60 × 10 kms) 6.00	(0.60 × 20 kms) 12.00
Operating Cost	***13.00***	***21.00***
÷ Effective tonne-kms	÷ 25	÷ 50
Cost per tonne-km	***₹0.52***	***₹0.42***

Decision: Purchase should be made from colliery X having lower operating cost per trip.

Working Notes:

(1) Total operating time in 1 trip:	***Colliery X***	***Colliery Y***
Running time (mine to plot)	60/20 × 5 Kms 15 minutes	60/20 × 10 Kms 30 minutes
Loading time	30 minutes	20 minutes
Running time (plot to mine)	15 minutes	30 minutes
Unloading time	10 minutes	10 minutes
Total operating time in one trip	***70 minutes***	***90 minutes***
(2) Effective tonnes km per trip:	5 tonnes × 5 kms + Nil tonnes × 5 kms ***= 25 tonne kms***	5 tonnes × 10 kms + Nil tonnes × 10 kms ***= 50 tonne kms***

BBQ 59

GTC has a lorry of 6-ton carrying capacity. It operates lorry service from city A to city B. It charges ₹2,400 per ton from city 'A' to city 'B' and ₹2,200 per ton for the return journey from city 'B' to city 'A'. Goods are also delivered to an intermediate city 'C' but no concession or reduction in rates is given. Distance between the city 'A' to 'B' is 300 km and distance from city 'A' to 'C' is 140 km.

In January 2023, the truck made 12 outward journeys for city 'B'. The details of journeys are as follows:

Outward journey	***No. of journeys***	***Load (in ton)***
'A' to 'B'	10	6
'A' to 'C'	2	6
'C' to 'B'	2	4
Return journey	***No. of journeys***	***Load (in ton)***
'B' to 'A'	5	8
'B' to 'A'	6	6
'B' to 'C'	1	6
'C' to 'A'	1	0

Annual fixed costs and maintenance charges are ₹6,00,000 and ₹1,20,000 respectively. Running charges spent during January 2023 are ₹2,94,400 (includes ₹12,400 paid as penalty for overloading).

You are required to:

1. Calculate the cost as per ***(a)*** Commercial ton-kilometre. ***(b)*** Absolute ton-kilometre
2. Calculate Net Profit/ loss for the month of January, 2023.

Answer

1. (a) Calculation of cost per commercial ton-kms:

Cost per commercial ton-km = $\frac{3,42,000}{44,862}$ = ₹7.62

1. (b) Calculation of cost per absolute ton-kms:

Cost per absolute ton-km = $\frac{3,42,000}{44,720}$ = ₹7.65

2. Statement of Profit
(For the month of January, 2023)

Particulars	Amount
Receipts:	
From outward journey (12 journeys × 6 tons × ₹2,400)	1,72,800
From return journey (5 journeys × 8 tons × ₹2,200) + (7 journeys × 6 tons × ₹2,200)	1,80,400
Total Receipts	**3,53,200**
Less: Total operating cost	(3,42,000)
Operating Profit	**11,200**
Less: Fine paid for overloading	(12,400)
Net Loss for the month	**(₹1,200)**

Notes:

(1) While calculating absolute/commercial ton km., actual load carried are considered irrespective of the fact it attracts fines or penalty.

(2) Penalty paid for overloading is an abnormal expenditure and is not included in the operating cost of the bus. This amount will be debited to Costing Profit and Loss A/c and hence deducted from operating profit to arrive at net profit/loss.

(3) No concession or reduction in rates for any delivery of goods at station 'C'.

Working Notes:

(i) Statement of Total Monthly Cost
(For the month of January, 2023)

Particulars	Amount
Fixed cost (6,00,000 ÷ 12)	50,000
Maintenance charges (1,20,000 ÷ 12)	10,000
Running charges (2,94,400 – 12,400)	2,82,000
Total Operating Cost	**3,42,000**

(ii) Calculation of commercial ton-kms:

Total distance = 12 journeys × 300 kms × 2 (two way) = **7,200**

Total weight = 12 journeys × 6 ton + 2 journeys × 4 ton + 5 journeys × 8 ton + 6 Journeys × 6 ton + 1 journey × 6 ton = **162 ton**

Commercial ton-km = Total distance × Average weight
= 7,200 kms × (162 tons ÷ 26 journeys) = **44,862**

(iii) Calculation of absolute ton-kms:

A to B = (10 journeys × 300 kms × 6 tons) + {2 journeys × [(140 kms × 6 tons) + (160 kms × 4 tons)]} = **20,960**

B to A = (5 journeys × 300 kms × 8 tons) + (6 journeys × 300 kms × 6 tons) + {1 journey × [(160 kms × 6 tons) + (140 kms × Nil tons)]}

	=	***23,760***		
Absolute ton-km	=	20,960 + 23,760	=	***44,720***

BBQ 60

A company runs a holiday home. For this purpose, it has hired a building at a rent of ₹10,000 per month along with 5% of total taking. It has three types of suites for its customers viz. single room, double room and triple room. Following information is given:

Type of suites	*Number of rooms*	*Occupancy percentage*
Single room	100	100%
Double room	50	80%
Triple room	30	60%

The rent of double room suite is to be fixed at 2.5 times of the single room suite and that of triple room suite as twice of the double room suite.

The other expenses for the year 2023 are as follows:

Expenses	*₹*
Staff salaries	14,25,000
Room attendant's wages	4,50,000
Lighting, heating and power	2,15,000
Repairs and renovation	1,23,500
Laundry charges	80,500
Interior decoration	74,000
Sundries	1,53,000

Provide profit @ 20% on total taking and assume 360 days in a year. You are required to calculate the rent to be charged for each type of suite.

Answer

Statement Showing Rent to be Charged

Particulars	*₹*
Staff salaries	14,25,000
Room attendant's wages	4,50,000
Lighting, heating and power	2,15,000
Repairs and renovation	1,23,500
Laundry charges	80,500
Interior decoration	74,000
Sundries	1,53,000
Building rent:	
Fixed	1,20,000
Variable @ 5% on taking	1,76,067
Total Cost	***28,17,067***
Add: Profit @ 20% on taking	7,04,266
****Total Taking***	***35,21,333***
÷ Equivalent single room days	÷ 1,04,400
Rent for single room day	***₹33.73***
Rent for double room day (33.73 × 2.5)	***₹84.32***
Rent for triple room day (33.73 × 2.5 × 2)	***₹168.65***

Working Notes:

1. Calculation of Taking:

*Total Taking	=	Operating cost (excluding rent on taking) + 5% for rent + 20% for profit
	=	₹26,41,000 + 25% of total takings
75% of Taking	=	₹26,41,000
Total Taking	=	***₹35,21,333***

2. Calculation of equivalent single room suites:

Type of suites	*Room days*	*Equivalent single room suites*
Single room suite	100 × 360 ×100% = 36,000	36,000 × 1= 36,000
Double room suite	50 × 360 × 80% = 14,400	14,400 × 2.5 = 36,000
Triple room suite	30 × 360 × 60% = 6,480	6,480 × 5 = 32,400
Total equivalent single room days		***1,04,400***

BBQ 61

A lodging home is being run in a small hill station with 100 single rooms. The home offers concessional rates during six off-season (Winter) months in a year. During this period, half of the full room rent is charged. The management's profit margin is targeted at 20% of the room rent. The following are the cost estimates and other details for the year ending on 31st March. [Assume a month to be of 30 days].

(a) Occupancy during the season is 80% while in the off- season it is 40% only.

(b) Total investment in the home is ₹200 lakhs of which 80% relate to buildings and balance for furniture and equipment.

(c) Expenses:

Staff salary [Excluding room attendants]	₹5,50,000
Repairs to building	₹2,61,000
Laundry charges	₹80,000
Interior	₹1,75,000
Miscellaneous expenses	₹1,90,800

(d) Annual depreciation is to be provided for buildings @ 5% and on furniture and equipment @ 15% on straight-line basis.

(e) Room attendants are paid ₹10 per room day on the basis of occupancy of the rooms in a month.

(f) Monthly lighting charges are ₹120 per room, except in four months in winter when it is ₹30 per room.

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

Answer

Statement Showing Per Day Chargeable Rent

Particulars	*₹*
Staff salary	5,5,0000
Repairs to building	2,61,000
Laundry charges	80,000
Interior	1,75,000
Miscellaneous expenses	1,90,800
Depreciation:	
On Building (₹200 lakhs × 80% × 5%)	8,00,000
On Furniture (₹200 lakhs × 20% × 15%)	6,00,000
Room attendant's wages:	
In Season (100 rooms × 80% × 30 days × 6 months × ₹10)	1,44,000
In Off-Season (100 rooms × 40% × 30 days × 6 months × ₹10)	72,000
Lighting charges:	
Season & Non Winter (100 rooms × 80% × 6 months × ₹120)	57,600
	9,600

Off-Season & Non Winter (100 rooms × 40% × 2 months × ₹120)	4,800
Off-Season & Winter (100 rooms × 40% × 4 months × ₹30)	
Total Cost	***29,44,800***
Add: Profit @ 20% on Room rent or 25% on Cost	7,36,200
Total Rent to be Charged	***36,81,000***
÷ Equivalent Off-Season room days	÷ 36,000
Rent for one room per day in Off-Season	***₹102.25***
Rent for one room per day in Season (₹102.25 × 2)	***₹204.50***

Working Notes:

Equivalent Off –Season room days = 100 × 80% × 30 days × 6 months × 2 (double of Off-Season) + 100 × 40% × 30 days × 6 months × 1

= 14,400 × 2 + 7,200 × 1

= ***36,000 Room days***

BBQ 62

ABC Hospital runs a Critical Care Unit (CCU) in a hired building. CCU consists of 35 beds and 5 more beds can be added, if required.

Rent per month	₹75,000
Supervisors 2 persons	₹25,000 per month each
Nurses 4 persons	₹20,000 per month each
Ward Boys 4 persons	₹5,000 per month each
Doctors paid	₹2,50,000 per month
(paid on the basis of number of patients attended and the time spent by them)	

Other expenses for the year are as follows:

Repairs (Fixed)	₹81,000
Food to Patients (Variable)	₹8,80,000
Other services to patients (Variable)	₹3,00,000
Laundry charges (Variable)	₹6,00,000
Medicines (Variable)	₹7,50,000
Other fixed expenses	₹10,80,000
Administration expenses allocated	₹10,00,000

It was estimated that for 150 days in a year 35 beds are occupied and for 80 days only 25 beds are occupied. The hospital hired 750 beds at a charge of ₹100 per bed per day, to accommodate the flow of patients. However, this does not exceed more than 5 extra beds over and above the normal capacity of 35 beds on any day.

You are required to

(a) Calculate profit per Patient day, if the hospital recovers on an average ₹2,000 per day from each patient
(b) Find out Breakeven point for the hospital.

Answer

(a) Statement Showing Profit Per Patient Day

Particulars	***Amount***
(A) Variable Costs:	
Doctor fess (2,50,000 × 12)	30,00,000
Food to Patients (Variable)	8,80,000

Other services to patients (Variable)	3,00,000
Laundry charges (Variable)	6,00,000
Medicines (Variable)	7,50,000
Bed hire charges (100 × 750 beds)	75,0000
Total (A)	***56,05,000***
(B) Fixed Costs:	
Rent (75,000 × 12)	9,00,000
Supervisors (2 persons × 25,000 × 12)	6,00,000
Nurses (4 persons × 20,000 × 12)	9,60,000
Ward Boys (4 persons × 5,000 × 12)	2,40,000
Repairs (Fixed)	81,000
Other fixed expenses	10,80,000
Administration expenses allocated	10,00,000
Total (B)	***48,61,000***
Total cost (A + B)	***1,04,66,000***
Collection from patients (2,000 × 8,000 patient days)	***1,60,00,000***
Profit (Collection – Total cost)	***55,34,000***
Profit per patient day (Profit ÷ Patient days)	***691.75***

(b) Calculation of BEP for the hospital:

BEP = Fixed cost ÷ Contribution per patient day
= 48,61,000 ÷ 1,299.375 = ***3,741 patient days***

Working Notes:

1. Calculation of number of Patient days:

= (35 beds × 150 days) + (25 beds × 80 days) + 750 beds
= ***8,000***

2. Calculation Contribution per patient day:

Contribution = Sales – Variable cost
= 1,60,00,000 – 56,05,000 = 1,03,95,000

Contribution per patient day = 1,03,95,000 ÷ 8,000 = ***1,299.375***

BBQ 63

Following are the data pertaining to Infotech Pvt. Ltd, for the year 2022 – 23:

Salary to 5 Software Engineers	₹15,00,000
Salary to 2 Project Leaders	₹9,00,000
Salary to Project Manager	₹6,00,000
Repairs & maintenance	₹3,00,000
Administration overheads	₹12,00,000

The company executes a Project XYZ, the details of the same as are as follows:

Project duration	6 months
Travel expenses incurred for the project	₹1,87,500

One Project Leader and three Software Engineers were involved for the entire duration of the project, whereas Project Manager spends 2 months' efforts, during the execution of the project. Two Laptops were purchased at a cost of ₹50,000 each, for use in the project and the life of the same is estimated to be 2 years.

Prepare Project cost sheet considering overheads are absorbed on the basis of salary.

Answer

Project Cost Sheet

Particulars	Amount
Salaries:	
Software engineers (3 × 25,000 × 6 months)	4,50,000
Project Leader (37,500 × 6 months)	2,25,000
Project manager (50,000 × 2 months)	1,00,000
Total Salary	***7,75,000***
Overheads (50 % of Salary)	3,87,500
Travel expenses	1,87,500
Depreciation on Laptops [(1,00,000 ÷ 2 years) × 6/12]	25,000
Total Project Cost	***13,75,000***

Working Notes:

1. Total Overheads per annum = Repairs & Maintenance + Administration Overheads
= 3,00,000 + 12,00,000 = ***15,00,000***

2. Calculation of total salary per annum and salary per month:

Particulars	Total Per Annum	Per Person Per Annum	Per Person Per Month
Salary to 5 Software Engineers	₹15,00,000	₹3,00,000	₹25,000
Salary to 2 Project Leaders	₹9,00,000	₹4,50,000	₹37,500
Salary to Project Manager	₹6,00,000	₹6,00,000	₹50,000
Total	***₹30,00,000***	***₹13,50,000***	***₹1,12,500***

3. Calculation of Overhead absorption rate:

Overhead absorption rate = Total overheads per annum ÷ Total salary per annum
= 15,00,000 ÷ 30,00,000 = ***50% of salary***

BBQ 64

SLS Infrastructure built and operates 110 km. highway on the basis of Built-Operate-Transfer (BOT) for the period of 25 years. A traffic assessment has been carried out to estimate the traffic flow per day shows the following figures:

Sl. No.	Type of vehicle	Daily traffic volume
1	Two wheelers	44,500
2	Car and SUVs	3,450
3	Bus and LCV	1,800
4	Heavy commercial vehicles	816

The following is the estimated cost of the project:

Activities	Amount (₹in Lakh)
Site clearance	170.70
Land development and filling work	9,080.35
Sub base and base courses	10,260.70
Bituminous work	35,070.80
Bridge, flyover, underpasses, pedestrian subway, footbridge, etc.	29,055.60
Drainage and protection work	9,040.50
Traffic sign, marking and road appurtenance	8,405.00
Maintenance, repairing and rehabilitation	12,429.60
Environment management	982.00
Total Project Cost	***1,14,495.25***

An average cost of ₹1,120 Lakh has to be incurred on administration and toll plaza operation.

On the basis of the vehicle specifications (i.e. weight, size, time saving etc.), the following weights has been assigned to passing vehicles:

Sl. No.	*Type of vehicle*	*Weight (%)*
1	Two wheelers	5%
2	Car and SUVs	20%
3	Bus and LCV	30%
4	Heavy commercial vehicles	45%

Required:

(1) Calculate the total project cost per day of concession period.
(2) Compute toll fee to be charged for per vehicle of each type, if the company wants earn a profit of 15% on total cost.

Note: Concession period is a period for which an infrastructure is allowed to operate and recover its investment.

Answer

(1) Statement Showing Total Project Cost per Day

Activities	*Amount (₹in Lakh)*
Site clearance	170.70
Land development and filling work	9,080.35
Sub base and base courses	10,260.70
Bituminous work	35,070.80
Bridge, flyover, underpasses, pedestrian subway, footbridge, etc.	29,055.60
Drainage and protection work	9,040.50
Traffic sign, marking and road appurtenance	8,405.00
Maintenance, repairing and rehabilitation	12,429.60
Environment management	982.00
Administration and toll plaza operation cost	1,120.00
Total Project Cost	***1,15,615.25***
÷ Concession period in days (25 years × 365 days)	÷ 9,125
Cost per day of concession period (₹in Lakh)	***₹12.67***

(2) Statement Showing Toll Fee to be Charged per Vehicle of Each Type

Particulars		*Amount*
Toll to be recovered per day		14,57,050
÷ Total equivalent Two wheelers per day		÷ 76,444
Toll per Two wheelers		***₹19.06***
Toll per Cars and SUVs	(₹19.06 × 4)	***₹76.24***
Toll per Bus and LCV	(₹19.06 × 6)	***₹114.36***
Toll per Heavy commercial vehicles	(₹19.06 × 9)	***₹171.54***

Working note:

(a) Calculation of Toll per day:

Toll recovery per day = Cost per day of concession period + 15% profit on cost
= ₹12,67,000 + 15% of ₹12,67,000 = ***₹14,57,050***

(b) Calculation of Equivalent Two wheelers per day:

Sl. No.	Type of vehicle	Weight (%)	Ratio	Daily traffic volume	Equivalent Two wheeler
1	Two wheelers	5%	1	44,500	44,500
2	Car and SUVs	20%	4	3,450	13,800
3	Bus and LCV	30%	6	1,800	10,800
4	Heavy commercial vehicles	45%	9	816	7,344
Total Equivalent Two wheeler per day					**76,444**

BBQ 65

RST Toll Plaza Limited built a 80 kilometer long highway between two cities and operates a toll plaza to collect tolls from passing vehicles using the highway. The company has estimated that 50,000 light weight, 12,000 medium weight and 10,000 heavy weight vehicles will be using the highway in one month in outward journey and the same number for return journey.

As per government notification, vehicles used for medical emergencies, members of parliament, and essential services are exempt from toll charges. It is estimated that 10% of light weight vehicles will pass the highway for such use.

It is the policy of the company that if vehicles return within 24 hours of their outward journey. The toll fare will be reduced by 25 percent automatically. It is estimated 30% of chargeable light weight vehicles return within the specified time frame.

The toll charges for medium weight vehicles is to be fixed as 2.5 times of the light weight vehicles and that of heavy weight vehicles as 2 times of the medium weight vehicles.

The toll operating and maintenance cost for a month is ₹59,09,090. The company requires a profit of 10% over the total cost to cover interest and other costs.

Required:

(a) Calculate the toll rate for each type of vehicles if concession facilities are not available on the return journey.

(b) Calculate the toll rate that will be charged from light weight vehicles if a return journey concession facility is available, assuming that the revenue earned from light weight vehicles calculate in option (a) remains the same.

Answer

(a) Calculation of toll rate for each type of vehicles:

Total collection from toll = Cost + 10% = ₹59,09,090 + 10%
= ₹64,99,999

Let, toll rate for Light weight vehicle be 'T' then toll rate for Medium weight vehicle will 2.5T and for Heavy weight vehicles will 5T

Now,
Total Toll collection = (45,000 × 2 × T) + (12,000 × 2 × 2.5T) + (10,000 × 2 × 5T)
₹64,99,999 = 2,50,000T
T = ₹26

Toll rate for light vehicles = **₹26**
Toll rate for light vehicles = 2.5T = ₹26 × 2.5 = **₹65**
Toll rate for light vehicles = 5T = ₹26 × 5 = **₹130**

Note: Toll plaza collects toll from 45,000 light weight vehicles one side journey (50,000 – 10% Exempt vehicles).

(b) Calculation of toll rate of Light weight vehicles with concession facility:

Revenue earned from Light weight vehicles under (a) = 45,000 × 2 × ₹26 = ₹23,40,000

Let, toll rate for Light weight vehicle be 'T' then toll rate for return Light weight vehicle be '0.75T'

Revenue from Light weight vehicles	=	(45,000×T) + (45,000×70%×T + 45,000×30%×0.75T)
₹23,40,000	=	86,625T
T	=	***₹27.013***

BBQ 66

Sanziet Lifecare Ltd. operates in life insurance business. Last year it launched a new term insurance policy for practicing professionals 'Professionals Protection Plus'. The company has incurred the following expenditures during the last year for the policy:

Policy development cost	₹11,25,000
Cost of marketing of the policy	₹45,20,000
Sales support expenses	₹11,45,000
Policy issuance cost	₹10,05,900
Policy servicing cost	₹35,20,700
Claims management cost	₹1,25,600
IT cost	₹74,32,000
Postage and logistics	₹10,25,000
Facilities cost	₹15,24,000
Employees cost	₹5,60,000
Office administration cost	₹16,20,400
Number of policy sold	528
Total insured value of policies	₹1,320 crore

Required:

1. Calculate total cost for Professionals Protection Plus' policy segregating the costs into four main activities namely ***(a)*** Product development, Marketing and Sales support, ***(b)*** Operations, ***(c)*** IT and ***(d)*** Support functions.
2. Calculate cost per policy.
3. Calculate cost per rupee of insured value.

Answer

1. Statement Showing Total Cost for 'Professionals Protection Plus' Policy

Particulars	***Amount***
(a) Product development, Marketing and Sales support:	
Policy development cost	11,25,000
Cost of marketing of the policy	45,20,000
Sales support expenses	11,45,000
Total (a)	***67,90,000***
(b) Operations:	
Policy issuance cost	10,05,900
Policy servicing cost	35,20,700
Claims management cost	1,25,600
Total (b)	***46,52,200***
(c) IT Cost:	
IT cost	74,32,000
Total (c)	***74,32,000***

(d) Support functions:	
Postage and logistics	10,25,000
Facilities cost	15,24,000
Employees cost	5,60,000
Office administration cost	16,20,400
Total (d)	***47,29,400***
Total Cost (a + b + c + d)	***2,36,03,600***

2. Calculate cost per policy = Total Cost ÷ No. of Policies
= ₹2,36,03,600 ÷ 528 = ***₹44,703.79***

3. Cost per rupee of insured value = Total Cost ÷ Total insured value
= ₹2,36,03,600 ÷ ₹1,320 crores = ***₹0.0018***

BBQ 67

Prepare the cost statement of Ignus Thermal Power Station showing the cost of electricity generated per kwh, from the data provided below pertaining to the year 2022-23:

Total units generated	20,00,000 kwh
Operating labour	₹30,00,000
Repairs & maintenance	₹10,00,000
Lubricants, spares and stores	₹8,00,000
Plant supervision	₹6,00,000
Administration overheads	₹40,00,000

5 kwh. of electricity generated per kg of coal consumed @ ₹4.25 per kg. Depreciation charges @ 5% on capital cost of ₹5,00,00,000.

Answer

Cost Statement of Ignus Thermal Power Station

Particulars	***Amount***
(A) Fixed Costs:	
Plant supervision	6,00,000
Administration overheads	40,00,000
Depreciation (₹5,00,00,000 × 5%)	25,00,000
Total (A)	***71,00,000***
(B) Variable Costs:	
Operating labour (Student can treat it as fixed also)	30,00,000
Lubricant, spares and stores	8,00,000
Repairs and Maintenance	10,00,000
Coal cost (20,00,000 kwh ÷ 5 kwh) × ₹4.25 per kg	17,00,000
Total (B)	***65,00,000***
Total Operating Cost (A + B)	***1,36,00,000***
÷ Total kwh generated	÷ 20,00,000
Cost of electricity generated per kwh	***₹6.80***

CHAPTER 8 PROCESS & OPERATION COSTING

1. *Process Costing is a method of costing used in industries where the material has to pass through two or more processes for being converted into a final product. It is defined as "a method of Cost Accounting whereby costs are charged to processes or operations and averaged over units produced". A separate account for each process is opened and all expenditure pertaining to a process is charged to that process account. Such type of costing method is useful in the manufacturing of products like steel, paper, medicines, soaps, chemicals, rubber, vegetable oil, paints, varnish etc. where the production process is continuous and the output of one process becomes the input of the following process till completion.*

2. *Normal Process Account:*

Step 1: *Prepare separate process account by debiting all direct cost and apportionable and recoverable expenses.*

Step 2: *Credited process account with normal loss units and their scrap value.*

Step 3: *Calculate normal cost per unit (NCPU)*

$$= \frac{\text{Total Cost} - \text{Sale Vale of Normal Loss Units}}{\text{Total Units} - \text{Normal Loss Units}}$$

Step 4: *Valued actual output and abnormal gain or loss as per NCPU.*

Step 5: *Prepare normal loss, abnormal loss, abnormal gain and profit and loss A/C.*

Proforma Process Account

Particulars	Units	₹	Particulars	Units	₹
To Process A/C (Previous)	XXX	XXX	By Normal loss	XXX	XXX
To Units introduced	XXX	XXX			
To Sundry materials		XXX	By Process A/C (Next) or	XXX	XXX
To Labour		XXX	Finished goods A/C or		
To Direct expenses		XXX	Costing P/L A/C		
To Indirect expenses		XXX			
To Abnormal Gain (If any)		XXX	By Abnormal loss (If any)	XXX	XXX
	XXX	XXX		XXX	XXX

Proforma Normal Loss Account (Expected or Standard Loss/Kabadi wale ka A/c)

Particulars	Units	₹	Particulars	Units	₹
To Process I A/C	XXX	XXX	By Cash A/C:		
To Process II A/C	XXX	XXX	Process I	XXX	XXX
To Process III A/C	XXX	XXX	Process II	XXX	XXX
			Process III	XXX	XXX
			By Abnormal gain A/C	XXX	XXX
	XXX	XXX		XXX	XXX

Proforma Abnormal Loss Account (Unexpected Loss/ Good units bani kabad)

Particulars	Units	₹	Particulars	Units	₹
To Process I A/C	XXX	XXX	By Cash A/C:		
To Process II A/C	XXX	XXX	Process I	XXX	XXX
			Process II	XXX	XXX
			By Costing P/L A/C		XXX
	XXX	XXX		XXX	XXX

Abnormal Gain Account (Unexpected Gain/ Kabad bana Good units)

Particulars	Units	₹	Particulars	Units	₹
To Normal loss A/C	XXX	XXX	By Process II A/C	XXX	XXX
To Costing P/L A/C		XXX			
	XXX	XXX		XXX	XXX

Costing Profit And Loss Account

Particulars	Units	₹	Particulars	Units	₹
To Process III A/C	XXX	XXX	By Sales A/C	XXX	XXX
To Selling & Admin exps.		XXX	By Abnormal gain A/C		XXX
To Abnormal loss A/C		XXX			
To Profit (b.f.)		XXX			
	XXX	XXX		XXX	XXX

3. Royalty on output or units produced:

Step 1: Debit royalty expense in process account on standard units to be produced.

Step2: Excess or Less payment of royalty expense is shown in Abnormal Gain or Loss account.

Step3: Actual payment of royalty is shown in Royalty A/c.

4. Process A/c with By Product:

Step 1: Credit Process A/c by NRV of By Product. (NRV = Sales Value – Selling Expenses – Further Cost)

Step2: Calculate NCPU = $\frac{\text{Total Cost} - \text{Sale Vale of Normal Loss Units} - \text{NRV of By Product}}{\text{Total Units} - \text{Normal Loss Units} - \text{By Product Units}}$

5. Statement of Profit when process department sells a portion of output in market and transfer balance to next process department:

- Transfer units to next process on the basis of NCPU
- Transfer units to Costing P/L A/c on the basis of NCPU
- Sale of units and profit are shown in Costing P/L A/c

6. Equivalent Production (Closing WIP Only)

Equivalent production: This concept is used in case of WIP units in process.

Step 1: Prepare process account as usual.

Step2: Prepare statement of equivalent production.

Step 3: Prepare statement of cost.

Step 4: Prepare statement of apportionment of cost or statement of evaluation (in case of abnormal gain or loss).

Step 5: Do complete process account.

Proforma Statement of Equivalent Production

Particulars	Units	Materials		Labour		Overhead	
		%	E.U.	%	E.U.	%	E.U.
Units introduced:							
Normal loss	XXX	-	-	-	-	-	-
Units completed	XXX	XX	XXX	XX	XXX	XX	XXX
Closing WIP	XXX	XX	XXX	XX	XXX	XX	XXX
Abnormal loss (If any)	XXX	XX	XXX	XX	XXX	XX	XXX
Less: Abnormal gain (If any)	(XXX)	XX	(XXX)	XX	(XXX)	XX	(XXX)
Total	XXX	-	XXX	-	XXX	-	XXX

If nothing is specified in the question:

- % of completion of Abnormal loss units — 100%
- % of completion of WIP units:
  - Materials — 100%
  - Labour — 50%
  - Overheads — 50%
- % of material components — 100%

Always:

- % of completion of Finished goods — 100%
- % of completion of Abnormal gain — 100%
- % of completion of Normal loss — 0%
- % of completion of units received from previous process — 100%

Proforma Statement of Cost

Elements	Cost	Eq. Units	Cost per unit
Materials	XXX (Net of Scrap of Normal Loss Units)	XXX	XXX
Labour	XXX	XXX	XXX
Overheads	XXX	XXX	XXX
Total Cost Per Unit			XXX

- Sale value of scrap of normal loss units is deducted from the cost of materials 1 in case of two materials

Proforma Statement of Evaluation

Particulars	Elements	Equivalent units	Cost per unit	Total (₹)
1. Units completed	Materials	XXX	XXX	XXX
	Labour	XXX	XXX	XXX
	Overhead	XXX	XXX	XXX
				XXX
2. Closing WIP	Materials	XXX	XXX	XXX
	Labour	XXX	XXX	XXX
	Overhead	XXX	XXX	XXX
				XXX
3. Abnormal loss	Materials	XXX	XXX	XXX
	Labour	XXX	XXX	XXX
	Overheads	XXX	XXX	XXX
				XXX
4. Abnormal gain	Materials	XXX	XXX	XXX
	Labour	XXX	XXX	XXX
	Overheads	XXX	XXX	XXX
				XXX

- If any item of cost is directly related to completed units then cost of such items should be directly added to valuation of completed units (Like: Packing material cost related to completed units).

7. Opening WIP with FIFO method:

Step 1: Prepare process account as usual.

Step2: Prepare statement of equivalent production

- First convert opening WIP units into units completed (Show balance work only)
- Convert current units into balance completed units, closing WIP, normal loss, abnormal loss or abnormal gain

Step 3: Prepare statement of cost (ignore cost of opening WIP).

Step 4: Prepare statement of apportionment of cost or statement of evaluation (Add cost of opening WIP directly to value of completed units).

Step 5: Do complete process account.

Proforma Statement of Equivalent Production (FIFO Method)

Particulars	Units	Materials		Labour		Overhead	
		%	E.U.	%	E.U.	%	E.U.
Opening units used for:							
Completed units	XXX	XX	XXX	XX	XXX	XX	XXX
Current units used for:							
Balance completed units	XXX	XX	XXX	XX	XXX	XX	XXX
Normal loss	-	-	-	-	-	-	-
Closing WIP	XXX	XX	XXX	XX	XXX	XX	XXX

Abnormal loss (If any)	XXX	XX	XXX	XX	XXX	XX	XXX
Less: Abnormal gain (If any)	(XXX)	XX	(XXX)	XX	(XXX)	XX	(XXX)
Total	XXX	-	XXX	-	XXX	-	XXX

Proforma Statement of Cost

Elements	Cost (Ignore cost of opening WIP)	Eq. Units	Cost per unit
Materials	Current Material Cost – Scrap of Normal Loss Units	XXX	XXX
Labour	Current Labour Cost	XXX	XXX
Overheads	Current Overheads Cost	XXX	XXX
Total Cost Per Unit			XXX

Proforma Statement of Evaluation

Particulars	Elements	Equivalent units	Cost per unit	Total (₹)
1. Units completed	Materials	XXX	XXX	XXX
	Labour	XXX	XXX	XXX
	Overhead	XXX	XXX	XXX
Add: Cost of Opening WIP				XXX
				XXX
2. Closing WIP	Materials	XXX	XXX	XXX
	Labour	XXX	XXX	XXX
	Overhead	XXX	XXX	XXX
				XXX
3. Abnormal loss	Materials	XXX	XXX	XXX
	Labour	XXX	XXX	XXX
	Overheads	XXX	XXX	XXX
				XXX
4. Abnormal gain	Materials	XXX	XXX	XXX
	Labour	XXX	XXX	XXX
	Overheads	XXX	XXX	XXX
				XXX

8. Opening WIP with Average method:

Step 1: Prepare process account as usual.

Step2: Prepare statement of equivalent production (considering total work).

Step 3: Prepare statement of cost (add cost of opening WIP to current period cost element wise).

Step 4: Prepare statement of apportionment of cost or statement of evaluation.

Step 5: Do complete process account.

Proforma Statement of Equivalent Production (Average Method)

Particulars	Units	Materials		Labour		Overhead	
		%	E.U.	%	E.U.	%	E.U.
Normal loss	XXX	-	-	-	-	-	-
Units completed	XXX	XX	XXX	XX	XXX	XX	XXX
Closing WIP	XXX	XX	XXX	XX	XXX	XX	XXX
Abnormal loss (If any)	XXX	XX	XXX	XX	XXX	XX	XXX
Less: Abnormal gain (If any)	(XXX)	XX	(XXX)	XX	(XXX)	XX	(XXX)
Total	XXX	-	XXX	-	XXX	-	XXX

Proforma Statement of Cost

Elements	Total Cost (Current Cost + Cost of opening WIP)	Eq. Units	Cost per unit
Materials	Current + Opening – Scrap of Normal Loss Units	XXX	XXX
Labour	Current + Opening	XXX	XXX
Overheads	Current + Opening	XXX	XXX
Total Cost Per Unit			XXX

Proforma Statement of Evaluation

Particulars	Elements	Equivalent units	Cost per unit	Total (₹)
1. Units completed	Materials	XXX	XXX	XXX
	Labour	XXX	XXX	XXX
	Overhead	XXX	XXX	XXX
				XXX
2. Closing WIP	Materials	XXX	XXX	XXX
	Labour	XXX	XXX	XXX
	Overhead	XXX	XXX	XXX
				XXX
3. Abnormal loss	Materials	XXX	XXX	XXX
	Labour	XXX	XXX	XXX
	Overheads	XXX	XXX	XXX
				XXX
4. Abnormal gain	Materials	XXX	XXX	XXX
	Labour	XXX	XXX	XXX
	Overheads	XXX	XXX	XXX
				XXX

Note: *If nothing is specified in respect of method of valuation then:*

- *If % of opening WIP is given : Use FIFO Method*
- *If % of opening WIP is not given : Use Weighted Average Method*

9. Inter Process Profit:

- *Process department transfers its output to next process department on cost plus profit basis.*
- *Profit earned by each process department is used to evaluate performance of concern process department*

BBQ 68

A product passes through three processes A, B, and C. The normal wastage and actual output of each process is as follows:

Process	Actual Output	Normal Loss
Process A	9,500 units	3%
Process B	9,100 units	5%
Process C	8,100 units	8%

Wastage of Process A was sold 25 Paise per unit, that of Process B at 50 Paise per unit and that of Process C at ₹1 per unit. 10,000 units were issued to Process A in the beginning of October 2023 at a cost of ₹1 per unit the other expenses were as follows:

Name of Expenses	Process A (₹)	Process B (₹)	Process C (₹)
Sundry Materials	1,000	1,500	500
Labour	5,000	8,000	6,500
Direct expenses	1,050	1,188	2,009

Selling and distribution expenses are ₹850 and sale value per unit is ₹6.00.

Prepare all accounts.

Answer

Process A Account

Particulars	Units	₹	Particulars	Units	₹
To Units Introduced	10,000	10,000	By Normal Loss A/c	300	75
To Sundry Materials		1,000	(3% @ ₹0.25/unit)		
To Labour		5,000	By Process B A/c	9,500	16,625
To Direct expenses		1,050	@ ₹1.75 per unit		
			By Abnormal Loss A/c @ ₹1.75 per unit	200	350
	10,000	**17,050**		**10,000**	**17,050**

$$NCPU = \frac{\text{Total Cost} - \text{Sale value of Normal Loss Units}}{\text{Total Units} - \text{Normal Loss Units}} = \frac{17,050 - 75}{10,000 - 300} = ₹1.75 \text{ per unit}$$

Process B Account

Particulars	Units	₹	Particulars	Units	₹
To Process A A/c	9,500	16,625	By Normal Loss A/c	475	238
To Sundry Materials		1,500	(5% @ ₹0.50/unit)		
To Labour		8,000	By Process C A/c	9,100	27,300
To Direct expenses		1,188	@ ₹3 per unit		
To Abnormal Gain A/c @ ₹3 per unit	75	225			
	9,575	**27,538**		**9,575**	**27,538**

$$NCPU = \frac{\text{Total Cost} - \text{Sale value of Normal Loss Units}}{\text{Total Units} - \text{Normal Loss Units}} = \frac{27,313 - 238}{9,500 - 475} = ₹3 \text{ per unit}$$

Process C Account

Particulars	Units	₹	Particulars	Units	₹
To Process B A/c	9,100	27,300	By Normal Loss A/c	728	728
To Sundry Materials		500	(8% @ ₹1.00/unit)		
To Labour		6,500	By Profit & Loss A/c	8,100	34,425
To Direct expenses		2,009	@ ₹4.25 per unit		
			By Abnormal Loss A/c @ ₹4.25 per unit	272	1,156
	9,100	**36,309**		**9,100**	**36,309**

$$NCPU = \frac{\text{Total Cost} - \text{Sale value of Normal Loss Units}}{\text{Total Units} - \text{Normal Loss Units}} = \frac{36,309 - 728}{9,100 - 728} = ₹4.25 \text{ per unit}$$

Normal Loss Account

Particulars	Units	₹	Particulars	Units	₹

To Process A A/c	300	75	By Cash A/c:		
To Process B A/c	475	238	Process A	300	75
To Process C A/c	728	728	Process B	400	200
			Process C	728	728
			By Abnormal Gain A/c	75	38
	1,503	**1,041**		**1,503**	**1,041**

Abnormal Loss Account

Particulars	Units	₹	Particulars	Units	₹
To Process A A/c	200	350	By Cash A/c:		
To Process C A/c	272	1,156	Process A	200	50
			Process C	272	272
			By Costing P/L A/c		1,184
	472	**1,506**		**472**	**1,506**

Abnormal Gain Account

Particulars	Units	₹	Particulars	Units	₹
To Normal Loss A/c	75	38	By Process B A/c	75	225
To Costing P/L A/c		187			
	75	**225**		**75**	**225**

Costing Profit and Loss Account

Particulars	Units	₹	Particulars	Units	₹
To Process C A/c	8,100	34,425	By Sales A/c	8,100	48,600
To Selling Expenses		850	(8,100 × 6.00)		
To Abnormal Loss A/c		1,184	By Abnormal Gain A/c		187
To Profit (b.f.)		12,328			
	8,100	**48,787**		**8,100**	**48,787**

BBQ 69

RST Limited processes Product Z through two distinct processes – Process-I and Process-II. On completion, it is transferred to finished stock. From the following information for the year 2022-23, prepare Process-I A/c, Process-II A/c, Finished Stock A/c and Income Statement:

Particulars	Process-I	Process-II
Raw materials used	7,500 units	-
Raw materials cost per unit	₹60	-
Transfer to next process/finished stock	7,050 units	6,525 units
Normal loss (on inputs)	5%	10%
Direct wages	₹1,35,750	₹1,29,250
Direct expenses	60% of Direct wages	65% of Direct wages
Manufacturing overheads	20% of Direct wages	15% of Direct wages
Realisable value of scrap per unit	₹12.50	₹37.50

6,000 units of finished goods were sold at a profit of 15% on cost. Assume that there was no opening or closing stock of work-in-process.

Answer

Process-I Account

Particulars	Units	₹	Particulars	Units	₹

To Raw Materials used	7,500	4,50,000	By Normal Loss	375	4,688
To Direct Wages		1,35,750	(5% of 7,500 units) ×12.5		
To Direct Expenses		81,450	By Process-II Account	7,050	6,82,402
To Manufacturing OH		27,150	(₹96.7947 × 7,050 units)		
			By Abnormal Loss A/c	75	7,260
			(₹96.7947 × 75 units)		
	7,500	***6,94,350***		***7,500***	***6,94,350***

$$NCPU = \frac{\text{Total Cost} - \text{Realisable Value of Normal Loss Units}}{\text{Inputs Units} - \text{Normal Loss Units}} = \frac{6,94,350 - 4,688}{7,500 - 375} = ₹96.7947$$

Process-II Account

Particulars	*Units*	*₹*	*Particulars*	*Units*	*₹*
To Process-I A/c	7,050	6,82,402	By Normal Loss	705	26,438
To Direct Wages		1,29,250	(10% of 7,050 units)×37.5		
To Direct Expenses		84,013	By Finished Stock A/c	6,525	9,13,823
To Manufacturing OH		19,387	(₹140.0495 × 6,525 units)		
To Abnormal Gain A/c	180	25,209			
(₹140.0495 × 180 units)	***7,230***	***9,40,261***		***7,230***	***9,40,261***

$$NCPU = \frac{\text{Total Cost} - \text{Realisable Value of Normal Loss Units}}{\text{Inputs Units} - \text{Normal Loss Units}} = \frac{9,15,052 - 26,438}{7,050 - 705} = ₹140.0495$$

Finished Goods Stock Account

Particulars	*Units*	*₹*	*Particulars*	*Units*	*₹*
To Process-II A/c	6,525	9,13,823	By Cost of Sales	6,000	8,40,297
			(₹140.0495 × 6,000 units)		
				525	73,526
	6,525	***9,13,823***	By Balance c/d	***6,525***	***9,13,823***

Income Statement

Particulars	*₹*	*Particulars*	*₹*
To Cost of Sales	8,40,297	By Sales	9,66,342
(₹140.0495 × 6,000 units)		(₹8,40,297 × 115%)	
To Abnormal Loss	6,322	By Abnormal Gain	18,459
[(₹96.7947 – ₹12.50) × 75 units]		[(₹140.0495 – ₹37.50) × 180 units]	
To Net Profit	1,38,182		
	9,84,801		***9,84,801***

BBQ 70

A manufacturing unit manufactures a product 'XYZ' which passes through three Processes: X, Y and Z. the following data is given:

Particulars	*Process X*	*Process Y*	*Process Z*
Material consumed (in ₹)	2,600	2,250	2,000
Direct wages (in ₹)	4,000	3,500	3,000

(a) The total production overhead of ₹15,750 was recovered @150% of direct wages.
(b) 15,000 units at ₹2 each were introduced to process 'X'.
(c) The output of each process passes to the next process and finally, 12,000 units were transferred finished stock account from process 'Z'.
(d) No stock of materials or work in progress were left at the end.

The following additional information if given:

Process	% of wastage to normal input	Value of scrap per unit (₹)
X	6%	1.10
Y	?	2.00
Z	5%	1.00

You are required to:

(1) Find out the percentage of wastage in process 'Y' given that the output of process 'Y' is transferred to process 'Z' at ₹4 per unit.

(2) Prepare process accounts for all the three processes X, Y and Z.

[(10 Marks) July 2021]

Answer

(1) Calculation of percentage of wastage in process Y:

Let scrap units in process Y be 'x'

$$\text{Cost per unit in process Y} = \frac{\text{Total cost – sale of scrap}}{\text{total units – Normal loss units}} = \frac{52{,}610 - 2x}{14{,}100 - x} = ₹4$$

$$4\,(14{,}100 - x) = 52{,}610 - 2x$$
$$56{,}400 - 4x = 52{,}610 - 2x$$
$$3{,}790 = 2x$$
$$x = 3{,}790 \div 2 = 1{,}895 \text{ units}$$

$$\text{Percentage of wastage} = (1{,}895 \div 14{,}100) \times 100 = 13.44\%$$

(2) Process X Account

Particulars	Units	₹	Particulars	Units	₹
To Units introduced	15,000	30,000	By Normal Loss	900	990
To Material consumed		2,600	(6% of 15,000 units)		
To Direct wages		4,000	By Process Y Account	14,100	41,610
To Production overheads (150% of 4,000)		6,000			
	15,000	***42,600***		***15,000***	***42,600***

Process Y Account

Particulars	Units	₹	Particulars	Units	₹
To Process X A/c	14,100	41,610	By Normal Loss	1,895	3,790
To Material consumed		2,250	By Process Z Account		
To Direct wages		3,500	@₹4 per unit	12,205	48,820
To Production overheads (150% of 3,500)		5,250			
	14,100	***52,610***		***14,100***	***52,610***

Process Z Account

Particulars	Units	₹	Particulars	Units	₹
To Process Y A/c	12,205	48,820	By Normal Loss	610	610
To Material consumed		2,000	(5% of 12,205 units)		
To Direct wages		3,000	By Finished stock	12,000	59,725
To Production overheads (150% of 3,000)		4,500	Account @ ₹4.977 per unit		
To Abnormal gain @	405	2,015			

₹4.977 per unit					
	12,610	***60,335***		***12,610***	***60,335***

Cost per unit = $\frac{\text{Total cost – sale of scrap}}{\text{total units – Normal loss units}}$ = $\frac{58,320 - 610}{12,205 - 610}$ = ***₹4.977 per unit***

BBQ 71

Meta Company Ltd. is engaged in the production of product 'Trio' which passes through two different processes: Process P and Process Q. Other information obtained from books of account for the year is as follows:

Particulars	***Process P***	***Process Q***
Raw material used	10,000	-
Raw material cost per unit	₹80	-
Direct wages	₹52,000	₹78,000
Direct expenses	₹8,600	₹11,100
Selling Price (per unit)	₹130	₹190

Production overheads of ₹3,00,000 are recovered as percentage of direct wages.

Actual output of the two processes was: P – 9,200 units and Q – 6,400 units. 3/4th of the output of Process P was passed on to the Process Q and the balance was sold.

Management & Selling expenses during the year were 1,70,000. These are not allocable to the processes.

The normal loss of the two processes, calculated on the input of every process was: Process P – 6% and Process Q – 10%.

The loss of Process P was sold at ₹5 per unit and that of Q at ₹8 per unit. Assume the Process P and Process Q are not the responsibility centres.

You are required to prepare:

(i) Process P Account
(ii) Process Q Account
(iii) Abnormal Loss and Abnormal Gain Account
(iv) Costing Profit & Loss Account.

Answer

(i) Process P Account

Particulars	***Units***	***₹***	***Particulars***	***Units***	***₹***
To Raw Materials	10,000	8,00,000	By Normal Loss	600	3,000
To Direct Wages		52,000	(6% @ ₹5 per unit)		
To Direct Expenses		8,600	By Abnormal Loss A/c	200	20,800
To Production OH		1,20,000	By Process Q Account	6,900	7,17,600
			By Profit and Loss A/c	2,300	2,39,200
	10,000	***9,80,600***		***10,000***	***9,80,600***

Production OH = $\frac{3,00,000}{52,000+78,000} \times 52,000$ = ***₹1,20,000***

Normal cost p.u. = $\frac{\text{Total cost} - \text{scrap of normal loss}}{\text{Total units} - \text{normal loss units}}$ = $\frac{9,80,600 - 2,500}{10,000 - 600}$ = **₹104**

(ii) Process Q Account

Particulars	Units	₹	Particulars	Units	₹
To Process P Account	6,900	7,17,600	By Normal Loss	690	5,520
To Direct Wages		78,000	(10% @ ₹8 per unit)		
To Direct Expenses		11,100	By Profit and Loss A/c	6,400	10,11,200
To Production OH		1,80,000			
To Abnormal Gain	190	30,020			
	7,090	**10,16,720**		**7,090**	**10,16,720**

Production OH = $\frac{3,00,000}{52,000+78,000} \times 78,000$ = **₹1,80,000**

Normal cost per unit = $\frac{9,86,700 - 5,520}{6,900 - 690}$ = **₹158**

(iii) Abnormal Loss Account

Particulars	Units	₹	Particulars	Units	₹
To Process P A/c	200	20,800	By Cash A/c	200	1,000
			By Costing P/L A/c		19,800
	200	**20,800**		**200**	**20,800**

Abnormal Gain Account

Particulars	Units	₹	Particulars	Units	₹
To Normal Loss A/c	190	1,520	By Process Q A/c	190	30,020
To Costing P/L A/c		28,500			
	190	**30,020**		**190**	**30,020**

(iv) Costing Profit and Loss Account

Particulars	Units	₹	Particulars	Units	₹
To Process P A/c	2,300	2,39,200	By Sales:		
To Process Q A/c	6,400	10,11,200	Process P	2,300	2,99,000
To Mgt. & Selling Exps.		1,70,000	Process Q	6,400	12,16,000
To Abnormal Loss A/c		19,800	By Abnormal Gain A/c		28,500
To Profit		1,03,300			
	8,700	**15,43,500**		**8,700**	**15,43,500**

BBQ 72

C Limited manufactures a range of products and the data below refer to one product which goes through one process only. The company operates a thirteen four weekly reporting system for process and product costs and the data given below relate to period 10. There was no opening work-in-progress stock.

5,000 units of materials input	at ₹2.94 per unit
Further direct materials added	13,830
Direct wages incurred	6,555
Production overheads	7,470
Normal loss	3% of input

Closing work-in-progress was 800 units but these were incomplete, having reached the following percentage of completion for each of the elements of cost listed.

Direct materials added	75%	Direct wages	50%
Production overhead	25%		

270 units were scrapped after a quality control check when the units were at the following degrees of completion:

Direct materials added	66-⅔%	Direct wages	33-⅓%
Production overhead	16-⅔%		

Units scrapped regardless of the degree of completion are sold for ₹1.00 each and it is company policy to credit the process account with the scrap value of normal loss units.

You are required to prepare the Period 10 accounts for the:

(i) Process account; and
(ii) Abnormal gain or loss.

Answer

Process Account

Particulars	*Units*	*₹*	*Particulars*	*Units*	*₹*
To Units Introduced	5,000	14,700	By Normal Loss	150	150
To Direct Materials		13,830	By Abnormal Loss A/c	120	696
To Labour		6,555	By Finished Goods	3,930	36,549
To Production OH		7,470	By Closing WIP	800	5,160
	5,000	***42,555***		***5,000***	***42,555***

Abnormal Loss A/c

Particulars	*Units*	*₹*	*Particulars*	*Units*	*₹*
To Process A/c	120	696	By Cash A/c	120	120
			By Profit and Loss A/c		576
	120	***696***		***120***	***696***

Working Notes:

Statement of Equivalent Production (Process I)

Particulars	*Units*	*Materials 1*		*Materials 2*		*Labour*		*Overhead*	
		%	*E. Unit*	*%*	*E. Unit*	*%*	*E. Unit*	*%*	*E. Unit*
Normal Loss	150	-	-	-	-	-	-	-	-
Abnormal Loss	120	100	120	66.67	80	33.33	40	16.67	20
Finished Units	3,930	100	3,930	100	3,930	100	3,930	100	3,930
Closing WIP	800	100	800	75	600	50	400	25	200
Total	***5,000***	***-***	***4,850***	***-***	***4,610***	***-***	***4,370***	***-***	***4,150***

Statement of Cost

Elements	*Cost*	*Equivalent Units*	*Cost Per Unit*
Materials 1	14,700 – 150 = 14,550	4,850	3.00
Materials 2	13,830	4,610	3.00
Labour	6,555	4,370	1.50
Overheads	7,470	4,150	1.80
Total cost per unit			9.30

Statement of Evaluation

Particulars	*Elements*	*Equivalent Units*	*Cost Per Unit*	*Total*
Finished Units	Materials 1	3,930	3.00	11,790

	Materials 2	3,930	3.00	11,790
	Labour	3,930	1.50	5,895
	Overhead	3,930	1.80	7,074
				36,549
Abnormal Loss	Materials 1	120	3.00	360
	Materials 2	80	3.00	240
	Labour	40	1.50	60
	Overhead	20	1.80	36
				696
Closing WIP	Materials 1	800	3.00	2,400
	Materials 2	600	3.00	1,800
	Labour	400	1.50	600
	Overhead	200	1.80	360
				5,160

BBQ 73

The following data are available in respect of process 1 for March 2023:

1. Opening stock of work in process 800 units at a total cost of ₹4,000.
2. Degree of completion of opening work in progress:
   - Materials 100%
   - Labour 60%
   - Overheads 60%
3. Input of materials at a total cost of ₹36,800 for 9,200 units.
4. Direct wages incurred ₹16,740
5. Production overhead ₹8,370
6. Unit scrapped 1,200 units. The state of completion of these units was:
   - Materials 100%
   - Labour 80%
   - Overheads 80%
7. Closing work in progress 900 units. The stage of completion of these units was:
   - Materials 100%
   - Labour 70%
   - Overheads 70%
8. 7,900 units were completed and transferred to the next process.
9. Normal loss is 8% of the total input.
10. Scrap value is ₹4 per unit.

You are required to:

(A) Compute equivalent production.
(B) Calculate the cost per equivalent unit for each element.
(C) Calculate the value of abnormal loss (or gain) closing work in progress and the units transferred to the next process by using ***FIFO Method***.
(D) Show the process account for March 2023.

Answer

(A) Statement of Equivalent Production

Particulars	***Units***	***Materials***		***Labour & OH***	
		%	***Eq. Unit***	***%***	***Eq. Unit***
Opening units:					
Used for Completed Units	800	-	-	40	320
Units Introduced:					

Used for Completed Units	7,100	100	7,100	100	7,100
Used for Closing WIP	900	100	900	70	630
Normal Loss	800	-	-	-	-
Abnormal Loss	400	100	400	80	320
Total	***10,000***	***-***	***8,400***	***-***	***8,370***

(B) Statement of Cost

Elements	*Cost*	*Equivalent Units*	*Cost Per Unit*
Materials	36,800 – 3,200 = 33,600	8,400	₹4.00
Labour	16,740	8,370	₹2.00
Overheads	8,370	8,370	₹1.00
Total cost per unit			₹7.00

(C) Statement of Valuation of Abnormal Loss, Closing WIP, and Units Transferred to Next Process

Particulars	*Elements*	*Eq. Units*	*Cost per unit*	*Total*
Units Transferred:				
Current Period Cost	Materials	7,100	4.00	28,400
	Labour, OH	7,420	2.00 + 1.00	22,680
Add: Cost of Opening WIP (Used in completed units)				4,000
				54,660
Closing WIP	Materials	900	4.00	3,600
	Labour, OH	630	2.00 + 1.00	1,890
				5,490
	Materials	400	4.00	1,600
Abnormal Loss	Labour, OH	320	2.00 + 1.00	960
				2,560

(D) Process Account For March 2023

Particulars	*Units*	*₹*	*Particulars*	*Units*	*₹*
To Opening WIP	800	4,000	By Normal loss	800	3,200
To Materials	9,200	36,800	By Abnormal Loss	400	2,560
To Labour		16,740	By Next Process A/c	7,900	54,660
To Overhead		8,370	By Closing WIP	900	5,490
	10,000	***65,910***		***10,000***	***65,910***

BBQ 74

Following details are related to the work done in Process 'A' of XYZ Company during the month of March, 2024:

Opening work-in-progress ***2,000 units***

Materials	₹80,000
Labour	₹15,000
Overheads	₹45,000

Materials introduced in Process 'A' ***38,000 units***

Materials	₹14,80,000
Direct labour	₹3,59,000
Overheads	₹10,77,000

Units scrapped ***3,000 units***

Degree of completion:

Materials	100%
Labour and overheads	80%

Closing work-in-progress ***2,000 units***

Degree of completion:

Materials	100%
Labour and overhead	80%

Units finished and transferred to Process 'B'	35,000 units
Normal loss to total input including opening work-in-progress	5%
Scrapped units fetch	₹20 per unit

You are required to prepare

1. Statement of equivalent production;
2. Statement of cost;
3. Statement of distribution cost; and
4. Process 'A' Account, Normal and Abnormal Loss Accounts.

Answer

1. Statement of Equivalent Production (Average Cost Method)

Particulars	Total Units	Materials		Processing Cost	
		%	Unit	%	Unit
Units Completed	35,000	100	35,000	100	35,000
Normal loss	2,000	-	-	-	-
Abnormal Loss	1,000	100	1,000	80	800
Closing WIP	2,000	100	2,000	80	1,600
Total	***40,000***	***-***	***38,000***	***-***	***37,400***

2. Statement of Cost

Elements	Total Cost	Equivalent Units	Cost Per Unit
Materials	80,000 + 14,80,000 – 40,000 = 15,20,000	38,000	40.00
Labour	15,000 + 3,59,000 = 3,74,000	37,400	10.00
Overheads	45,000 + 10,77,000 = 11,22,000	37,400	30.00
			80.00

3. Statement of Evaluation

Particulars	Elements	Eq. Units	Cost Per Unit	Total
Units Completed	Materials, Labour, Overheads	35,000	80.00	***28,00,000***
Abnormal Loss	Materials	1,000	40.00	40,000
	Labour, Overheads	800	10.00 + 30.00	32,000
				72,000
Closing WIP	Materials	2,000	40.00	80,000
	Labour, Overheads	1,600	10.00 + 30.00	64,000
				1,44,000

4. Process A Account

Particulars	Units	₹	Particulars	Units	₹
To Opening WIP	2,000	1,40,000	By Normal Loss	2,000	40,000
To Direct Materials	38,000	14,80,000	By Process B A/c	35,000	28,00,000

To Direct Labour		3,59,000	By Abnormal Loss A/c	1,000	72,000
To Overhead		10,77,000	By Closing WIP	2,000	1,44,000
	40,000	***30,56,000***		***40,000***	***30,56,000***

Normal Loss Account

Particulars	***Units***	***₹***	***Particulars***	***Units***	***₹***
To Process A A/c	2,000	40,000	By Cash A/c	2,000	40,000
	2,000	***40,000***		***2,000***	***40,000***

Abnormal Loss Account

Particulars	***Units***	***₹***	***Particulars***	***Units***	***₹***
To Process A A/c	1,000	72,000	By Cash A/c	1,000	20,000
			By Costing P&L A/c		72,000
	1,000	***72,000***	(b.f.)	***1,000***	***72,000***

BBQ 75

A Ltd. produces product AXE which passes through two processes before it is completed and transferred to finished stock. The following data relate to October 2023.

	Process I	***Process II***	***Finished Stock***
Opening stock	7,500	9,000	22,500
Direct materials	15,000	15,750	
Direct wages	11,200	11,250	
Factory overheads	10,500	4,500	
Closing stock	3,700	4,500	11,250
Inter - process profit included in opening stock	Nil	1,500	8,250

Output of process I is transferred to Process II at 25% profit on the transfer price. Output of Process II is transferred to finished stock at 20% profit on the transfer price. Stock in process is valued at prime cost. Finished stock is valued at the price at which it is received from process II. Sales during the period are ₹1,40,000. Prepare Process accounts and finished goods account showing the profit element at each stage.

Answer

Process I A/c

Particulars	***Total***	***Cost***	***Profit***	***Particulars***	***Total***	***Cost***	***Profit***
Opening Stock	7,500	7,500	-	Process II A/c	54,000	40,500	13,500
Direct Materials	15,000	15,000	-	Closing Stock	3,700	3,700	-
Direct Wages	11,200	11,200	-				
Prime Cost	33,700	33,700	-				
Factory OH	10,500	10,500	-				
Total Cost	44,200	44,200	-				
Profit	13,500	-	13,500				
	57,700	***44,200***	***13,500***		***57,700***	***44,200***	***13,500***

Process II A/c

Particulars	***Total***	***Cost***	***Profit***	***Particulars***	***Total***	***Cost***	***Profit***
Opening Stock	9,000	7,500	1,500	Finished Stock	1,12,500	75,750	36,750
Process II A/C	54,000	40,500	13,500	A/c			

Direct Materials	15,750	15,750	-	Closing Stock	4,500	3,750	*750
Direct Wages	11,250	11,250	-				
Prime Cost	90,000	75,000	15,000				
Factory OH	4,500	4,500	-				
Total Cost	94,500	79,500	15,000				
Profit	22,500	-	22,500				
	1,17,000	***79,500***	***37,500***		***1,17,000***	***79,500***	***37,500***

Finished Stock A/c

Particulars	***Total***	***Cost***	***Profit***	***Particulars***	***Total***	***Cost***	***Profit***
Opening Stock	22,500	14,250	8,250	Costing P&L A/c	1,40,000	82,425	57,575
Process II A/c	1,12,500	75,750	36,750	Closing Stock	11,250	7,575	*3,675
Profit	16,250	-	16,250				
	1,51,250	***90,000***	***61,250***		***1,51,250***	***90,000***	***61,250***

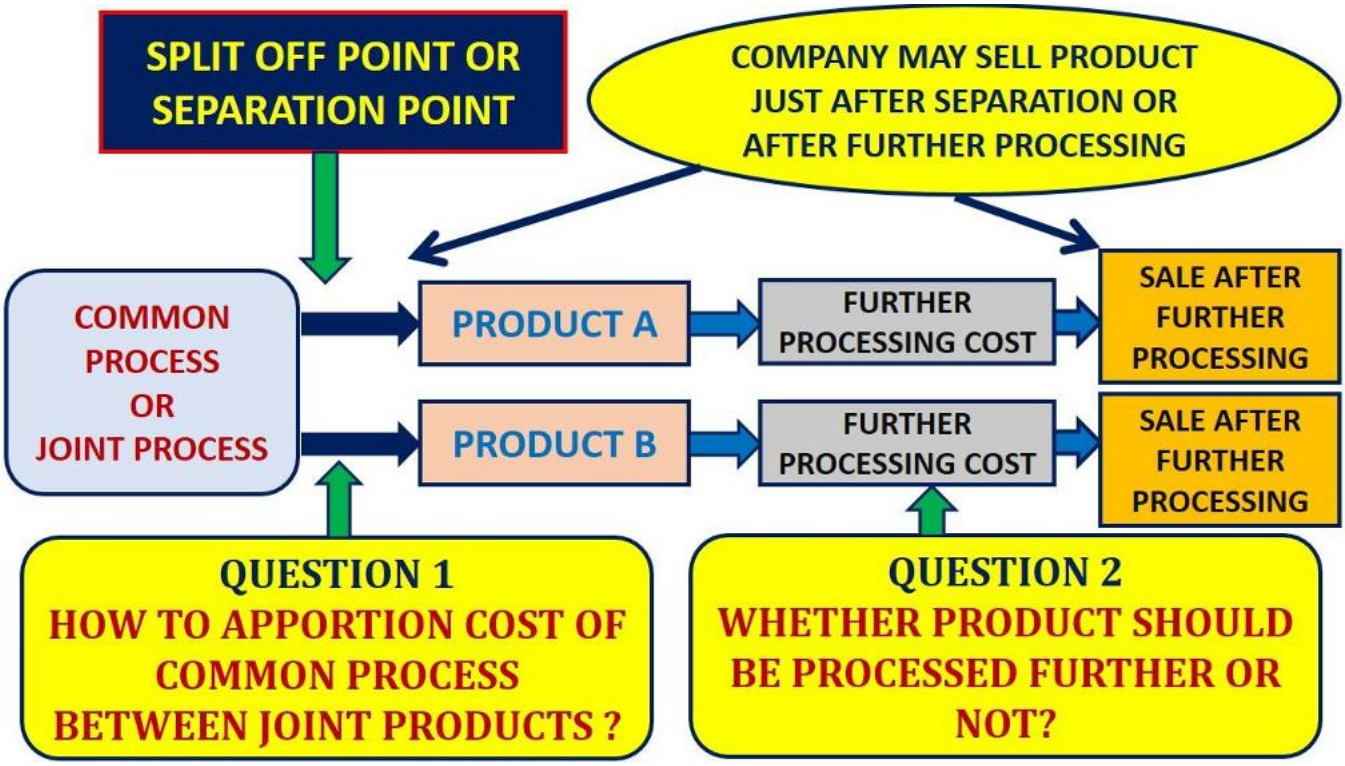
**** Stock reserve in closing stock of Process II*** = $^{15,000}/_{90,000} \times 4,500$ = ***750***

**** Stock reserve in closing stock of FG*** = $^{36,750}/_{1,12,500} \times 11,250$ = ***3,675***

CHAPTER 9 JOINT PRODUCTS & BY PRODUCTS

1. ***Joint Products:*** *Two or more products of equal importance, produced, simultaneously from the same process, with each having a significant relative sale value are known as joint products. For example, in the oil industry, gasoline, fuel oil, lubricants, paraffin, coal tar, asphalt and kerosene are all produced from crude petroleum. These are known as joint products.*

2. ***Understanding of Chapter:***



3. ***Methods of apportionment of joint cost:***

- ***Physical unit method:*** *Apportionment of joint cost on the basis of physical units or output at split off point.*

Statement Showing Apportionment of Joint Cost
(Physical Units Method)

Particulars	Product A	Product B
Physical units or output at split of point	XXX	XXX
Joint Cost in proportion of Physical units	XXX	XXX

- ***Average unit cost method:*** *Apportionment of joint cost on the basis of average cost per unit.*

Step 1: *Calculate Average unit cost*

Average unit cost = $\frac{\text{Total Joint Cost}}{\text{Total Units at Separation Point}}$

Step 2: Apportion joint cost on the basis of average unit cost

- **Market value at separation point method:** Apportionment of joint cost on the basis of market value at separation point net of selling expenses at split off point (if any) of total output of products.

Statement Showing Apportionment of Joint Cost
(Market Value at Separation Point Method)

Particulars	Product A	Product B
Market value at separation point of total output at separation point Less: Selling expenses at separation point	XXX (XXX)	XXX (XXX)
Net Market value at separation point	XXX	XXX
Joint Cost in proportion of Net MV at separation point	XXX	XXX

- **Market value after further processing method:** Apportionment of joint cost on the basis of market value after further processing of total output of products.

Statement Showing Apportionment of Joint Cost
(Market Value After Further Processing Method)

Particulars	Product A	Product B
Market value after further processing of total output after further processing	XXX	XXX
Joint Cost in proportion of MV after further processing	XXX	XXX

- **Net realisable value (NRV) method/ NRV at split off point method:** Apportionment of joint cost on the basis of net realisable value at split off point of total output of products.

NRV = Sale value after further processing – further processing cost – selling expenses after further processing if any

Statement Showing Apportionment of Joint Cost
(NRV Method)

Particulars	Product A	Product B
Market value after further processing of total output after further processing Less: Further processing cost Less: Selling expenses after further processing	XXX (XXX) (XXX)	XXX (XXX) (XXX)
Net Realizable Value	XXX	XXX
Joint Cost in proportion of NRV	XXX	XXX

➢ *Contribution margin method:*

Step 1: Apportionment of variable joint cost on the basis of physical units.

Step 2: Apportionment of fixed joint cost on the basis of contribution.

Note: Fixed cost will not be apportioned to product having zero or negative contribution.

Statement Showing Apportionment of Joint Cost
(Contribution Margin Method)

Particulars	Product A	Product B
Physical units or output	XXX	XXX
Variable Joint Cost in proportion of Physical units	XXX	XXX
Market value of total output	XXX	XXX
Less: Variable joint cost	(XXX)	(XXX)
Contribution	XXX	XXX
Fixed Joint Cost in proportion of Positive contribution	XXX	XXX
Total Joint Cost (Variable joint Cost + Fixed Joint Cost)	XXX	XXX

➢ *Reverse cost method:*

Statement Showing Apportionment of Joint Cost
(Reverse Cost Method)

Particulars	Product A	Product B
Sale value after further processing of total output after further processing	XXX	XXX
Less: Profit	(XXX)	(XXX)
Less: Selling expenses after further processing	(XXX)	(XXX)
Less: Further cost	(XXX)	(XXX)
Joint Cost	XXX	XXX

Note: If total joint cost mismatched with apportioned joint cost then apportion actual joint cost in proportion of apportioned mismatched joint cost.

➢ *Constant gross margin method:*

Step 1: First calculate constant percentage of profit:

$$\text{Percentage of Profit} = \frac{\text{Total Profit}}{\text{Total Sales}} \times 100$$

Step 2: Use reverse cost method to find out joint cost of each product.

4. *Further Processing Decision: Decision in respect of further processing of any product*

Incremental Revenue (IR) = Sale value of total output after further processing – Sale value of total output at separation Point

Incremental Cost (IC) = ***Further processing cost + Selling expenses after further processing – Selling expenses at split off point***

Situation	Further Processing Decision
1. IR > IC	Yes
2. IR = IC	Indifferent
3. IR < IC	No

5. Treatment of by product:

Situation 1: By product has commercial use: ***treat it as joint product.***

How to trace:

- ***When joint cost is also apportioned to by-product***
- ***When By-product also earns profit***

Situation 2: By product don't have commercial use:

Step 1: ***Deduct sale value or NRV of by-product from the joint cost.***

Step 2: ***Apportion net joint cost among remaining main products.***

BBQ 76

Bright Chemicals Ltd. electrolyses common salt to obtain three joint products - caustic soda, chlorine and hydrogen. During a costing period, the expenditure relating to the inputs for the common process amounted to ₹3,50,000. After separation expenses amounting to ₹1,60,000, ₹75,000 and ₹10,000 were incurred for caustic soda, chlorine and hydrogen respectively.

The entire production was sold and ₹3,75,000, ₹2,50,000 and ₹60,000 were realised for caustic soda, chlorine and hydrogen respectively. The selling expenses were estimated at 5% of realizations sale. The management expected profits @ 15%, 10% and 5% of realization from sale of caustic soda, chlorine, and hydrogen respectively.

Draw a columnar statement showing the apportionment of joint costs and the profitability of each product.

Answer

Statement Showing Apportionment of Joint Cost

Particulars	Soda	Chlorine	Hydrogen
Sale value after further processing	3,75,000	2,50,000	60,000
Less: Estimated profit @ 15%, 10% and 5% on sales	56,250	25,000	3,000
Less: Selling expenses @ 5% of sales	18,750	12,500	3,000
Less: Further cost	1,60,000	75,000	10,000
Estimated Joint Cost	***₹1,40,000***	***₹1,37,500***	***₹44,000***
Joint Cost ₹3,50,000 in 1,400 : 1,375 : 440	***₹1,52,411***	***₹1,49,689***	***₹47,900***
Profit (Sales–Selling expenses–Further cost–Actual Joint cost)	***₹43,839***	***₹12,811***	***(₹900)***

BBQ 77

From the following details advise whether products should be processed further or not:

Particulars		Product A	Product B	Product C
Sale value:	After further processing	1,50,000	2,40,000	70,000

	At separation point	80,000	1,50,000	50,000
Selling expenses:	After further processing	20,000	30,000	12,000
	At separation point	15,000	20,000	7,000
Further cost		30,000	80,000	35,000

Answer

Statement Showing Further Processing Decision

Product	*Calculation Incremental Revenue and Cost*		*Status*	*Decision*
A	IR = 1,50,000 – 80,000 IC = 30,000 + (20,000 – 15,000)	= 70,000 = 35,000	IR > IC	***Yes***
B	IR = 2,40,000 – 1,50,000 IC = 80,000 + (30,000 – 20,000)	= 90,000 = 90,000	IR = IC	***Indifferent***
C	IR = 70,000 – 50,000 IC = 35,000 + (12,000 – 7,000)	= 20,000 = 40,000	IR < IC	***No***

BBQ 78

A company purchases raw materials worth ₹11.04 lakhs and processes them into four products P, Q, R and S, which have a unit sale value of ₹3, ₹9, ₹16 and ₹60 respectively at split-off point, as they could be sold as such to other processors. However, during a year, the company decided to further process and sell products P, Q and S, while R was not to be processed further but sold at split-off point to other processors. The processing of raw materials into the four products cost ₹28 lakhs to the company. The other data for the year were as under:

Product	*Output (in units)*	*Sales (in ₹)*	*Separate costs (in ₹)*
P	10,00,000	46,00,000	12,00,000
Q	20,000	4,00,000	2,40,000
R	10,000	1,60,000	NIL
S	18,000	12,00,000	40,000

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

(a) If the joint costs are allocated amongst the four products on the basis of ***Net realizable value at split-off point***, what would be the company's annual income?

(b) If the company had sold off all the other three products at split-off stage, identify the increase or decrease in the company's annual income as compared to ***(a)*** above.

(c) What sales strategy could the company have planned to maximize its profits in the year?

(d) Identify the net increase in income if the strategy at ***(c)*** is adopted, as compared to ***(a)*** above.

Answer

(a) Statement Showing Annual Income (Net Realisable Value Method)

Products	*P (₹)*	*Q (₹)*	*R (₹)*	*S (₹)*	*Total (₹)*
Sales value after further processing	46,00,000	4,00,000	1,60,000	12,00,000	63,60,000
Less: Further cost	12,00,000	2,40,000	-	40,000	14,80,000
Net Realisable Value	34,00,000	1,60,000	1,60,000	11,60,000	48,80,000
Joint Cost (in NRV proportion)	***27,20,000***	***1,28,000***	***1,28,000***	***9,28,000***	***39,04,000***
Sales value after further processing	46,00,000	4,00,000	1,60,000	12,00,000	63,60,000
Less: Further cost	12,00,000	2,40,000	-	40,000	14,80,000
Less: Joint cost	27,20,000	1,28,000	1,28,000	9,28,000	39,04,000
Annual Income	***6,80,000***	***32,000***	***32,000***	***2,32,000***	***9,76,000***

Joint cost = Raw material cost + Processing cost (excluding material cost)

= 11,04,000 + 28,00,000 = ***39,04,000***

(b) Statement Showing Annual Income
(When all products are sold at split off stage)

Products	***P (₹)***	***Q (₹)***	***R (₹)***	***S (₹)***	***Total (₹)***
Number of units	10,00,000	20,000	10,000	18,000	-
Sale price per unit at split off stage	₹3	₹9	₹16	₹60	-
Sales value at split off stage	30,00,000	1,80,000	1,60,000	10,80,000	44,20,000
Less: Joint cost	27,20,000	1,28,000	1,28,000	9,28,000	39,04,000
Annual Income	***2,80,000***	***52,000***	***32,000***	***1,52,000***	***5,16,000***
Increase/(Decrease) in Income (5,16,000 – 9,76,000)					***(4,60,000)***

(c) Strategy to maximize profits: Best production plan will be to sell P and S after further processing and Q and R at the point of split off.

(d) Statement Showing Net Increase in Income (If strategy is adopted)

Products	***P (₹)***	***Q (₹)***	***R (₹)***	***S (₹)***	***Total (₹)***
Sales value	46,00,000	1,80,000	1,60,000	12,00,000	63,60,000
Less: Further cost	12,00,000	-	-	40,000	14,80,000
Less: Joint cost	27,20,000	1,28,000	1,28,000	9,28,000	39,04,000
Annual Income	***6,80,000***	***52,000***	***32,000***	***2,32,000***	***9,96,000***
Net Increase in Income (9,96,000 – 9,76,000)					***20,000***

BBQ 79

'Buttery Butter' is engaged in the production of Buttermilk, Butter and Ghee. It purchases processed cream and let it through the process of churning until it separates into buttermilk and butter. For the month of January, 2023, 'Buttery Butter' purchased 50 Kilolitre processed cream @ ₹100 per 1,000 ml. Conversion cost of ₹1,00,000 were incurred upto the split off point, where two saleable products were produced i.e. buttermilk and butter. Butter can be further processed into Ghee.

The January, 2023 production and sales information is as follows:

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

All 20 tonne of butter were further processed at an incremental cost of ₹1,20,000 to yield 16 Kilolitre of Ghee. There was no opening or closing inventories of buttermilk, butter or ghee in January, 2023.

Required:

(a) Show how joint cost would be apportioned between Buttermilk and Butter under ***Estimated Net Realisable Value method.***

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

Answer

(a) Statement Showing Apportionment of Joint Cost
(Estimated Net Realisable Value Method)

Particulars	***Buttermilk***	***Butter***

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

Joint cost = (₹100 × 50 × 1000) + ₹1,00,000 = ***₹51,00,000***

(b) Further processing of Butter into Ghee decision:

Incremental revenue	=	₹480 × 16 × 1000 - ₹360 × 20 × 1000	=	₹4,80,000
Incremental cost	=	₹1,20,000		
Incremental benefit	=	₹4,80,000 - ₹1,20,000	=	₹3,60,000

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

BBQ 80

Sun-moon Ltd. produces and sells the following products:

Products	Units	Selling price at split-off point (₹)	Selling price after further processing (₹)
A	2,00,000	17	25
B	30,000	13	17
C	25,000	8	12
D	20,000	10	-
E	75,000	14	20

Raw material costs ₹35,90,000 and other manufacturing expenses cost ₹5,47,000 in the manufacturing process which are absorbed on the products on the basis of their ***'Net realisable value'***. The further processing costs of A, B, C and E are ₹12,50,000; ₹1,50,000; ₹50,000 and ₹1,50,000 respectively. Fixed costs are ₹4,73,000.

You are required to prepare the following in respect of the coming year:

(a) Statement showing income forecast of the company assuming that none of its products are to be further processed.

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

(c) Can you suggest any other production plan whereby the company can maximise its profits? If yes, then submit a statement showing income forecast arising out of adoption of that plan.

Answer

(a) Statement Showing Income Forecast of the Company
(Assuming that none of its products are further processed)

Products	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)	Total (₹)
Number of units	2,00,000	30,000	25,000	20,000	75,000	-
Sale price per unit	17	13	8	10	14	-
Sales revenue	34,00,000	3,90,000	2,00,000	2,00,000	10,50,000	52,40,000
Less: Apportioned cost	26,25,000	2,52,000	1,75,000	1,40,000	9,45,000	41,37,000
	7,75,000	1,38,000	25,000	60,000	1,05,000	11,03,000
Less: Fixed cost						4,73,000
Profit						***6,30,000***

(b) Statement Showing Income Forecast of the Company
(Assuming that products A, B, C and E are further processed)

Products	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)	Total (₹)
Number of units	2,00,000	30,000	25,000	20,000	75,000	-
Sale price per unit	25	17	12	10	20	-
Sales revenue	50,00,000	5,10,000	3,00,000	2,00,000	15,00,000	75,10,000
Less: Apportioned cost	26,25,000	2,52,000	1,75,000	1,40,000	9,45,000	41,37,000
Less: Further cost	12,50,000	1,50,000	50,000	-	1,50,000	16,00,000
	11,25,000	1,08,000	75,000	60,000	4,05,000	17,73,000
Less: Fixed cost						4,73,000
Profit						**13,00,000**

(c) Suggested production plan for maximising profits: On comparing the figures of excess of revenue over cost of manufacturing in the above statements one observes that the concern is earning more after further processing of A, C and E products but is loosing a sum of ₹30,000 in the case of product B (if it is processed further). Hence the best production plan will be to sell A, C and E after further processing and B and D at the point of split off. The profit statement based on this suggested production plan is as below:

Profit Statement Based on Suggested Production Plan

Products	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)	Total (₹)
Number of units	2,00,000	30,000	25,000	20,000	75,000	-
Sale price per unit	25	13	12	10	20	-
Sales revenue	50,00,000	3,90,000	3,00,000	2,00,000	15,00,000	73,90,000
Less: Apportioned cost	26,25,000	2,52,000	1,75,000	1,40,000	9,45,000	41,37,000
Less: Further cost	12,50,000	-	50,000	-	1,50,000	14,50,000
	11,25,000	1,38,000	75,000	60,000	4,05,000	18,03,000
Less: Fixed cost						4,73,000
Profit						**13,30,000**

Hence the profit of the company has increased by ₹30,000

Working note:

Statement Showing Apportionment of Joint Cost
(Net Realisable Value Method)

Products	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)
Number of units	2,00,000	30,000	25,000	20,000	75,000
Sale price per unit	25	17	12	10	20
Sales revenue	50,00,000	5,10,000	3,00,000	2,00,000	15,00,000
Less: Further cost	12,50,000	1,50,000	50,000	-	1,50,000
Net Realisable Value	37,50,000	3,60,000	2,50,000	2,00,000	13,50,000
Joint cost (in NRV proportion)	**26,25,000**	**2,52,000**	**1,75,000**	**1,40,000**	**9,45,000**

Joint cost = Raw material cost + other manufacturing expenses
= 35,90,000 + 5,47,000
= ***41,37,000***

BBQ 81

Smile company produces two main products and a by-product out of a joint process. The ratio of output quantities to input quantities of direct material used in the joint process remains consistent on yearly basis. Company has employed the physical volume method to allocate joint production costs to the main products. The net realizable value of the by-product is used to reduce the joint production costs before the joint costs are allocated to the main products. Details of company's operation are given in the table below. During the

month, company incurred joint production costs of ₹10,00,000. The main products are not marketable at the split off point and thus have to be processed further.

Particulars	Product A	Product B	By Product
Monthly output in kg.	60,000	1,20,000	50,000
Selling price per kg.	₹ 50	₹ 30	₹ 5
Process costs	₹ 2,00,000	₹ 3,00,000	

Find out the amount of joint product cost that Smile company would allocate to the product B by using the physical volume method to allocate joint production costs?

Answer

Calculation of Net joint costs to be allocated:

Particulars	Amount (₹)
Joint Costs	10,00,000
Less: Net Realizable value of by-product (50,000×5)	2,50,000
Net joint costs to be allocated	7,50,000

$$\text{Joint cost allocable to Product B} = \frac{\text{Net joint cost allocable to products}}{\text{Total Units}} \times \text{Physical qty of Product B}$$

$$= \frac{7,50,000}{60,000+1,20,000} \times 1,20,000 = ₹5,00,000$$

BBQ 82

A company manufactures one main product (M1) and two by-products B1 and B2 for the month of January 2013, following details are available:

Total Cost upto Separation Point ₹2,12,400

Particulars	M1	B1	B2
Cost after separation	-	₹35,000	₹24,000
No. of units produced	4,000	1,800	3,000
Selling price per units	₹100	₹40	₹30
Estimated net profit as percentage to sales value	-	20%	30%
Estimated selling expenses as percentage to sales value	20%	15%	15%

There are no beginning or closing inventories.

Prepare statement showing:

I. Allocation of joint cost; and
II. Product-wise and overall profitability of the company for January 2013.

Answer

I. Statement of Allocation of Joint Cost

Particulars	B1	B2
Sales @ ₹40/₹30 per unit	72,000	90,000
Less: Estimated profit @ 20%/30%	14,400	27,000
Less: Estimated selling expenses @ 15% on sales	10,800	13,500
Less: Further estimated cost (cost after separation)	35,000	24,000
Joint Cost	***11,800***	***25,500***
Total Joint Cost		2,12,400
Less: Joint cost allocable to B1		11,800

Less: Joint cost allocable to B2	25,500
Joint Cost allocable to M1	***1,75,100***

II. Product-wise & Overall Profitability Statement

Particulars	*M1*	*B1*	*B2*	*Total*
Sales	4,00,000	72,000	90,000	5,62,000
Less: Selling expenses @ 20%/15%/15%	80,000	10,800	13,500	1,04,300
Less: Cost after separation	Nil	35,000	24,000	59,000
Less: Joint cost	1,75,100	11,800	25,500	2,12,400
Profit	***1,44,900***	***14,400***	***27,000***	***1,86,300***

BBQ 83

A factory producing article A also produces a by-product B which is further processed into finished product.

The joint costs of manufacture are given below:

Material	₹5,000
Labour	₹3,000
Overheads	₹2,000
	₹10,000

Subsequent costs are given below:

	A	*B*
Material	₹3,000	₹1,500
Labour	₹1,400	₹1,000
Overheads	₹600	₹500
	₹5,000	***₹3,000***

Selling Price:

Product A	₹16,000
Product B	₹8,000

Estimated profits on selling prices:

Product A	25%
Product B	20%

Assume that selling and distributing expenses are in proportion of sales prices. Show how you would apportion joint costs of manufacture and prepare a statement showing cost of production of A and B.

Answer

Statement Showing Apportionment of Joint Cost

Particulars	*Article A*	*By-product B*
Sales value	16,000	8,000
Less: Profit @ 25% of 16,000 & 20% of 8,000	4,000	1,600
Less: Selling expenses (400 in 16 : 8)	267	133
Less: Subsequent cost	5,000	3,000
Joint cost	***6,733***	***3,267***

**** Calculation of selling expenses:***

Selling expenses = Total sales – Total profit – Total subsequent cost – Total joint cost
= (16,000 + 8,000) – (4,000 + 1,600) – (5,000 + 3,000) – 10,000
= ***400***

Statement Showing Cost of Production

Particulars	*Article A*	*By-product B*
Joint cost	6,733	3,267
Subsequent cost	5,000	3,000
Cost of Production	***11,733***	***6,267***

BBQ 84

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

Individual departmental expenses are as follows:

	Department X (In Lakh)	*Department Y (In Lakh)*
Direct materials	₹95.00	₹14.00
Direct labour	₹80.00	₹27.00
Variable overheads	₹100.00	₹35.00
Fixed overheads	₹75.00	₹52.00
Total	***₹350.00***	***₹128.00***

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

Product 'P1'	₹28.38 lakh
Product 'P2'	₹25.00 lakh
Product 'YP1'	₹19.00 lakh

The selling prices per kg are as under:

Product 'P1'	₹110
Product 'P2'	₹325
Product 'YP1'	₹150

You are required to:

(1) Prepare a statement showing the apportionment of joint costs in the ratio of value of sales, net of selling expenses.
(2) Statement showing profitability at split off point.
(3) Statement of profitability of 'YP1'
(4) Would you recommend further processing of 'P1'?

Answer

Input in Department X	=	9,00,000 kgs		
Yield	=	90%		
Therefore Output	=	90% of 9,00,000 kgs	=	8,10,000 kgs
Ratio of output for 'P1' and 'P2'	=	***60 : 40***		
Product of 'P1'	=	60% of 8,10,000 kgs	=	4,86,000 kgs
Product of 'P2'	=	40% of 8,10,000 kgs	=	3,24,000 kgs

(1) Statement Showing Apportionment of Joint Cost

Particulars	Product 'P1' (₹in Lakh)	Product 'P2' (₹in Lakh)
Sales value at split-off-point	(4,86,000 × 110)	(3,24,000 × 325)
	534.60	1,053.00
Less: Selling expenses if sold at split-off-point	(28.38)	(25.00)
Net sales at split-off-point	506.22	1,028.00
Share of joint cost of *₹1,205 lakh (in 506.22 : 1,028)	***397.59***	***807.41***

**** Calculation of joint cost:***

Raw materials (9,00,000 kgs × ₹95)	=	855 lakh
Process cost of department X	=	350 lakh
Joint cost	=	***1,205 lakh***

(2) Statement of Profitability at Split Off Point

Particulars	Product 'P1' (₹in Lakh)	Product 'P2' (₹in Lakh)
Sales value at split-off-point	(4,86,000 × 110)	(3,24,000 × 325)
	534.60	1,053.00
Less: Selling expenses if sold at split-off-point	(28.38)	(25.00)
Less: Joint Cost	(397.59)	(807.41)
Profit	***108.63***	***220.59***

(3) Statement of Profitability of 'YP1'

Particulars	Product 'YP1' (₹in Lakh)
Sales value (4,61,700 × 150)	692.55
Less: Further processing cost in department Y	(128.00)
Less: Selling expenses if sold after further processing	(19.00)
Less: Joint Cost	(397.59)
Profit	***147.96***

Calculation of output of product 'YP1':

Output = 95% of 4,86,000 kgs = ***4,61,700 kgs***

(4) Further Processing Decision: Product 'P1' should be sold after further processing as product 'YP1' having higher profit.

BBQ 85

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

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

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

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

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

Answer

Statement Showing Apportionment of Joint Cost and Profitability

Particulars	*Product X*	*By-Product Z*
Number of units produced at split off point (in kg)	14,580	3,645
Market value at separation point per kg	₹60	₹30
Total market value at separation point	₹8,74,800	₹1,09,350
Apportionment of Joint Cost ₹6,21,900 in sales ratio	***₹5,52,800***	***₹69,100***
Profit (Sales value – Joint cost)	***₹3,22,000***	***₹40,250***

Working Notes:

(a) Output of Product X at split off point = 14,580 kg

∴ Output of By-product Z = (14,580 ÷ 80) × 20 = 3,645 kgs

(b) Input of raw material into each process:

Output of Process T	=	14,580 + 3,645	=	18,225 kgs
Input of process T	=	18,225 ÷ 90%	=	20,250 kgs
Input of Process S	=	20,250 ÷ 90%	=	22,500 kgs
Input of Process R	=	22,500 ÷ 90%	=	25,000 kgs

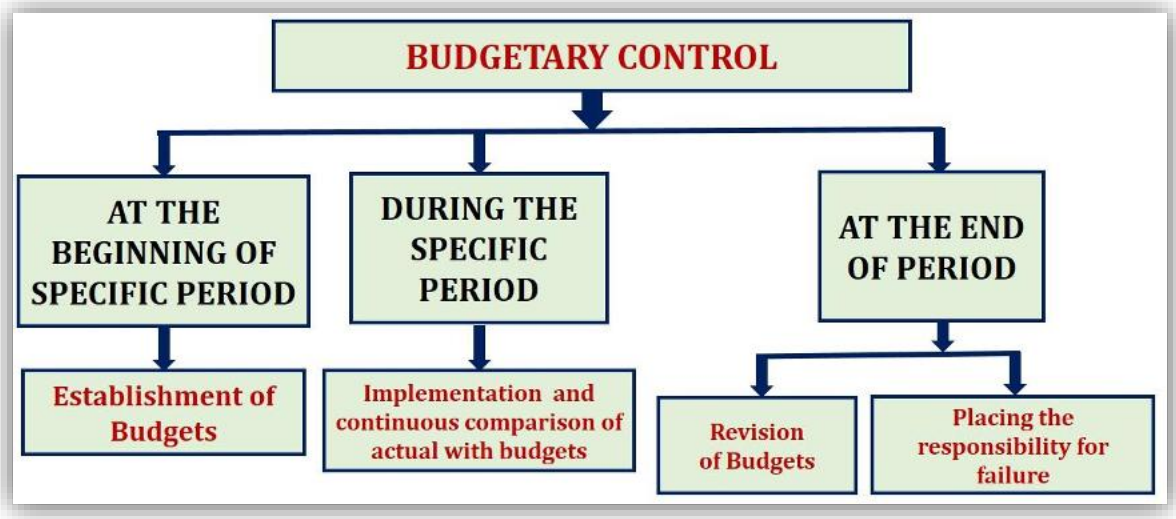
(c) Calculation of Joint Cost:

Particulars	*Process R*	*Process S*	*Process T*	*Total*
Material input (in kg)	25,000	22,500	20,250	-
Material cost:				
Material J (25,000 × 40% × ₹15)	1,50,000	-	-	1,50,000
Material K (25,000 × 40% × ₹9)	90,000	-	-	90,000
Material L (25,000 × 20% × ₹7)	35,000	-	-	35,000
Variable cost @ ₹5, ₹4.50, ₹3.40 per kg	1,25,000	1,01,250	68,850	2,95,100
Fixed cost	42,000	5,000	4,800	51,800
Joint Cost	***4,42,000***	***1,06,250***	***73,650***	***6,21,900***

CHAPTER 10 BUDGETS & BUDGETARY CONTROL

1. **Budget:** *A budget is an instrument of management used as an aid in the planning, programming and control of business activity. The Chartered Institute of Management Accountants (CIMA) UK defines budget as "A financial and/or quantitative statement, prepared and approved prior to a defined period of time of the policy to be pursued during that period for the purpose of attaining a given objective. It may include income, expenditure and employment of capital" The budget is a blue- print of the projected plan of action expressed in quantitative terms for a specified period of time.*

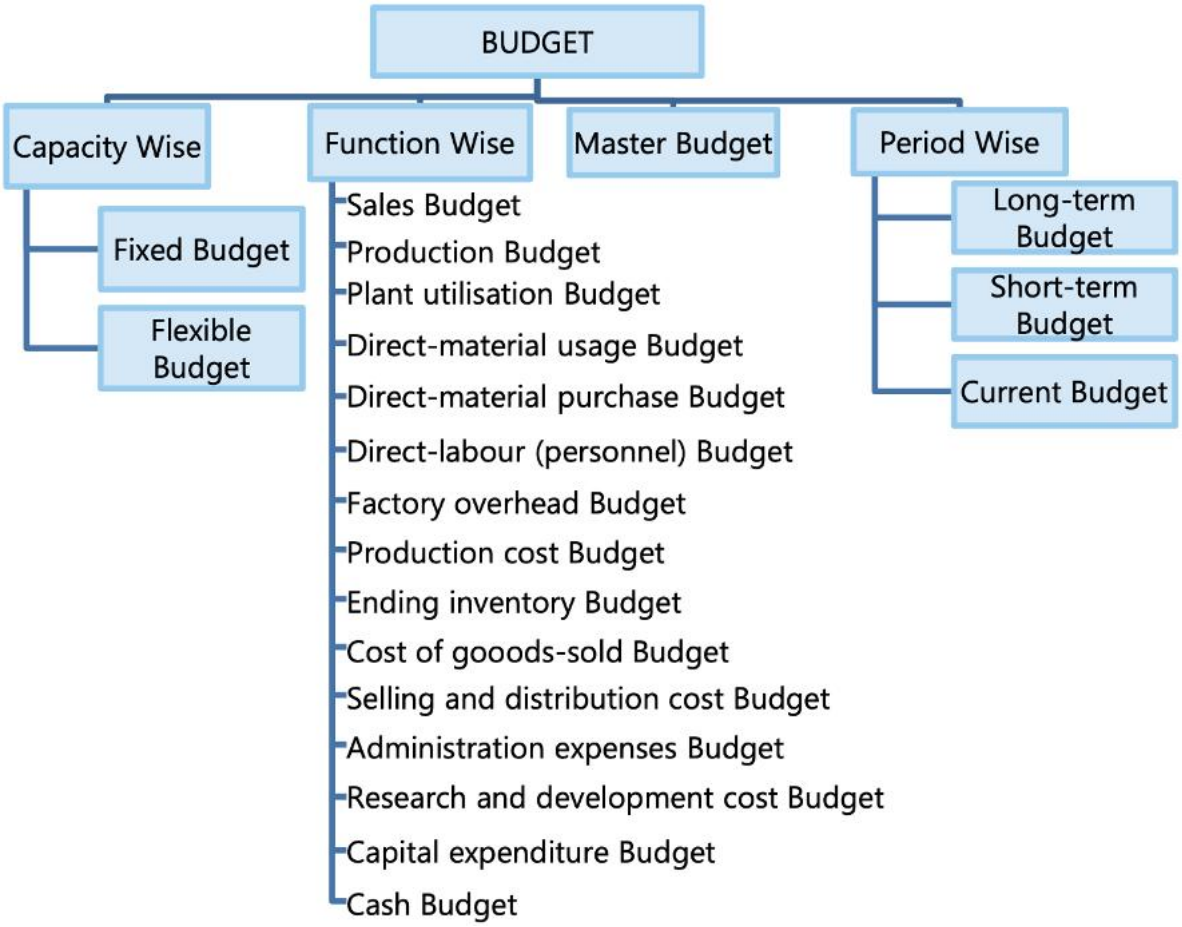
2. **Budgetary Control:** *It is the system of management control and accounting in which all the operations are forecasted and planned in advance to the extent possible and the actual results compared with the forecasted and planned results.*



3. **Difference between Fixed and Flexible budget:**

S.N.	Fixed Budget	Flexible Budget
1	*It does not change with actual volume of activity achieved. Thus it is rigid.*	*It can be re-casted on the basis of activity level to be achieved. Thus it is not rigid.*
2	*It operates on one level of activity and under one set of conditions.*	*It consists of various budgets for different level of activity.*
3	*If the budgeted and actual activity levels differ significantly, then cost ascertainment and price fixation do not give a correct picture.*	*It facilitates the cost ascertainment and price fixation at different levels of activity.*
4	*If the budgeted and actual activity levels differ significantly, then the aspects like cost ascertainment and price fixation do not give a correct picture.*	*Flexible budgeting at different levels of activity facilitates the ascertainment of cost, fixation of selling price and tendering of quotations.*
5	*Comparisons of actual and budgeted targets are meaningless particularly when there is difference between two levels.*	*It provided meaningful basis of comparison of actual and budgeted targets.*

4. Types of Budget:



5. Zero Based Budgeting (ZBB):

- *Zero-based Budgeting (ZBB) is defined as a method of budgeting which requires each cost element to be specifically justified, though the activities to which the budget relates are not being undertaken for the first time. The cost of each activity has to be justified and without justification, the budget allowance is zero.*
- *ZBB is an activity based budgeting system where budgets are prepared for each activities rather than functional department.*
- *In case of corporate entities, ZBB is best suited for discretionary costs like research and development cost, training programmes, advertisement etc.*

6. Performance Budgeting (PB): *Performance budgeting requires fixing of the responsibility of each executive in organisation and the continuous appraisal of his performance. It is, therefore, considered to be synonymous with responsibility accounting. A performance budget is one which presents the purposes and objectives for which funds are required.*

7. Variable Cost Per Unit = $\frac{\triangle in\ Cost}{\triangle in\ Units}$

8. Fixed Cost = Total Cost – Variable Cost

BBQ 86

During the FY 2022-23, P Limited has produced 60,000 units operating at 50% capacity level. The cost structure at the 50% level of activity is as under:

Direct Material	₹300 per unit
Direct Wages	₹100 per unit
Variable Overheads	₹100 per unit
Direct Expenses	₹60 per unit
Factory Expenses (25% Fixed)	₹80 per unit
Selling and Distribution Expenses (80% Variable)	₹40 per unit
Office and Administrative Expenses (100% Fixed)	₹20 per unit

The company anticipates that in FY 2023-24, the variable costs will go up by 20% and fixed costs will go up by 15%. The selling price per unit will increase by 10% to ₹880

Required:

(a) Calculate the budgeted profit/loss for the FY 2022-23.

(b) Prepare an Expense budget on marginal cost basis for the FY 2023-24 for the company at 50% and 60% level of activity and find out the profits at respective levels.

Answer

(1) Statement of Budgeted Profit for the FY 2022-23

Particulars	***Per Unit (₹)***	***60,000 units (₹)***
(A) Sales	800.00	4,80,00,000
(B) Variable Cost:		
Direct Material	300	1,80,00,000
Direct Wages	100	60,00,000
Variable Overhead	100	60,00,000
Direct Expenses	60	36,00,000
Variable Factory Expenses (75% of ₹80 p.u.)	60	36,00,000
Variable Selling and Distribution Expenses (80% of ₹40 p.u.)	32	19,20,000
Total (B)	***652***	***3,91,20,000***
(C) Contribution (A - B)	***148***	***88,80,000***
(D) Fixed Cost:		
Office and Administration Expenses (100%)	-	12,00,000
Fixed Factory Expenses (25%)	-	12,00,000
Fixed Selling and Distribution Expenses (20%)	-	4,80,000
Total (D)		***28,80,000***
Net Profit (C - D)	***-***	***60,00,000***

(2) Expense Budget of P Ltd. for the FY 2023-24 at 50% & 60% level

Particulars	***60,000 units***		***72,000 units***	
	Per Unit	***Amount***	***Per Unit***	***Amount***
(A) Sales	880	5,28,00,000	880	6,33,60,000
(B) Variable Cost:				
Direct Material	360	2,16,00,000	360	2,59,20,000
Direct Wages	120	72,00,000	120	86,40,000
Variable Overhead	120	72,00,000	120	86,40,000
Direct Expenses	72	43,20,000	72	51,84,000
Variable Factory Expenses	72	43,20,000	72	51,84,000
Variable Selling and Distribution Expenses	38.40	23,04,000	38.40	27,64,800
Total (B)	***782.40***	***4,69,44,000***	***782.40***	***5,63,32,800***
(C) Contribution (A - B)	***97.60***	***58,56,000***	***97.60***	***70,27,200***

(D) Fixed Cost:				
Office and Administration Expenses (100%)	-	13,80,000	-	13,80,000
Fixed Factory Expenses (25%)	-	13,80,000	-	13,80,000
Fixed Selling and Distribution Expenses (20%)	-	5,52,000	-	5,52,000
Total (D)		***33,12,000***		***33,12,000***
Net Profit (C - D)	***-***	***25,44,000***	***-***	***37,15,200***

BBQ 87

S Ltd. has prepared budget for the coming year for its two products A and B.

	Product A	***Product B***
Production & Sales units	6,000	9,000
Raw material cost per unit	₹60.00	₹42.00
Direct labour cost per unit	₹30.00	₹18.00
Variable overhead per unit	₹12.00	₹6.00
Fixed overhead per unit	₹8.00	₹4.00
Selling price per unit	₹120.00	₹78.00

After some marketing efforts, the sales quantity of the Product A & B can be increased by 1,500 units and 500 units respectively but for this purpose the variable overhead and fixed overhead will be increased by 10% and 5% respectively for both products.

You are required to prepare flexible budget for both the products:

(a) Before marketing efforts.
(b) After marketing efforts.

Answer

(a) Flexible Budget before Marketing Efforts

Particulars	***Product A (6,000 units)***		***Product B (9,000 units)***	
	Per unit	***Total***	***Per unit***	***Total***
Sales	120.00	7,20,000	78.00	7,02,000
Raw materials cost	60.00	3,60,000	42.00	3,78,000
Direct labour cost	30.00	1,80,000	18.00	1,62,000
Variable overhead	12.00	72,000	6.00	54,000
Fixed overhead	8.00	48,000	4.00	36,000
Total cost	***110.00***	***6,60,000***	***70.00***	***6,30,000***
Profit	***10.00***	***60,000***	***8.00***	***72,000***

(b) Flexible Budget After Marketing Efforts

Particulars	***Product A (7,500 units)***		***Product B (9,500 units)***	
	Per unit	***Total***	***Per unit***	***Total***
Sales	120.00	9,00,000	78.00	7,41,000
Raw materials cost	60.00	4,50,000	42.00	3,99,000
Direct labour cost	30.00	2,25,000	18.00	1,71,000
Variable overhead	13.20	99,000	6.60	62,700
Fixed OH (48,000 + 5%)/(36,000 + 5%)	6.72	50,400	3.98	37,800
Total cost	***109.92***	***8,24,400***	***70.58***	***6,70,500***
Profit	***10.08***	***75,600***	***7.42***	***70,500***

BBQ 88

The Budget manager of Jaypee Electricals Ltd. is preparing a flexible budget for the accounting year commencing from 1st April. Normal capacity of production of the company is 1,25,000 units.

The company produces one product, a component 'P'. Direct material costs ₹7 per unit. Direct labour averages ₹2.50 per hour and requires 1.60 hours to produce on unit of 'P'. Salesmen are paid a commission of ₹1 per unit sold.

Fixed selling and administration expenses amount to ₹85,000 per year. Manufacturing overhead has been estimated in the following amounts under specified conditions of volume:

Particulars	1,20,000 units	1,50,000 units
Indirect materials	2,64,000	3,30,000
Indirect Labour	1,50,000	1,87,500
Inspection	90,000	1,12,500
Maintenance	84,000	1,02,000
Supervision	1,98,000	2,34,000
Depreciation (Plant &Equipment)	90,000	90,000
Engineering services	94,000	94,000
Total Manufacturing Overhead	**9,70,000**	**11,50,000**

Prepare a budget of total cost at 1,40,000 units of output.

Answer

Flexible Budget

Particulars		Amount (₹)
(A) Variable Cost:		
Direct materials	(1,40,000 × ₹7)	9,80,000
Direct labour	(1,40,000 × 1.6 hours × ₹2.5)	5,60,000
Salesmen commission	(1,40,000 × ₹1)	1,40,000
Indirect materials	{(₹2,64,000 ÷ 1,20,000) × 1,40,000}	
Indirect Labour	{(₹1,50,000 ÷ 1,20,000) × 1,40,000}	3,08,000
Inspection	{(₹90,000 ÷ 1,20,000) × 1,40,000}	1,75,000
Total (A)		1,05,000
(B) Fixed Cost:		**22,68,000**
Selling and administration		
Depreciation		85,000
Engineering services		90,000
Total (B)		94,000
(C) Semi Variable Cost:		**2,69,000**
Maintenance:		
Variable	(1,40,000 × ₹0.60)	84,000
Fixed		12,000
Supervision:		
Variable	(1,40,000 × ₹1.20)	1,68,000
Fixed		54,000
Total (C)		**3,18,000**
Total Cost (A + B + C)		**28,55,000**

Working Note:

Calculation of variable cost per unit and fixed cost portion of semi variable items:

$$\text{Variable cost per unit} = \frac{\text{Difference in Total Cost}}{\text{Difference in Units}}$$

Variable Maintenance cost per unit	=	$\frac{1,02,000 - 84,000}{1,50,000 - 1,20,000}$	=	₹0.60 per unit
Variable Supervision cost per unit	=	$\frac{2,34,000 - 1,98,000}{1,50,000 - 1,20,000}$	=	₹1.20 per unit
Fixed cost	=	Total cost – Variable Cost		
Fixed Maintenance cost	=	84,000 – 1,20,000 × 0.60	=	₹12,000
Fixed Supervision cost	=	1,98,000 – 1,20,000 × 1.20	=	₹54,000

BBQ 89

A Limited has furnished the following information for the months from 1st January to 30th April, 2023:

	January	***February***	***March***	***April***
Number of Working days	25	24	26	25
Production (in units) per Working day	50	55	60	52
Raw Material Purchases (% by weight to total of 4 months)	21%	26%	30%	23%
Purchase price of raw material (per kg)	₹10	₹12	₹13	₹11

Quantity of raw material per unit of product : 4 kg.
Opening stock of raw material on 1st January : 6,020 kg. (Cost ₹63, 210)
Closing stock of raw material on 30th April : 5,100 kg.

All the purchases of material are made at the start of each month.

Required:

(a) Calculate the consumption of raw materials (in kgs) month-by-month and in total.
(b) Calculate the month-wise quantity and value of raw materials purchased.
(c) Prepare the priced stores ledger for each month using the FIFO method.

Answer

(a) Raw Material Consumption Budget in Kgs

Particulars	***January***	***February***	***March***	***April***	***Total***
No. of working days	25	24	26	25	-
Production in units per day	50	55	60	52	-
Monthly production in units	1,250	1,320	1,560	1,300	5,430
Raw Material Consumption @ 4 kg p.u.	***5,000***	***5,280***	***6,240***	***5,200***	***21,720***

(b) Raw Material Purchase Budget in Quantity and Value

Particulars	***January***	***February***	***March***	***April***
Raw Material Purchases (%)	21%	26%	30%	23%
Purchase in kgs (20,800 kgs × % of purchase)	4,368 kgs	5,408 Kgs	6,240 kgs	4,784 kgs
Purchase price per kg	₹10	₹12	₹13	₹11
Purchase in Value	***₹43,680***	***₹64,896***	***₹81,120***	***₹52,624***

Working note:

Total Purchase of Raw Material (January to April) = Consumption + Closing Stock –Opening Stock
= 21,720 + 5,100 – 6,020
= 20,800 Kgs.

(c) Stores Ledger (FIFO Method)

Months	Receipts			Issues			Balance		
	Kgs	Rate	Value	Kgs	Rate	Value	Kgs	Rate	Value
Opening							6,020	10.5	63,210
January	4,368	10	43,680	5,000	10.5	52,500	1,020 4,368	10.5 10	10,710 43,680
February	5,408	12	64,896	1,020 4,260	10.5 10	10,720 42,600	108 5,408	10 12	1,080 64,896
March	6,240	13	81,120	108 5,408 724	10 12 13	1,080 64,896 9,412	5,516	13	71,708
April	4,784	11	52,624	5,200	13	67,600	316 4,784	13 11	4,108 52,624

BBQ 90

Jigyasa Ltd. is drawing a production plan for its two products Minimax (MM) and Heavyhigh (HH) for the year 2023-24. The company's policy is to hold closing stock of finished goods at 25% of the anticipated volume of sales of the succeeding month. The following are the estimated data for two products:

	Minimax (MM)	Heavyhigh (HH)
Budgeted production (in units)	1,80,000	1,20,000
Direct material per unit	₹220.00	₹280.00
Direct labour per unit	₹130.00	₹120.00
Manufacturing overheads	₹4,00,000	₹5,00,000

The estimated units to be sold in the first four months of the year 2023-24 are as under:

	April	May	June	July
Minimax (MM)	8,000	10,000	12,000	16,000
Heavyhigh (HH)	6,000	8,000	9,000	14,000

You are required to:

(a) Prepare a production budget for the first quarter in month-wise.
(b) Present production cost budget for first quarter.

Answer

(a) Production Budget of Product Minimax and Heavyhigh (in units)

Particulars	April		May		June		Total	
	MM	HH	MM	HH	MM	HH	MM	HH
Sales	8,000	6,000	10,000	8,000	12,000	9,000	30,000	23,000
Add: Closing Stock (25% of next month's sales)	2,500	2,000	3,000	2,250	4,000	3,500	9,500	7,750
Less: Opening Stock	*2,000	*1,500	2,500	2,000	3,000	2,250	7,500	5,750
Production in units	**8,500**	**6,500**	**10,500**	**8,250**	**13,000**	**10,250**	**32,000**	**25,000**

Note: Opening stock of April is the closing stock of March, which is as per company's policy 25% of next month's sales.

(b) Production Cost Budget

Elements of cost	Minimax (MM)		Heavyhigh (HH)	
	Per unit	Total (₹)	Per unit	Total (₹)

No of units	1	32,000	1	25,000
Direct Material	220	70,40,000	280	70,00,000
Direct Labour	130	41,60,000	120	30,00,000
Manufacturing Overhead:				
MM: (₹4,00,000 ÷ 1,80,000) × 32,000	2.22	71,111	-	-
HH: (₹5,00,000 ÷ 1,20,000) × 25,000	-	-	4.167	1,04,167
Production Cost	***352.22***	***1,12,71,111***	***404.167***	***1,01,04,167***

BBQ 91

K Ltd. produces and markets a very popular product called 'X'. The company is interested in presenting its budget for the second quarter of 2023.

The following information are made available for this purpose:

(a) It expects to sell 1,50,000 bags of 'X' during the second quarter of 2023 at the selling price of ₹1,200 per bag.

(b) Each bag of 'X' requires 2.5 mtr. of raw material 'Y' and 7.5 mtr. of raw – material 'Z'.

(c) Stock levels are planned as follows:

Particulars	*Beginning of Quarter*	*End of Quarter*
Finished Bags of 'X' (Nos.)	45,000	33,000
Raw – Material 'Y' (mtr)	96,000	78,000
Raw – Material 'Z' (mtr)	1,71,000	1,41,000
Empty Bag (Nos.)	1,11,000	84,000

(d) 'Y' cost ₹160 per mtr., 'Z' costs ₹30 per mtr. and 'Empty Bag' costs ₹110 each.

(e) It requires 9 minutes of direct labour to produce and fill one bag of 'X'. Labour cost is ₹70 per hour.

(f) Variable manufacturing costs are ₹60 per bag. Fixed manufacturing costs ₹40,00,000 per quarter.

(g) Variable selling and administration expenses are 5% of sales and fixed administration and selling expenses are ₹3,75,000 per quarter.

Required

1. Prepare a production budget for the said quarter in quantity.
2. Prepare a raw material purchase budget for 'Y', 'Z' and 'Empty Bags' for the said quarter in quantity as well as in rupees.
3. Compute the budgeted variable cost to produce one bag of 'X'.

Answer

1. Production Budget of 'X' for the Second Quarter

Particulars	*Bags (Nos.)*
Budgeted Sales	1,50,000
Add: Desired Closing stock	33,000
Total Requirements	1,83,000
Less: Opening stock	(45,000)
Required Production	1,38,000

2. Raw Materials Purchase Budget in Quantity as well as in ₹ for 1,38,000 Bags of 'X'

Particulars	*'Y'*	*'Z'*	*Empty Bags*
Production Requirements Per bag of 'X'	2.5	7.5	1.0

Requirement for Production	3,45,000 (1,38,000 × 2.5)	10,35,000 (1,38,000 × 7.5)	1,38,000 (1,38,000 × 1)
Add: Desired Closing Stock	78,000	1,41,000	84,000
Total Requirements	4,23,000	11,76,000	2,22,000
Less: Opening Stock	(96,000)	(1,71,000)	(1,11,000)
Quantity to be Purchased	***3,27,000***	***10,05,000***	***1,11,000***
Cost per mtr./Bag	₹160	₹30	₹110
Cost of Purchase	***₹5,23,20,000***	***₹3,01,50,000***	***₹1,22,10,000***

3. Computation of Budgeted Variable Cost of Production of 1 Bag of 'X'

Particulars	***Amount (₹)***
Raw Material:	
Y 2.5 mtr @₹160	400.00
Z 7.5 mtr @₹30	225.00
Empty Bag	110.00
Direct Labour {(₹70 ÷ 60 minutes) × 9 minutes}	10.50
Variable Manufacturing Overheads	60.00
Variable Cost of Production per bag	***805.50***

BBQ 92

B Ltd manufactures two products viz., X and Y and sells them through two divisions, East and West. For the purpose of Sales Budget to the Budget Committee, following information has been made available for the year 2022-23:

Product	***Budgeted Sales***		***Actual Sales***	
	East Division	***West Division***	***East Division***	***West Division***
X	800 units at ₹18	1,200 units at ₹18	1,000 units at ₹18	1,400 units at ₹18
Y	600 units at ₹42	1,000 units at ₹42	400 units at ₹42	800 units at ₹42

Adequate market studies reveal that product X is popular but underpriced. It is expected that if the price of X is increased by ₹2, it will find a ready market. On the other hand, Y is overpriced and if the price of Y is reduced by ₹2, it will have more demand in the market. The company management has agreed for the aforesaid price changes. On the basis of these price changes and the reports of salesmen, following estimates have been prepared by the Divisional Managers:

Percentage increase in sales over budgeted sales:

Product	***East Division***	***West Division***
X	+ 12.5%	+ 7.5%
Y	+ 22.5%	+ 12.5%

With the help of the intensive advertisement campaign, following additional sales (over and above the above mentioned estimated sales by Divisional Managers) are possible:

Product	***East Division***	***West Division***
X	120 units	140 units
Y	80 units	100 units

You are required to prepare Sales Budget 2023 – 2024 after incorporating above estimates and also show the Budgeted Sales and Actual Sales of 2022 – 2023.

Answer

1. Statement Showing Sales Budget for 2023-24

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amount (₹)	Qty.	Rate (₹)	Amount (₹)	Amount (₹)
East	1,020	20	20,400	815	40	32,600	53,000
West	1,430	20	28,600	1,225	40	49,000	77,600
Total	**2,450**	**-**	**49,000**	**2,040**	**-**	**81,600**	**1,30,600**

Working notes:

Calculation of budgeted sales of product X for 2023 -24 in units:

East division	=	(800 units + 12.5%) + 120 units	=	1,020 units
West division	=	(1,200 units + 7.5%) + 140 units	=	1,430 units

Calculation of budgeted sales of product Y for 2022 -23 in units:

East division	=	(600 units + 22.5%) + 80 units	=	815 units
West division	=	(1,000 units + 12.5%) + 100 units	=	1,225 units

2. Statement Showing Sales Budget for 2022 – 23

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amount (₹)	Qty.	Rate (₹)	Amount (₹)	Amount (₹)
East	800	18	14,400	600	42	25,200	39,600
West	1,200	18	21,600	1,000	42	42,000	63,600
Total	**2,000**	**-**	**36,000**	**1,600**	**-**	**67,200**	**1,03,200**

3. Statement Showing Actual Sales for 2022 – 23

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amount (₹)	Qty.	Rate (₹)	Amount (₹)	Amount (₹)
East	1,000	18	18,000	400	42	16,800	34,800
West	1,400	18	25,200	800	42	33,600	58,800
Total	**2,400**	**-**	**43,200**	**1,200**	**-**	**50,400**	**93,600**

BBQ 93

The accountant of manufacturing company provides you the following details for the year 2022:

Direct materials	₹1,75,000	Other variable costs	₹80,000
Direct wages	₹1,00,000	Other fixed costs	₹80,000
Fixed factory overheads	₹1,00,000	Profit	₹1,15,000
Variable factory overheads	₹1,00,000	Sales	₹7,50,000

During the year, the company manufactured two products A and B and the output and costs were:

	A	B
Output (units)	2,00,000	1,00,000
Selling price per unit	₹2.00	₹3.50
Direct materials per unit	₹0.50	₹0.75
Direct wages per unit	₹0.25	₹0.50

Variable factory overhead are absorbed as a percentage of direct wages. Other variable costs have been computed as: Product A ₹0.25 per unit; and B ₹0.30 per unit.

During 2023, it is expected that the demand of product A will fall by 25% and for B by 50%. It is decided to manufacture a further product C, the cost for which are estimated as follows:

	C
Output (units)	2,00,000
Selling price per unit	₹1.75
Direct materials per unit	₹0.40
Direct wages per unit	₹0.25

It is anticipated that the other variable cost per unit will be the same as for product A.

Prepare a budget to present to the management, showing the current position and the position for 2023. Comment on the comparative results.

Answer

Budget Showing Current Position and Position for 2023

Particulars	Position for 2022			Position for 2023			
	A	B	Total	A	B	C	Total
Sales (Units)	2,00,000	1,00,000	3,00,000	1,50,000	50,000	2,00,000	4,00,000
Sales (in ₹)	4,00,000	3,50,000	7,50,000	3,00,000	1,75,000	3,50,000	8,25,000
Direct materials	1,00,000	75,000	1,75,000	75,000	37,500	80,000	1,92,500
Direct wages	50,000	50,000	1,00,000	37,500	25,000	50,000	1,12,500
Factory OH (V)	50,000	50,000	1,00,000	37,500	25,000	50,000	1,12,500
Other cost (V)	50,000	30,000	80,000	37,500	15,000	50,000	1,02,500
Marginal Cost	***2,50,000***	***2,05,000***	***4,55,000***	***1,87,500***	***1,02,500***	***2,30,000***	***5,20,000***
Contribution	***1,50,000***	***1,45,000***	***2,95,000***	***1,12,500***	***72,500***	***1,20,000***	***3,05,000***
Less: Fixed cost							
Factory			1,00,000				1,00,000
Other			80,000				80,000
Profit			***1,15,000***				***1,25,000***

Comment: Introduction of Product C is likely to increase profit by 10,000 (i.e. from 1,15,000 to 1,25,000) in 2023 as compared to 2022. Therefore, introduction of product C is recommended.

BBQ 94

Concorde Ltd. manufactures two products using two types of materials and one grade of labour. Shown below is an extract from the company's working papers for the next month's budget:

	Product A	Product B
Budgeted sales (in units)	2,400	3,600
Budgeted material consumption per unit (in kg):		
Material X	5	3
Material Y	4	6
Standard labour hours allowed per unit of product	3	5

Material X and Material Y cost ₹4 and ₹6 per kg and labours are paid 25 per hour. Overtime premium is 50% and is payable, if a worker works for more than 40 hours a week. There are 180 direct workers.

The target productivity ratio (or efficiency ratio) for the productive hours worked by the direct workers in actually manufacturing the products is 80%. In addition the non-productive down-time is budgeted at 20% of the productive hours worked.

There are four 5-days weeks in the budgeted period and it is anticipated that sales and production will occur evenly throughout the whole period.

It is anticipated that stock at the beginning of the period will be:

Product A 400 units

Product B	200 units
Material X	1,000 kg
Material Y	500 kg

The anticipated closing stocks for the budgeted period are as below:

Product A	4 days sales
Product B	5 days sales
Material X	10 days consumption
Material Y	6 days consumption

Calculate the Materials Purchase Budget and Wages Budget for the direct workers, showing the quantities and values, for the month.

Answer

(i) Material Purchase Budget

Particulars	***Material X***	***Material Y***
Materials consumed:		
Product A @ 5 kg/4 kg per unit of 2,480 units	12,400	9,920
Product B @ 3 kg/6 kg per unit of 4,300 units	12,900	25,800
Total consumption (in kg)	25,300	35,720
Add: Closing Stock:		
Materials X ($^{25,300}/_{20\ days}$ × 10 days)	12,650	-
Materials Y ($^{35,720}/_{20\ days}$ × 6 days)	-	10,716
Less: Opening Stock of Raw Material	(1,000)	(500)
Quantity of materials to be purchased (in kg)	***36,950***	***45,936***
Rate per kg	₹4	₹6
Material Purchase (in ₹)	***₹1,47,800***	***₹2,75,616***

(ii) Wages Budget

Particulars	***Product A***	***Product B***
Units to be produced	2,480	4,300
Standard hours allowed per unit	3	5
Total standard hours allowed	7,440	21,500
Productive hours required for production (80% efficiency)		
Product A (7,440 ÷ 80%)	9,300	-
Product A (21,500 ÷ 80%)	-	26,875
Add: Non-productive down time @ 20% of productive hours	1,860	5,375
Total hours to be paid	***11,160***	***32,250***
Total hours to be paid (11,160 + 32,250)		43,410
Normal hours (4 weeks × 40 hours × 180 workers)		28,800
Overtime hours (43,410 – 28,800)		14,610
Wages to be paid:		
Normal hours @ ₹25 per hour for 28,800 hours		₹7,20,000
Overtime hours @ ₹37.50 (25 + 50%) per hour for 14,610 hours		₹5,47,875
Total Wages paid (in ₹)		***₹12,67,875***

Working notes:

(1) Number of days in budget period = 4 weeks × 5 days = 20 days

(2) Calculation of number of units to be produced:

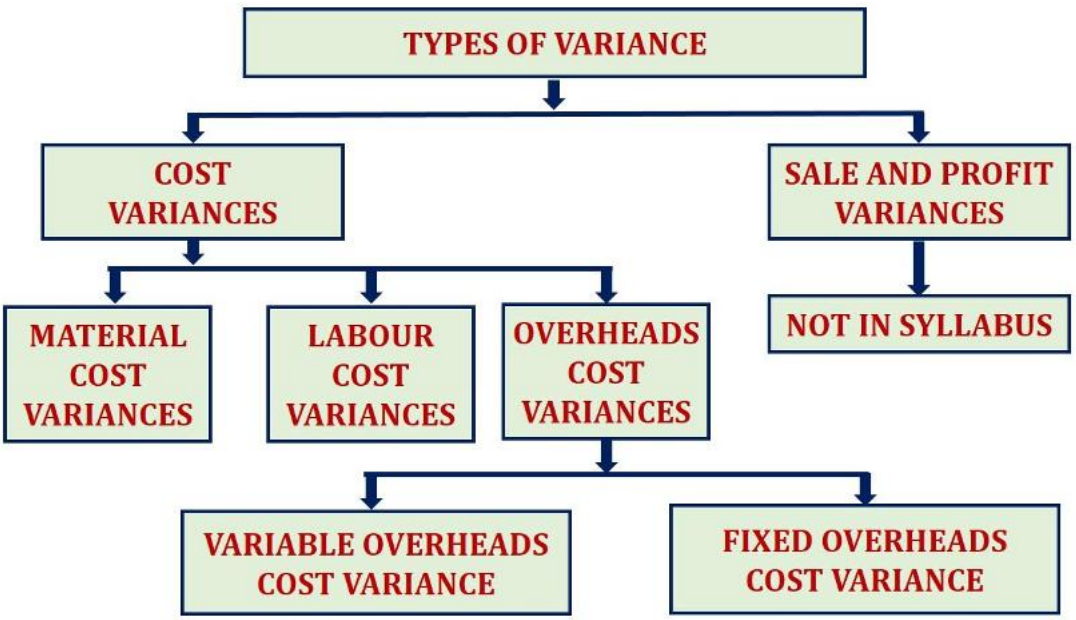
Particulars	Product A	Product B
Units to be sold	2,400	3,600
Add: Closing Stock:		
Product A ($^{2,400}/_{20\ days}$ × 4 days)	480	-
Product B ($^{3,600}/_{20\ days}$ × 5 days)	-	900
Less: Opening Stock	(400)	(200)
Units to be produced	***2,480***	***4,300***

CHAPTER 11 STANDARD COSTING

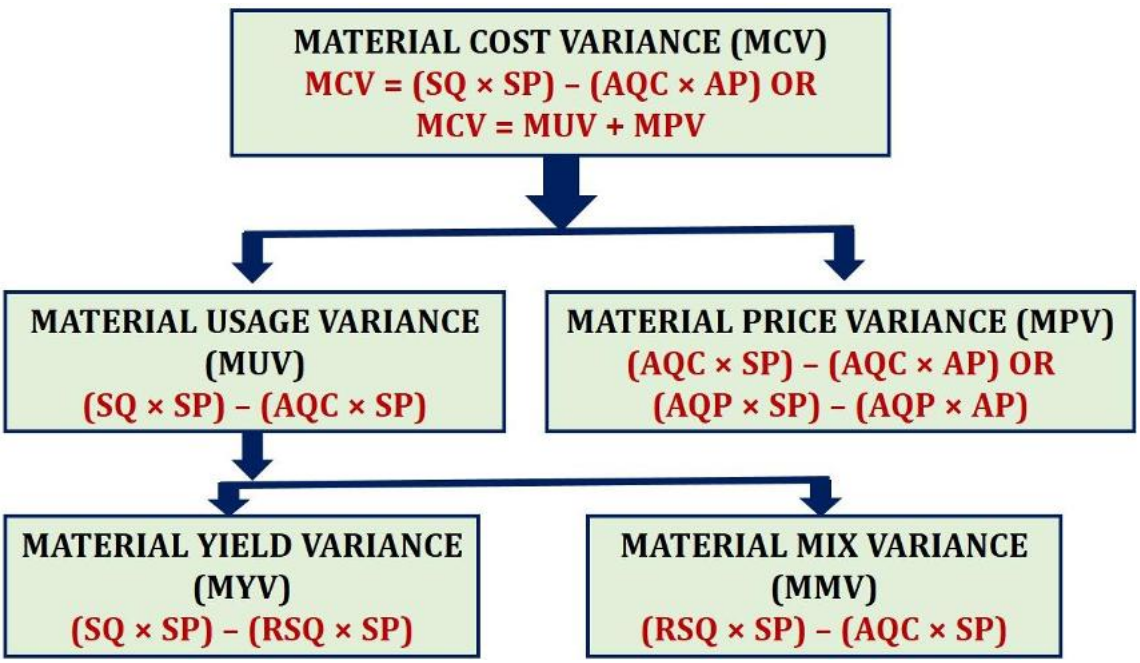
1. ***Standard Costing:*** *Standard costing is a method of cost and management accounting which starts with setting of standards and ends with reporting of variances to management for taking corrective actions. The Official Terminology of CIMA, London defines standard costing as "Control technique that reports variances by comparing actual costs to pre-set standards so facilitating action through management by exception."*

2. ***Cost Variance:*** *Difference between actual cost and standard cost to produce actual output.*

3. ***Types of Variance:***



4. ***Material Variances:***



(a)	Material Cost Variance (MPV Based on consumption)	=	(SQ × SP) – (AQC × AP)		
	Material Cost Variance (MPV Based on purchase)	=	MUV + MPV	or	MYV + MMV + MPV
(b)	Material Usage Variance	=	(SQ × SP) – (AQC × SP)	or	MYV + MMV
(c)	Material Yield Variance	=	(SQ × SP) – (RSQ × SP)	or	MUV - MMV
(d)	Material Mix Variance	=	(RSQ × SP) – (AQC × SP)	or	MUV - MYV
(e)	Material Price Variance (Based on consumption)	=	(AQC × SP) – (AQC × AP)	or	MCV - MUV
(f)	Material Price Variance (Based on purchase)	=	(AQP × SP) – (AQP × AP)	or	MCV - MUV

Here,

SQ (Standard Quantity): Standard quantity of raw material consumption to produce actual output.

AQP (Actual Quantity Purchased): Actual quantity of raw materials purchased.

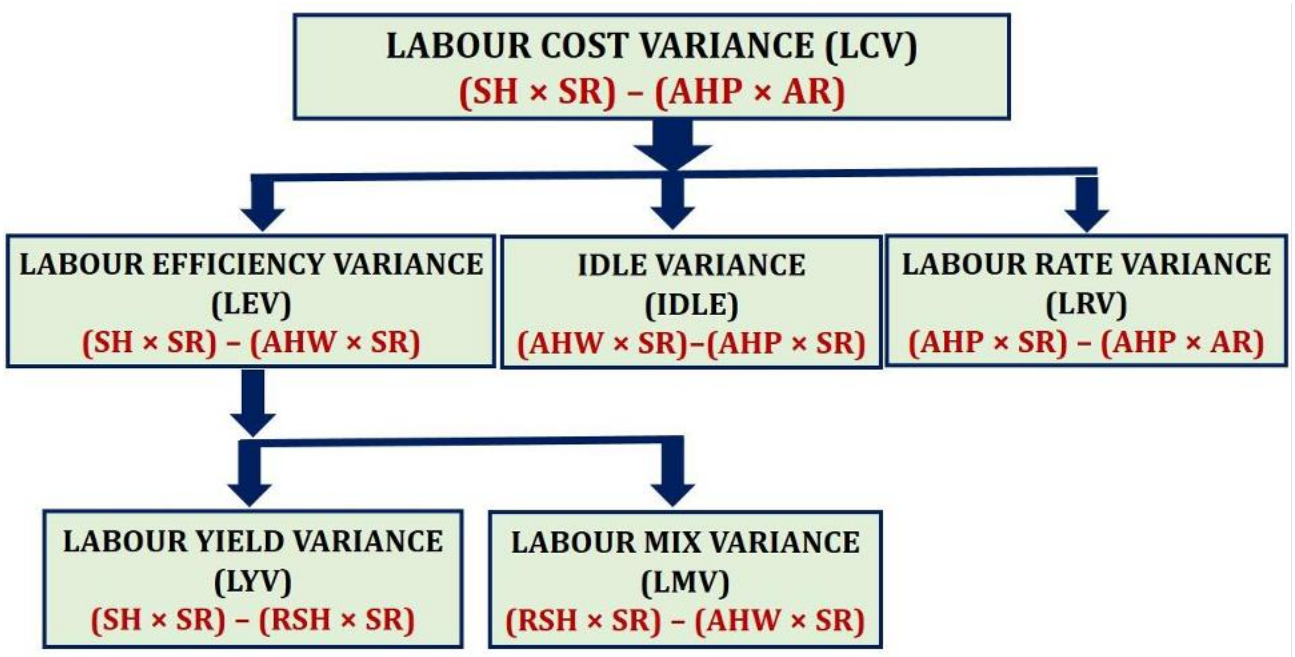
AQC (Actual Quantity Consumed): Actual quantity of raw materials consumed to produce actual output.

RSQ (Revised Standard Quantity): Actual quantity of raw materials consumed in standard proportion.

SP (Standard Price): Standard purchase price of raw materials.

AP (Actual Price): Actual purchase price of raw materials.

5. Labour Variances:



(a)	*Labour Cost Variance*	=	*(SH × SR) – (AHP × AR)*	*or LEV + Idle + LRV*
(b)	*Labour Efficiency Variance*	=	*(SH × SR) – (AHW × SR)*	*or LYV + LMV*
(c)	*Labour Yield Variance*	=	*(SH × SR) – (RSH × SR)*	*or LEV - LMV*
(d)	*Labour Mix/Gang Variance*	=	*(RSH × SR) – (AHW × SR)*	*or LEV - LYV*
(e)	*Labour Idle Variance*	=	*(AHW × SR) – (AHP × SR)*	*or LCV – LEV - LRV*
(f)	*Labour Rate Variance*	=	*(AHP × SR) – (AHP × AR)*	*or LCV – LEV - Idle*

Here,

SH (Standard Hours): Standard hours to produce actual output.

AHP (Actual Hour Paid): Actual labour hours paid.

AHW (Actual Hours Worked): Actual labour hours worked to produce actual output.

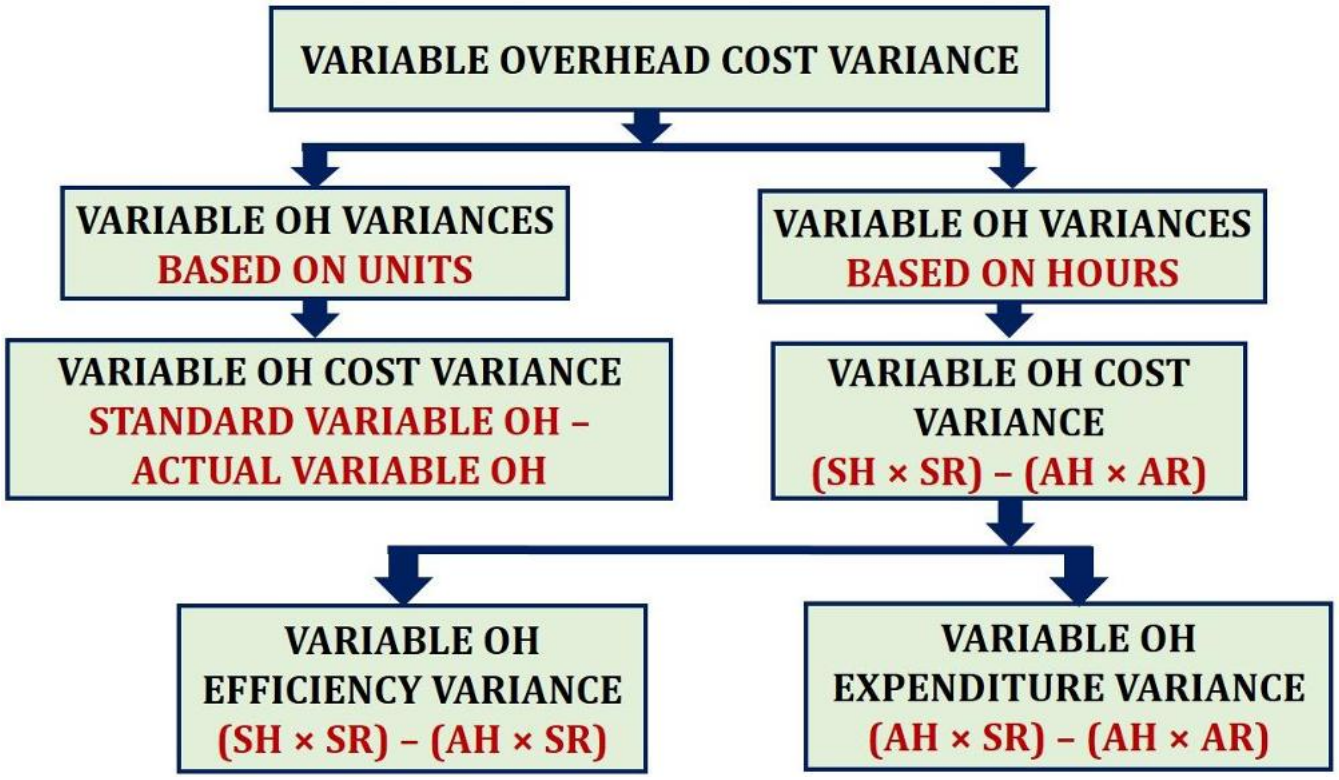
AHW = AHP (actual hours paid) - Abnormal idle time hours

RSH (Revised Standard Hours): Actual labour hours worked in standard proportion.

SR (Standard Rate): Standard wage rate.

AR (Actual Rate): Actual wage rate.

6. Variable Overhead Variances:



Method 1: Variable Overhead Variance based on units:

(a) Variable OH Cost Variance = Standard Variable OH – Actual Variable OH

- ***We cannot calculate Variable OH Efficiency variance and Variable OH Expenditure variance on the basis of units.***

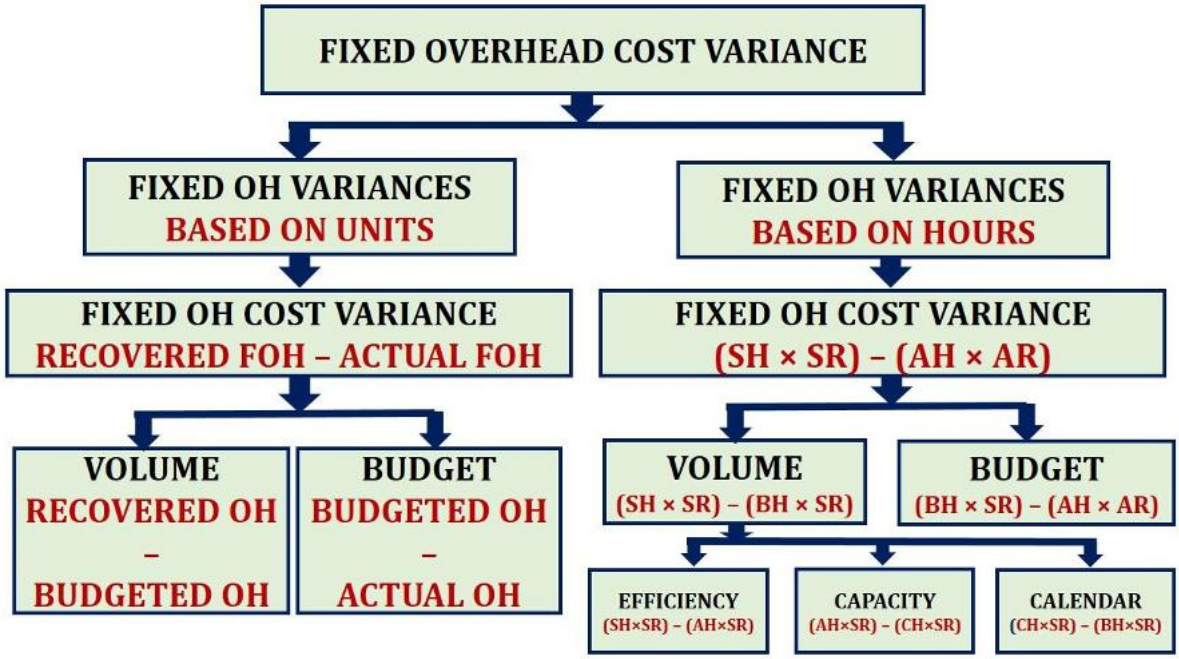
Method 2: Variable Overhead Variance based on hours:

(a) Variable OH Cost Variance = (SH × SR) – (AH × AR)

(b) Variable OH Efficiency Variance = (SH × SR) – (AH × SR)

(c) Variable OH Expenditure/Budget Variance = (AH × SR) – (AH × AR)

6. Fixed Overhead Variances:



Method 1: Fixed Overhead Variance based on units:

(a) Fixed OH Cost Variance = Absorbed/Recovered Fixed OH – Actual Fixed OH

(b) Fixed OH Expenditure Variance = Budgeted Fixed OH – Actual Fixed OH

(c) Fixed OH Volume Variance = Absorbed/Recovered Fixed OH – Budgeted Fixed OH

- ***We cannot calculate Fixed OH Efficiency variance, Fixed OH Capacity variance and Fixed OH Calendar variance on the basis of units.***
- ***Here Fixed overheads are recovered on the basis of units.***

Method 2: Fixed Overhead Variance based on hours:

(a)	*Fixed OH Cost Variance*	=	*(SH × SR) – (AH × AR)*
(b)	*Fixed OH Expenditure/Budget Variance*	=	*(BH × SR) – (AH × AR)*
(c)	*Fixed OH Volume Variance*	=	*(SH × SR) – (BH × SR)*
(d)	*Fixed OH Efficiency Variance*	=	*(SH × SR) – (AH × SR)*
(e)	*Fixed OH Capacity Variance*	=	*(AH × SR) – (CH × SR)*
(f)	*Fixed OH Calendar Variance*	=	*(CH × SR) – (BH × SR)*

Here,

SH (Standard Hours): Standard hours to produce actual output.

AH (Actual Hours): Actual hours to produce actual output.

BH (Budgeted Hours): Budgeted hours or Estimated hours.

CH (Calendar Hours): Standard working hours for actual working days.

SR (Standard Rate): Standard rate or recovery rate of Fixed OH on the basis of time.

SR = Budgeted Fixed OH ÷ Budgeted Hours

AR (Actual Rate): Actual wage rate.

(SH × SR): Absorbed or recovered fixed overheads.

(BH × SR): Budgeted fixed overheads.

(AH × AR): Actual fixed overheads.

7. Various Budget Ratios:

(a)	*Efficiency Ratio*	=	$\frac{\text{Standard Hours}}{\text{Actual Hours}} \times 100$
(b)	*Activity Ratio*	=	$\frac{\text{Standard Hours}}{\text{Budgeted Hours}} \times 100$
(c)	*Calendar Ratio*	=	$\frac{\text{Available Working Days}}{\text{Budgeted Working Days}} \times 100$
(d)	*Standard Capacity Usage Ratio*	=	$\frac{\text{Budgeted Hours}}{\text{Maximum Possible Hours in Budget}} \times 100$
(e)	*Actual Capacity Usage Ratio*	=	$\frac{\text{Actual Hours Worked}}{\text{Max. Possible working Hours in a Period}} \times 100$
(f)	*Actual Usage of Budgeted Capacity Ratio*	=	$\frac{\text{Actual Working Hours}}{\text{Budgeted Hours}} \times 100$

BBQ 95

The Standard mix to produce one unit of product is as follows:

Material X	60	units @ ₹15 per unit	₹900
Material Y	80	units @ ₹20 per unit	₹1,600
Material Z	100	units @ ₹25 per unit	₹2,500
	240		***₹5,000***

During the month of April, 10 units were actually produced and consumption was as follows:

Material X	640	units @ ₹17.50 per unit	₹11,200
Material Y	950	units @ ₹18.00 per unit	₹17,100
Material Z	870	units @ ₹27.50 per unit	₹23,925
	2,460		***₹52,225***

Calculate all material variances.

Answer

1. Material Cost Variance = (SQ × SP) – (AQ × AP)
= ₹50,000 – ₹52,225 = ***₹2,225 A***

2. Material Price Variance = (AQ × SP) – (AQ × AP)
= ₹50,350 - ₹52,225 = ***₹1,875 A***

3. Material Usage Variance = (SQ × SP) – (AQ × SP)
= ₹50,000 – ₹50,350 = ***₹350 A***

4. Material Mix Variance = (RSQ × SP) – (AQ × SP)
= ₹51,250 – ₹50,350 = ***₹900 F***

5. Material Yield Variance = (SQ × SP) – (RSQ × SP)
= ₹50,000 – ₹51,250 = ***₹1,250 A***

Working notes:

a. Basic Calculation

Materials	***SQ × SP***	***RSQ × SP***	***AQ × SP***	***AQ × AP***
X	600 × ₹15.00	615 × ₹15.00	640 × ₹15.00	640 × ₹17.50
Y	800 × ₹20.00	820 × ₹20.00	950 × ₹20.00	950 × ₹18.00
Z	1,000 × ₹25.00	1,025 × ₹25.00	870 × ₹25.00	870 × ₹27.50
Total	₹50,000	₹51,250	₹50,350	₹52,225

b. SQ of input for actual output:

Materials X	=	60 units × 10 units of FG	=	600 units
Materials Y	=	80 units × 10 units of FG	=	800 units
Materials Z	=	100 units × 10 units of FG	=	1,000 units

c. RSQ (Revised Standard Quantity)of actual input:

Materials X	=	2,460 units × 60/240	=	615 units
Materials Y	=	2,460 units × 80/240	=	820 units
Materials Z	=	2,460 units × 100/240	=	1,025 units

BBQ 96

The standard cost of a chemical mixture is as follows:

60% of Material A @ ₹50 per kg
40% of Material B @ ₹60 per kg

A standard loss of 25% on output is expected in production. The cost records for a period has shown the following usage:

540 kg of Material A @ ₹60 per kg
260 kg of Material B @ ₹50 per kg
The quantity processed was 680 kilograms of good product.

From the above given information calculate:

(1) Material Cost Variance
(2) Material Price Variance
(3) Material Usage Variance
(4) Material Mix Variance
(5) Material Yield Variance

Answer

(1) Material Cost Variance = (SQ × SP) – (AQ × AP)
= ₹45,900 – ₹45,400 = ***₹500 F***

(2) Material Price Variance = (AQ × SP) – (AQ × AP)
= ₹42,600 - ₹45,400 = ***₹2,800 A***

(3) Material Usage Variance = (SQ × SP) – (AQ × SP)
= ₹45,900 – ₹42,600 = ***₹3,300 F***

(4) Material Mix Variance = (RSQ × SP) – (AQ × SP)
= ₹43,200 – ₹42,600 = ***₹600 F***

(5) Material Yield Variance = (SQ × SP) – (RSQ × SP)
= ₹45,900 – ₹43,200 = ***₹2,700 F***

Working notes:

(a) Basic Calculation

Materials	***SQ × SP***	***RSQ × SP***	***AQ × SP***	***AQ × AP***
A	510 × ₹50	480 × ₹50	540 × ₹50	540 × ₹60
B	340 × ₹60	320 × ₹60	260 × ₹60	260 × ₹50
Total	₹45,900	₹43,200	₹42,600	₹45,400

(b) SQ of input for actual output:

Input – Loss = Output
Input – 25% Output = Output
Input = 125% Output
Input of Raw Material = 125% × 680 kgs of Good Product = 850 kgs

Materials A = 850 kgs × 60% = 510 kgs
Materials B = 850 kgs × 40% = 340 kgs

(c) RSQ (Revised Standard Quantity)of actual input:

Materials A = 800 kgs × 60% = 480 kgs
Materials B = 800 kgs × 40% = 320 kgs

BBQ 97

J.K. Ltd. manufactures NXE by mixing three raw materials. For every batch of 100 kg. of NXE, 125 kg. of raw materials are used. In April, 60 batches were prepared to produce an output of 5,600 kg. of NXE. The standard and actual particulars for April, are as follows:

Materials	Standard		Actual		Materials Purchased
	Mix	Price per kg	Mix	Price per kg	
	%	(₹)	%	(₹)	(kg)
A	50	20	60	21	5,000
B	30	10	20	8	2,000
C	20	5	20	6	1,200

Calculate all variances.

Answer

1. Material Price Variance = (AQP × SP) – (AQP × AP)
(Based on purchase) = ₹1,26,000 - ₹1,28,200 = ***₹2,200 A***

Or

Material Price Variance = (AQ used × SP) – (AQ used × AP)
(Based on consumption) = ₹1,12,500 - ₹1,15,500 = ***₹3,000 A***

2. Material Mix Variance = (RSQ × SP) – (AQ × SP)
= ₹1,05,000 – ₹1,12,500 = ***₹7,500 A***

3. Material Yield Variance = (SQ × SP) – (RSQ × SP)
= ₹98,000 – ₹1,05,000 = ***₹7,000 A***

4. Material Usage Variance = (SQ × SP) – (AQ × SP)
= ₹98,000 – ₹1,12,500 = ***₹14,500 A***

5. Material Cost Variance = MUV + MPV
(based on purchase) = ₹14,500 A + ₹2,200 A = ***₹16,700 A***

Or

Material Cost Variance = (SQ × SP) – (AQ × AP)
(based on consumption) = ₹98,000 – ₹1,15,500 = ***₹17,500 A***

Working notes:

a. Basic calculation

Materials	SQ × SP	RSQ × SP	AQC × SP	AQC × AP	AQP × SP	AQP × AP
A	3,500 × ₹20	3,750 × ₹20	4,500 × ₹20	4,500 × ₹21	5,000 × ₹20	5,000 × ₹21
B	2,100 × ₹10	2,250 × ₹10	1,500 × ₹10	1,500 × ₹8	2,000 × ₹10	2,000 × ₹8
C	1,400 × ₹5	1,500 × ₹5	1,500 × ₹5	1,500 × ₹6	1,200 × ₹5	1,200 × ₹6
Total	₹98,000	₹1,05,000	₹1,12,500	₹1,15,500	₹1,26,000	₹1,28,200

b. Actual quantity of materials used = 125 kg × 60 batches = 7,500 kgs.
Materials A = 7,500 kgs. × 60% = 4,500 kgs.
Materials B = 7,500 kgs. × 20% = 1,500 kgs.
Materials C = 7,500 kgs. × 20% = 1,500 kgs.

c. RSQ (Revised Standard Quantity) of actual input:
Materials A = 7,500 kgs. × 50% = 3,750 kgs.
Materials B = 7,500 kgs. × 30% = 2,250 kgs.
Materials C = 7,500 kgs. × 20% = 1,500 kgs.

d. SQ of input for actual output = 5,600 kgs × 125 kg/100 kg = 7,000 kgs.
Materials A = 7,000 kgs. × 50% = 3,500 kgs.
Materials B = 7,000 kgs. × 30% = 2,100 kgs.

Materials C	=	7,000 kgs. × 20%	=	1,400 kgs.

BBQ 98

NPX Ltd. uses Standard costing system for manufacturing of its product X. Following is the budget data given in relation to labour hours for manufacture of 1 unit of Product X:

Labour	Hours	Rate (₹)
Skilled	2	6
Semi-Skilled	3	4
Un-Skilled	5	3
Total	10	-

In the month of January, 2023, total 10,000 units were produced following are the details:

Labour	Hours	Rate (₹)	Amount (₹)
Skilled	18,000	7	1,26,000
Semi-Skilled	33,000	3.5	1,15,500
Un-Skilled	58,000	4	2,32,000
Total	1,09,000	-	4,73,500

Actual Idle hours (abnormal) during the month:

Skilled	500
Semi-Skilled	700
Un-skilled	800
Total	2,000

Calculate:

(a) Labour Variances.

(b) Also show the effect on Labour Rate Variance if 5,000 hours of Skilled Labour are paid @ ₹5.5 per hour and balance were paid @ ₹7 per hour.

Answer

(a) Calculation of Labour Variances:

Labour Cost Variance	=	(SH × SR) – (AH × AR)		
	=	₹3,90,000 - ₹4,73,500	=	***₹83,500 A***
Labour Rate Variance	=	(AH × SR) – (AH × AR)		
	=	₹4,14,000 – ₹4,73,500	=	***₹59,500 A***
Labour Efficiency Variance	=	(SH × SR) – (AHW × SR)		
	=	₹3,90,000 – ₹4,05,800	=	***₹15,800 A***
Labour Mix Variance	=	(RSH × SR) – (AHW × SR)		
	=	₹4,17,300 – ₹4,05,800	=	***₹11,500 F***
Labour Yield Variance	=	(SH × SR) – (RSH × SR)		
	=	₹3,90,000 – ₹4,17,300	=	***₹27,300 A***
Labour Idle Variance	=	(AHW × SR) – (AH × SR)		
	=	₹4,05,800 – ₹4,14,000	=	***₹8,200 A***

(b) Labour Rate Variance revised:

Labour rate Variance	=	(AH × SR) – (AH × AR)		
Skilled	=	(18,000×6) – (5,000×5.5 + 13,000×7)	=	10,500 A
Semi-Skilled	=	33,000 × (4 – 3.5)	=	16,500 F
Un-Skilled	=	58,000 × (3 - 4)	=	58,000 A
Total	=	10,500 A + 16,500 F + 58,000 A	=	***₹52,000 A***

Effect on Labour Rate Variance= ***Adverse effect decreased by ₹7,500 (₹59,500A to ₹52,000 A)***

Working notes:

1. Basic Calculation

Workers	*SH × SR*	*RSH × SR*	*AHW × SR*	*AH × SR*	*AH × AR*
Skilled	20,000 × 6	21,400 × 6	17,500 × 6	18,000 × 6	18,000 × 7
Semi-Skilled	30,000 × 4	32,100 × 4	32,300 × 4	33,000 × 4	33,000 × 3.5
Un-Skilled	50,000 × 3	53,500 × 3	57,200 × 3	58,000 × 3	58,000 × 4
Total	₹3,90,000	₹4,17,300	₹4,05,800	₹4,14,000	₹4,73,500

2. RSH (Revised Standard Hours):

Total Actual Hours Worked	=	17,500 + 32,300 + 57,200	=	1,07,000 hours
Skilled	=	1,07,000 × 2/10	=	21,400 hours
Semi-Skilled	=	1,07,000 × 3/10	=	32,100 hours
Un-Skilled	=	1,07,000 × 5/10	=	53,500 hours

3. SH (Standard hours) for actual output 10,000 units:

Skilled	=	10,000 × 2	=	20,000 hours
Semi-Skilled	=	10,000 × 3	=	30,000 hours
Un-Skilled	=	10,000 × 5	=	50,000 hours

BBQ 99

The standard output of a Product 'D' is 50 units per hour in manufacturing department of a Company employing 100 workers. In a 40 hours week, the department produced 1,920 units of product 'D' despite 5% of the time paid was lost due to an abnormal reason. The hourly wage rates actually paid were ₹12.40, ₹12.00 and ₹11.40 respectively to Group 'A' consisting 10 workers, Group 'B' consisting 30 workers and Group 'C' consisting 60 workers. The standard wage rate per labour is same for all the workers. Labour Efficiency Variance is given ₹480 (F).

You are required to compute:

(1) Total Labour Cost Variance.
(2) Total Labour Rate Variance.
(3) Total Labour Gang Variance.
(4) Total Labour Yield Variance, and
(5) Total Labour Idle Time Variance.

Answer

(1)	Labour Cost Variance	=	(SH × SR) – (AH × AR)		
		=	₹46,080 - ₹46,720	=	***₹640 A***
(2)	Labour Rate Variance	=	(AH × SR) – (AH × AR)		
		=	₹48,000 – ₹46,720	=	***₹1,280 F***

(3)	Labour Gang Variance	=	(RSH × SR) – (AHW × SR)		
		=	₹45,600 – ₹45,600	=	***Nil***
(4)	Labour Yield Variance	=	(SH × SR) – (RSH × SR)		
		=	₹46,080 – ₹45,600	=	***₹480 F***
(5)	Labour Idle Variance	=	(AHW × SR) – (AH × SR)		
		=	₹45,600 – ₹48,000	=	***₹2,400 A***

Working notes:

(a) Basic Calculation

Workers	***SH × SR***	***RSH × SR***	***AHW × SR***	***AH × SR***	***AH × AR***
Group A	384 × 12	380 × 12	380 × 12	10×40×12	10×40×12.40
Group B	1,152 × 12	1,140 × 12	1,140 × 12	30×40×12	30×40×12.00
Group C	2,304 × 12	2,280 × 12	2,280 × 12	60×40×12	60×40×11.40
Total	₹46,080	₹45,600	₹45,600	₹48,000	₹46,720

(b) RSH (Revised Standard Hours) and AHW (Actual Hours Worked):

Total Actual Hours Worked	=	(100 workers × 40 hours) – 5% abnormal idle time		
	=	3,800 hours		
Group A	=	3,800 × 10/100	=	380 hours
Group B	=	3,800 × 30/100	=	1,140 hours
Group C	=	3,800 × 60/100	=	2,280 hours

(c) SH (Standard hours) for actual output 1,920 units:

Total standard hours	=	(100 workers × 1 hour ÷ 50 units) × 1,920 units		
	=	3,840 hours		
Group A	=	3,840 × 10/100	=	384 hours
Group B	=	3,840 × 30/100	=	1,152 hours
Group C	=	3,840 × 60/100	=	2,304 hours

(d) Standard wages rate (SR):

Labour Efficiency Variance	=	(SH - AHW) × SR		
480 F	=	(3,840 – 3,800) × SR		
SR	=	480 ÷ 40	=	₹12 per hour

BBQ 100

The following data for Pijee Ltd. is given:

Particulars	***Budgeted***	***Actual***
Production in units	400	360
Man hours to produce above	8,000	7,000
Variable overheads	₹10,000	₹9,150

The standard time to produce one unit of the product is 20 hours.

Calculate relevant Variable overhead variances.

Answer

(i) Variable Overhead Cost variance = (SH × SR) - (AH × AR)

		=	(360 × 20 hours × ₹1.25) - ₹9,150	=	***150 A***
(ii)	Variable OH Expenditure Variance	=	(AH × SR) - (AH × AR)		
		=	(7,000 × ₹1.25) - ₹9,150	=	***400 A***
(iii)	Variable OH Efficiency Variance	=	(SH × SR) - (AH × SR)		
		=	(360 × 20 hours × ₹1.25) - (7,000 × ₹1.25)	=	***250 F***

Working Notes:

(a)	Standard Rate (SR)	=	Budgeted Variable Overheads ÷ Budgeted Hours	
		=	₹10,000 ÷ 8,000 hours =	***₹1.25 per hour***

BBQ 101

Following information is available from the records of a factory:

Particulars	***Budget***	***Actual***
Fixed overhead for June, 2017	₹10,000	₹12,000
Production in June, 2017 (units)	2,000	2,100
Standard time per unit (hours)	10	-
Actual hours worked in June	-	22,000

Compute: (i) Fixed Overhead Cost Variance, ***(ii)*** Expenditure Variance, ***(iii)*** Volume Variance.

Answer

(i)	Fixed Overhead Variance	=	Absorbed Overheads – Actual Overheads	
		=	(2,100 units × 10 hours × ₹0.50*) – 12,000	
		=	10,500 – 12,000	= ***1,500 A***
(ii)	Fixed OH Expenditure Variance	=	Budgeted Overheads - Actual Overheads	
		=	10,000 - 12,000	= ***2,000 A***
(iii)	Fixed OH Volume Variance	=	Absorbed Overheads – Budgeted Overheads	
		=	10,500 – 10,000	= ***500 F***
	*Standard Rate (SH) per hour	=	$\frac{\text{Budgeted OH}}{\text{Budgeted Hours}}$	
		=	$\frac{10{,}000}{2{,}000 \text{ Units} \times 10 \text{ Hours per unit}}$	= ***₹0.50***

BBQ102

AB Ltd. has furnished the following data:

Particulars	***Budget***	***Actual, July***
No. of working days	25	27
Production in units	20,000	22,000
Fixed Overheads (₹)	30,000	31,000

Budgeted fixed overhead rate is ₹1.00 per hour. In July, the actual hours worked were 31,500.

Calculate the following variances in relation to fixed overheads:

(a) Efficiency Variance ***(b)*** Capacity Variance ***(c)*** Calendar Variance
(d) Volume Variance ***(e)*** Expenditure Variance.

Answer

(a)	***Fixed OH Efficiency Variance***	=	(SH × SR) – (AH × SR)		
		=	(33,000 × ₹1) – (31,500 × ₹1)	=	***1,500 F***
(b)	***Fixed OH Capacity Variance***	=	(AH × SR) – (CH × SR)		
		=	(31,500 × ₹1) – (32,400 × ₹1)	=	***900 A***
(c)	***Fixed OH Calendar Variance***	=	(CH × SR) – (BH × SR)		
		=	(32,400 × ₹1) – ₹30,000	=	***2,400 F***
(d)	***Fixed OH Volume Variance***	=	(SH × SR) – (BH × SR)		
		=	(33,000 × ₹1) – ₹30,000	=	***3,000 F***
(e)	***Fixed OH Expenditure Variance***	=	(BH × SR) – (AH × AR)		
		=	₹30,000 – ₹31,000	=	***1,000 A***

Working notes:

Budgeted hours (BH)	=	₹30,000 ÷ ₹1 per hour	=	30,000 hours
Standard hour per unit	=	30,000 hours ÷ 20,000 units	=	1.5 hour
Standard hour for actual output (SH)	=	22,000 units × 1.5 hours	=	33,000 hours
Calendar hours (CH)	=	(30,000 hours × $^{27}/_{25}$ days)	=	32,400 hours

BBQ 103

SJ Ltd. has furnished the following information:

Standard overhead absorption rate per unit	₹20
Standard rate per hour	₹4
Budgeted production	12,000 units
Actual production	15,560 units
Actual overheads were	₹2,95,000 (₹62,500 fixed)
Actual hours	74,000

Overheads are based on the following flexible budget:

Production (units)	8,000	10,000	14,000
Total Overheads (₹)	1,80,000	2,10,000	2,70,000

You are required to calculate the following overhead variances (on hour's basis) with appropriate workings:

(i) Variable overhead efficiency and expenditure variance.
(ii) Fixed overhead efficiency and capacity variance.

Answer

(i)	Variable Overhead Efficiency	=	(SH × SR) - (AH × SR)		
		=	2,33,400 - 2,22,000	=	***11,400 F***
	Variable Expenditure Variable	=	(AH × SR) - (AH × AR)		
		=	2,22,000 - 2,35,500	=	***10,500 A***
(ii)	Fixed Overhead Efficiency	=	(SH × SR) - (AH × SR)		
		=	77,800 – 74,000	=	***3,800 F***

Fixed OH Capacity Variance	=	(AH × SR) - (BH × SR)		
	=	74,000 - 60,000	=	***14,000 F***

Working Notes:

For variable overheads:

SH × SR	=	15,560 units × 5 hours per unit × ₹3 per hour		
	=	***2,33,400***		
AH × SR	=	74,000 hours × ₹3 per hour	=	***2,22,000***
AH × AR	=	2,95,000 - 62,500	=	***2,32,500***

For fixed overheads:

SH × SR	=	15,560 units × 5 hours × ₹1 per hour	=	***77,800***
AH × SR	=	74,000 × ₹1 per hour	=	***74,000***
BH × BR	=	12,000 units × 5 hours per unit × ₹1 per hour		
	=	***60,000***		

Standard OH (variable + fixed)	=	***₹20 per unit***		
Standard hours per unit	=	$\frac{\text{Standard overhead per unit}}{\text{Standard rate per hour}}$	=	$\frac{20.00}{4.00}$
	=	***5 hours per unit***		
Budgeted variable cost per unit	=	$\frac{\text{Difference in expense}}{\text{Difference in units}}$	=	$\frac{2,10,000 - 1,80,000}{10,000 - 8,000}$
	=	***₹15.00 per unit***		
Standard variable overhead per hour	=	$\frac{15.00}{5 \text{ hours}}$	=	***₹3 per hour***
Standard fixed overhead per hour	=	Total Standard OH per hour – Standard Variable OH per hour		
	=	4.00 - 3.00	=	***₹1 per hour***

BBQ 104

Following data is available for DKG and Co:

Standard working hours	8 hours per day of 5 days per week
Maximum capacity	50 employees
Actual working	40 employees
Actual hours expected to be worked per four week	6,400 hours
Standard hours expected to be earned per four weeks	8,000 hours
Actual hours worked in the four week period	6,000 hours
Standard hours earned in the four week period	7,000 hours.

The related period is of 4 weeks. In this period there was a one special day holiday due to national event.

Calculate:

(1) Efficiency Ratio,
(2) Activity Ratio,
(3) Calendar Ratio,
(4) Standard Capacity Usage Ratio,
(5) Actual Capacity Usage Ratio,
(6) Actual Usage of Budgeted Capacity Ratio.

Answer

Maximum Capacity in a budget period = 50 Employees × 8 Hours × 5 Days × 4 Weeks = ***8,000 Hours***

Budgeted Hours = 40 Employees × 8 Hours × 5 Days × 4 Weeks = ***6,400 Hours***

Actual Hours = ***6,000 Hours (given)***

Standard Hours for Actual Output = ***7,000 Hours***

Budget Number of Days = ***20 Days (4 Weeks x 5 Days)***

Actual Number of Days = 20 – 1 = ***19 Days***

(1) Efficiency Ratio $= \frac{\text{Standard Hours}}{\text{Actual Hours}} \times 100 = \frac{7{,}000 \text{ Hours}}{6{,}000 \text{ Hours}} \times 100$

$=$ ***116.67%***

(2) Activity Ratio $= \frac{\text{Standard Hours}}{\text{Budgeted Hours}} \times 100 = \frac{7{,}000 \text{ Hours}}{6{,}400 \text{ Hours}} \times 100$

$=$ ***109.375%***

(3) Calendar Ratio $= \frac{\text{Available Working Days}}{\text{Budgeted Working Days}} = \frac{19 \text{ Days}}{20 \text{ Days}}$

$=$ ***95%***

(4) Standard Capacity Usage Ratio $= \frac{\text{Budgeted Hours}}{\text{Max. Possible Hours in Budget Period}} \times 100$

$= \frac{6{,}400 \text{ Hours}}{8{,}000 \text{ Hours}} \times 100 =$ ***80%***

(5) Actual Capacity Usage Ratio $= \frac{\text{Actual Hours Worked}}{\text{Max. Possible Working Hours in a Period}} \times 100$

$= \frac{6{,}000 \text{ Hours}}{8{,}000 \text{ Hours}} \times 100 =$ ***75%***

(6) Actual Usage of Budgeted Capacity Ratio

$= \frac{\text{Actual Working Hours}}{\text{Budgeted Hours}} \times 100$

$= \frac{6{,}000 \text{ Hours}}{6{,}400 \text{ Hours}} \times 100 =$ ***93.75%***

CHAPTER 12 MARGINAL COSTING

1. **Marginal Cost Equation:** $C = F + P$

2. **Contribution:** *It is the balance amount of sales after deduction of variable cost which is used to recover fixed cost and provide profit.*

   Contribution = Sales – Variable cost

3. **Contribution ratio or Profit Volume ratio (PV ratio):**

   Profit volume ratio = $\frac{\text{Contribution}}{\text{Sales}} \times 100$

   Profit volume ratio = 100 – Variable cost ratio

   Profit volume ratio = $\frac{\text{Fixed Cost}}{\text{BEP Sales}} \times 100$

   Profit volume ratio = $\frac{\text{Profit}}{\text{MOS Sales}} \times 100$

4. **Break Even Point (BEP):**

   - Level of sales at which company is in situation of no profit and no loss
   - Level of sales at which contribution and fixed cost are same

   BEP Sales = Variable cost + Fixed cost + ~~Profit~~

   BEP Sales in units = $\frac{\text{Fixed Cost}}{\text{Contribution Per Unit}}$

   BEP Sales in units = BEP Sales in amount ÷ Sale price per unit

   BEP Sales in units = Total Sales in units – MOS Sales in units

   BEP Sales (in amount) = $\frac{\text{Fixed Cost}}{\text{PV Ratio}} \times 100$

   BEP Sales (in amount) = BEP Sales in units × Sale price per unit

   BEP Sales (in amount) = Total Sales in amount – MOS Sales in amount

5. **Margin of Safety (MOS):**

   - Level of sales over and above BEP sales
   - Level of sales at which contribution and profit are same

   MOS Sales = Variable cost + ~~Fixed cost~~ + Profit

MOS Sales in units	=	$\frac{\text{Profit}}{\text{Contribution Per Unit}}$
MOS Sales in units	=	*MOS Sales in amount ÷ Sale price per unit*
MOS Sales in units	=	*Total Sales in units – BEP Sales in units*
MOS Sales (in amount)	=	$\frac{\text{Profit}}{\text{PV Ratio}}$
MOS Sales (in amount)	=	*MOS Sales in units × Sale price per unit*
BEP Sales (in amount)	=	*Total Sales in amount – BEP Sales in amount*

6. *Profit Planning:*

Target sales in units	=	$\frac{\text{Fixed Cost+Profit}}{\text{Contribution Per Unit}}$
Target sales in amount	=	$\frac{\text{Fixed Cost + Profit}}{\text{PV Ratio}}$
Target sales in units	=	$\frac{\text{Fixed Cost}}{\text{Contribution Per Unit} - \text{Profit Per Unit}}$
Target sales in amount	=	$\frac{\text{Fixed Cost}}{\text{PV Ratio} - \%\text{ of Profit To Sales}}$

7. *PV Ratio and Variable Cost Ratio under two periods data:*

Variable Cost ratio	=	$\frac{\text{Change in Total Cost}}{\text{Change in Sales}} \times 100$
Profit Volume ratio	=	$\frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$
Variable cost per unit	=	$\frac{\text{Change in Total Cost}}{\text{Change in Sales Units}}$
Contribution per unit	=	$\frac{\text{Change in Profit}}{\text{Change in Sales Units}}$

8. *Sales Mix or Multiple products:*

- *Use Composite/Average contribution per unit or PV ratio*
- *Use Composite/Average contribution per unit or PV ratio to solve the problems*

9. *Merger of Plants:*

Step 1: Calculate total Sales, Variable Cost, Fixed Cost and P/V Ratio of merged plant at 100% Capacity.

Step 2: Solve the problem with P/V Ratio calculated in Step 1.

10. Key Factor or Limiting Factor:

- Anything which limits the activity of an entity
- The factor is a key to determine the level of sale and production, thus it is also known as key factor.

Example of key factor or limiting factor:

- Men (employees),
- Materials (raw material or supplies),
- Machine (capacity),
- Money (availability of fund or budget)
- Demand for the product etc.

Step 1: Calculate Contribution per key factor unit.

Step 2: Give rank to all products on the basis of contribution per key factor unit.

Step 3: Prepare statement of optimum product mix on the basis of rank in step 2.

Step 4: Prepare statement showing optimum contribution or profit.

11. Shut Down Point:

$$\text{Shut down point} = \frac{\text{Avoidable Fixed Cost} - \text{Reopening Cost}}{\text{Contribution per unit or PV Ratio}}$$

12. Indifference Point or Cost Indifference Point or Cost BEP:

$$\text{Indifference point} = \frac{\text{Difference in Fixed Cost}}{\text{Difference in Variable Cost Per unit}}$$

Situation	Suggestion
Expected activity < Indifference point	Select option having lower fixed cost
Expected activity = Indifference point	Select any option
Expected activity > Indifference point	Select option having lower variable cost per unit

13. Income Statement Under Absorption Costing:

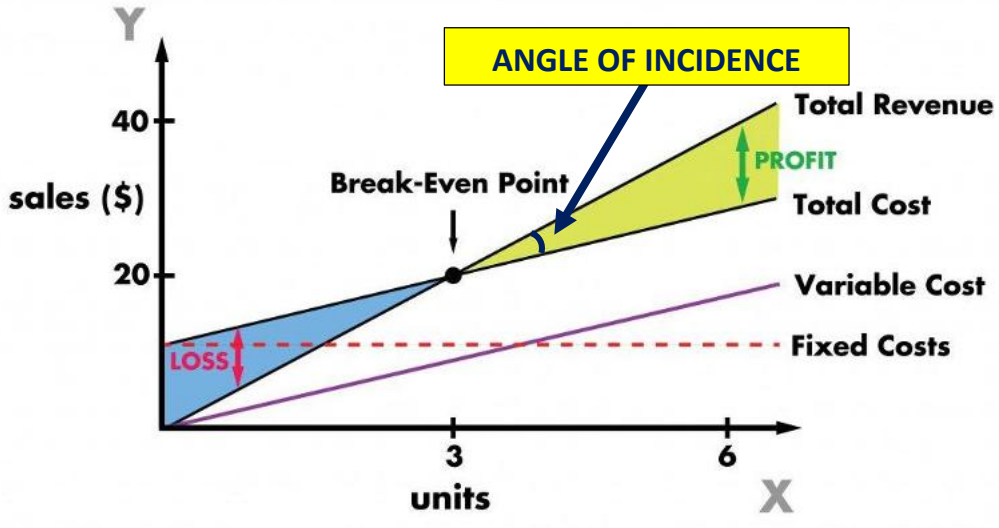
Particulars	₹
Sales	XXX
Production costs:	
Variable (Actual)	XXX
Fixed (Recovered)	XXX
Cost of Production	XXX
Add: Opening stock (Opening Units @ standard rate of cost of production)	XXX
Less: Closing stock (Closing Units @ current rate of cost of production)	(XXX)
Cost of Goods Sold	XXX
Add: Under absorbed fixed production overhead (If any)	XXX

Less: Over absorbed fixed production overhead (If any)	(XXX)
Add: Variable administrative and selling costs	XXX
Add: Fixed administrative and selling costs	XXX
Total Cost	XXX
Profit (Sales – Total Cost)	XXX

14. Income Statement Under Marginal Costing:

Particulars	₹
Sales	XXX
Production costs:	
Variable (Actual)	XXX
Variable Cost of Production	XXX
Add: Opening stock (Opening Units @ standard rate of variable COP)	XXX
Less: Closing stock (Closing Units @ current rate of variable cost of production)	(XXX)
Variable Cost of Goods Sold	XXX
Add: Variable administrative and selling costs	XXX
Variable Cost of Sales	XXX
Contribution (Sales – Variable Cost of sales)	XXX
Less: Fixed cost (all)	(XXX)
Profit (Contribution – Fixed Cost)	XXX

15. BEP and Angle of Incidence Graph:



BBQ 105

A company has a PV ratio of 40%. By what percentage must sales be increased to offset 20% reduction in selling price?

Answer

Let current sale price be ₹100 per unit. Hence,

Particulars	Current	Proposed
Sales	100	80
Less: Variable cost (60% of ₹100)	60	60
Contribution	**40**	**20**

Revised Sales (in ₹) = $\frac{\text{Desired Contribution}}{\text{Revised PV Ratio}}$ = $\frac{40}{25\%}$ = **₹160**

Revised Sales (in units) = $\frac{\text{Desired Contribution}}{\text{Revised Contribution p.u.}}$ = $\frac{40}{20}$ = **2 units**

*Revised P/V Ratio = Revised Contribution ÷ Revised Selling Price
= (20 ÷ 80) × 100 = 25%

Therefore, Sales value to be increased by 60% and sales quantity to be doubled to offset the reduction in selling price.

BBQ 106

SHA Limited provides the following trading results:

Year	Sales	Profit
2012-13	₹25,00,000	10% of Sale
2013-14	₹20,00,000	8% of Sale

You are required to calculate:

(i) Fixed Cost
(ii) Break Even Point
(iii) Amount of profit, if sale is ₹30,00,000
(iv) Sale, when desired profit is ₹4,75,000
(v) Margin of Safety at a profit of ₹2,70,000

Answer

(i) Calculation of Fixed Cost (by using data of year 2012-13):

Fixed cost = Contribution – profit = (Sales × PV Ratio) - 10% of Sale
= (₹25,00,000 × 18%) - 10% of ₹25,00,000 = **₹2,00,000**

(ii) Calculation of Break Even Point:

BEP = $\frac{\text{Fixed Cost}}{\text{PV Ratio}}$ = $\frac{2,00,000}{18\%}$ = **₹11,11,111.11**

(iii) Calculation of Amount of profit, if Sale is ₹30,00,000:

Profit = Contribution - Fixed Cost
= ₹30,00,000 × 18% - 2,00,000 = **₹3,40,000**

(iv) Sales, when desired profit is ₹4,75,000:

Sales $= \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{PV Ratio}} = \frac{2,00,000 + 4,75,000}{18\%}$

$= ₹37,50,000$

(v) Margin of Safety at a profit of ₹2,70,000:

MOS $= \frac{\text{Profit}}{\text{PV Ratio}} = \frac{2,70,000}{18\%} = ₹15,00,000$

Working Note:

PV Ratio $= \frac{\text{Difference in Profit}}{\text{Difference in Sales}} \times 100 = \frac{10\% \text{ of } 25,00,000 - 8\% \text{ of } 20,00,000}{25,00,000 - 20,00,000} \times 100$

$= \frac{90,000}{5,00,000} \times 100 = 18\%$

BBQ 107

MNP Ltd. sold 2,75,000 units of its product at ₹37.50 per unit. Variable costs are ₹17.50 per unit (manufacturing costs of ₹14 and selling cost of ₹3.50 per unit). Fixed costs are incurred uniformly throughout the year and amount to ₹35,00,000 (including depreciation of ₹15,00,000). There are no beginning or ending inventories.

Required:

(i) Estimate breakeven sales level quantity and cash breakeven sales level quantity.
(ii) Estimate the P/V ratio.
(iii) Estimate the number of units that must be sold to earn an income (EBIT) of ₹2,50,000.
(iv) Estimate the sales level to achieve an after-tax income (PAT) of ₹2,50,000. Assume 40% corporate Income Tax rate.

Answer

(a) Break even sales $= \frac{\text{Fixed cost}}{\text{Contribution per unit}} = \frac{35,00,000}{37.50 - 17.50}$

$= 1,75,000 \text{ units.}$

Cash BEP (in Quantity) $= \frac{\text{Fixed cost (excluding depreciation)}}{\text{Contribution per unit}}$

$= \frac{35,00,000 - 15,00,000}{37.50 - 17.50} = 1,00,000 \text{ units.}$

(b) P/V ratio $= \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{37.50 - 17.50}{37.50} \times 100$

$= 53.33\%$

(c) No. of units must be sold $= \frac{\text{Fixed cost} + \text{Desired EBIT}}{\text{Contribution per unit}}$

$= \frac{35,00,000 + 2,50,000}{20.00} = 1,87,500 \text{ units.}$

(d) Desired Sales level (₹) $= \frac{\text{Fixed cost} + \text{Desired Profit Before Tax}}{\text{PV ratio}}$

$$= \frac{35,00,000 + 4,16,667}{53.33\%} = \textbf{₹73,43,750}$$

WN:

Desired PAT	=	₹2,50,000			
Tax rate	=	40%			
Desired Profit before tax	=	$\frac{\text{Desired PAT}}{(1-t)}$	=	$\frac{2,50,000}{(1-0.40)}$	= ***₹4,16,667***

BBQ 108

A Ltd. maintains margin of safety of 37.5% with an overall contribution to sales ratio of 40%. Its fixed costs amount to ₹5,00,000.

Calculate (i) Break-even sales, ***(ii)*** Total sales, ***(iii)*** Total variable cost, ***(iv)*** Current profit, ***(v)*** New 'margin of safety' if the sales volume is increased by 7-½%.

Answer

(i)	Break Even Sales × PV Ratio	=	Fixed Cost		
	Break Even Sales × 40%	=	₹5,00,000		
	Break Even Sales	=	₹5,00,000 ÷ 40%	=	***₹12,50,000***
(ii)	Total Sales	=	Break Even Sales + Margin of Safety		
	Total Sales	=	₹12,50,000 + 37.50% of Total Sales		
	62.50% of Total Sales	=	₹12,50,000		
	Total Sales	=	₹12,50,000 ÷ 62.50%	=	***₹20,00,000***
(iii)	Contribution to Sales Ratio	=	40%		
	Therefore, Variable cost to Sales Ratio	=	60%		
	Variable cost	=	60% of sales		
	Variable cost	=	60% of ₹20,00,000	=	***₹12,00,000***
(iv)	***Current Profit***	=	Sales - (Variable Cost + Fixed Cost)		
		=	₹20,00,000 - (₹12,00,000 + ₹5,00,000)		
		=	***₹3,00,000***		
(v)	***New Sales value***	=	₹20,00,000 + 7.50% of ₹20,00,000		
		=	***₹21,50,000***		
	New Margin of Safety	=	New Sales value – BES		
		=	₹21,50,000 - ₹12,50,000	=	***₹9,00,000***

BBQ 109

The profit for the year of R.J. Ltd. works out to 12.5% of the capital employed and the relevant figures are as under:

Sales	₹5,00,000
Direct Materials	₹2,50,000
Direct Labour	₹1,00,000
Variable Overheads	₹40,000
Capital Employed	₹4,00,000

The new Sales Manager who has joined the company recently estimates for next year a profit of about 23% on capital employed, provided the volume of sales is increased by 10% and simultaneously there is an increase in Selling Price of 4% and an overall cost reduction in all the elements of cost by 2%.

Find out by computing in detail the cost and profit for next year, whether the proposal of Sales Manager can be adopted.

Answer

Statement Showing Cost and Profit for the Next Year

Particulars	Existing	Estimated
Sales Value	5,00,000	5,72,000
Less: Direct Materials	2,50,000	2,69,500
Direct Labour	1,00,000	1,07,800
Variable Overheads	40,000	43,120
Contribution	***1,10,000***	***1,51,580***
Less: Fixed Cost	60,000	58,800
Profit	***50,000***	***92,780***

Fixed Cost = Existing Sales – Existing Marginal Cost – 12.5% on ₹4,00,000
= ₹5,00,000 – ₹3,90,000 – ₹50,000 = ***₹60,000***

Percentage Profit on Capital Employed equals to 23.19% $\left(\frac{92,780}{4,00,000}\times 100\right)$

Since the Profit of ₹92,780 is more than 23% of capital employed, the proposal of the Sales Manager can be adopted.

BBQ 110

An Indian soft drink company is planning to establish a subsidiary company in Bhutan to produce mineral water. Based on the estimated annual sales of 40,000 bottles of the mineral water, cost studies produced the following estimates for the Bhutanese subsidiary:

Name of Expense	Total Annual Cost	% of Total annual cost which is variable
Materials	2,10,000	100%
Labour	1,50,000	80%
Factory Overheads	92,000	60%
Administration Expenses	40,000	35%

The Bhutanese production will be sold by manufacturer's representatives who will receive a commission of 8% of the sale price. No portion of the Indian office expenses is to be allocated to the Bhutanese subsidiary.

You are required to

1. Compute the sale price per bottle to enable the management to realize an estimated 10% profit on sale proceeds in Bhutan.
2. Calculate the break-even point in sales as also in number of bottles for the Bhutanese subsidiary on the assumption that the sale price is ₹14 per bottle.

Answer

1. Calculation of sales price to earn 10% profit on sales:

Sales value = Fixed cost + Variable cost + Profit
Sales value = (2,10,000 × 0% + 1,50,000 × 20% + 92,000 × 40% + 40,000 × 65%) + (2,10,000 × 100% + 1,50,000 × 80% + 92,000 × 60% + 40,000 × 35% + Commission @ 8% on sales) + Profit @10% on sales

Sales value = 92,800 + 3,99,200 + 8% of sales + 10% of sales
Sales value = 4,92,000 ÷ 82% = ***₹6,00,000***

Sales Price	=	Sales value ÷ No. of units		
	=	6,00,000 ÷ 40,000 units	=	***₹15.00***

2. Calculation of Break Even Point:

Break Even Point (in units)	=	Fixed cost ÷ Contribution per unit		
	=	92,800 ÷ 2.90 (14 – 11.10)	=	***32,000 units***
Break Even Point (in ₹)	=	BEP in units × Sales price per unit		
	=	32,000 units × 14.00	=	***₹4,4,8000***

Working notes:

Total variable cost	=	3,99,200 + 8% on sales (8% of 40,000 × 14.00)		
	=	4,44,000		
Variable cost per unit	=	Total variable cost ÷ No. of units		
	=	4,44,000 ÷ 40,000 units	=	₹11.10

BBQ 111

The following are cost data for three alternative ways of processing the clerical work for cases brought before the LC Court System:

Particulars	***'A' Manual (₹)***	***'B' Semi Automatic (₹)***	***'C' Fully Automatic (₹)***
Monthly fixed costs:			
Occupancy	15,000	15,000	15,000
Maintenance contract	-	5,000	10,000
Equipment lease	-	25,000	1,00,000
Unit variable cost (per report):			
Supplies	40	80	20
Labour	200 (5 hours × 40)	60 (1 hour × 60)	20 (0.25 hour × 80)

1. Calculate cost indifference points. Interpret your results.

2. If the present case load is 600 cases and it is expected to go up to 850 cases in near future, which method is most appropriate on cost considerations?

Answer

1. Statement Showing Cost Indifference Point

Particulars	***A and B***	***A and C***	***B and C***
(a) Differential Fixed Cost	30,000 (45,000 – 15,000)	1,10,000 (1,25,000 – 15,000)	80,000 (1,25,000 – 45,000)
(b) Differential Variable Cost	100 (240 - 140)	200 (240 - 40)	100 (140 - 40)
(c) Cost Indifference Point (a) ÷ (b)	***300 cases***	***550 cases***	***800 cases***

Interpretation of Results

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

Number of Cases	***Alternative to be Chosen***

Cases ≤ 300	Alternative 'A'
300 ≥ Cases ≤ 800	Alternative 'B'
Cases ≥ 800	Alternative 'C'

2. Present case load is 600. Therefore, alternative B is suitable. As the number of cases is expected to go upto 850 cases, alternative C is most appropriate.

BBQ 112

Mr. X has ₹2,00,000 investments in his business firm. He wants a 15 percent return on his money. From an analysis of recent cost figures, he finds that his variable cost of operating is 60 percent of sales, his fixed costs are ₹80,000 per year.

Show computations to answer the following questions:

(i) What sales volume must be obtained to break even?
(ii) What sales volume must be obtained to get 15 percent return on investment?
(iii) Mr. X estimates that even if he closed the doors of his business, he would incur ₹25,000 as expenses per year. At what sales would he be better off by locking his business up?

Answer

P/V Ratio = 100 – Variable cost ratio
= 100 – 60% = ***40%***

(i) Break-even point = Fixed cost ÷ PV ratio
= 80,000 ÷ 40% = ***₹2,00,000***

(ii) Sales volume required $= \frac{\text{Fixed cost} + \text{Desired profit}}{\text{PV ratio}}$

$= \frac{80{,}000 + 15\% \text{ of } 2{,}00{,}000}{40\%}$ = ***₹2,75,000***

(iii) Shut down point $= \frac{\text{Avoidable fixed cost}}{\text{PV ratio}}$

$= \frac{80{,}000 - 25{,}000}{40\%}$ = ***₹1,37,500***

Mr. X should shut down the business if the sale is less than ₹1,37,500.

BBQ 113

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

	Products		
	A	***B***	***C***
Sales Mix	40%	35%	25%
Selling Price	₹300	₹400	₹200
Variable Cost	₹150	₹200	₹120
Total Fixed Costs			₹18,00,000
Total Sales			₹60,00,000

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

	Products		
	A	B	E
Sales Mix	45%	30%	25%
Selling Price	₹300	₹400	₹300
Variable Cost	₹150	₹200	₹150
Total Fixed Costs			₹18,00,000
Total Sales			₹64,00,000

Required:

(a) Calculate the PV ratio, Total contribution, Profit and Break-even sales for the existing product mix.

(b) Calculate the PV ratio, Total contribution, Profit and Break-even sales for the proposed sales mix.

(c) State whether the proposed sales mix is accepted or not?

Answer

(a) Calculation of PV Ratio, Total Contribution, Profit and BEP for the existing product mix:

	Products			Total
	A	B	C	
Selling Price (₹)	300	400	200	
Less: Variable Cost (₹)	150	200	120	
Contribution per unit (₹)	150	200	80	
P/V Ratio	50%	50%	40%	
Sales Mix	40%	35%	25%	
Contribution per rupee of sales (P/V Ratio × Sales Mix)	20%	17.5%	10%	47.5%
Present Total Contribution (₹60,00,000 × 47.5%)				₹28,50,000
Less: Fixed Costs				₹18,00,000
Present Profit				₹10,50,000
Present Break-Even Sales (₹18,00,000/0.475)				₹37,89,473.68

(b) Calculation of PV Ratio, Total Contribution, Profit and BEP for the proposed product mix:

	Products			Total
	A	B	E	
Selling Price (₹)	300	400	300	
Less: Variable Cost (₹)	150	200	150	
Contribution per unit (₹)	150	200	80	
P/V Ratio	50%	50%	50%	
Sales Mix	45%	30%	25%	
Contribution per rupee of sales (P/V Ratio × Sales Mix)	22.5%	15%	12.5%	50%
Present Total Contribution (₹64,00,000 × 50%)				₹32,00,000
Less: Fixed Costs				₹18,00,000
Present Profit				₹14,00,000
Present Break-Even Sales (₹18,00,000/0.5)				₹36,00,000

(c) The proposed sales mix increases the total contribution to sales ratio from 47.5% to 50% and the total profit from ₹10,50,000 to ₹14,00,000. Thus, the proposed sales mix should be accepted.

BBQ 114

M.K. Ltd. manufactures and sells a single product X whose selling price is ₹40 per unit and the variable cost is ₹16 per unit.

(a) If the Fixed Costs for this year are ₹4,80,000 and the annual sales are at 60% margin of safety, calculate the rate of net return on sales, assuming an income tax level of 40%

(b) For the next year, it is proposed to add another product line Y whose selling price would be ₹50 per unit and the variable cost ₹10 per unit. The total fixed costs are estimated at ₹6,66,600. The sales mix units of X : Y would be 7 : 3. At what level of sales next year, would M.K. Ltd. break even? Give separately for both X and Y the breakeven sales in rupee and quantities.

Answer

(a) Rate of net return on sales = $\frac{4,32,000}{20,00,000} \times 100$ = ***21.60%***

(b) Break Even Point = $\frac{\text{Fixed Cost}}{\text{Composite Contribution Per Unit}}$ = $\frac{6,66,600}{28.80}$

= ***23,145.80 units***

Break even Sales Mix:

Product X = 70% of 23,145.80 units = ***16,202 units or ₹6,48,080***

Product Y = 30% of 23,145.80 units = ***6,944 units or ₹3,47,200***

Working notes:

(1) Calculation of Net return:

Particulars	***(₹)***
Sales value (50,000 units × 40)	20,00,000
Less: Variable cost (50,000 units × 16)	8,00,000
Contribution	***12,00,000***
Less: Fixed cost	4,80,000
Profit Before Tax	***7,20,000***
Less: Income Tax @ 40%	2,88,000
Profit After Tax	***4,32,000***

BEP in units = $\frac{\text{Fixed cost}}{\text{contribution per unit}}$ = $\frac{4,80,000}{40-16}$ = 20,000 units

Total sales = BEP + MOS (60% of sales) = 20,000 units + 60% sales

Total sales = 20,000 units ÷ 40% = 50,000 units

(2) Composite Contribution per unit= (40 – 16) × 7/10 + (50 - 10) × 3/10 = ***28.80 per unit***

BBQ 115

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

	A	***B***
Capacity utilisation (%)	90	60
Sales (₹)	31,50,000	24,00,000
Variable Cost (₹)	19,80,000	11,25,000
Fixed Cost (₹)	6,50,000	7,50,000

Assuming that the proposal is implemented, calculate:

(1) Break-Even sales of the merged plant and the capacity utilization at that stage.
(2) Profitability of the merged plant at 80% capacity utilization.
(3) Sales Turnover of the merged plant to earn a profit of ₹30,00,000.

(4) When the merged plant is working at a capacity to earn a profit of ₹30,00,000, what percentage of increase in selling price is required to sustain an increase of 5% in fixed overheads.

Answer

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

Break-Even Sales	=	Fixed Cost ÷ P/V Ratio		
	=	₹14,00,000 ÷ 45.67%	=	***₹30,65,470***
Capacity Utilization	=	(BEP Sales ÷ Sales at 100% Capacity) × 100		
	=	(₹30,65,470 ÷ ₹75,00,000) × 100	=	***40.87%***

(2) Profitability of merged plant at 80% Capacity:

Profit	=	Contribution – Fixed Cost		
	=	{(₹75,00,000 × 80%) × 45.67%} - ₹14,00,000=		***₹13,40,200***

(3) Sales to earn a profit of ₹30,00,000:

Sales	=	(Fixed Cost + Profit) ÷ P/V Ratio		
	=	(₹14,00,000 + ₹30,00,000) ÷ 45.67%	=	***₹96,34,333***

(4) % increase in selling price:

Increase in fixed cost	=	₹14,00,000 × 5%	=	₹70,000
∴ % increase in sales price	=	(₹70,000 ÷ ₹96,34,333) × 100	=	***0.727%***

Working Notes:

Calculation of Sales, Variable Cost, P/V Ratio and Fixed Cost at 100% capacity of merged plant:

Sales	=	(₹31,50,000 ÷ 90%) + (₹24,00,000 ÷ 60%)	=	₹75,00,000
Variable Cost	=	(₹19,80,000 ÷ 90%) + (₹11,25,000 ÷ 60%)	=	₹40,75,000
P/V Ratio	=	(Contribution ÷ Sales) × 100		
	=	{(₹75,00,000 – ₹40,75,000) ÷ ₹75,00,000} × 100	=	45.67%
Fixed Cost	=	₹6,50,000 + ₹7,50,000	=	₹14,00,000

BBQ 116

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

You have the following information:

	X	***Y***	***Z***
Direct Material ₹ (per unit)	160	120	80
Variable Overheads ₹ (per unit)	8	20	12
Direct Labour:			

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

From the current budget, further details are as below:

Particulars	X	Y	Z
Annual production at present (in units)	10,000	12,000	20,000
Estimated selling price per unit (₹)	312	400	240
Sales departments estimate of possible sales in the coming year (in units)	12,000	16,000	24,000

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

Required:

(i) Identify the best possible product mix of Moon Ltd.
(ii) Calculate the total contribution from the best possible product mix.

Answer

(i) Statement Showing Best Possible Mix of Moon Ltd.

Rank	Product	Units/Mix	Labour hours dept. A
I	Product X	12,000	72,000
II	Product Y	16,000	1,60,000
III	Product Z (48,000 ÷ 5)	9,600	48,000 (b.f.)
Total		***37,600***	***2,80,000***

Best possible mix of X, Y, Z is 12,000 : 16,000 : 9,600

(ii) Calculation of contribution from best possible mix:

Total contribution = 12,000 units of X × 72 + 16,000 units of Y × 100 + 9,600 units of Z × 40
= ***₹28,48,000***

Working notes:

(3) Calculation of total available labour hours in department A:

Total available labour hours = 10,000 units of X × 6 hours + 12,000 units of Y × 10 hours + 20,000 units of Z × 5 hours
= 2,80,000 hours

(4) Calculation of Contribution per labour hour of department A and Rank:

Particulars	X	Y	Z
Sale price per unit	312	400	240
Less: Direct materials per unit	160	120	80
Less: Variable overheads per unit	8	20	12
Less: Wages per unit:			
Department A	24 (6 × 4)	40 (10 × 4)	20 (5 × 4)
Department B	48 (6 × 8)	120 (15 × 8)	88 (11 × 8)
Contribution per unit	72	100	40
÷ Labour hours per unit of Dept. A	÷ 6	÷ 10	÷ 5
Contribution per labour hour Dept. A	12	10	8
Rank	***I***	***II***	***III***

BBQ 117

X Ltd. supplies spare parts to an air craft company Y Ltd. The production capacity of X Ltd. facilitates production of any one spare part for a particular period of time. The following are the cost and other information for the production of the two different spare parts A and B:

Per unit	Part A	Part B
Alloy usage	1.6 kgs.	1.6 kgs.
Machine Time: Machine A	0.6 hrs.	0.25 hrs.
Machine Time: Machine B	0.5 hrs.	0.55 hrs.
Target Price (₹)	145	115

Total hours available for Machine A: 4,000 hours and for Machine B: 4,500 hours. Alloy available is 13,000 kgs @ ₹12.50 per kg. Variable overheads per machine hours for Machine A: ₹80 and for Machine B: ₹100

Required

1. Identify the spare part which will optimize contribution at the offered price.
2. If Y Ltd. reduces target price by 10% and offers ₹ 60 per hour of unutilized machine hour, what will be the total contribution from the spare part identified above?

Answer

1. Statement Showing Optimum Contribution

Particulars	Part A	Part B
Maximum units to be manufactured and sold	6,666	8,125
Sales Price	145	115
Less: Materials 1.60 kgs. @ ₹12.50 per kg	20	20
Variable overheads Machine A 0.6/.25 hour @ ₹80	48	20
Variable overheads Machine B 0.5/.55 hour @ ₹100	50	55
Contribution per unit	**27**	**20**
Maximum Contribution (Contribution per unit × Max. units)	**1,79,982**	**1,62,500**

Calculation of maximum number of units that can be produced under various limiting factor:

Particulars	Part A	Part B
Machine A (4,000 hours)	6,666 (4,000 ÷ 0.6)	16,000 (4,000 ÷ 0.25)
Machine B (4,500 hours)	9,000 (4,500 ÷ 0.5)	8,181 (4,500 ÷ 0.55)
Alloy Available (13,000 kg.)	8,125 (13,000 ÷ 1.6)	8,125 (13,000 ÷ 1.6)
Maximum number of part to be manufactured (Lowest of all)	**6,666**	**8,125**

Spare Part A will optimize the contribution.

2. Statement Showing Revised Contribution

Particulars	Part A
Parts to be manufactured	6,666
Machine A to be used (0.6 × 6,666)	4,000
Machine B to be used (0.5 × 6,666)	3,333
Underutilized machine hours (4,500 – 3,333)	1,167
Compensation for unutilized machine hours (1,167 × ₹60)	70,020
Reduction in price by 10% (6,666 × 145 × 10%)	96,657
Total revised contribution (1,79,982 + 70,020 – 96,657)	**1,53,345**

BBQ 118

Wonder ltd manufactures a single product, ZEST. The following figures relate to ZEST for a one year period:

Activity Level	50%	100%
Sales and production (units)	400	800
Sales	₹8,00,000	₹16,00,000
Production costs:		
Variable	₹3,20,000	₹6,40,000
Fixed	₹1,60,000	₹1,60,000
Selling and distribution costs:		
Variable	₹1,60,000	₹3,20,000
Fixed	₹2,40,000	₹2,40,000

The normal level of activity for the year is 800 units. Fixed costs are incurred evenly throughout the year and actual fixed costs are the same as budgeted. There were no stocks of ZEST at the beginning of the year. In the first quarter, 220 units were produced and 160 units were sold.

Required:

(a) What would be the fixed production costs absorbed by ZEST if absorption costing is used?
(b) What would be the under/over-recovery of overheads during the period?
(c) What would be the profit using absorption costing?
(d) What would be the profit using marginal costing?
(e) Why is there a difference between the answers to ***(c)*** and ***(d)***?

Answer

(a) Fixed production costs absorbed:

Budgeted fixed production costs	₹1,60,000
Budgeted output (Normal level of activity 800 units)	
Therefore, the absorption rate (₹1,60,000 ÷ 800)	₹200 per unit
Fixed cost recovered (During the first quarter, 220 units × ₹200)	***₹44,000***

(b) Under/over-recovery of overheads during the period:

Actual fixed production overhead (¼ of ₹1,60,000)	₹40,000
Absorbed fixed production overhead	₹44,000
Over-recovery of overheads	***₹4,000***

(c) Profit for the Quarter (Absorption Costing)

Activity Level	₹	₹
Sales revenue (160 units × ₹2,000)		3,20,000
Production costs:		
Variable (220 units × ₹800)	1,76,000	
Fixed overheads absorbed (220 units × ₹200)	44,000	2,20,000
Cost of production		***2,20,000***
Add: Opening stock		Nil
Less: Closing stock (₹2,20,000 ÷ 220 units) × 60 units		(60,000)
Cost of goods sold		***1,60,000***
Less: Adjustment for over recovery of fixed overheads		(4,000)
Add: Selling and distribution costs:		
Variable (160 units × ₹400)	64,000	
Fixed (¼ of ₹2,40,000)	60,000	1,24,000
Cost of sales		***2,80,000***
Profit (Sales – Cost of sales)		***40,000***

(d) Profit for the Quarter (Marginal costing)

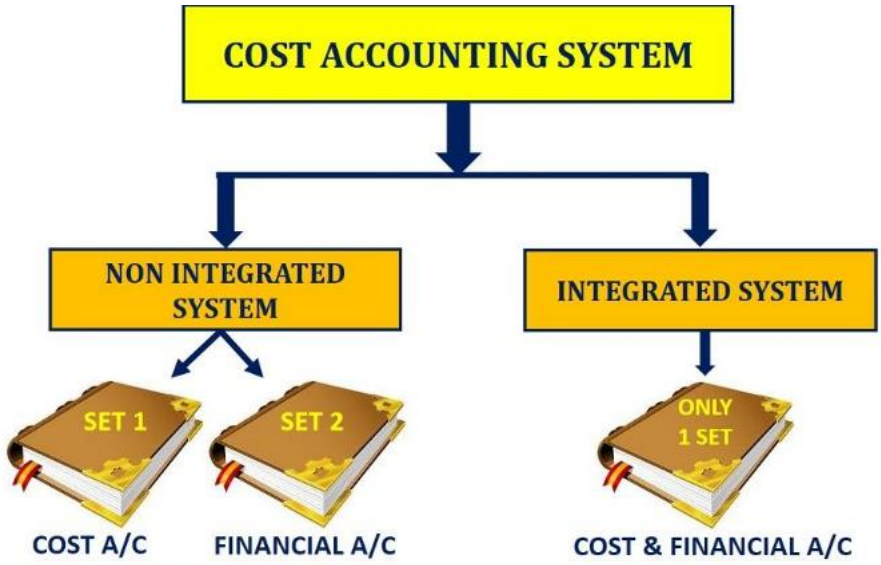
Activity Level	₹	₹
Sales revenue (160 units × ₹2,000)		3,20,000
Production costs:		
Variable (220 units × ₹800)		1,76,000
Cost of production		***1,76,000***
Add: Opening stock		Nil
Less: Closing stock (₹1,76,000 ÷ 220 units) × 60 units		(48,000)
Cost of goods sold		***1,28,000***
Add: Selling and distribution costs:		
Variable (160 units × ₹400)		64,000
Cost of sales		***1,92,000***
Contribution (Sales – Variable Cost of sales)		***1,28,000***
Less: Fixed costs:		
Production	40,000	
Selling & distribution	60,000	(1,00,000)
Profit		***28,000***

(e) Difference in profit between both techniques is due to difference in valuation of closing stock:

Profit as per Marginal costing	28,000
Add: under valuation of closing stock in marginal costing (60,000 – 48,000)	12,000
Profit as per Absorption costing	***40,000***

CHAPTER 13 COST ACCOUNTING SYSTEM

1. Cost Accounting System:



2. Integrated Accounting System: in this system only one set of books of account is maintained to records transactions related to cost account and financial account.

3. Accounting in Integrated System:

Store Ledger Control A/C

Particulars	₹	Particulars	₹
To Balance b/d	Opening Stock	By Purchase Return A/c	Return
To Cash/Bank/Supplier A/c	Purchase	By WIP A/c	Direct Mat.
To WIP A/c	Return	By Production OH A/c	Indirect Mat.
		By Production OH A/c	Normal Loss
		By Costing P/L A/c	Abnormal Loss
		By Balance c/d	Closing Stock
	-		-

Wages Control A/C

Particulars	₹	Particulars	₹
To Bank A/c	Wages Paid	By WIP A/c	Direct Labour
		By Production OH A/c	Ind. Labour
		By Production OH A/c	Normal Idle
		By Costing P/L A/c	Abnormal Idle
	-		-

Production Overhead Control A/C

Particulars	₹	Particulars	₹
To Bank A/c	OH Incurred	By WIP A/c	Recovered
To Depreciation A/c	Dep.	By Costing P/L A/c	Under
To Store A/c	Ind. M + NL	or	Recovery
To Wages A/c	Ind. L + NL	By Balance c/d	
	-		-

Work-In-Progress A/C

Particulars	₹	Particulars	₹
To Balance b/d	Opening WIP	By Finished Goods A/c	Completed
To Stores A/c	Direct Mat.	By Balance c/d	Closing WIP
To Wages A/c	Direct Lab.		
To Production OH A/c	Recovered		
	-		-

Administration Overhead A/C

Particulars	₹	Particulars	₹
To Bank A/c	OH Incurred	By Finished Goods A/c	Prod. Related
		By Cost of Sales A/c	General
		By Costing P/L A/c	Under Recovery
	-		-

Finished Goods Control A/C

Particulars	₹	Particulars	₹
To Balance c/d	Opening FG	By Cost of sales A/c	COGS
To Work-in-process A/c	Completed	By Balance c/d	Closing FG
To Administration OH A/c	Prod Related		
	-		-

Selling and Distribution Overhead A/C

Particulars	₹	Particulars	₹
To Bank A/c	OH Incurred	By Cost of Sales A/c	Recovered
		By Costing P/L A/c	Under Recovery
	-		-

Cost of Sales A/C

Particulars	₹	Particulars	₹
To Finished Good A/c	COGS	By Sales A/c	Sales
To Administration OH A/c	General		
To Selling OH A/c	S & D		
To Costing P/L A/c	Profit		
	-		-

Costing Profit & Loss A/C

Particulars	₹	Particulars	₹
To Stores A/c	Abnormal Loss	By Cost of Sales A/c	Profit
To Wages A/c	Abnormal Loss	By Abnormal Gain and Over	Abnormal Gain
To Production OH A/c	Under Recovery	Recovery	
To Administration OH A/c	Under Recovery		
To Selling OH A/c	Under Recovery		
To Net Profit	Net Profit		
	-		-

4. **Non Integrated Accounting System:** in this system two sets of books of accounts are maintained to records transactions related to cost account and financial account.

5. **Accounting in Non-integrated System:**

- In case of non-integrated accounting system cost records only recognize nominal account (material cost, labour cost, overheads etc.)

- For all transactions related to real account (bank, cash, assets etc.) and personal account (debtors, creditors, capital etc.) Cost record use a representative account viz.:
  - Cost Ledger Control A/C (CLC) or
  - Nominal Ledger Control A/C (NLC) or
  - General Ledger Adjustment A/C (GLA)

Store Ledger Control A/C

Particulars	₹	Particulars	₹
To Balance b/d	Opening Stock	By CLC	Return
To CLC A/c	Purchase	By WIP A/c	Direct Mat.
To WIP A/c	Return to stores	By Production OH A/c	Indirect Mat.
		By Production OH A/c	Normal Loss
		By Costing P/L A/c	Abnormal Loss
		By Balance c/d	Closing Stock
	-		-

Wages Control A/C

Particulars	₹	Particulars	₹
To CLC A/c	Wages Paid	By WIP A/c	Direct Lab.
		By Production OH A/c	Indirect Lab.
		By Production OH A/c	Normal Idle
		By Costing P/L A/c	Abnormal Idle
	-		-

Production Overhead Control A/C

Particulars	₹	Particulars	₹
To CLC A/c	OH Incurred	By WIP A/c	Recovered
To Store A/c	Ind. M + NL	By Costing P/L A/c or	Under Recovery
To Wages A/c	Ind. L + NL	By Balance c/d	
	-		-

Work-In-Progress A/C

Particulars	₹	Particulars	₹
To Balance b/d	Opening WIP	By Finished Goods A/c	Completed
To Stores A/c	Direct Mat.	By Balance c/d	Closing WIP
To Wages A/c	Direct Lab.		
To Production OH A/c	Recovered		
	-		-

Administration Overhead A/C

Particulars	₹	Particulars	₹
To CLC A/c	OH Incurred	By Finished Goods A/c	Prod. Related
		By Cost of Sales A/c	General
		By Costing P/L A/c	Under Recovery
	-		-

Finished Goods Control A/C

Particulars	₹	Particulars	₹
To Balance c/d	Opening FG	By Cost of sales A/c	COGS
To Work-in-process A/c	Completed	By Balance c/d	Closing FG
To Administration OH A/c	Prod Related		
	-		-

Selling and Distribution Overhead A/C

Particulars	₹	Particulars	₹
To CLC A/c	OH Incurred	By Cost of Sales A/c	Recovered
		By Costing P/L A/c	Under Recovery
	-		-

Cost of Sales A/C

Particulars	₹	Particulars	₹
To Finished Good A/c	COGS	By CLC A/c	Sales
To Administration OH A/c	General		
To Selling OH A/c	S & D		
To Costing P/L A/c	Profit		
	-		-

Costing Profit & Loss A/C

Particulars	₹	Particulars	₹
To Stores A/c	Abnormal Loss	By Cost of Sales A/c	Profit
To Wages A/c	Abnormal Loss	By Abnormal Gain and Over Recovery	Abnormal Gain
To Production OH A/c	Under Recovery		
To Administration OH A/c	Under Recovery		
To Selling OH A/c	Under Recovery		
To CLC A/c	Net Profit		
	-		-

Cost Ledger Control A/C

Particulars	₹	Particulars	₹
To Stores A/c	Return	By Balance b/d	Opening Bal
To Cost of Sales A/c	Sales	By Stores A/c	Purchase
To Balance c/d	Closing Balance	By Wages A/c	Wages Paid
		By Production OH A/c	OH Incurred
		By Admin OH A/c	OH Incurred
		By Selling OH A/c	OH Incurred
		By Costing P/L A/c	Net Profit
	-		-

Notes:

- There is no posting in stores ledger for Material transferred between Jobs or Batches.
- Normal loss of material and normal idle time is to be transferred to Production Overheads A/C.
- Administrative overheads is treated as related to production in case of absence of information.
- Shortage in material can be treated as (i) normal loss (preferred), (ii) abnormal loss.
- Inventory audit raw material loss is abnormal loss.
- In case of absence of information solve the problem by using non-integrated method.
- If question asked to prepare reconciliation and there is no additional item then under-over recovery of overhead is carried forward to prepare reconciliation.

BBQ 119

Journalize the following transactions assuming the cost and financial accounts are integrated:

Particulars	(in ₹)
Direct Materials issued to production	5,88,000
Allocation of Wages (Indirect)	7,50,000
Factory Overheads (Over absorbed)	2,25,000
Administrative Overheads (Under absorbed)	1,55,000
Deficiency found in stock of Raw material (Normal)	2,00,000

Answer

Journal Entries

S. No.	Entries		Dr.	Cr.
(a)	Work-in-progress Ledger Control A/c	Dr.	5,88,000	-
	To Store Ledger Control A/c		-	5,88,000
	(Being issue of direct materials to production)			
(b)	Factory Overhead Control A/c	Dr.	7,50,000	-
	To Wages Control A/c		-	7,50,000
	(Being allocation of indirect wages)			
(c)	Factory Overhead Control A/c	Dr.	2,25,000	-
	To Costing Profit & Loss A/c		-	2,25,000
	(Being transfer of over absorption of factory overhead)			
(d)	Costing Profit & Loss A/c	Dr.	1,55,000	-
	To Administration Overhead Control A/c		-	1,55,000
	(Being transfer of under absorption of administration overhead)			
(e)	Factory Overhead Control A/c	Dr.	2,00,000	-
	To Store Ledger Control A/c		-	2,00,000
	(Being transfer of deficiency in stock of raw material)			

BBQ 120

The following information is available from a company's records for March, 2016:

(a)	Opening balance of Creditors Account	₹25,000
(b)	Closing balance of Creditors Account	₹40,000
(c)	Payment made to Creditors	₹5,80,000
(d)	Opening balance of Stores Ledger Control Account	₹40,000
(e)	Closing balance of Stores Ledger Control Account	₹65,000
(f)	Wages paid (for 8,000 hours) 20% relate to indirect workers	₹4,00,000
(g)	Various indirect expenses incurred	₹60,000
(h)	Opening balance of WIP Control Account	₹50,000
(i)	Inventory of WIP at the end includes:	
	Material worth	₹35,000
	Labour hours booked	400 hours
(j)	Budgeted:	
	Overhead cost	₹20,80,000
	Labour hours	1,04,000

(a) Factory overhead is charged to production at budgeted rate based on direct labour hours.

You are required to prepare Creditors A/c, Stores Ledger Control A/c, WIP Control A/c, Wages Control A/c and Factory Overhead Control A/c.

Answer

Creditors A/c

Particulars	₹	Particulars	₹
To Cash or Bank A/c	5,80,000	By Balance b/d	25,000
To Balance c/d	40,000	By Stores Ledger Control A/c (Balancing figure)	5,95,000
	6,20,000		***6,20,000***

Stores Ledger Control A/c

Particulars	₹	Particulars	₹
To Balance b/d	40,000	By Work-in-progress Control A/c	5,70,000
To Creditors A/c (Purchase: figure from creditor A/c)	5,95,000	(Balancing figure)	
		By Balance b/d	65,000
	6,35,000		***6,35,000***

Work-in-progress Ledger Control A/c

Particulars	₹	Particulars	₹
To Balance b/d	50,000	By Finished Goods Control A/c (b.f.)	10,05,000
To Stores Ledger Control A/c	5,70,000	By Balance c/d:	
To Wages Control A/c	3,20,000	Material	
To Factory Overhead Control A/c	1,28,000	₹35,000	
		Labour (400 hrs × ₹50)	63,000
	10,68,000	₹20,000	***10,68,000***
		Overheads (400 hrs × ₹20) ₹8,000	

Wages Control A/c

Particulars	₹	Particulars	₹
To Bank A/c	4,00,000	By WIP Ledger Control A/c (8,000 hours × 80% × 50)	3,20,000
		By Factory Overhead Control A/c (8,000 hours × 20% × 50)	80,000
	4,00,000		***4,00,000***

Factory Overhead Control A/c

Particulars	₹	Particulars	₹
To Bank A/c	60,000	By WIP Ledger Control A/c	1,28,000
To Wages Control A/c	80,000	(6,400 hrs × ₹20)	
		By Costing P/L A/c (Under-absorbed Overheads)	12,000
	1,40,000		***1,40,000***

Working notes:

1. Direct Labour Hour Rate = Labour Cost ÷ Labour Hour
= ₹4,00,000 ÷ 8,000 hours = ***₹50 per hour***

2. Factory Overhead Rate = Budgeted Factory Overheads ÷ Budgeted Labour Hours
= ₹20,80,000 ÷ 1,04,000 = ***₹20 per hour***

BBQ 121

Journalise the following transactions in the cost books under non- integrated system of accounting:

(a)	Credit Purchase of Material	₹27,000
(b)	Manufacturing overheads charged to production	₹6,000
(c)	Selling and Distribution overheads recovered from Sales	₹4,000
(d)	Indirect wages incurred	₹8,000
(e)	Material returned from production to stores	₹9,000

Answer

Journal Entries

S. No.	Entries		Dr.	Cr.
(a)	Store Ledger Control A/c	Dr.	27,000	-
	To Cost Ledger Control A/c		-	27,000
(b)	Work-in-progress Ledger Control A/c	Dr.	6,000	-
	To Manufacturing Overhead Control A/c		-	6,000
(c)	Cost of Sales A/c	Dr.	4,000	-
	To Selling & Distribution Overhead Control A/c		-	4,000
(d)	Wages Control A/c	Dr.	8,000	-
	To Cost Ledger Control A/c		-	8,000
(e)	Store Ledger Control A/c	Dr.	9,000	-
	To Work-in-progress Ledger Control A/c		-	9,000

BBQ 122

The following figures have been extracted from the Cost Ledger of a manufacturing unit:

Stores:

Opening balance	15,000
Purchases	80,000
Transfer from work-in-progress	40,000
Issues to work-in-progress	80,000
Issues to repairs and maintenance	10,000
Sold as special case at cost	5,000
Shortage in the year	3,000

Work-in-progress:

Opening inventory	30,000
Direct labour cost charged	30,000
Overhead cost charged	1,20,000
Closing balance	20,000

Entire output is sold at a profit of 10% on actual cost from work-in-progress.

Wages for the period	35,000
Overhead expenses	1,25,000

Ascertain the profit or loss as per financial account and cost accounts and reconcile them.

Answer

Stores Ledger Control Account

Particulars	Amount	Particulars	Amount
To Balance b/d	15,000	By WIP Control A/c	80,000
To Cost Ledger Control A/c	80,000	By Cost Ledger Control A/c	5,000
(Purchases)	40,000	(Materials sold at cost)	
To Work in progress Control A/c		By Overhead Control A/c	10,000

(Return from WIP)		By Overhead Control A/c (assumed normal)	3,000
		By Balance c/d	37,000
	1,35,000		***1,35,000***

Wages Control Account

Particulars	*Amount*	*Particulars*	*Amount*
To Cost Ledger Control A/c	35,000	By WIP Control A/c	30,000
		By Overhead Control A/c	5,000
	35,000		***35,000***

Overhead Control Account

Particulars	*Amount*	*Particulars*	*Amount*
To Cost Ledger Control A/c	1,25,000	By WIP Control A/c	1,20,000
To Store Ledger Control A/c	10,000	By Balance c/d	23,000
To Store Ledger Control A/c	3,000	(under recovery carried forward)	
To Wages Control A/c	5,000		
	1,43,000		***1,43,000***

Work in Progress Control Account

Particulars	*Amount*	*Particulars*	*Amount*
To Balance b/d	30,000	By Stores Control A/c	40,000
To Stores Ledger Control A/c	80,000	By Costing Profit and Loss A/c	2,00,000
To Wages Control A/c	30,000	(i.e., cost of sales)	
To Overhead Control A/c	1,20,000	By Balance c/d	20,000
	2,60,000		***2,60,000***

Costing Profit & Loss Account

Particulars	*Amount*	*Particulars*	*Amount*
To WIP Control A/c	2,00,000	By Cost Ledger Control A/c	2,20,000
To Profit	20,000	(Sales: 2,00,000 + 10%)	
	2,20,000		***2,20,000***

(Alternatively) Statement of Profit as per Costing Records

Particulars	*Amount*
Direct materials cost (80,000 – 40,000)	40,000
Direct wages	30,000
Prime Cost	70,000
Production overheads	1,20,000
Add: Opening WIP	30,000
Less: Closing WIP	(20,000)
Cost of Finished Goods	2,00,000
Profit @10% of 2,00,000	20,000
Sales	2,20,000

Profit & Loss Account

Particulars		*Amount*	*Particulars*		*Amount*
To Opening stock:			By Sales		2,20,000
Materials	15,000		By Closing stock:		
WIP	30,000	45,000	Materials	37,000	
To Purchases net of item sold		75,000	WIP	20,000	57,000

(80,000 – 5,000)		By Net Loss	3,000
To Wages incurred	35,000		
To Overheads incurred	1,25,000		
	2,80,000		***2,80,000***

Reconciliation statement

Particulars	***₹***
Profit as per Cost Accounts	20,000
Less: Overhead under recovered	(23,000)
Loss as per Financial Accounts	(3,000)

BBQ 123

The following balances were extracted from a company's ledger as on 30th June 2018:

Name of Account	***Dr.***	***Cr.***
Raw materials control A/c	2,82,450	-
Work in progress control A/c	2,38,300	-
Finished stock control A/c	3,92,500	-
General ledger adjustment A/c	-	9,13,250
Total	***9,13,250***	***9,13,250***

The following transactions took place during the quarter ended 30th September, 2018:

Factory overhead - allocated to WIP	1,36,350
Goods Finished at - cost	13,76,200
Raw materials purchased	12,43,810
Direct wages - allocated to WIP	2,56,800
Cost of goods sold	14,56,500
Raw materials - issued to production	13,60,430
Raw materials - credited by suppliers	27,200
Raw material losses – inventory audit	6,000
WIP rejected (with no scrap value)	12,300
Customer's return (at cost) of finished goods	45,900

You are required to prepare:

(1) Raw material control A/c
(2) Work-in-progress control A/c
(3) Finished stock control A/c
(4) General ledger adjustment A/c

Answer

Raw Material Control A/c

Particulars	***Amount***	***Particulars***	***Amount***
To Balance b/d	2,82,450	By WIP A/c	13,60,430
To General Ledger Adjustment A/c	12,43,810	By General Ledger Adjustment A/c	27,200
		By General Ledger Adjustment A/c (Loss)	6,000
		By Balance c/d (Bal. figure)	1,32,630
	15,26,260		***15,26,260***

Work-in-Process Control A/c

Particulars	***Amount***	***Particulars***	***Amount***

To Balance b/d	2,38,300	By Finished Stock Control A/c	13,76,200
To Raw Material Control A/c	13,60,430	By General Ledger Adjustment A/c	12,300
To Wages Control A/c	2,56,800	(Rejected)	
To Factory OH Control A/c	1,36,350	By Balance c/d (Bal. figure)	6,03,380
	19,91,880		***19,91,880***

Finished Stock Control A/c

Particulars	***Amount***	***Particulars***	***Amount***
To Balance b/d	3,92,500	By Cost of Sales	14,56,500
To Work-in-Progress Control A/c	13,76,200	By Balance c/d (bal. figure)	3,58,100
To Cost of Sales (Return)	45,900		
	18,14,600		***18,14,600***

General Ledger Adjustment A/c

Particulars	***Amount***	***Particulars***	***Amount***
To Raw Material Control A/c (Returns)	27,200	By Balance b/d	9,13,250
		By Raw Material Control A/c	12,43,810
To Raw Materials Control A/c (Loss)	6,000	By Wages Control A/c	2,56,800
To WIP Control A/c (Rejected)	12,300	By Factory OH Control A/c	1,36,350
To Balance c/d	25,04,710		
	25,50,210		***25,50,210***

CHAPTER 14 RECONCILIATION

1. **Reconciliation:** In case of non-integrated accounting system, we have to reconcile profit between two sets of books of account.

Step 1: Prepare financial profit and loss account

Step 2: Prepare cost sheet or costing profit and loss account

Step 3: Prepare reconciliation statement or memorandum reconciliation account

2. Proforma Reconciliation Statement

Particulars		Amount	Amount
Profit/(Loss) as per Cost Books			XXX
Add:	Opening stock overstated or over-valued in cost	XXX	
	Closing stock understated or under-valued in cost	XXX	
	Depreciation over recovered	XXX	
	Factory overheads over recovered	XXX	
	Administration expenses over recovered	XXX	
	Selling and distribution overheads over recovered	XXX	
	Interest received or Bank interest credited	XXX	
	Rent received	XXX	
	Commission received	XXX	
	Dividend received	XXX	
	Stores adjustment (credit in financial book)	XXX	
	Transfer fees (credit in financial book)	XXX	
	Profit on sale of fixed assets or investment	XXX	
	Other abnormal gain	XXX	
	Notional rent, salary, depreciation or interest in cost	XXX	XXX
Less:	Opening stock understated or under-valued in cost	XXX	
	Closing stock overstated or over-valued in cost	XXX	
	Depreciation under recovered	XXX	
	Factory overheads under recovered	XXX	
	Administration expenses under recovered	XXX	
	Selling and distribution overheads under recovered	XXX	
	Interest paid	XXX	
	Dividend paid	XXX	
	Income tax	XXX	
	Stores adjustment (debit in financial book)	XXX	
	Bad debts or provision for doubtful debt	XXX	
	Goodwill written off	XXX	
	Preliminary expenses/under writing commission etc written off	XXX	
	Expenses of share transfer office	XXX	
	Obsolescence loss	XXX	
	Loss on sale of fixed assets or investment	XXX	
	Other abnormal loss	XXX	
	Fine, penalty, donation etc.	XXX	(XXX)
Profit/(Loss) as per Financial Books			XXX

3. Reasons of Difference between Cost and Financial Accounts:

1. Items included in the financial accounts but not in cost accounts (purely financial items):

- Expenses and discounts on issue of shares, debentures etc.
- Other capital losses i.e., loss by fire not covered by insurance etc.
- Losses on the sales of fixed assets and investments
- Profits on the sale of fixed assets and investments
- Fictitious assets written off (Preliminary expenses written off etc.)
- Goodwill written off
- Donations, subscriptions etc.
- Fine, penalties etc.
- Expenses of the company's share transfer office, if any
- Transfer fee received
- Interest received on bank deposits, loans and investments
- Commission received
- Dividends received
- Rent received
- Bad debts, provision for bad debts
- Cash discount
- Interest on loans or bank mortgages or debenture etc.
- Income tax
- Dividend paid
- Transfer to reserve etc.

2. Items included in cost accounts only (notional expenses):

- Charges in lieu of rent where premises are owned (Notional Rent)
- Interest on capital at notional figure though not incurred (Notional Interest)
- Salary for the proprietor at notional figure though not incurred (Notional Salary)
- Notional depreciation on the assets fully depreciated for which book value is nil

3. Items whose treatment is different in the two sets of accounts:

- Difference in methods of valuation of stock
- Difference in methods of depreciation etc.
- Difference in treatment of overheads (under-over absorption carry forward method)

BBQ 124

GK Limited showed a net loss of ₹2,43,300 as per their financial accounts for the year ended 31st March, 2018. However, cost accounts disclosed a net loss of ₹2,48,300 for the same period. On scrutinizing both the set of books of accounts, the following information were revealed:

(a)	Works overheads over recovered	30,400
(b)	Selling overheads under recovered	20,300
(c)	Administrative overhead under recovered	27,700
(d)	Depreciation over charged in cost accounts	35,100
(e)	Bad debts w/off in financial accounts	15,000
(f)	Preliminary Exp. w/off in financial accounts	5,000
(g)	Interest credited during the year in financial accountants	7,500

Prepare a reconciliation statement reconciling losses shown by financial and cost accounts by taking costing net loss as base.

Answer

Reconciliation Statement

Particulars	*Amount*	*Amount*
Loss as per Cost Records		***(2,48,300)***
Add: Factory overhead over recovered	30,400	
Depreciation over charged in cost accounts	35,100	
Interest credited during the year in financial accounts	7,500	73,000
Less: Selling overheads under recovered	20,300	
Administrative overheads under recovered	27,700	
Bad debts w/off in financial accounts	15,000	
Preliminary Exp. w/off in financial accounts	5,000	(68,000)
Profit as per Financial Books		***(2,43,300)***

BBQ 125

A manufacturing company has disclosed net loss of ₹48,700 as per their cost accounting records for the year ended 31st March, 2014. However their financial accounting records disclosed net profit of ₹35,400 for the same period.

A scrutiny of data of both the sets of books of accounts revealed the following informations:

(a)	Factory overheads under absorbed	₹30,500
(b)	Administrative overheads over absorbed	₹65,000
(c)	Depreciation charged in financial accounts	₹2,25,000
(d)	Depreciation charged in cost accounts	₹2,70,000
(e)	Income tax provision	₹52,400
(f)	Transfer fee (credited in financial accounts)	₹10,200
(g)	Obsolescence loss charged in financial accounts	₹20,700
(h)	Notional rent of own premises charged in cost accounts	₹54,000
(i)	Value of opening stock:	
	(a) In cost accounts	₹1,38,000
	(b) In financial accounts	₹1,15,000
(j)	Value of closing stock:	
	(c) In cost accounts	₹1,22,000

(d) In financial accounts ₹1,12,500

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

Answer

Memorandum Reconciliation Account

Particulars	***₹***	***Particulars***	***₹***
To Net loss as per Costing Books	***48,700***	By Admin OH over absorbed	65,000
To Factory OH under absorbed	30,500	By Depreciation over charged	45,000
To Income tax provision	52,400	(2,70,000 - 2,25,000)	
To Obsolescence loss	20,700	By Transfer fee	10,200
To Closing stock over valued	9,500	By Notional rent	54,000
To Net profit as per Fin. Books	***35,400***	By Opening stock over valued	23,000
	1,97,200		***1,97,200***

BBQ 126

The financial books of a company reveal the following data for the year ended 31st March, 2023:

Opening stock:

Finished goods (625 units)	53,125
Work-in-process	46,000

During the year (01.04.22 to 31.03.23):

Raw materials consumed	8,40,000
Direct Labour	6,10,000
Factory overheads	4,22,000
Administration overheads (production related)	1,98,000
Dividend paid	1,22,000
Bad Debts	18,000
Selling and Distribution Overheads	72,000
Interest received	38,000
Rent received	46,000
Sales (12,615 units)	22,80,000

Closing stock:

Finished goods (415 units)	45,650
Work-in-process	41,200

The cost records provide as under:

- Factory overheads are absorbed at 70% of direct wages.
- Administration overheads are recovered at 15% of factory cost.
- Selling and distribution overheads are charged at ₹3 per unit sold.
- Opening stock of finished goods is valued at ₹120 per unit.
- The company values work-in-process at factory cost for both Financial and Cost Profit reporting.

Required:

(i) Prepare statements for the year ended 31st March, 2023 to show
- ***(a)*** The profit as per financial records
- ***(b)*** The profit as per costing records.

(ii) Present a statement reconciling the profit as per costing records with the profit as per Financial Records?

Answer

(i) (a) Financial Profit and Loss A/c

Particulars	Amount	Particulars	Amount
To Opening stock:		By Sales	22,80,000
WIP	46,000	By Closing stock:	
Finished goods	53,125	WIP	41,200
To Raw material consumed	8,40,000	Finished goods (375 units)	45,650
To Direct labour	6,10,000		
To Gross profit	8,17,725		
	23,66,850		**23,66,850**
To Factory overheads	4,22,000	By Gross profit	8,17,725
To Administrative overheads	1,98,000	By Interest received	38,000
To Selling & Distribution overheads	72,000	By Rent received	46,000
To Dividend Paid	1,22,000		
To Bad debts	18,000		
To Net Profit	69,725		
	9,01,725		**9,01,725**

(i) (b) Cost Sheet showing Costing P/L (Production 12,405 units)

Particulars	Amount
Direct Material	8,40,000
Direct labour	6,10,000
Prime Cost	**14,50,000**
Factory overhead (70% of direct wages)	4,27,000
Add: Opening WIP	46,000
Less: Closing WIP	(41,200)
Factory Cost	**18,81,800**
Administrative overhead (15% of factory cost)	2,82,270
Cost of Production	**21,64,070**
Add: Opening finished goods (₹120 × 625 units)	75,000
Less: Closing Stock of finished goods (W.N. 2)	(72,397)
Cost of Goods Sold	**21,66,673**
Selling & distribution overheads (₹3 × 12,615 units)	37,845
Cost of sales	**22,04,518**
Profit (balancing figure)	75,482
Sales	**22,80,000**

(ii) Reconciliation Statement

Particulars	Amount	Amount
Profit as per Cost Records (Cost Sheet)		**75,482**
Add: Interest Received	38,000	
Rent Received	46,000	
Administration overheads over recovered (2,82,270 – 1,98,000)	84,270	
Factory overheads over recovered (4,27,000 – 4,22,000)	21,875	
Opening stock overvalued (75,000 – 53,125)	5,000	**1,95,145**
Less: Dividend	1,22,000	
Bad debts	18,000	
Selling & distribution OH under recovered (72,000 – 37,845)	34,155	
Closing stock over valued (72,397 – 45,650)	26,747	**(2,00,902)**
Profit as per Financial Records		**69,725**

Working note:

(1) Number of units produced = Units sold + Closing finished units – Opening finished units
= 12,615 + 415 - 625 = **12,405 units**

(2) Value of closing finished goods = $\frac{\text{Cost of Production}}{\text{Units Produced}}$ × Closing finished goods units

= $\frac{21,64,070}{12,405}$ × 415 = **₹72,397**

Note: Closing stock is valued as per FIFO method.

BBQ 127

The Profit and Loss account of ABC Ltd. for the year ended 31st March, 2021 is given below:

Profit & Loss Account
(For the year ended 31st March, 2021)

To Direct Material	6,50,000	By Sales (15,000 units)	15,00,000
To Direct Wages	3,50,000	By Dividend received	9,000
To Factory overheads	2,60,000		
To Administrative overheads	1,05,000		
To Selling overheads	85,000		
To Loss on sale of investments	2,000		
To Net profit	57,000		
	15,09,000		**15,09,000**

Additional information:

(a) The factory overheads are 50% fixed and 50% variable.
(b) The administration overheads are 100% fixed.
(c) Selling overheads are completely variable.
(d) Normal production capacity of ABC Ltd. is 20,000 units.
(e) Indirect expenses are absorbed in the cost accounts on the basis of normal production capacity.
(f) Notional rent of own premises charged in Cost Accounts is amounting to ₹12,000.

You are required to:

(1) Prepare a Cost Sheet and ascertain the profit as per Cost records for the year ended 31st March, 2021.
(2) Reconcile the Profit as per Financial Records with profit as per Cost Records.

Answer

(1) Cost Sheet

Particulars	Amount (₹)
Direct Materials	6,50,000
Direct Wages	3,50,000
Prime Cost	**10,00,000**
Factory Overheads:	
Variable (2,60,000 × 50%)	1,30,000
Fixed {(2,60,000 × 50%) × 15,000/20,000}	97,500
Factory Cost	**12,27,500**
Administrative Overheads (1,05,000 ×15,000/20,000)	78,750
Notional rent	12,000
Cost of Production	**13,18,250**
Selling Overheads (completely variable)	85,000
Cost of sales	**14,03,250**

Profit (balancing figure)	96,750
Sales	***15,00,000***

(2) Reconciliation Statement

Particulars	***Amount***
Profit as per Cost Accounts	***96,750***
Add: Dividend received	9,000
Notional rent	12,000
Less: Factory overheads under recovered (2,60,000 – 1,30,000 – 97,500)	32,500
Administration overheads under recovered (1,05,000 – 78,750)	26,250
Loss on sale of investments	2,000
Profit as per Financial Accounts	***57,000***