



***CA INTER***  
***COSTING BOOSTER***  
***BATCH***

***By***

***CA Namit Arora Sir***

***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.).

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

Here,

$$\begin{aligned} A &= \text{Annual requirement of raw material to be purchased in quantity} \\ O &= \text{Cost per order} \end{aligned}$$

**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:**

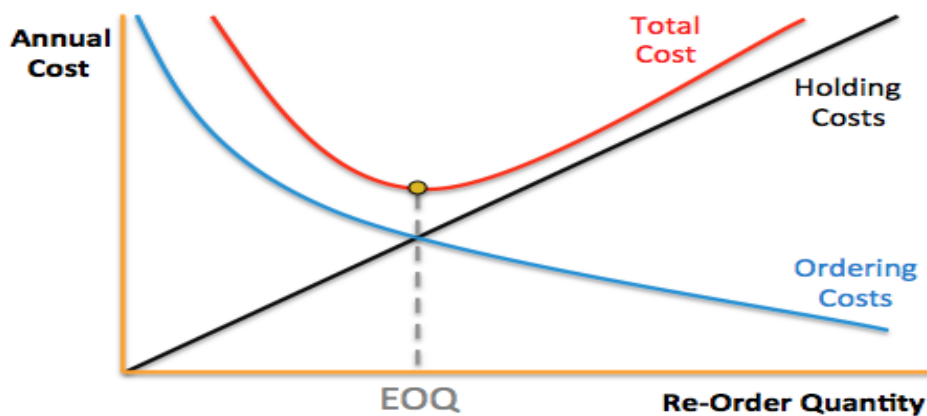
$$\text{Alternative 1: When there is no Safety Stock} = \frac{1}{2} \times ROQ \times C$$

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

Here,

$$C = \text{Carrying cost per unit per annum}$$

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.



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

Here,

$$\begin{aligned} A &= \text{Annual requirement of raw material to be purchased in quantity} \\ O &= \text{Cost per order} \\ C &= \text{Carrying cost per unit per annum} \end{aligned}$$

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** =  $ROL - (Average\ usage \times Average\ re-order\ period)$

7. **Maximum Stock Level** =  $ROL + ROQ - (Minimum\ usage \times Minimum\ re-order\ period)$

8. **Average Stock level:**

**Alternative 1** =  $\frac{1}{2} (Minimum\ stock\ level + Maximum\ stock\ level)$

**Alternative 2** =  $\frac{1}{2} \text{ of } ROQ + Minimum\ stock\ level$

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

10. **ABC analysis:**

|          | <b>% Value</b> | <b>% Quantity</b> | <b>Control</b> |
|----------|----------------|-------------------|----------------|
| <b>A</b> | 70%            | 10%               | High           |
| <b>B</b> | 20%            | 20%               | Medium         |
| <b>C</b> | 10%            | 70%               | Low            |

11. **Valuation of Material:****Statement Showing Cost Per Unit**

| <b>Particulars</b>  | <b>₹</b> |
|---|----------|
| <b>Purchase price/Invoice price/Listed Price</b>  | XXX      |
| <b>Less: Trade or Quantity discount (× Cash discount)</b>   | (XXX)    |
| <b>Less: Subsidy/grant/incentives from government</b>   | (XXX)    |
| <b>Add: Road tax/toll tax</b>   | XXX      |
| <b>Add: IGST/CGST/SGST (when ITC is not available)</b>  | XXX      |
| <b>Add: Custom duty</b>   | XXX      |
| <b>Add: Insurance</b>   | XXX      |
| <b>Add: Commission/Brokerage on purchase</b>  | XXX      |
| <b>Add: Freight inward</b>  | XXX      |
| <b>Add: Net cost of Containers/Drums or packing material (when not returnable or returnable at low value)</b> | XXX      |
| <b>Total cost</b>   | XXX      |
| <b>÷ Number of Effective units</b>  | ÷ XXX    |
| <b>(Total units - Normal shortage - Provision for further Shortage)</b>                                       |          |
| <b>Cost per unit</b>  | 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)      | -            | -            |
| <b>Total Cost</b>  | <b>90</b> | <b>11.11</b> | <b>1,000</b> |

### 13. Abnormal loss:

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

| Particulars          | Quantity  | Rate         | Value      |
|----------------------|-----------|--------------|------------|
| Purchase             | 100       | 10.00        | 1,000      |
| Less : Abnormal Loss | (10)      | 10.00        | (100)      |
| <b>Total Cost</b>    | <b>90</b> | <b>10.00</b> | <b>900</b> |

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 | = | $\frac{1}{2} \times ROQ \times C$ | = | $\frac{1}{2} \times 2,400 \times 2$ | = | ₹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 | = | $\frac{1}{2} \times \text{ROQ} \times C$ | = | $\frac{1}{2} \times 4,000 \times 2$ | = | ₹4,000 |
| Total         | = | ₹2,400 + 2,400                           | = |                                     | = | ₹5,440 |

$$\text{Extra cost (a) - (b)} = ₹5,440 - ₹4,800 = ₹640$$

### 3. Minimum Carrying Cost:

$$\text{Minimum carrying cost} = \frac{1}{2} \times 2,400 \text{ units} \times 10\% \text{ of ₹20} = ₹2,400$$

### 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

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

#### 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 ( $\frac{A}{\text{ROQ}} \times ₹200$ )                              | 8,000                         | 400                       |
| Carrying cost ( $\frac{1}{2} \times \text{ROQ} \times C$ ) (C = 20% of ₹400/₹384) | 8,000                         | 1,53,600                  |
| <b>Total cost</b>   | <b>32,16,000</b>              | <b>32,26,000</b>          |

**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**

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

**Where,**

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

$$\begin{aligned} O &= \text{Ordering cost per order} = \text{handling cost per order} + \text{freight per order} \\ &= ₹370 + ₹380 = ₹750 \end{aligned}$$

$$\begin{aligned} C &= \text{Carrying cost and holding cost of inventory per unit p.a.} \\ &= \text{Carrying cost per unit p.a.} + \text{Interest cost of investment in inventory per unit p.a.} \\ &= (\text{₹0.25 per kg per month} \times 12 \text{ months}) + \text{₹12 per kg p.a.} \\ &= ₹3 + ₹12 = ₹15 \text{ per kg p.a.} \end{aligned}$$

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

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

**Or**

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

**Working Notes:**

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

**(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 ( $A/\text{ROQ} \times O$ )                                       | 15,000                        | 3,000                    |
| Carrying cost ( $\frac{1}{2} \times \text{ROQ} \times C$ )                      | 15,000                        | 75,000                   |
| Total cost  | 30,000                        | 78,000                   |
| <b>Extra Cost or Discount to be negotiated</b>                                  | -                             | <b>48,000</b>            |
| <b>% of Discount <math>\{(48,000 \div 40,000 \times 80) \times 100\}</math></b> | -                             | <b>1.5%</b>              |

**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)





$$= 2,000 + [(200 \text{ units} \times 6 \text{ kg}) \times 3 \text{ weeks}] = 5,600 \text{ kg}$$

(iv) **Average level of A**

$$= \text{Minimum stock level} + \frac{1}{2} \text{ ROQ}$$

$$= 4,000 + \frac{1}{2} \times 10,000$$

$$= 4,000 + 5,000 = 9,000 \text{ kg}$$

**Or**

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

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

**Working Notes:**

**Max. Stock of A**

$$= \text{ROL (Minimum usage} \times \text{Minimum re-order period)} + \text{ROQ}$$

$$= 8,000 \text{ kg} - [(175 \text{ units} \times 10 \text{ kg}) \times 1 \text{ week}] + 10,000 = 16,250 \text{ kg}$$

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

**Calculate from the above:**

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

**Answer**

1. **Re-order quantity**

$$= \sqrt{\frac{2 \times 2,600 \times 100}{15}} = 186 \text{ units}$$

**\*Annual Requirement**

$$= 52 \text{ weeks} \times \text{Normal usage of input units per week}$$

$$= 52 \text{ weeks} \times 50 \text{ units per week} = 2,600 \text{ units}$$

**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:<br>Number of orders<br>Ordering cost (number of orders × ₹100)       | 2,600 ÷ 186 = 13.97 or 14<br>1,400 | 2,600 ÷ 1,500 = 1.73 or 2<br>200 |
| 3. Carrying cost ( $\frac{1}{2} \times \text{ROQ} \times C$ )<br>(C = 15% of ₹100/₹95) | 1,395                              | 10,688                           |
| <b>Total cost (1+2+3)</b>  | <b>2,62,795</b>                    | <b>2,57,888</b>                  |

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

2. **Re-order Level**

$$= \text{Maximum Re-order period} \times \text{Maximum Usage}$$

$$= 6 \text{ weeks} \times 75 \text{ units} = 450 \text{ units}$$

3. **Minimum Level**

$$= \text{ROL} - (\text{Normal usage} \times \text{Average re-order period})$$

$$= 450 \text{ units} - (50 \text{ units} \times 5 \text{ weeks})$$

$$\begin{aligned}
 &= 450 \text{ units} - 250 \text{ units} &&= 200 \text{ units} \\
 4. \quad \text{Maximum Level} &= \text{ROL} - (\text{Minimum usage} \times \text{Minimum re-order period}) + \text{ROQ} \\
 &= 450 \text{ units} - (25 \text{ units} \times 4 \text{ weeks}) + 186 \text{ units} &&= 536 \text{ units} \\
 5. \quad \text{Average Stock Level} &= \frac{1}{2} \times (\text{Minimum Stock Level} + \text{Maximum Stock Level}) \\
 &= \frac{1}{2} \times (200 \text{ units} + 536 \text{ units}) &&= 368 \text{ units} \\
 \text{Or} & && \\
 &= \frac{1}{2} \times \text{ROQ} + \text{Minimum Stock Level} \\
 &= \frac{1}{2} \times 186 + 200 \text{ units} &&= 293 \text{ units}
 \end{aligned}$$

**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 be able to sell 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**

$$\begin{aligned}
 (a) \quad \text{Re-order quantity} &= \text{EOQ} - 200 \text{ kg} = \sqrt{\frac{2 \times 17,200 \times 720}{125 \times 13.76\%}} - 200 \text{ kg} = 1,000 \text{ kg} \\
 (b) \quad \text{Re-order Level} &= \text{Maximum consumption per day} \times \text{Maximum lead time} \\
 &= 70 \text{ kg} \times 8 \text{ days} = 560 \text{ kg} \\
 (c) \quad \text{Maximum Level} &= \text{ROL} + \text{ROQ} - (\text{Minimum consumption per day} \times \text{Minimum lead time}) \\
 &= 560 \text{ kg} + 1,000 \text{ kg} - (30 \text{ kg} \times 4 \text{ days}) = 1,440 \text{ kg} \\
 (d) \quad \text{Minimum Level} &= \text{ROL} - (\text{Average consumption per day} \times \text{Average lead time}) \\
 &= 560 \text{ kg} - (50 \text{ kg} \times 6 \text{ days}) = 260 \text{ kg} \\
 (e) \quad \text{Average Stock Level} &= \frac{1}{2} \times (\text{Minimum Stock Level} + \text{Maximum Stock Level}) \\
 &= \frac{1}{2} \times (1,440 \text{ kg} + 260 \text{ kg}) = 850 \text{ kg} \\
 &\text{Or} \\
 &= \frac{1}{2} \times \text{ROQ} + \text{Minimum Stock Level} \\
 &= \frac{1}{2} \times 1,000 \text{ kg} + 260 \text{ kg} = 760 \text{ kg}
 \end{aligned}$$



## (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  | $18 \times 720 = 12,960$  | $15 \times 720 = 10,800$   |
| Carrying cost ( $\frac{1}{2} \times \text{ROQ} \times C$ ) | 8,600<br>( $\frac{1}{2} \times 1,000 \times 125 \times 13.76\%$ ) | 10,320<br>( $\frac{1}{2} \times 1,200 \times 125 \times 13.76\%$ ) |
| <b>Total ordering and carrying cost</b>                    | <b>21,560</b>   | <b>21,120</b>  |
| <b>Impact on profit</b>                                    | <b>-</b>  | <b>440</b>   |

**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 $\times$ 2 kg.) | <b>18,200 kg.</b> |
| Less: Opening Stock of 'Dee'   | 1,000 kg.         |
| Annual purchase for raw material 'Dee'   | <b>17,200 kg.</b> |

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

|                                    |   |   |   |                    |
|------------------------------------|---|---|---|--------------------|
| Average consumption per day        | = | $18,200 \text{ kg} \div 364 \text{ days}$ | = | 50 kg              |
| Hence, Maximum consumption per day | = | $50 \text{ kg} + 20 \text{ kg}$           | = | 70 kg              |
| So minimum consumption per day     | = | $\text{Average} \times 2 - \text{Max.}$   | = | $50 \times 2 - 70$ |
|                                    | = | 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 $\times$ 1,200)                  | Total Carrying Cost ( $\frac{1}{2} \times \text{ROQ} \times 20\%$ of Price) | Purchase Cost (5,000 $\times$ Price) | Total Cost |
|------------------|---|---|--------------------------------------|------------|
| 400              | $\{(5,000/400) 12.5 \text{ or } 13 \times 1,200\} = 15,600$ | 48,000<br>( $\frac{1}{2} \times 400 \times 20\% \times 1,200$ )             | 60,00,000<br>(5,000 $\times$ 1,200)  | 60,63,600  |
| 500              | $\{(5,000/500) 10 \times 1,200\} = 12,000$                  | 59,000<br>( $\frac{1}{2} \times 500 \times 20\% \times 1,180$ )             | 59,00,000<br>(5,000 $\times$ 1,180)  | 59,71,000  |
| 1,000            | $\{(5,000/1,000) 5 \times 1,200\} = 6,000$                  | 1,16,000<br>( $\frac{1}{2} \times 1,000 \times 20\% \times 1,160$ )         | 58,00,000<br>(5,000 $\times$ 1,160)  | 59,22,000  |

|       |   |                                       |                              |           |
|-------|---|---------------------------------------|------------------------------|-----------|
| 2,000 | {(5,000/2,000) 2.5<br>or 3 × 1,200} = 3,600 | 2,28,000<br>(½ × 2,000 × 20% × 1,140) | 57,00,000<br>(5,000 × 1,140) | 59,31,600 |
| 3,000 | {(5,000/3,000) 1.6<br>or 2 × 1,200} = 2,400 | 3,36,000<br>(½ × 3,000 × 20% × 1,120) | 56,00,000<br>(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 be no discount offer then the purchase quantity should be equal to EOQ. The EOQ is as follows:**

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

### 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):**

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

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.

$$\begin{aligned} \text{Safety stock} &= \frac{\text{Annual Demand}}{360} \times (\text{Maximum lead time} - \text{Average lead time}) \\ &= \frac{54,000}{360} \times (7 \text{ days} - 6 \text{ days}) = 150 \text{ castings} \\ \text{Re-order point} &= \text{Safety stock} + \text{Average lead time consumption} \\ &= 150 \text{ castings} + (6 \text{ days} \times 150 \text{ casting}) = 1,050 \text{ castings} \end{aligned}$$

### 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.

$$\begin{aligned} \text{Safety stock} &= \frac{\text{Annual Demand}}{360} \times (\text{Maximum lead time} - \text{Average lead time}) \\ &= \frac{54,000}{360} \times (9 \text{ days} - 6 \text{ days}) = 450 \text{ castings} \\ \text{Re-order point} &= \text{Safety stock} + \text{Average lead time consumption} \\ &= 450 \text{ castings} + (6 \text{ days} \times 150 \text{ casting}) = 1,350 \text{ castings} \end{aligned}$$

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

$$\begin{aligned} \text{Total cost of ordering} &= \frac{\text{Annual Demand}}{\text{EOQ}} \times \text{Cost per order} \\ &= \frac{54,000}{1,800} \times ₹9,000 = ₹2,70,000 \\ \text{Total cost of carrying} &= (\text{Safety stock} + \frac{1}{2} \text{EOQ}) \times \text{Carrying cost per unit p.a.} \\ &= (450 \text{ units} + \frac{1}{2} \times 1,800 \text{ units}) \times ₹300 = ₹4,05,000 \end{aligned}$$

$$5. (a) \text{ Computation of new EOQ} = \sqrt{\frac{2 \times 54,000 \times 600}{720}} = 300 \text{ castings}$$

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

Under new purchasing policy IPL Ltd. has to place order in every 2<sup>nd</sup> 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                                     | 2,500                                   | 2,875                      |
|                  | 30                    | 0.05            | 4,500                           | 225                                     |   |                            |
|                  |                       |                 | 12,000                          | 375                                     |   |                            |
| 20               | 80                    | 0.02            | 12,000                          | 240                                     | 1,000                                   | 2,140                      |
|                  | 60                    | 0.05            | 9,000                           | 450                                     |   |                            |
|                  | 30                    | 0.10            | 4,500                           | 450                                     |   |                            |
|                  |                       |                 | 25,500                          | 1,140                                   |   |                            |
| 10               | 90                    | 0.02            | 13,500                          | 270                                     | 500                                     | 2,195                      |
|                  | 70                    | 0.05            | 10,500                          | 525                                     |   |                            |
|                  | 40                    | 0.10            | 6,000                           | 600                                     |   |                            |
|                  | 10                    | 0.20            | 1,500                           | 300                                     |   |                            |
|                  |                       |                 | 31,500                          | 1,695                                   |   |                            |
| 0                | 100                   | 0.02            | 15,000                          | 300                                     | 0                                       | 2,700                      |
|                  | 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                                   |   |                            |

*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    |
| -                | <b>750</b> | -             | <b>7,500</b>   | <b>100</b>                | -    |

**(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                     |          |
| <b>Total</b>       | <b>2</b>         | <b>5,250</b>   | <b>70.00</b>              | <b>A</b> |
| 3                  | 106              | 900            | 12                        |          |
| 4                  | 104              | 600            | 8                         |          |
| <b>Total</b>       | <b>2</b>         | <b>1,500</b>   | <b>20.00</b>              | <b>B</b> |
| 5                  | 105              | 450            | 6                         |          |
| 6                  | 102              | 300            | 4                         |          |
| <b>Total</b>       | <b>2</b>         | <b>750</b>     | <b>10.00</b>              | <b>C</b> |
| <b>Grand Total</b> | <b>6</b>         | <b>7,500</b>   | <b>100</b>                |          |

**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           |
| <b>Inventory turnover ratio (Materials consumed ÷ Average inventory)</b> | <b>7 times</b> | <b>2.5 times</b> |
| <b>Inventory turnover (365 ÷ IT Ratio)</b>                               | <b>52 days</b> | <b>146 days</b>  |

**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<br>(Will be given only if payment is made within 30 days.) | @10%                    |
| 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    |
| <b>Cost per unit (₹60,000/800 units)</b>                | <b>1</b> | <b>75</b> |

### Note:

- GST is payable on net price i.e., listed price less discount.
- 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:

| <i>Invoice</i>                                 | ₹               |
|--|-----------------|
| 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           |
| <b>Total cost</b>                              | <b>2,28,240</b> |

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*

| <i>Particulars</i>                             | <i>Chemical A</i> | <i>Chemical B</i> |
|--|-------------------|-------------------|
| 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         |
| <b>Rate per kg</b>                             | <b>12.04</b>      | <b>15.43</b>      |

**Working notes:**

*Calculation of Effective Quantity of each Chemical Available for Use*

| <i>Particulars</i>                     | <i>Chemical A</i> | <i>Chemical B</i> |
|--|-------------------|-------------------|
| 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             |
| <b>Quantity available</b>              | <b>9,310</b>      | <b>7,526.4</b>    |

## CHAPTER 2

## EMPLOYEE COST

1. **Wages under Straight Time Rate System** = Working hours  $\times$  Time Rate per hour
2. **Wages under Straight Piece Rate System** = Number of units produced  $\times$  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** =  $(AH \times R) + 50\% (SH - AH) \times R$

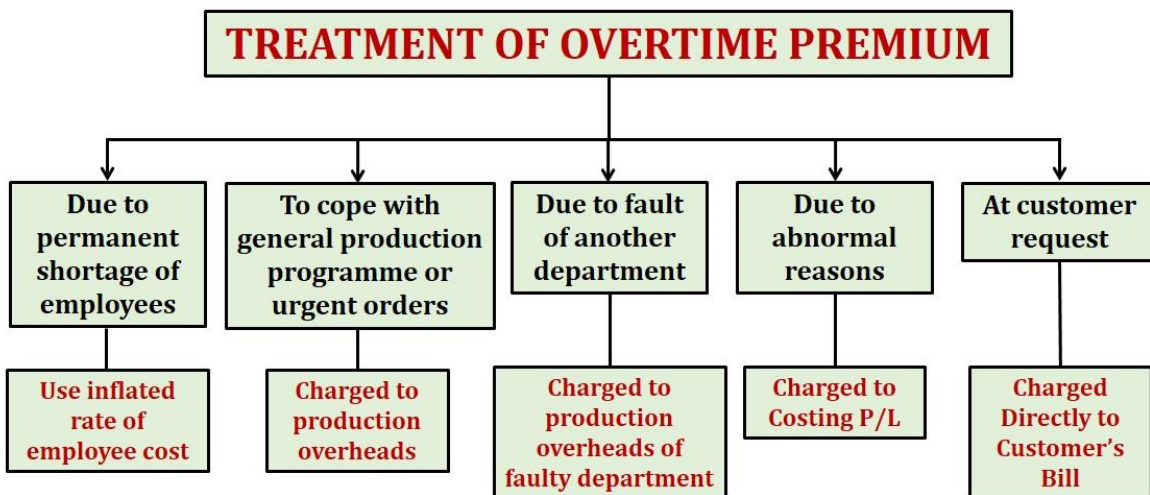
Here,

|         |   |   |
|---------|---|---|
| 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** =  $(AH \times R) + AH/SH (SH - AH) \times R$
6. **Effective hourly rate** = Wages  $\div$  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        |
| <b>Gross Wages</b> | <b>XXX</b> |

#### 10. Statement Showing Net Wages:

| Particulars                                     | Amount     |
|---|------------|
| <b>Gross Wages</b>                              | <b>XXX</b> |
| 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)      |
| <b>Net Wages</b>                                | <b>XXX</b> |

#### 11. Statement Showing Employee Cost Per Hour:

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

**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:**

$$\text{Separation Method} = \frac{\text{Number of separations}}{\text{Average workers}} \times 100$$

$$\text{Replacement Method} = \frac{\text{Number of replacements}}{\text{Average workers}} \times 100$$

$$\text{New Accession Method} = \frac{\text{Number of new joinings}}{\text{Average workers}} \times 100$$

$$\text{Accession Method} = \frac{\text{Number of total joinings}}{\text{Average workers}} \times 100$$

$$\text{Flux Method (without new accession)} = \frac{\text{No. of separations + replacements}}{\text{Average workers}} \times 100$$

$$\text{Flux Method (with new accession)} = \frac{\text{No. of separations + accessions}}{\text{Average workers}} \times 100$$

$$\text{Average Workers} = \frac{\text{Opening workers} + \text{Closing workers}}{2}$$

$$\text{13. Equivalent Annual Turnover Rate} = \text{Employee Turnover Rate} \times 365/52/12$$

**14. Statement Showing Profit Foregone on Account of Labour Turnover**

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

**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<br>(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:**

$$\begin{aligned} \text{Total earnings under Halsey scheme} &= (\text{AH} \times \text{R}) + 50\% (\text{SH} - \text{AH}) \times \text{R} \\ &= (2,000 \times ₹40) + 50\% (2,500 - 2,000) \times ₹40 \\ &= \mathbf{₹90,000} \end{aligned}$$

$$\begin{aligned} \text{Total earnings under Rowan scheme} &= (\text{AH} \times \text{R}) + \frac{\text{AH}}{\text{SH}} \times (\text{SH} - \text{AH}) \times \text{R} \\ &= (2,000 \times ₹40) + \frac{2,000}{2,500} \times (2,500 - 2,000) \times ₹40 \\ &= \mathbf{₹96,000} \end{aligned}$$

$$\text{Effective rate under Halsey Plan} = ₹90,000 \div 2,000 \text{ hours} = \mathbf{₹45 \text{ per hour}}$$

$$\text{Effective rate under Rowan Plan} = ₹96,000 \div 2,000 \text{ hours} = \mathbf{₹48 \text{ per hour}}$$

$$\begin{aligned} \text{Actual hours (AH)} &= 10 \text{ workers} \times 25 \text{ days} \times 8 \text{ hours per day} \\ &= 2,000 \text{ hours} \end{aligned}$$

$$\text{Standard hours (SH)} = 1,250 \text{ units} \times 2 \text{ hours per unit} = 2,500 \text{ hours}$$

**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:**

$$\text{Halsey Plan} = ₹80 - ₹72 = \mathbf{₹8.00 \text{ per unit}}$$

$$\text{Rowan Plan} = ₹80 - ₹76.80 = \mathbf{₹3.20 \text{ per unit}}$$

**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:*

$$\begin{aligned}
 \text{Effective Earnings per hour} &= \frac{[(AH \times R) + AH/SH (SH - AH) \times R]}{AH} \\
 37.50 &= \frac{[30 AH + AH/4 (4 - AH) \times 30]}{AH} \\
 37.50 AH &= 30 AH + AH/4 (4 - AH) \times 30 \\
 7.50 AH &= AH/4 (4 - AH) \times 30 \\
 7.50 AH &= AH (4 - AH) \times 7.50 \\
 1 &= 4 - AH \\
 AH &= 3 \text{ hours}
 \end{aligned}$$

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

$$\begin{aligned}
 \text{Total earnings} &= (AH \times R) + 50\% (SH - AH) \times R \\
 &= (3 \times 30) + 50\% (4 - 3) \times 30 = \text{₹}105 \\
 \text{Effective hourly rate} &= \text{Total earning} \div \text{hours worked} \\
 &= \text{₹}105 \div 3 \text{ hours} = \text{₹}35
 \end{aligned}$$

### 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:

|   | <b>A</b> | <b>B</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:

| <b>Jobs</b> | <b>X</b> | <b>Y</b> | <b>Z</b> |
|-------------|----------|----------|----------|
| 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*

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

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

**Statement Showing Labour Cost Chargeable to Jobs**

| <b>Particulars</b>                  | <b>Job X</b>   | <b>Job Y</b>   | <b>Job Z</b>   |
|-------------------------------------|----------------|----------------|----------------|
| 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         |
| <b>Labour Cost chargeable</b>       | <b>₹19,200</b> | <b>₹11,420</b> | <b>₹12,480</b> |

**Working Note:**

**1. Statement Showing Employee Cost Excluding Overtime**

| <b>Particulars</b>   | <b>A</b>       | <b>B</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           |
| <b>Employee Cost (Excluding overtime)</b>                    | <b>₹16,000</b> | <b>₹25,600</b> |

**2. Overtime wages of worker A** =  $(₹15,000 \div 200 \text{ hours}) \times 2 \times 10 \text{ hours} = ₹1,500$

**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:

| <b>Day</b>        | <b>Worker A paid @ ₹200 per day for 8 hours</b> | <b>Worker B paid @ ₹100 per day for 8 hours</b> | <b>Worker C paid @ ₹300 per day for 8 hours</b> |
|-------------------|---|---|---|
| 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   |
| <b>Total</b>      | <b>49 hours</b>                                 | <b>48 hours</b>                                 | <b>57 hours</b>                                 |

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     | -            | -           | -              | -   | -                  |
| <b>Total</b> | <b>40</b>    | <b>4</b>    | <b>5</b>       | <b>10</b>                                   | <b>54</b>          |

**(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                  |
| <b>Total</b> | <b>44</b>    | <b>4</b>    | <b>-</b>       | <b>-</b>                                    | <b>48</b>          |

\*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                  |
| <b>Total</b> | <b>44</b>    | <b>8</b>    | <b>5</b>       | <b>10</b>                                   | <b>62</b>          |

\*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<br>(₹968 ÷ 176 hours) | ₹5.50             | ₹5.50             | ₹5.50             |
| Hourly rate                                       | ₹30.50            | ₹18.00            | ₹43.00            |
| Total normal hours                                | 54                | 48                | 62                |
| <b>Total Wages Payable</b>                        | <b>₹1,647.00</b>  | <b>₹864.00</b>    | <b>₹2,666.00</b>  |

**BBQ 19****No of workers on the payroll:**

At the beginning of the month  
At the end of the month

900 workers  
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**

$$\begin{aligned}
 \text{Separation method} &= \frac{\text{No. of separation}}{\text{Average no. of workers}} \times 100 = \frac{10 + 40}{1,000} \times 100 = 5\% \\
 \text{Replacement method} &= \frac{\text{No. of workers replaced}}{\text{Average no. of workers}} \times 100 = \frac{25}{1,000} \times 100 = 2.5\% \\
 \text{New Accession method} &= \frac{\text{No. of new accessions}}{\text{Average no. of workers}} \times 100 = \frac{125}{1,000} \times 100 = 12.5\% \\
 \text{Accession method} &= \frac{\text{No. of accessions}}{\text{Average no. of workers}} \times 100 = \frac{150}{1,000} \times 100 = 15\% \\
 \text{Flux method} &= \frac{\text{No. of accessions} + \text{No. of separation}}{\text{Average no. of workers}} \times 100 = \frac{150 + 50}{1,000} \times 100 \\
 &= 20\% \\
 \text{*Average no of workers} &= \frac{900 + 1,100}{2} = 1,000 \text{ workers}
 \end{aligned}$$

### BBQ 20

RST Company Ltd. had computed labour turnover rates for the quarter ended 31<sup>st</sup> 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:**

$$\begin{aligned}
 \text{Number of accessions} &= \text{Replaced} + \text{New Joined} \\
 &= (10\% + 5\%) \text{ 15\% of average workers} \\
 &= 15\% \text{ of } 500 = 75 \text{ workers}
 \end{aligned}$$

**Or**

$$\begin{aligned}
 \text{Number of accessions} &= \text{Flux} - \text{Separated} \\
 &= (20\% - 5\%) \text{ 15\% of average workers} \\
 &= 15\% \text{ of } 500 = 75 \text{ workers}
 \end{aligned}$$

**(ii) Calculation of workers left and discharged:**

$$\begin{aligned}
 \text{Number of workers separated} &= 5\% \text{ of average workers} \\
 &= 5\% \text{ of } 500 = 25 \text{ workers}
 \end{aligned}$$

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

$$\begin{aligned}
 \text{Number of workers replaced} &= 10\% \text{ of average workers} = 50 \text{ workers} \\
 \text{Therefore, Average workers} &= 50 \div 10\% = 500 \text{ workers}
 \end{aligned}$$

### 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**

| <i>Particulars</i>  | <i>Amount</i>   |
|---|-----------------|
| 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          |
| <b>Profit Foregone</b>  | <b>5,57,930</b> |

**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                               | <b>4,30,000</b> |

**2. Contribution earned per productive hours:**

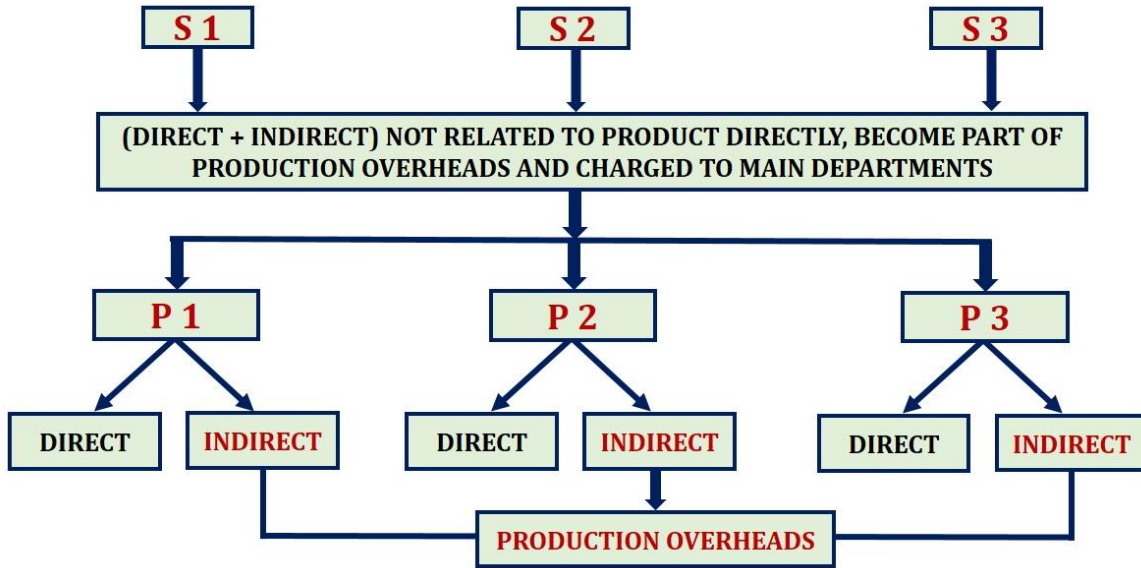
|   |               |
|---|---------------|
| Sales value   | 83,03,300     |
| Contribution (20% of 83,03,300)                         | 16,60,660     |
| Contribution per productive hour (16,60,660 ÷ 4,30,000) | <b>₹3.862</b> |



**CHAPTER 3**

**OVERHEADS – ABSORPTION COSTING METHOD**

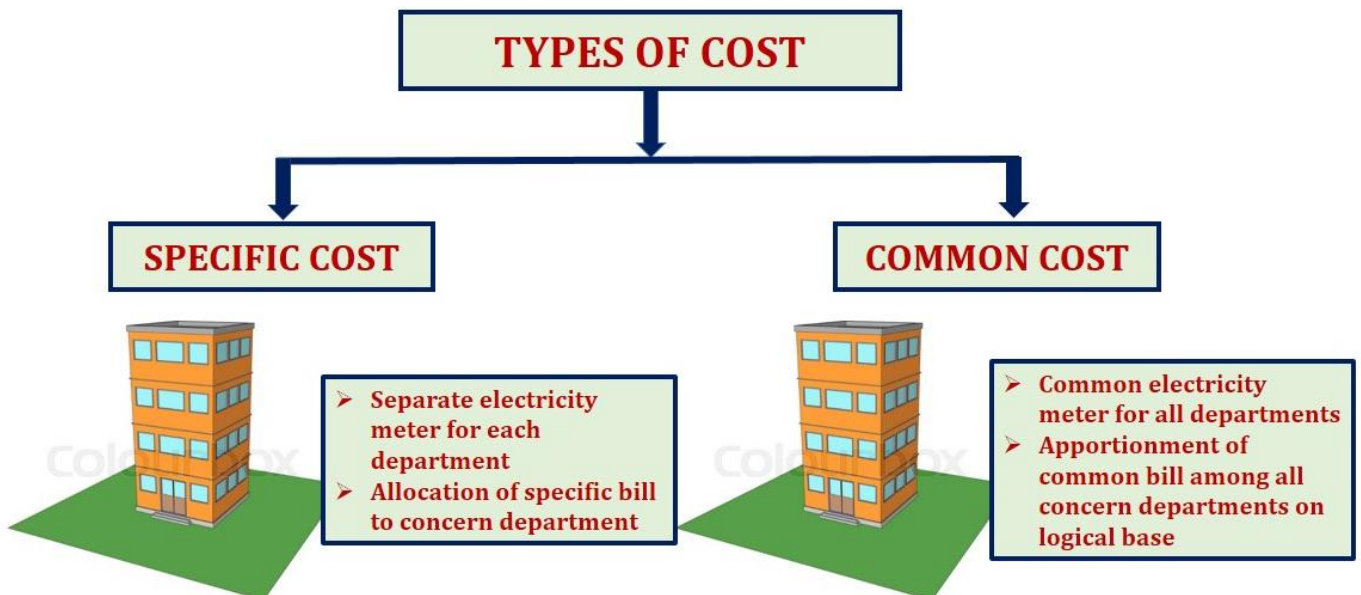
1. **Production Overheads:** All indirect cost related to production.



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.

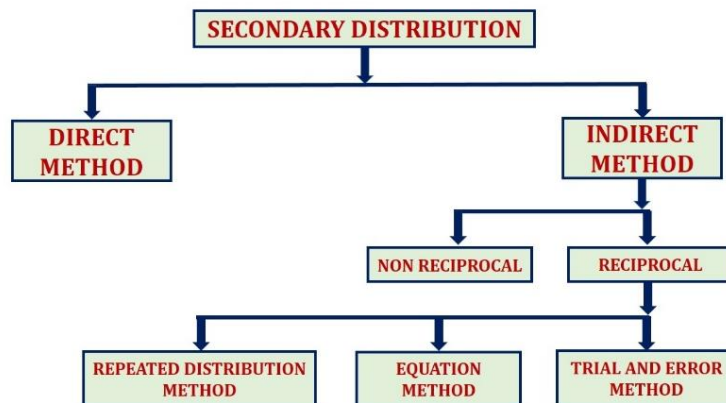
3. **Types of Cost:**



#### 4. Statement Showing Primary Distribution:

| Particulars           | Basis      | Production dept. |            | Service dept. |            |
|-----------------------|------------|------------------|------------|---------------|------------|
|                       |            | P1               | P2         | S1            | S2         |
| <b>Specific Cost:</b> |            |                  |            |               |            |
| 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        |
| <b>Common Cost:</b>   |            |                  |            |               |            |
| Rent                  | Area       | Yes              | Yes        | Yes           | Yes        |
| Insurance etc.        | Value      | Yes              | Yes        | Yes           | Yes        |
| <b>Total OH</b>       |            | <b>XXX</b>       | <b>XXX</b> | <b>XXX</b>    | <b>XXX</b> |

#### 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**.

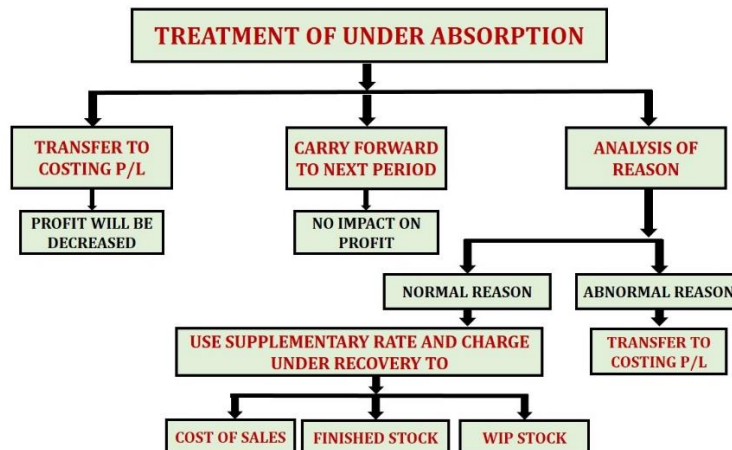
**13. Types of Recovery Base:**

- 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):**

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

**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           |
| <b>Total</b>       | <b>-</b>        | <b>12,600</b>          | <b>15,950</b> | <b>15,800</b> | <b>12,650</b>       | <b>13,100</b> | <b>12,250</b> |

**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 |
|-----------------------------|-----------------|-------------------|------------------|
| <b>Main Departments:</b>    |                 |                   |                  |
| Purchase Department         | 5,00,000        | 12                | 800              |
| Packing Department          | 8,00,000        | 15                | 1700             |
| Distribution Department     | 3,50,000        | 7                 | 700              |
| <b>Service Departments:</b> |                 |                   |                  |
| 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) |
| <b>Total OH</b>   | -                | <b>7,96,000</b>        | <b>12,61,000</b> | <b>5,53,000</b> | -                   | -          |

**(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        |
| <b>Total overheads</b>   | <b>Primary Dist.</b> | <b>7,700</b>           | <b>7,300</b> | <b>9,800</b>  | <b>4,700</b>        | <b>929</b> |
| 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)       |
| <b>Total OH</b>          | -                    | <b>9,233</b>           | <b>9,035</b> | <b>12,161</b> | -                   | -          |
| ÷ Working hours          | -                    | 3,070                  | 4,475        | 2,419         | -                   | -          |
| <b>OH rate per hour</b>  |                      | <b>₹3.01</b>           | <b>₹2.02</b> | <b>₹5.03</b>  | -                   | -          |

## 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<sub>1</sub> and P<sub>2</sub> and two service departments S<sub>1</sub> and S<sub>2</sub>. After making a primary distribution of factory overheads of all departments are as under:

|                |   |           |
|----------------|---|-----------|
| P <sub>1</sub> | = | ₹4,02,000 |
| P <sub>2</sub> | = | ₹2,93,000 |
| S <sub>1</sub> | = | ₹3,52,000 |
| S <sub>2</sub> | = | ₹33,000   |

## Overheads of service departments are apportioned as below:

|                           | P <sub>1</sub> | P <sub>2</sub> | S <sub>1</sub> | S <sub>2</sub> |
|---------------------------|----------------|----------------|----------------|----------------|
| Department S <sub>1</sub> | 40%            | 50%            | -              | 10%            |
| Department S <sub>2</sub> | 50%            | 40%            | 10%            | -              |

A product 'Z' passes through all the two production departments – P<sub>1</sub> and P<sub>2</sub> 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 <sub>1</sub>         | P <sub>2</sub>  | S <sub>1</sub>      | S <sub>2</sub> |
| Overheads                     | Primary distribution | 4,02,000               | 2,93,000        | 3,52,000            | 33,000         |
| Apportionment:                |                      |                        |                 |                     |                |
| Department S <sub>1</sub>     | (40:50:10)           | 1,43,555               | 1,79,445        | (3,58,889)          | 35,889         |
| Department S <sub>2</sub>     | (50:40:10)           | 34,445                 | 27,555          | 6,889               | (68,889)       |
| <b>Total Overheads</b>        |                      | <b>5,80,000</b>        | <b>5,00,000</b> | -                   | -              |
| ÷ Production Hours            |                      | 5,840                  | 5,840           | -                   | -              |
| <b>Recovery rate per hour</b> | -                    | <b>99.32</b>           | <b>85.62</b>    | -                   | -              |

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

$$\begin{aligned} \text{Expenses of Department S}_1 &= 3,52,000 + 10\% \text{ of Expenses of S}_2 \\ \text{Expenses of Department S}_2 &= 33,000 + 10\% \text{ of Expenses of S}_1 \end{aligned}$$

**Now:**

$$\begin{aligned} \text{Expenses of Department S}_1 &= 3,52,000 + 10\% (33,000 + 10\% \text{ of S}_1) \\ \text{Expenses of Department S}_1 &= 3,52,000 + 3,300 + 1\% \text{ of S}_1 \end{aligned}$$

$$\text{Expenses of Department S}_1 = 3,55,300 \div 99\% = \mathbf{3,58,889}$$

$$\begin{aligned} \text{Expenses of Department S}_2 &= 33,000 + 10\% \text{ of S}_1 \\ &= 33,000 + 10\% \text{ of } 3,58,889 \\ &= 33,000 + 35,889 = \mathbf{68,889} \end{aligned}$$

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

| Particulars                                 | Amount          |
|---|-----------------|
| Direct Materials                            | 500             |
| Direct Labour                               | 350             |
| <b>Prime Cost</b>                           | <b>850</b>      |
| Production Overheads:                       |                 |
| Department P <sub>1</sub> (2 hours × 99.32) | 198.64          |
| Department P <sub>2</sub> (3 hours × 85.62) | 256.86          |
| <b>Total Cost</b>                           | <b>1,305.50</b> |

**Working Notes:**

$$\text{Calculation of production hours} = 365 \times 16 \text{ hours} = 5,840 \text{ hours}$$

**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:**

- 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.
- 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:**

$$\begin{aligned} \text{(A) When the Robot is used} &= \frac{69,000}{2,000 \text{ hrs}} = ₹34.50 \\ \text{(B) When the Robot is not used} &= \frac{18,000}{1,500 \text{ hrs}} = ₹12.00 \end{aligned}$$

**(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       |
| <b>Machine Hour Rate</b>        | -           | <b>22.00</b> | -        | <b>18.43</b> | -        | <b>34.50</b> |

**Working note:**

- Total machine hours used (500 + 1,000 + 400 + 400 + 1,200) = 3,500
- Total machine hours without the use of robot (500 + 1,000) = 1,500
- Total machine hours with the use of robot (400 + 400 + 1,200) = 2,000
- 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        |
| <b>Total</b>                                    | <b>₹42,000.00</b> |
- Robot hire charges for a month (₹2,70,000 ÷ 6 months) = ₹45,000
- Overheads for using machines without Robot =  $\frac{42,000}{3,500 \text{ hrs}} \times 1,500 \text{ hrs.} = ₹18,000$
- Overheads for using machines with Robot =  $\frac{42,000}{3,500 \text{ hrs}} \times 2,000 \text{ hrs.} + ₹45,000 = ₹69,000$

**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<br>(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:**

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

**(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.

$$\begin{aligned} \text{Supplementary OH Rate} &= \frac{\text{Under Absorbed Overhead}}{\text{Equivalent Units}} = \frac{42,000}{12,500 + 5,000 + 2,500} \\ &= \text{₹2.10 per unit} \end{aligned}$$

**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 21<sup>st</sup> August, 20X1 is given below:

| <i>Particulars</i>                             | ₹   | ₹                  |
|--|-----|--------------------|
| Direct materials (all items)                   |     | 780                |
| Direct labour (manual) 20 hours @ ₹15 per hour |     | 300                |
| <b><i>Machine facilities:</i></b>              |     |                    |
| 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                |
| <b><i>Total cost</i></b>                       |     | <b><i>1810</i></b> |

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 21<sup>st</sup> 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:

| <i>Particulars</i>                             | ₹   | ₹                   |
|--|-----|---------------------|
| Direct materials (all items)                   |     | 780                 |
| Direct labour (manual) 20 hours @ ₹15 per hour |     | 300                 |
| <b><i>Machine facilities:</i></b>              |     |                     |
| 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                 |
| <b><i>Total cost</i></b>                       |     | <b><i>1810</i></b>  |
| <b><i>Supplementary Rates</i></b>              |     |                     |
| Overheads @ ₹2 per hour on 20 manual hours     | 40  |                     |
| Machine No I: 4 hours @ ₹15                    | 60  |                     |
| Machine No II: 6 hours @ ₹15                   | 90  | 190                 |
| <b><i>Total cost</i></b>                       |     | <b><i>2,000</i></b> |

### ***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 |                       | = | <b><i>₹2 (₹10 – ₹8) per hour</i></b> |

**(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 |                   | = | <b>₹15 (₹60 - ₹45) per hour</b> |

**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 |                     | = | <b>₹15 (₹80 - ₹65) per hour</b> |

**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<br>(₹) | Direct Wages<br>(₹) | Factory OH<br>(₹) | Direct Labour<br>hours | Machine<br>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<br>(₹) | Direct Wages<br>(₹) | Direct Labour<br>hours | Machine<br>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:**

- Calculate the overhead absorption rate as per the current policy of the company and determine the selling price of the Job No. CW 7083.
- 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.
- Determine the selling price of Job CW 7083 based on the overhead application rates calculated in (ii) above.
- 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**

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



$$\begin{aligned} \text{Blanket rate} &= \frac{\text{Budgeted Factory Overheads}}{\text{Budgeted Direct Wages}} \times 100 = \frac{3,60,000 + 1,40,000 + 1,25,000}{80,000 + 3,50,000 + 70,000} \times 100 \\ &= \mathbf{125\% \text{ of Direct Wages}} \end{aligned}$$

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

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

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

**1. Machining Department:**

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

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

**2. Assembly Department:**

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

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

**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:

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

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

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

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

**(a) Under Current Policy (Blanket Rate)**

| <i>Details</i>                                | <i>Machining</i>  | <i>Assembly</i> | <i>Packing</i>  | <i>Total</i>    |
|---|-------------------|-----------------|-----------------|-----------------|
| 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        |
| <i>(Under)/over recovery (1 - 2)</i>          | <i>(2,70,000)</i> | <i>2,53,500</i> | <i>(22,500)</i> | <i>(39,000)</i> |

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

| <i>Details</i>                             | <i>Machining</i> | <i>Assembly</i> | <i>Packing</i> | <i>Total</i>  |
|--|------------------|-----------------|----------------|---------------|
| 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      |
| <i>(Under)/over recovery (1 - 2)</i>       | <i>42,000</i>    | <i>42,000</i>   | <i>15,000</i>  | <i>99,000</i> |

**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**

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

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

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)               |
| <b>Paid Hours per month</b>                                 |                     |
|   | <b>7,380</b>        |
| Less: Leave hours (20 hours × 6 operators)                  | (120)               |
| Less: Normal idle time (10 hours × 6 operators)             | (60)                |
| <b>Effective Productive Hours</b>                           |                     |
|   | <b>7,200</b>        |

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 &amp; 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:**

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

|   |     |
|---|-----|
| <p style="text-align: center;"><b>Works/Factory Cost</b></p> <p>Add: Quality Control Cost<br/>           Add: Research and Development Cost<br/>           Add: Administrative Overheads (relating to production activity)<br/>           Less: Credit for recoveries/Scrap/By-Products<br/>           Add: Packing Cost (Primary)</p>  | XXX |
| <p style="text-align: center;"><b>Cost of Production</b></p> <p>Add: Opening Finished Goods<br/>           Less: Closing Finished Goods</p>   | XXX |
| <p style="text-align: center;"><b>Cost of Goods Sold</b></p> <p><b>Add: Administrative OH (General/not related to production):</b><br/>           Depreciation and maintenance of, building, furniture etc. of corporate or general management.<br/>           Salary of administrative employees, accountants, directors, secretaries etc.<br/>           Rent, rates &amp; taxes, insurance, lighting, office expenses etc.<br/>           Indirect materials- printing and stationery, office supplies etc.<br/>           Legal charges, audit fees, corporate office expenses like directors' sitting fees, remuneration and commission, meeting expenses etc.</p> <p><b>Add: Selling Overheads:</b><br/>           Salary and wages related with sales department and employees directly related with selling of goods.<br/>           Rent, depreciation, maintenance and other cost related with sales department.<br/>           Cost of advertisement, maintenance of website for online sales, market research etc.<br/>           Expenses for participation in Industrial exhibition</p> <p><b>Add: Distribution Overheads:</b><br/>           Salary and wages of employees engaged in distribution of goods.<br/>           Transportation and insurance costs related with distribution.<br/>           Depreciation, hire charges, maintenance and other operating costs related with distribution vehicles etc.<br/>           Packing Cost (Secondary)</p> | XXX |
| <p style="text-align: center;"><b>Cost of Sales (Excluding Interest)</b></p> <p><b>Add: Interest or Financing Charges</b></p>   | XXX |
| <p style="text-align: center;"><b>Cost of Sales (Including Interest)</b></p> <p><b>Add: Profit</b></p>  | XXX |
| <b>Sales</b>  | 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                                       | <b>1,42,00,000</b> | <b>73.19</b>  |
| Wages paid to production workers                         | 36,64,000          | 18.89         |
| Expenses paid for utilities                              | 1,45,600           | 0.75          |
| <b>Prime Cost</b>  | <b>1,80,09,600</b> | <b>92.83</b>  |
| 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)        | -             |
| <b>Cost of Production</b>                                | <b>1,83,78,400</b> | <b>94.73</b>  |
| Add: Value of opening finished stock                     | 9,60,000           | -             |
| Less: Value of closing finished stock (₹94.734 × 44,000) | (41,68,296)        | -             |
| <b>Cost of Goods Sold</b>                                | <b>1,51,70,104</b> | <b>94.81</b>  |
| 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          |

|                                |                    |               |
|--------------------------------|--------------------|---------------|
| <i>Cost of Sales</i>           | <b>1,85,89,104</b> | <b>116.18</b> |
| Add: Profit @15% on sales      | 32,80,430          | 20.50         |
| <i>Sales (1,85,89,104÷85%)</i> | <b>2,18,69,534</b> | <b>136.68</b> |

**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 31<sup>st</sup> March 2023:

| <i>Particulars</i>   | <i>Amount (₹)</i> |
|--|-------------------|
| 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 31<sup>st</sup> March 2023.

**Answer**

**Cost Sheet of R Ltd.**  
**(for the year ended at 31<sup>st</sup> March, 2023)**

| <i>Particulars</i>                   | <i>Amount (₹)</i> | <i>Amount (₹)</i> |
|--------------------------------------|-------------------|-------------------|
| 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:       |                   |                   |



|    |  |           |           |
|----|--|-----------|-----------|
|    | 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 managers:                                |           |           |
|    | 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 1 <sup>st</sup> 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 31 <sup>st</sup> 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 31<sup>st</sup> 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 31<sup>st</sup> March, 2023**

| <i>Particulars</i>   | <i>Amount</i> | <i>Amount</i>       |
|--|---------------|---------------------|
| Material consumed:   |               |                     |
| Raw materials purchased  | 10,00,00,000  |                     |
| Freight inward   | 11,20,600     |                     |
| Add: Opening stock of raw materials                                | 18,00,000     |                     |
| Less: Closing stock of raw materials                               | (9,60,000)    | 10,19,60,600        |
| 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           |
| <b>Prime Cost</b>  |               | <b>10,74,25,200</b> |
| 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)          |
| <b>Works / Factory Cost</b>  |               | <b>10,80,83,100</b> |
| 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              |
| <b>Cost of Production</b>  |               | <b>10,93,05,700</b> |
| Add: Opening stock of Finished goods                               |               | 11,00,000           |
| Less: Closing stock of Finished goods                              |               | (18,00,000)         |
| <b>Cost of Goods Sold</b>  |               | <b>10,86,05,700</b> |
| 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            |
| <b>Cost of Sales</b>                                    |           | <b>11,35,03,300</b> |

**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:

| <b>Level</b> | <b>Works cost per unit (₹)</b> |
|--------------|--------------------------------|
| 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:**

- It gives gift items costing Rs. 30 per unit of sale.
- 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.
- It spends ₹1,00,000 on refreshments served every month to its customers.
- 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)**

| <b>Particulars</b> | <b>30%</b><br><b>(30,000 units)</b> | <b>100%</b><br><b>(1,00,000 units)</b> |
|--------------------|-------------------------------------|--|
|--------------------|-------------------------------------|--|

|   |                    |                    |
|---|--------------------|--------------------|
| 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          |
| <b>Additional expenses:</b>               |                    |                    |
| Gifts @ ₹30 per unit                      | -                  | 30,00,000          |
| Customers prizes                          | -                  | 1,00,000           |
| Refreshment                               | -                  | 1,00,000           |
| Sponsorship cost                          | -                  | 20,00,000          |
| <b>Cost of Sales</b>                      | <b>1,27,00,000</b> | <b>3,96,00,000</b> |
| Profit                                    | 38,00,000          | 1,04,00,000        |
| <b>Sales @ ₹550/₹500 per unit</b>         | <b>1,65,00,000</b> | <b>5,00,00,000</b> |

**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 30<sup>th</sup> 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)       |
| <b>Materials Consumed</b>            | <b>12,60,250</b> |
| Direct Wages                         | 2,57,250         |
| Direct Expenses                      | 1,80,000         |
| <b>Prime Cost</b>                    | <b>16,97,500</b> |
| Factory Overheads (2,57,250 ÷ 175%)  | 1,47,000         |
| Add: Opening WIP                     | 1,70,800         |

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

**Working Note:****Statement Showing Material Purchased**

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

**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**

| <i>Particulars</i>                            | <i>First 3 Months</i> | <i>Next 9 Months</i> | <i>Total</i>     |
|---|-----------------------|----------------------|------------------|
| <b>Number of Units (W.N. 1)</b>               | <b>4,500</b>          | <b>21,600</b>        | <b>26,100</b>    |
| 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)       |
| <b>Raw Materials Consumed</b>                 | <b>1,57,500</b>       | <b>7,56,000</b>      | <b>9,13,500</b>  |
| Direct Labour (W.N. 2)                        | 1,44,000              | 6,48,000             | 7,92,000         |
| <b>Prime Cost</b>                             | <b>3,01,500</b>       | <b>14,04,000</b>     | <b>17,05,500</b> |
| 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         |
| <b>Works Cost</b>                             | <b>4,63,500</b>       | <b>20,41,200</b>     | <b>25,04,700</b> |
| Administrative Overheads                      | 1,29,600              | 3,88,800             | 5,18,400         |
| <b>Cost of Production</b>                     | <b>5,93,100</b>       | <b>24,30,000</b>     | <b>30,23,100</b> |
| Selling and Distribution OH @ ₹8 per unit     | 36,000                | 1,72,800             | 2,08,800         |
| <b>Cost of Sales</b>                          | <b>6,29,100</b>       | <b>26,02,800</b>     | <b>32,31,900</b> |

**(2) Statement Showing Selling Price Per Unit**

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

**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        |
| <b>Total production for the year</b>         | = | <b>26,100 units</b> |

**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 31<sup>st</sup> March, 2023 were:

|                     |                 |
|---------------------|-----------------|
| Direct material     | 2,00,000        |
| Direct wages        | 1,12,000        |
| Production Overhead | 48,000          |
|                     | <b>3,60,000</b> |

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        |
| <b>Prime Cost</b>                        | <b>1,20,000</b> | <b>3.00</b> | <b>1,92,000</b> | <b>1.60</b> |
| Production overheads                     | 12,000          | 0.30        | 36,000          | 0.30        |
| <b>Factory Cost</b>                      | <b>1,32,000</b> | <b>3.30</b> | <b>2,28,000</b> | <b>1.90</b> |
| Administrative overheads @ 200% of wages | 80,000          | 2.00        | 1,44,000        | 1.20        |
| <b>Cost of Production</b>                | <b>2,12,000</b> | <b>5.30</b> | <b>3,72,000</b> | <b>3.10</b> |
| Less: Closing stock                      | (21,200)        | -           | (62,000)        | -           |
| <b>Cost of Goods Sold</b>                | <b>1,90,800</b> | <b>5.30</b> | <b>3,10,000</b> | <b>3.10</b> |
| Selling Expenses                         | 9,000           | 0.25        | 25,000          | 0.25        |
| <b>Cost of Sales</b>                     | <b>1,99,800</b> | <b>5.55</b> | <b>3,35,000</b> | <b>3.35</b> |
| Profit                                   | 52,200          | 1.45        | 1,65,000        | 1.65        |
| <b>Sales</b>                             | <b>2,52,000</b> | <b>7.00</b> | <b>5,00,000</b> | <b>5.00</b> |

## CHAPTER 5

## JOB &amp; 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   |            |
| <b>Prime Cost</b>   | XXX        |
| Factory/Works/Production/Manufacturing Overheads                |            |
| Add: Opening WIP (if any)                                       |            |
| <b>Works/Factory Cost</b>                                       | XXX        |
| Add: Administrative Overheads (relating to production activity) |            |
| <b>Cost of Production/Cost of Goods Sold</b>                    | XXX        |
| Add: Administrative OH (General/not related to production)      |            |
| Add: Selling Overheads  |            |
| Add: Distribution Overheads                                     |            |
| <b>Cost of Sales</b>  | XXX        |
| Add: Profit   | XXX        |
| <b>Sales</b>  | XXX        |

## 3. Valuation of Closing WIP:

| Particulars                                      | Total Cost |
|--|------------|
| Direct Material Consumed                         |            |
| Direct Wages or Labour or Employee Cost          |            |
| Direct Expenses                                  |            |
| <b>Prime Cost</b>                                | XXX        |
| Factory/Works/Production/Manufacturing Overheads |            |
| Add: Opening WIP (if any)                        |            |
| <b>Value of Closing WIP</b>                      | 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 31<sup>st</sup> 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**

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

**Working Notes:**

- % of Factory OH to direct wages =  $(4,50,000/7,50,000) \times 100 = 60\%$
- % of Administration OH to works cost =  $(4,20,000/21,00,000) \times 100 = 20\%$
- % of Selling & distribution OH to works cost =  $(5,25,000/21,00,000) \times 100 = 25\%$
- % of Profit to sales =  $(6,09,000/36,54,000) \times 100 = 16.67\%$

**(b) Cost Sheet for the job order in 2023**

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

|   |                  |
|---|------------------|
| Profit (16.6.7% on sales or 20% on cost of sales) | 7,14,000         |
| <i>Sales value (35,70,000 ÷ 83.33%)</i>           | <b>42,84,000</b> |

**BBQ 40**

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

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

Analysis of the profit and loss account for the year ended 31<sup>st</sup> 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        |                  |  |                 |
|                     |        | <b>4,30,000</b> |                  |  | <b>4,30,000</b> |
| Selling expenses    |        | 90,000          | Gross profit b/d |  | 1,30,000        |
| Net profit          |        | 40,000          |                  |  |                 |
|                     |        | <b>1,30,000</b> |                  |  | <b>1,30,000</b> |

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

**Required:**

- Prepare a job cost sheet.
- Calculate the entire revised cost using the above figures as the base.
- 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         |
|                                     | <b>Prime Cost</b> | <b>200.00</b> |
| 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           |
| <b>Works Cost</b>                            | <b>251.00</b>  |
| Selling Expenses @ 30% on works cost         | 75.30          |
| <b>Total Cost</b>                            | <b>326.30</b>  |
| Profit @ 20% on selling price or 25% on cost | 81.575         |
| <b>Sales</b>                                 | <b>407.875</b> |

**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 | = | $\frac{\text{Selling Expenses}}{\text{Works Cost}} \times 100$ | = | $\frac{90,000}{4,30,000 - 1,30,000} \times 100$ |
|                                    | = | <b>30% of works cost</b>                                       |   |   |

**BBQ 41**

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

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

**Materials used in October were as follows:**

| <b>Material Requisition</b> | <b>Job No.</b> | <b>Cost</b>  |
|-----------------------------|----------------|--------------|
| 54                          | 118            | 300          |
| 55                          | 118            | 425          |
| 56                          | 118            | 515          |
| 57                          | 120            | 665          |
| 58                          | 121            | 910          |
| 59                          | 124            | 720          |
|                             |                | <b>3,535</b> |

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

| <b>Job No.</b> | <b>Numbers of hours</b> |               |
|----------------|-------------------------|---------------|
|                | <b>Shop A</b>           | <b>Shop B</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        | <b>2,990</b> |
| September | 118     | 810       | 500           | 400        | 1,710        |
| October   | 118     | 515       | 330           | 264        | 1,109        |
| Total     | -       | 1,325     | 830           | 664        | <b>2,819</b> |
| September | 120     | 765       | 475           | 380        | 1,620        |
| October   | 120     | 665       | 245           | 196        | 1,106        |
| Total     | -       | 1,430     | 720           | 576        | <b>2,726</b> |

**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          |
| <b>Invoice Price</b>                      | <b>3,946.80</b> | <b>3,721.08</b> | <b>3,598.32</b> |

**Working Note:**

**Recovery rate of Factory Overheads**

$$= \frac{\text{Factory OH}}{\text{Direct Labour Cost}} \times 100$$

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

**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.

| <i>Particulars</i>              | <i>Job 1 (₹)</i> | <i>Job 2 (₹)</i> |
|---------------------------------|------------------|------------------|
| 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:*

- Compute the percentage recovery rates of factory overheads and administrative overheads.
- Calculate the amount of factory overheads, administrative overheads and profit for each of the two jobs.
- 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**

| <i>Particulars</i>       | <i>Job 1</i>  | <i>Job 2</i>  |
|--------------------------|---|---|
| Direct materials         | 1,08,000  | 75,000  |
| Direct wages             | 84,000  | 60,000  |
| <b>Prime cost</b>        | <b>1,92,000</b>   | <b>1,35,000</b>   |
| Factory overheads        | 84,000F   | 60,000F   |
| <b>Factory cost</b>      | <b>1,92,000+84,000F</b>   | <b>1,35,000+60,000F</b>   |
| Administration overheads | (1,92,000+84,000F)A   | (1,35,000+60,000F)A   |
| <b>Total cost</b>        | <b>(1,92,000+84,000F)+<br/>(1,92,000+84,000F)A<br/>= 2,97,600</b> | <b>(1,35,000+60,000F)+<br/>(1,35,000+60,000F)A<br/>= 2,10,000</b> |

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

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

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

Now, we have the following equations:

$$1,92,000 + 84,000 F + 1,92,000A + 84,000 FA = 2,97,600 \quad (1)$$

$$1,35,000 + 60,000F + 1,35,000A + 60,000FA = 2,10,000 \quad (2)$$

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

$$9,60,000 + 4,20,000 F + 9,60,000A + 4,20,000 FA = 14,88,000 \quad (3)$$

$$9,45,000 + 4,20,000F + 9,45,000A + 4,20,000FA = 14,70,000 \quad (4)$$

By subtracting equation (4) from (3):

$$15,000 + 15,000 A = 18,000$$

$$15,000A = 3,000$$

$$A = 0.2 \text{ or } 20\%$$

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

$$1,92,000 + 84,000F + 1,92,000 \times 0.2 + (84,000F \times .2 = 2,97,600$$

$$84,000 F + 16,800 F = 67,200$$

$$F = 0.6667 \text{ or } 66.67\%$$

**(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          |
| <b>Prime cost</b>                              | <b>1,92,000</b> | <b>1,35,000</b> |
| Factory overheads (66.67% of wages)            | 56,000          | 40,000          |
| <b>Factory cost</b>                            | <b>2,48,000</b> | <b>1,75,000</b> |
| Administration overheads (20% of factory cost) | 49,600          | 35,000          |
| <b>Total cost</b>                              | <b>2,97,600</b> | <b>2,10,000</b> |
| Profit   | 35,712          | 42,000          |
| <b>Selling Price</b>                           | <b>3,33,312</b> | <b>2,52,000</b> |

**(c) Selling Price of the Job 3**

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

**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

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

$$\text{No. of batch} = 600 \text{ units} \div 50 \text{ units} = 12 \text{ batches}$$

## 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.

| <i>Month</i> | <i>Batch output</i> | <i>Material cost (₹)</i> | <i>Direct wages (₹)</i> | <i>Direct labour hours</i> |
|--------------|---------------------|--------------------------|-------------------------|----------------------------|
| 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:

| <i>Month</i> | <i>Chargeable expenses</i> | <i>Direct labour hours</i> |
|--------------|----------------------------|----------------------------|
| 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

| <i>Particulars</i>      | <i>Jan.</i>  | <i>Feb.</i>  | <i>March</i> | <i>April</i> | <i>May</i>   | <i>June</i>  | <i>Total</i> |
|-------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Batch output (in units) | 210          | 200          | 220          | 180          | 200          | 220          | 1,230        |
| Sales value (₹)         | <b>1,680</b> | <b>1,600</b> | <b>1,760</b> | <b>1,440</b> | <b>1,600</b> | <b>1,760</b> | <b>9,840</b> |
| 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        |
| <b>Total cost</b>       | <b>1,370</b> | <b>1,452</b> | <b>1,502</b> | <b>1,391</b> | <b>1,630</b> | <b>1,680</b> | <b>9,025</b> |
| Profit per batch (₹)    | <b>310</b>   | <b>148</b>   | <b>258</b>   | <b>49</b>    | <b>(30)</b>  | <b>80</b>    | <b>815</b>   |

|                         |      |      |      |      |        |      |      |
|-------------------------|------|------|------|------|--------|------|------|
| 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**

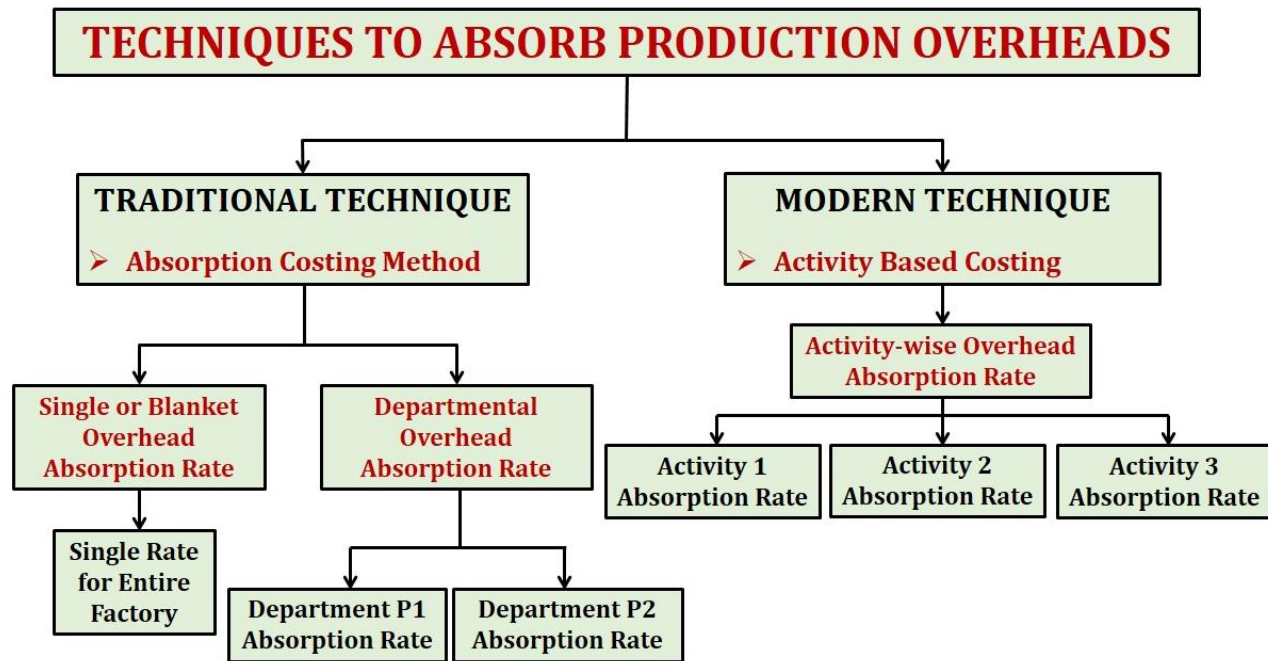
$$(i) \text{ Economic Run size} = \sqrt{\frac{2 DS}{C}} = \sqrt{\frac{2 \times 90,000 \times 1,500}{5\% \text{ of } 2,200}} = 1,567 \text{ bearings}$$

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

| Particulars                              | At EBQ 1,567   | At RBQ 18,000                                     |
|--|--|---|
| Set up Cost ( $\frac{D}{RBQ} \times S$ ) | (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 × $\frac{1}{2}$ × C)  | $\frac{1}{2} \times 1,567 \times 110 = 86,185$       | $\frac{1}{2} \times 18,000 \times 110 = 9,90,000$ |
| <b>Total Cost</b>                        | <b>1,73,185</b>                                      | <b>9,97,500</b>                                   |
| <b>Extra Cost</b>                        | <b>-</b>   | <b>8,24,315</b>                                   |

## 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        |
| <b>Prime Cost</b>                                   | <b>XXX</b> |
| <b>Production Overhead:</b>                         |            |
| 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        |
| <b>Total Cost</b>                                   | <b>XXX</b> |
| ÷ Number of units                                   | XXX        |
| <b>Cost per unit</b>                                | <b>XXX</b> |

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 31<sup>st</sup> March, 2023 are as follows:

| <i>Particulars</i>             | <i>A</i> | <i>B</i> | <i>C</i> |
|--------------------------------|----------|----------|----------|
| 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:**

| <i>Particulars</i> | <i>(₹)</i> |
|--------------------|------------|
| 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:**

| <i>Particulars</i>           | <i>A</i> | <i>B</i> | <i>C</i> |
|------------------------------|----------|----------|----------|
| For complete production:     |          |          |          |
| Batches of material          | 10       | 5        | 15       |
| Per unit of production:      |          |          |          |
| Number of Machine operations | 6        | 3        | 2        |

**You are requested to:**

- Prepare a statement for management showing the unit costs and total costs of each product using the absorption costing method.
- Prepare a statement for management showing the product costs of each product using the ABC approach.
- 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**

| <i>Particulars</i>                                    | <i>A (₹)</i>  | <i>B (₹)</i>  | <i>C (₹)</i>  |
|---|---------------|---------------|---------------|
| 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         |
| <b>Total Unit Cost</b>                                | (17 × 30/60)  | (17 × 45/60)  | (17 × 60/60)  |
| Number of units                                       | <b>21.50</b>  | <b>32.25</b>  | <b>33.00</b>  |
| <b>Total Cost (total unit cost × number of units)</b> | 4,000         | 3,000         | 1,600         |
|   | <b>86,000</b> | <b>96,750</b> | <b>52,800</b> |





### 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   | 4.50  | 2.25   |
|   | (4 × 0.75)                                   | (6 × 0.75)                                  | (3 × 0.75)                                   |
| Electricity @ ₹1.082 per operation                    | 6.49   | 3.25  | 2.16   |
|   | (6 × 1.082)                                  | (3 × 1.082)                                 | (2 × 1.082)                                  |
| Storage @ ₹1,040 per batch                            | 2.60   | 1.73  | 9.75   |
|   | $\left(10 \times \frac{1,040}{4,000}\right)$ | $\left(5 \times \frac{1,040}{3,000}\right)$ | $\left(15 \times \frac{1,040}{1,600}\right)$ |
| <b>Total Unit Cost</b>                                | <b>25.09</b>                                 | <b>28.98</b>                                | <b>30.16</b>                                 |
| Number of units                                       | 4,000  | 3,000                                       | 1,600  |
| <b>Total Cost (total unit cost × number of units)</b> | <b>1,00,360</b>                              | <b>86,940</b>                               | <b>48,256</b>                                |

### 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:

| <i>Particulars</i>                  | <i>P</i> | <i>Q</i> | <i>R</i> |
|-------------------------------------|----------|----------|----------|
| 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:**

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

**Answer**

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

| <i>Particulars</i>                             | <i>P (₹)</i> | <i>Q (₹)</i> | <i>R (₹)</i> |
|--|--------------|--------------|--------------|
| 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           |
| <b>Cost per unit</b>                           | <b>230</b>   | <b>428</b>   | <b>364</b>   |

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

| <i>Particulars</i>   | <i>P (₹)</i>     | <i>Q (₹)</i>     | <i>R (₹)</i>     |
|--|------------------|------------------|------------------|
| 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/<br>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<br>100/40/60 inspection        | 4,80,000         | 1,92,000         | 2,88,000         |
| Purchase Related Costs @ ₹750 per purchase of<br>60/100/160 purchases      | 45,000           | 75,000           | 1,20,000         |
| <b>Total Costs</b>   | <b>12,81,000</b> | <b>21,25,000</b> | <b>67,04,000</b> |
| <b>Cost per unit (Total Cost ÷ Units)</b>                                  | <b>427.00</b>    | <b>425.00</b>    | <b>335.20</b>    |

**Working Notes:**

- (a) Total Machine Hours =  $3,000 \times 10 + 5,000 \times 18 + 20,000 \times 14 = 4,00,000$  hours
- (b) Total Production OH =  $4,00,000$  machine hours  $\times$  ₹6 = ₹24,00,000
- (c) Total no. of Batches =  $(3,000 \div 150) + (5,000 \div 500) + (20,000 \div 1,000)$   
= 20 batches + 10 batches + 20 batches = 50 batches
- (d) Total no. of Inspections =  $5 \times 20$  batches +  $4 \times 10$  batches +  $3 \times 20$  batches  
= 200 inspections



(e) Total no. of Purchase Order =  $3 \times 20$  batches +  $10 \times 10$  batches +  $8 \times 20$  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"**

| <i>Particulars</i>                                  | <i>BABYSOFT-<br/>Gold</i> | <i>BABYSOFT-<br/>Pearl</i> | <i>BABYSOFT-<br/>Diamond</i> |
|---|---------------------------|----------------------------|------------------------------|
| 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                        |
| <b>Cost per unit</b>                                | <b>189.00</b>             | <b>244.17</b>              | <b>291.50</b>                |
| <b>Total cost (Cost per unit × number of units)</b> | <b>7,56,000</b>           | <b>7,32,510</b>            | <b>5,83,000</b>              |

**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**

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

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

| <i>Particulars</i>   | <i>BABYSOFT- Gold</i> | <i>BABYSOFT- Pearl</i> | <i>BABYSOFT- Diamond</i> |
|----------------------|-----------------------|------------------------|--------------------------|
| 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                  | 6.36                   | 7.02                     |
| Supervising cost     | (0.06 × 108)          | (0.06 × 106)           | (0.06 × 117)             |
| Utilities            | 5.00                  | 6.67                   | 10.00                    |
| Production OH:       | (10 × 30/60)          | (10 × 40/60)           | (10 × 60/60)             |
| Utilities            | 8.50                  | 8.50                   | 10.20                    |
| Production OH:       | (1.70 × 5)            | (1.70 × 5)             | (1.70 × 6)               |
| <b>Cost per unit</b> | <b>192.48</b>         | <b>243.70</b>          | <b>285.72</b>            |
| <b>Total cost</b>    | <b>7,69,920</b>       | <b>7,31,100</b>        | <b>5,71,440</b>          |

**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:

|                         | <i>BABYSOFT- Gold</i>      | <i>BABYSOFT- Pearl</i>     | <i>BABYSOFT- Diamond</i>   | <i>Total</i> |
|-------------------------|----------------------------|----------------------------|----------------------------|--------------|
| Quantity (units)        | 4,000                      | 3,000                      | 2,000                      | -            |
| Weight per unit (grams) | 108<br>{(60×0.8)+20+30+10} | 106<br>{(55×0.8)+20+30+12} | 117<br>{(65×0.8)+20+30+15} | -            |
| Total weight (grams)    | 4,32,000<br>(4,000 × 108)  | 3,18,000<br>(3,000 × 106)  | 2,34,000<br>(2,000 × 117)  | 9,84,000     |
| Total operations        | 20,000<br>(4,000 × 5)      | 15,000<br>(3,000 × 5)      | 12,000<br>(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:

|                                  | <i>Soft drinks</i> | <i>Fresh produce</i> | <i>Packaged food</i> |
|----------------------------------|--------------------|----------------------|----------------------|
| 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:

| <i>Activity</i>  | <i>Description of activity</i>                            | <i>Total Cost</i> | <i>Cost-allocation base</i>        |
|------------------|---|-------------------|------------------------------------|
| 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:

- 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.
- 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

- 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<br>(₹) | Fresh<br>Produce (₹) | Packaged<br>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    |
| <b>% of Operating income to Sales</b> | <b>1.70%</b>       | <b>7.17%</b>         | <b>3.30%</b>          | <b>4.97%</b> |

Working notes:

(a) Calculation of Cost Driver Rate

| Activity<br>(1)  | Total cost (₹)<br>(2) | Cost allocation base<br>(3) | Cost driver rate<br>(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<br>(₹) | Fresh<br>Produce (₹) | Packaged<br>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    |
| <b>% of Operating income to Sales</b>                   | <b>10.78%</b>      | <b>0.60%</b>         | <b>8.75%</b>          | <b>4.97%</b> |

**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:

| <i>Equipments</i> | <i>Orders processed</i> | <i>Machine hours worked</i> | <i>Inspection hours</i> |
|-------------------|-------------------------|-----------------------------|-------------------------|
| 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**

| <i>Particulars</i>                                   | <i>Equipment Y</i> | <i>Equipment Z</i> |
|--|--------------------|--------------------|
| 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            |
| <b><i>Manufacturing cost per unit</i></b>            | <b>₹936.38</b>     | <b>₹1,298.50</b>   |

$$\begin{aligned} \text{Predetermined overhead rate} &= \text{Budgeted overheads} \div \text{Budgeted labour hours} \\ &= ₹12,42,500 \div 20,000 \text{ hours} = ₹62.125/\text{hour} \end{aligned}$$

$$\begin{aligned} \text{Total labour hours} &= 2,500 \text{ units of Y} \times 3 \text{ hours} + 3,125 \text{ units of Y} \times 4 \text{ hours} \\ &= 20,000 \text{ hours} \end{aligned}$$

**(2) Statement Showing Unit Manufacturing Cost Using ABC Method**

| <i>Particulars</i>                        | <i>Equipment Y</i> | <i>Equipment Z</i> |
|---|--------------------|--------------------|
| Direct material cost                      | ₹300               | ₹450               |
| Direct labour cost                        | ₹450               | ₹600               |
| Overheads per unit (W.N.)                 | ₹226.80            | ₹216.16            |
| <b><i>Manufacturing cost per unit</i></b> | <b>₹976.80</b>     | <b>₹1,266.16</b>   |

**(3) Statement Showing Cost Distortion**

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

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        |
| <b>Overhead per unit</b> |               |                  |                 | <b>₹226.80</b> | <b>₹216.16</b> |

## 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:

- 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.
- 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       | 1,23,12,000     | 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                       | <b>53,090</b> | <b>2,23,531</b> | <b>6,90,375</b> | <b>7,39,757</b> | <b>274</b> |



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

**(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         | 4,00,000  | All fixed, no change.  |
| (b) Rents                       | 2,00,000  | Fully fixed, no change.  |
| (c) Currency Replenishment Cost | 1,00,000  | Expected to double during budget period.   |
| 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 quantities 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:**

| <i>Activity</i>                 | <i>Budgeted Cost (₹)</i> | <i>Remark</i>  |
|---------------------------------|--------------------------|--|
| ATM Services:                   |                          |  |
| (a) Machine Maintenance         | 4,00,000                 | All fixed, no change.  |
| (b) Rents                       | 2,00,000                 | Fully fixed, no change.  |
| (c) Currency Replenishment Cost | 2,00,000                 | Doubled during budget period.  |
| Total                           | 8,00,000                 |  |
| Computer Processing             | 2,50,000                 | ₹2,50,000 (half of ₹5,00,000) is fixed and no change is expected.  |
|                                 | 7,50,000                 | ₹2,50,000 (variable portion) is expected to increase to three times the current level.   |
| Total                           | 10,00,000                |  |
| Issuing Statements              | 18,00,000                | Existing.  |
|                                 | 2,00,000                 | 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     |
|---|------------|
| <b>(A) Standing Charges or Fixed Cost:</b>                |            |
| 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        |
| <b>Total (A)</b>  | <b>XXX</b> |
| <b>(B) Running Charges or Variable Cost:</b>              |            |
| 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        |
| <b>Total (B)</b>  | <b>XXX</b> |
| <b>(C) Maintenance Charges or Semi Variable Cost:</b>     |            |
| Repairs and maintenance                                   | XXX        |
| Tyres   | XXX        |
| Spares etc.   | XXX        |
| <b>Total (C)</b>  | <b>XXX</b> |
| <b>Total Operating Cost (A + B + C)</b>                   | <b>XXX</b> |
| Add: profit   | XXX        |
| <b>Net Collections or Taking</b>                          | <b>XXX</b> |
| Add: Indirect taxes (Passenger tax, GST etc.)             | XXX        |
| <b>Gross Collections or Taking</b>                        | <b>XXX</b> |
| ÷ Total passenger-kms or ton-kms                          | XXX        |
| <b>Fare/Charges for Per Passenger-Km or Ton-Kms</b>       | <b>XXX</b> |

## 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** =  $D1 \times W1 + D2 \times W2 + D3 \times W3 \dots\dots$
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       |
|--|--------------|
| <b>(a) Product Development, Marketing and Sales support:</b> |              |
| Policy development cost                                      | XXX          |
| Cost of marketing of the policy                              | XXX          |
| Sales support expenses                                       | XXX          |
| <b>Total (A)</b>   | <b>XXX</b>   |
| <b>(b) Operations:</b>                                       |              |
| Policy issuance cost   | XXX          |
| Policy servicing cost  | XXX          |
| Claims management cost                                       | XXX          |
| <b>Total (B)</b>   | <b>XXX</b>   |
| <b>(c) IT Cost:</b>  |              |
| IT cost  | XXX          |
| <b>Total (C)</b>   | <b>XXX</b>   |
| <b>(d) Support functions:</b>                                |              |
| Postage and logistics  | XXX          |
| Facilities cost  | XXX          |
| Employees cost   | XXX          |
| Office administration cost                                   | XXX          |
| <b>Total (D)</b>   | <b>XXX</b>   |
| <b>Total Cost (A + B + C + D)</b>                            | <b>XXX</b>   |
| <b>÷ Number of Policies</b>                                  | <b>÷ XXX</b> |
| <b>Cost Per Policy</b>                                       | <b>XXX</b>   |

**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          |
|---|--------------------------------|-----------------|
| <b>(A) Standing Charges:</b>            |                                |                 |
| 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          |
| <b>Total (A)</b>                        |                                | <b>1,30,500</b> |
| <b>(B) Running Charges:</b>             |                                |                 |
| Petrol and oil                          | (500/100 × 6,000 kms)          | 30,000          |
| Commission @ 10% of collections         |                                | 23,667          |
| <b>Total (B)</b>                        |                                | <b>53,667</b>   |
| <b>(C) Maintenance Charges:</b>         |                                |                 |
| Repairs and maintenance                 | (2,04,000 × 1/12)              | 17,000          |
| <b>Total (C)</b>                        |                                | <b>17,000</b>   |
| <b>Total operating cost (A + B + C)</b> |                                | <b>2,01,167</b> |
| Add: Profit @ 15% of collections        |                                | 35,500          |
| <b>Collections (WN 3)</b>               |                                | <b>2,36,667</b> |
| ÷ Total Passenger-kms                   |                                | ÷ 2,40,000      |
| <b>Fare for per passenger-km</b>        |                                | <b>₹0.9861</b>  |

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

$$= 2 \times \text{No of round trips daily} \times \text{Distance one way} \times \text{No of days}$$

$$= 2 \times 3 \times 40 \times 25 = \mathbf{6,000 \text{ kms}}$$

**WN 2: Calculation of passenger-kms per month:**

$$= \text{No of kms travelled per month} \times \text{No of passengers}$$

$$= 6,000 \times 40 = \mathbf{2,40,000 \text{ passenger-kms}}$$

**WN 3: Calculation of collections:**

$$\text{Total collections} = \text{Operating cost (excluding commission on collections)} + 10\% \text{ for commission} + 15\% \text{ for profit}$$

$$= 1,30,500 + 30,000 + 17,000 + 25\% \text{ of collections}$$

$$\mathbf{Collections} = \mathbf{₹2,36,667}$$

**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**

| <b>Particulars</b>                      | <b>Amount</b>    |
|---|------------------|
| <b>(A) Standing Charges:</b>            |                  |
| 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           |
| <b>Total (A)</b>                        | <b>72,041.25</b> |
| <b>(B) Running Costs:</b>               |                  |
| Diesel (11,440 km ÷ 4 km) × ₹56         | 1,60,160         |
| Lubricant oil (11,440 km. ÷ 100 ) × ₹10 | 1,144            |
| <b>Total (B)</b>                        | <b>1,61,304</b>  |

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

**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                   |
| <b>Taking</b> | = | <b>4,68,690.50</b>                            |

**2. Calculation of total km runs per month:**

| <b>Bus route</b>    | <b>Kms per trip</b> | <b>Trips per day</b> | <b>Days per month</b> | <b>Kms per month</b> |
|---------------------|---------------------|----------------------|-----------------------|----------------------|
| 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            |
|                     |                     |                      |                       | <b>11,440 kms</b>    |

**3. Calculation of total passenger kms:**

$$= (4,000 \text{ kms} \times 50 \text{ persons} \times 90\%) + (4,200 \text{ kms} \times 50 \text{ persons} \times 85\%) + (3,240 \text{ kms} \times 50 \text{ persons} \times 100\%) = \mathbf{5,20,500}$$

**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)<br>(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:*

| <i>Distance from the school</i> | <i>Bus Fee</i> | <i>% of students availing facility</i> |
|---------------------------------|----------------|--|
| 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*

| <i>Particulars</i>                      | <i>1 Bus</i>    | <i>25 Buses</i>  |
|---|-----------------|------------------|
| <b>(A) Standing Charges:</b>            |                 |                  |
| 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        |
| <b>Total (A)</b>                        | <b>1,78,850</b> | <b>44,71,250</b> |
| <b>(B) Maintenance Charges:</b>         |                 |                  |
| Repairs and maintenance                 | 16,400          | 4,10,000         |
| <b>Total (B)</b>                        | <b>16,400</b>   | <b>4,10,000</b>  |
| <b>(C) Running Charges:</b>             |                 |                  |
| Diesel                                  | 56,832          | 14,20,800        |
| <b>Total (C)</b>                        | <b>56,832</b>   | <b>14,20,800</b> |
| <b>Total operating cost (A + B + C)</b> | <b>2,52,082</b> | <b>63,02,050</b> |

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

|                            |   |  |   |                |
|----------------------------|---|--|---|----------------|
| (a) 4 kms from the school  | = | $(2,52,082 \div 12) \div 354$ students | = | <b>₹59.34</b>  |
| (b) 8 kms from the school  | = | $₹59.34 \times 2$                      | = | <b>₹118.68</b> |
| (c) 16 kms from the school | = | $₹59.34 \times 4$                      | = | <b>₹237.36</b> |

**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)     |
| <b>Cost of diesel per bus per year</b> | = | <b>₹56,832 (3,072 litres × ₹18.50)</b> |

**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%)                        |
| <b>Total 25% equivalent students</b> | = | <b>18 + (36 × 2) + (66 × 4) = 354 students</b> |

**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:**

- Purchase and maintain it's own fleet of cars. The average cost of a car is ₹6,00,000.
- Allow the executive to use his own car and reimburse expenses at the rate of ₹10 per kilometer and also bear insurance costs.
- 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:**

- Petrol ₹6 per km.
- Repairs and maintenance ₹0.20 per km.
- Tyres ₹0.12 per km.
- Insurance ₹1,200 per car per annum.
- Taxes ₹800 per car per annum.
- Life of the car 5 years with annual mileage of 20,000 kms.
- 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            |
|---|-----------------|-----------------|-----------------|
| <b>(A) Standing Charges:</b>            |                 |                 |                 |
| Insurance                               | 1,200           | 1,200           | -               |
| Taxes                                   | 800             | -               | 800             |
| Depreciation (6,00,000 – 80,000) × 1/5  | 1,04,000        | -               | -               |
| Hire Charges                            | -               | -               | 1,80,000        |
| <b>Total (A)</b>                        | <b>1,06,000</b> | <b>1,200</b>    | <b>1,80,800</b> |
| <b>(B) Running Charges:</b>             |                 |                 |                 |
| Petrol (20,000 × 6)                     | 1,20,000        | -               | 1,20,000        |
| Reimbursement (20,000 × 10)             | -               | 2,00,000        | -               |
| <b>Total (B)</b>                        | <b>1,20,000</b> | <b>2,00,000</b> | <b>1,20,000</b> |
| <b>(C) Maintenance Charges:</b>         |                 |                 |                 |
| Repairs and maintenance (20,000 × 0.20) | 4,000           | -               | -               |
| Tyres (20,000 × .12)                    | 2,400           | -               | 2,400           |
| <b>Total (C)</b>                        | <b>6,400</b>    | <b>-</b>        | <b>2,400</b>    |
| <b>Total Cost (A + B + C)</b>           | <b>2,32,400</b> | <b>2,01,200</b> | <b>3,03,200</b> |
| <b>Rank</b>                             | <b>II</b>       | <b>I</b>        | <b>III</b>      |

**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:

| <b>Particulars</b>                           | <b>CNG Car</b> | <b>EV Car</b> |
|--|----------------|---------------|
| 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:

| <b>Particulars</b>                                  |             |
|---|-------------|
| 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**

| <b>Particulars</b>   | <b>CNG Car (₹)</b> | <b>EV Car (₹)</b> |
|--|--------------------|-------------------|
| <b>(A) Running Charges:</b>                                  |                    |                   |
| Fuel cost/ Power consumption cost                            | 4,500              | 1,425             |
| <b>Total (A)</b>   | <b>4,500</b>       | <b>1,425</b>      |
| <b>(B) Standing Charges</b>                                  |                    |                   |
| 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             |
| <b>Total (B)</b>   | <b>31,216.66</b>   | <b>37,216.67</b>  |
| <b>(C) Maintenance Charges:</b>                              |                    |                   |
| 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             |
| <b>Total (C)</b>   | <b>911.12</b>      | <b>5,066.66</b>   |
| <b>Total Cost (A + B + C)</b>                                | <b>36,627.78</b>   | <b>43,708.33</b>  |

**Working notes:**

|   |   |  |   |                  |
|---|---|--|---|------------------|
| (a) <b>Fuel cost per month</b>                | = | $(₹60 \div 20 \text{ kms}) \times 1,500 \text{ kms}$   | = | <b>₹4,500</b>    |
| <b>Power cost per month</b>                   | = | $(₹7.6 \times 30 \text{ KWH} \div 240 \text{ kms}) \times 1,500 \text{ kms}$                     | = | <b>₹1,425</b>    |
| (b) <b>Depreciation CNG Car</b>               | = | $(₹9,20,000 - ₹95,000) \div 15 \text{ Years} \times 1/12$  | = | <b>₹4,583.33</b> |
| <b>Depreciation EV Car</b>                    | = | $(₹15,20,000 - ₹1,50,000 - ₹1,70,000) \div 10 \text{ Years} \times 1/12$                         | = | <b>₹10,000</b>   |
| (c) <b>Amortised cost of tyre CNG Car:</b>    |   |  |   |                  |
| Life of car                                   | = | 15 years   |   |                  |
| Replacement of tyres                          | = | after 5 years  |   |                  |
| Total replacements                            | = | only 2 replacements during 15 years<br>(no replacement at the end of useful life, sold as scrap) |   |                  |
| Amortised cost                                | = | $[(₹16,000 \times 2) \div 15 \text{ Years}] \times 1/12$   | = | <b>₹177.78</b>   |
| (d) <b>Amortised cost of tyre EV Car:</b>     |   |  |   |                  |
| Life of car                                   | = | 10 years   |   |                  |
| Replacement of tyres                          | = | after 5 years  |   |                  |
| Total replacements                            | = | only 1 replacement during 10 years<br>(no replacement at the end of useful life, sold as scrap)  |   |                  |
| Amortised cost                                | = | $(₹16,000 \div 10 \text{ Years}) \times 1/12$  | = | <b>₹133.33</b>   |
| (e) <b>Amortised cost of battery CNG Car:</b> |   |  |   |                  |
| Life of car                                   | = | 15 years   |   |                  |
| Replacement of battery                        | = | after 8 years  |   |                  |
| Total replacements                            | = | only one replacement during 15 years   |   |                  |
| Amortised cost                                | = | $(₹12,000 \div 15 \text{ Years}) \times 1/12$  | = | <b>₹66.67</b>    |
| (f) <b>Amortised cost of battery EV Car:</b>  |   |  |   |                  |
| Life of car                                   | = | 10 years   |   |                  |
| Replacement of battery                        | = | after 8 years  |   |                  |
| Total replacements                            | = | only one replacement during 10 years   |   |                  |
| Amortised cost                                | = | $(₹5,40,000 \div 10 \text{ Years}) \times 1/12$  | = | <b>₹4,500</b>    |

**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 | $(6.00 \times 70/60)$<br>7.00          | $(6.00 \times 90/60)$<br>9.00           |
| Fuel oil, tyres, repairs similar charges @ ₹0.60 per Km  | $(0.60 \times 10 \text{ kms})$<br>6.00 | $(0.60 \times 20 \text{ kms})$<br>12.00 |
| <b>Operating Cost</b>  | <b>13.00</b>                           | <b>21.00</b>                            |
| ÷ Effective tonne-kms  | ÷ 25                                   | ÷ 50                                    |
| <b>Cost per tonne-km</b>   | <b>₹0.52</b>                           | <b>₹0.42</b>                            |

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

**Working Notes:**

|  |   |   |
|--|---|---|
| <b>(1) Total operating time in 1 trip:</b> | <b>Colliery X</b>   | <b>Colliery Y</b>   |
| Running time (mine to plot)                | $60/20 \times 5 \text{ Kms}$<br>15 minutes                        | $60/20 \times 10 \text{ Kms}$<br>30 minutes                         |
| Loading time                               | 30 minutes  | 20 minutes  |
| Running time (plot to mine)                | 15 minutes  | 30 minutes  |
| Unloading time                             | 10 minutes  | 10 minutes  |
| <b>Total operating time in one trip</b>    | <b>70 minutes</b>   | <b>90 minutes</b>   |
| <b>(2) Effective tonnes km per trip:</b>   | 5 tonnes × 5 kms +<br>Nil tonnes × 5 kms<br><b>= 25 tonne kms</b> | 5 tonnes × 10 kms +<br>Nil tonnes × 10 kms<br><b>= 50 tonne kms</b> |

### 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:

| <b>Outward journey</b> | <b>No. of journeys</b> | <b>Load (in ton)</b> |
|------------------------|------------------------|----------------------|
| 'A' to 'B'             | 10                     | 6                    |
| 'A' to 'C'             | 2                      | 6                    |
| 'C' to 'B'             | 2                      | 4                    |
| <b>Return journey</b>  | <b>No. of journeys</b> | <b>Load (in ton)</b> |
| '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:**

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

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

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

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

| Particulars   | Amount          |
|---|-----------------|
| <b>Receipts:</b>  |                 |
| 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        |
| <b>Total Receipts</b>   | <b>3,53,200</b> |
| Less: Total operating cost  | (3,42,000)      |
| <b>Operating Profit</b>   | <b>11,200</b>   |
| Less: Fine paid for overloading   | (12,400)        |
| <b>Net Loss for the month</b>   | <b>(₹1,200)</b> |

**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        |
| <b>Total Operating Cost</b>         | <b>3,42,000</b> |

**(ii) Calculation of commercial ton-kms:**

$$\begin{aligned} \text{Total distance} &= 12 \text{ journeys} \times 300 \text{ kms} \times 2 \text{ (two way)} = 7,200 \\ \text{Total weight} &= 12 \text{ journeys} \times 6 \text{ ton} + 2 \text{ journeys} \times 4 \text{ ton} + 5 \text{ journeys} \times 8 \text{ ton} + 6 \\ &\quad \text{Journeys} \times 6 \text{ ton} + 1 \text{ journey} \times 6 \text{ ton} = 162 \text{ ton} \\ \text{Commercial ton-km} &= \text{Total distance} \times \text{Average weight} \\ &= 7,200 \text{ kms} \times (162 \text{ tons} \div 26 \text{ journeys}) = 44,862 \end{aligned}$$

**(iii) Calculation of absolute ton-kms:**

$$\begin{aligned} \text{A to B} &= (10 \text{ journeys} \times 300 \text{ kms} \times 6 \text{ tons}) + \{2 \text{ journeys} \times [(140 \text{ kms} \times 6 \text{ tons}) \\ &\quad + (160 \text{ kms} \times 4 \text{ tons})]\} = 20,960 \\ \text{B to A} &= (5 \text{ journeys} \times 300 \text{ kms} \times 8 \text{ tons}) + (6 \text{ journeys} \times 300 \text{ kms} \times 6 \text{ tons}) + \\ &\quad \{1 \text{ journey} \times [(160 \text{ kms} \times 6 \text{ tons}) + (140 \text{ kms} \times \text{Nil tons})]\} \end{aligned}$$



$$\begin{aligned} &= 23,760 \\ \text{Absolute ton-km} &= 20,960 + 23,760 = 44,720 \end{aligned}$$

**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         |
| <b>Total Cost</b>                                 | <b>28,17,067</b> |
| Add: Profit @ 20% on taking                       | 7,04,266         |
| <b>*Total Taking</b>                              | <b>35,21,333</b> |
| ÷ Equivalent single room days                     | ÷ 1,04,400       |
| <b>Rent for single room day</b>                   | <b>₹33.73</b>    |
| <b>Rent for double room day (33.73 × 2.5)</b>     | <b>₹84.32</b>    |
| <b>Rent for triple room day (33.73 × 2.5 × 2)</b> | <b>₹168.65</b>   |

**Working Notes:**

**1. Calculation of Taking:**

$$\begin{aligned} \text{*Total Taking} &= \text{Operating cost (excluding rent on taking) + 5\% for rent + 20\% for profit} \\ &= ₹26,41,000 + 25\% \text{ of total takings} \\ 75\% \text{ of Taking} &= ₹26,41,000 \end{aligned}$$

$$\text{Total Taking} = ₹35,21,333$$

## 2. Calculation of equivalent single room suites:

| Type of suites                           | Room days                              | Equivalent single room suites |
|--|--|-------------------------------|
| Single room suite                        | $100 \times 360 \times 100\% = 36,000$ | $36,000 \times 1 = 36,000$    |
| Double room suite                        | $50 \times 360 \times 80\% = 14,400$   | $14,400 \times 2.5 = 36,000$  |
| Triple room suite                        | $30 \times 360 \times 60\% = 6,480$    | $6,480 \times 5 = 32,400$     |
| <b>Total equivalent single room days</b> |  | <b>1,04,400</b>               |

### 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 31<sup>st</sup> 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   | 5,50,000 |
| 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)      |                  |
| <b>Total Cost</b>   | <b>29,44,800</b> |
| Add: Profit @ 20% on Room rent or 25% on Cost               | 7,36,200         |
| <b>Total Rent to be Charged</b>                             | <b>36,81,000</b> |
| ÷ Equivalent Off-Season room days                           | ÷ 36,000         |
| <b>Rent for one room per day in Off-Season</b>              | <b>₹102.25</b>   |
| <b>Rent for one room per day in Season (₹102.25 × 2)</b>    | <b>₹204.50</b>   |

**Working Notes:**

$$\begin{aligned}
 \text{Equivalent Off-Season room days} &= 100 \times 80\% \times 30 \text{ days} \times 6 \text{ months} \times 2 \text{ (double of Off-Season)} + \\
 & 100 \times 40\% \times 30 \text{ days} \times 6 \text{ months} \times 1 \\
 &= 14,400 \times 2 + 7,200 \times 1 \\
 &= \mathbf{36,000 \text{ Room days}}
 \end{aligned}$$

**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    |
|-----------------------------|-----------|
| <b>(A) Variable Costs:</b>  |           |
| 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)                            | 75,000             |
| <b>Total (A)</b>   | <b>56,05,000</b>   |
| <b>(B) Fixed Costs:</b>                                      |                    |
| 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          |
| <b>Total (B)</b>   | <b>48,61,000</b>   |
| <b>Total cost (A + B)</b>                                    | <b>1,04,66,000</b> |
| <b>Collection from patients (2,000 × 8,000 patient days)</b> | <b>1,60,00,000</b> |
| <b>Profit (Collection – Total cost)</b>                      | <b>55,34,000</b>   |
| <b>Profit per patient day (Profit ÷ Patient days)</b>        | <b>691.75</b>      |

**(b) Calculation of BEP for the hospital:**

$$\begin{aligned} \text{BEP} &= \text{Fixed cost} \div \text{Contribution per patient day} \\ &= 48,61,000 \div 1,299.375 = \mathbf{3,741 \text{ patient days}} \end{aligned}$$

**Working Notes:****1. Calculation of number of Patient days:**

$$\begin{aligned} &= (35 \text{ beds} \times 150 \text{ days}) + (25 \text{ beds} \times 80 \text{ days}) + 750 \text{ beds} \\ &= \mathbf{8,000} \end{aligned}$$

**2. Calculation Contribution per patient day:**

$$\begin{aligned} \text{Contribution} &= \text{Sales} - \text{Variable cost} \\ &= 1,60,00,000 - 56,05,000 = 1,03,95,000 \\ \text{Contribution per patient day} &= 1,03,95,000 \div 8,000 = \mathbf{1,299.375} \end{aligned}$$

**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**



| <i>Particulars</i>                                    | <i>Amount</i>    |
|---|------------------|
| 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         |
| <b>Total Salary</b>                                   | <b>7,75,000</b>  |
| Overheads (50 % of Salary)                            | 3,87,500         |
| Travel expenses                                       | 1,87,500         |
| Depreciation on Laptops [(1,00,000 ÷ 2 years) × 6/12] | 25,000           |
| <b>Total Project Cost</b>                             | <b>13,75,000</b> |

### 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:

| <i>Particulars</i>             | <i>Total Per Annum</i> | <i>Per Person Per Annum</i> | <i>Per Person Per Month</i> |
|--------------------------------|------------------------|-----------------------------|-----------------------------|
| 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                     |
| <b>Total</b>                   | <b>₹30,00,000</b>      | <b>₹13,50,000</b>           | <b>₹1,12,500</b>            |

### 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:

| <i>Sl. No.</i> | <i>Type of vehicle</i>    | <i>Daily traffic volume</i> |
|----------------|---------------------------|-----------------------------|
| 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:

| <i>Activities</i>   | <i>Amount<br/>(₹in Lakh)</i> |
|---|------------------------------|
| 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                       |
| <b>Total Project Cost</b>   | <b>1,14,495.25</b>           |

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<br>(₹ 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              |
| <b>Total Project Cost</b>   | <b>1,15,615.25</b>    |
| ÷ Concession period in days (25 years × 365 days)                 | ÷ 9,125               |
| <b>Cost per day of concession period (₹ in Lakh)</b>              | <b>₹12.67</b>         |

**(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                           | <b>₹19.06</b>  |
| Toll per Cars and SUVs (₹19.06 × 4)             | <b>₹76.24</b>  |
| Toll per Bus and LCV (₹19.06 × 6)               | <b>₹114.36</b> |
| Toll per Heavy commercial vehicles (₹19.06 × 9) | <b>₹171.54</b> |

**Working note:**

**(a) Calculation of Toll per day:**

$$\begin{aligned} \text{Toll recovery per day} &= \text{Cost per day of concession period} + 15\% \text{ profit on cost} \\ &= ₹12,67,000 + 15\% \text{ of } ₹12,67,000 = \mathbf{₹14,57,050} \end{aligned}$$

**(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                  |
| <b>Total Equivalent Two wheeler per day</b> |                           |            |       |                      | <b>76,444</b>          |

**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:**

$$\begin{aligned} \text{Total collection from toll} &= \text{Cost} + 10\% = ₹59,09,090 + 10\% \\ &= ₹64,99,999 \end{aligned}$$

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,

$$\begin{aligned} \text{Total Toll collection} &= (45,000 \times 2 \times T) + (12,000 \times 2 \times 2.5T) + (10,000 \times 2 \times 5T) \\ ₹64,99,999 &= 2,50,000T \\ T &= ₹26 \end{aligned}$$

$$\begin{aligned} \text{Toll rate for light vehicles} &= ₹26 \\ \text{Toll rate for light vehicles} &= 2.5T = ₹26 \times 2.5 = ₹65 \\ \text{Toll rate for light vehicles} &= 5T = ₹26 \times 5 = ₹130 \end{aligned}$$

**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) =  $45,000 \times 2 \times ₹26 = ₹23,40,000$

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 | = | $(45,000 \times T) + (45,000 \times 70\% \times T + 45,000 \times 30\% \times 0.75T)$ |
| ₹23,40,000                         | = | 86,625T   |
| T                                  | = | <b>₹27.013</b>  |

**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:**

- 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.
- Calculate cost per policy.
- Calculate cost per rupee of insured value.

**Answer****1. Statement Showing Total Cost for 'Professionals Protection Plus' Policy**

| Particulars  | Amount           |
|--|------------------|
| <b>(a) Product development, Marketing and Sales support:</b> |                  |
| Policy development cost                                      | 11,25,000        |
| Cost of marketing of the policy                              | 45,20,000        |
| Sales support expenses                                       | 11,45,000        |
| <b>Total (a)</b>   | <b>67,90,000</b> |
| <b>(b) Operations:</b>                                       |                  |
| Policy issuance cost   | 10,05,900        |
| Policy servicing cost  | 35,20,700        |
| Claims management cost                                       | 1,25,600         |
| <b>Total (b)</b>   | <b>46,52,200</b> |
| <b>(c) IT Cost:</b>  |                  |
| IT cost  | 74,32,000        |
| <b>Total (c)</b>   | <b>74,32,000</b> |

|                                   |                  |                    |
|-----------------------------------|------------------|--------------------|
| <b>(d) Support functions:</b>     |                  |                    |
| Postage and logistics             |                  | 10,25,000          |
| Facilities cost                   |                  | 15,24,000          |
| Employees cost                    |                  | 5,60,000           |
| Office administration cost        |                  | 16,20,400          |
|                                   | <b>Total (d)</b> | <b>47,29,400</b>   |
| <b>Total Cost (a + b + c + d)</b> |                  | <b>2,36,03,600</b> |

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**

| <b>Particulars</b>                                    | <b>Amount</b>      |
|---|--------------------|
| <b>(A) Fixed Costs:</b>                               |                    |
| Plant supervision                                     | 6,00,000           |
| Administration overheads                              | 40,00,000          |
| Depreciation (₹5,00,00,000 × 5%)                      | 25,00,000          |
| <b>Total (A)</b>                                      | <b>71,00,000</b>   |
| <b>(B) Variable Costs:</b>                            |                    |
| 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          |
| <b>Total (B)</b>                                      | <b>65,00,000</b>   |
| <b>Total Operating Cost (A + B)</b>                   | <b>1,36,00,000</b> |
| ÷ Total kwh generated                                 | ÷ 20,00,000        |
| <b>Cost of electricity generated per kwh</b>          | <b>₹6.80</b>       |

## CHAPTER 8

## PROCESS &amp; 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)

$$= \frac{\text{Total Cost} - \text{Sale Value of Normal Loss Units}}{\text{Total Units} - \text{Normal Loss Units}}$$

**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 | By Process A/C (Next) or  | XXX   | XXX |
| To Sundry materials       |       | XXX | Finished goods A/C or     |       |     |
| To Labour                 |       | XXX | Costing P/L A/C           |       |     |
| To Direct expenses        |       | XXX | By Abnormal loss (If any) | XXX   | XXX |
| To Indirect expenses      |       | XXX |                           | XXX   | XXX |
| To Abnormal Gain (If any) |       | 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 |       |     | 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.

**Step 2:** 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)      |
| <b>Total</b>                 | <b>XXX</b> | <b>-</b>  | <b>XXX</b> | <b>-</b> | <b>XXX</b> | <b>-</b> | <b>XXX</b> |

**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           |
| <b>Total Cost Per Unit</b> |   |           | <b>XXX</b>    |

- 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.

**Step 2:** 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:<br>Completed units         | XXX   | XX        | XXX  | XX     | XXX  | XX       | XXX  |
| Current units used for:<br>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)      |
| <b>Total</b>                 | <b>XXX</b> | <b>-</b> | <b>XXX</b> | <b>-</b> | <b>XXX</b> | <b>-</b> | <b>XXX</b> |

**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           |
| <b>Total Cost Per Unit</b> |  |           | <b>XXX</b>    |

**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        |
| <b>Add: Cost of Opening WIP</b> |           |                  |               | <b>XXX</b> |
| 2. Closing WIP                  | Materials | XXX              | XXX           | XXX        |
|                                 | Labour    | XXX              | XXX           | XXX        |
|                                 | Overhead  | XXX              | XXX           | XXX        |
| 3. Abnormal loss                | Materials | XXX              | XXX           | XXX        |
|                                 | Labour    | XXX              | XXX           | XXX        |
|                                 | Overheads | XXX              | XXX           | XXX        |
| 4. Abnormal gain                | Materials | XXX              | XXX           | XXX        |
|                                 | Labour    | XXX              | XXX           | XXX        |
|                                 | Overheads | XXX              | XXX           | XXX        |

**8. Opening WIP with Average method:****Step 1:** Prepare process account as usual.**Step 2:** 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)      |
| <b>Total</b>                 | <b>XXX</b> | <b>-</b>  | <b>XXX</b> | <b>-</b> | <b>XXX</b> | <b>-</b> | <b>XXX</b> |



### 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           |
| <b>Total Cost Per Unit</b> |   |           | <b>XXX</b>    |

### 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        |
|                    |           |                  |               | <b>XXX</b> |
| 2. Closing WIP     | Materials | XXX              | XXX           | XXX        |
|                    | Labour    | XXX              | XXX           | XXX        |
|                    | Overhead  | XXX              | XXX           | XXX        |
|                    |           |                  |               | <b>XXX</b> |
| 3. Abnormal loss   | Materials | XXX              | XXX           | XXX        |
|                    | Labour    | XXX              | XXX           | XXX        |
|                    | Overheads | XXX              | XXX           | XXX        |
|                    |           |                  |               | <b>XXX</b> |
| 4. Abnormal gain   | Materials | XXX              | XXX           | XXX        |
|                    | Labour    | XXX              | XXX           | XXX        |
|                    | Overheads | XXX              | XXX           | XXX        |
|                    |           |                  |               | <b>XXX</b> |

**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<br>(3% @ ₹0.25/unit)  | 300           | 75            |
| To Sundry Materials |               | 1,000         | By Process B A/c<br>@ ₹1.75 per unit     | 9,500         | 16,625        |
| To Labour           |               | 5,000         | By Abnormal Loss A/c @<br>₹1.75 per unit | 200           | 350           |
| To Direct expenses  |               | 1,050         |  |               |               |
|                     | <b>10,000</b> | <b>17,050</b> |  | <b>10,000</b> | <b>17,050</b> |

$$NCPU = \frac{\text{Total Cost} - \text{Sale value of Normal Loss Units}}{\text{Total Units} - \text{Normal Loss Units}} = \frac{17,050 - 75}{10,000 - 300} = ₹1.75 \text{ per unit}$$

**Process B Account**

| Particulars                           | Units        | ₹             | Particulars                             | Units        | ₹             |
|---------------------------------------|--------------|---------------|---|--------------|---------------|
| To Process A A/c                      | 9,500        | 16,625        | By Normal Loss A/c<br>(5% @ ₹0.50/unit) | 475          | 238           |
| To Sundry Materials                   |              | 1,500         | By Process C A/c<br>@ ₹3 per unit       | 9,100        | 27,300        |
| To Labour                             |              | 8,000         |   |              |               |
| To Direct expenses                    |              | 1,188         |   |              |               |
| To Abnormal Gain A/c @<br>₹3 per unit | 75           | 225           |   |              |               |
|                                       | <b>9,575</b> | <b>27,538</b> |   | <b>9,575</b> | <b>27,538</b> |

$$NCPU = \frac{\text{Total Cost} - \text{Sale value of Normal Loss Units}}{\text{Total Units} - \text{Normal Loss Units}} = \frac{27,538 - 238}{9,500 - 475} = ₹3 \text{ per unit}$$

**Process C Account**

| Particulars         | Units        | ₹             | Particulars                              | Units        | ₹             |
|---------------------|--------------|---------------|--|--------------|---------------|
| To Process B A/c    | 9,100        | 27,300        | By Normal Loss A/c<br>(8% @ ₹1.00/unit)  | 728          | 728           |
| To Sundry Materials |              | 500           | By Profit & Loss A/c<br>@ ₹4.25 per unit | 8,100        | 34,425        |
| To Labour           |              | 6,500         | By Abnormal Loss A/c @<br>₹4.25 per unit | 272          | 1,156         |
| To Direct expenses  |              | 2,009         |  |              |               |
|                     | <b>9,100</b> | <b>36,309</b> |  | <b>9,100</b> | <b>36,309</b> |

$$NCPU = \frac{\text{Total Cost} - \text{Sale value of Normal Loss Units}}{\text{Total Units} - \text{Normal Loss Units}} = \frac{36,309 - 728}{9,100 - 728} = ₹4.25 \text{ per unit}$$

**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           |
|                  | <b>1,503</b> | <b>1,041</b> |                      | <b>1,503</b> | <b>1,041</b> |

**Abnormal Loss Account**

| <i>Particulars</i> | <i>Units</i> | <i>₹</i>     | <i>Particulars</i> | <i>Units</i> | <i>₹</i>     |
|--------------------|--------------|--------------|--------------------|--------------|--------------|
| 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        |
|                    | <b>472</b>   | <b>1,506</b> |                    | <b>472</b>   | <b>1,506</b> |

**Abnormal Gain Account**

| <i>Particulars</i> | <i>Units</i> | <i>₹</i>   | <i>Particulars</i> | <i>Units</i> | <i>₹</i>   |
|--------------------|--------------|------------|--------------------|--------------|------------|
| To Normal Loss A/c | 75           | 38         | By Process B A/c   | 75           | 225        |
| To Costing P/L A/c |              | 187        |                    |              |            |
|                    | <b>75</b>    | <b>225</b> |                    | <b>75</b>    | <b>225</b> |

**Costing Profit and Loss Account**

| <i>Particulars</i>   | <i>Units</i> | <i>₹</i>      | <i>Particulars</i>   | <i>Units</i> | <i>₹</i>      |
|----------------------|--------------|---------------|----------------------|--------------|---------------|
| 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        |                      |              |               |
|                      | <b>8,100</b> | <b>48,787</b> |                      | <b>8,100</b> | <b>48,787</b> |

**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:

| <i>Particulars</i>                      | <i>Process-I</i>    | <i>Process-II</i>   |
|---|---------------------|---------------------|
| 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**

| <i>Particulars</i> | <i>Units</i> | <i>₹</i> | <i>Particulars</i> | <i>Units</i> | <i>₹</i> |
|--------------------|--------------|----------|--------------------|--------------|----------|
|--------------------|--------------|----------|--------------------|--------------|----------|

|                       |              |                 |                            |              |                 |
|-----------------------|--------------|-----------------|----------------------------|--------------|-----------------|
| 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)      |              |                 |
|                       | <b>7,500</b> | <b>6,94,350</b> |                            | <b>7,500</b> | <b>6,94,350</b> |

$$NCPU = \frac{\text{Total Cost} - \text{Realisable Value of Normal Loss Units}}{\text{Inputs Units} - \text{Normal Loss Units}} = \frac{6,94,350 - 4,688}{7,500 - 375} = ₹96.7947$$

**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) |              |                 |                             |              |                 |
|                         | <b>7,230</b> | <b>9,40,261</b> |                             | <b>7,230</b> | <b>9,40,261</b> |

$$NCPU = \frac{\text{Total Cost} - \text{Realisable Value of Normal Loss Units}}{\text{Inputs Units} - \text{Normal Loss Units}} = \frac{9,15,052 - 26,438}{7,050 - 705} = ₹140.0495$$

**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          |
|                   | <b>6,525</b> | <b>9,13,823</b> | By Balance c/d            | <b>6,525</b> | <b>9,13,823</b> |

**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        |                                    |                 |
|                                  | <b>9,84,801</b> |                                    | <b>9,84,801</b> |

**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     |

- The total production overhead of ₹15,750 was recovered @150% of direct wages.
- 15,000 units at ₹2 each were introduced to process 'X'.
- The output of each process passes to the next process and finally, 12,000 units were transferred finished stock account from process 'Z'.
- No stock of materials or work in progress were left at the end.

The following additional information is given:





| Process | % of wastage to normal input | Value of scrap per unit (₹) |
|---------|------------------------------|-----------------------------|
| X       | 6%                           | 1.10                        |
| Y       | ?                            | 2.00                        |
| Z       | 5%                           | 1.00                        |

**You are required to:**

- 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.
- 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'

$$\text{Cost per unit in process Y} = \frac{\text{Total cost} - \text{sale of scrap}}{\text{total units} - \text{Normal loss units}} = \frac{52,610 - 2x}{14,100 - x} = ₹4$$

$$\begin{aligned} 4(14,100 - x) &= 52,610 - 2x \\ 56,400 - 4x &= 52,610 - 2x \\ 3,790 &= 2x \\ x &= 3,790 \div 2 = 1,895 \text{ units} \end{aligned}$$

$$\text{Percentage of wastage} = (1,895 \div 14,100) \times 100 = 13.44\%$$

**(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<br>(150% of 4,000) |               | 6,000         |                      |               |               |
|  | <b>15,000</b> | <b>42,600</b> |                      | <b>15,000</b> | <b>42,600</b> |

**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<br>(150% of 3,500) |               | 5,250         |                      |               |               |
|  | <b>14,100</b> | <b>52,610</b> |                      | <b>14,100</b> | <b>52,610</b> |

**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<br>(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 |

$$\text{Cost per unit} = \frac{\text{Total cost} - \text{sale of scrap}}{\text{total units} - \text{Normal loss units}} = \frac{58,320 - 610}{12,205 - 610} = \text{₹4.977 per unit}$$

**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. 3/4<sup>th</sup> 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        |
|                    | <b>10,000</b> | <b>9,80,600</b> |                        | <b>10,000</b> | <b>9,80,600</b> |

$$\text{Production OH} = \frac{3,00,000}{52,000 + 78,000} \times 52,000 = \text{₹1,20,000}$$



$$\text{Normal cost p.u.} = \frac{\text{Total cost} - \text{scrap of normal loss}}{\text{Total units} - \text{normal loss units}} = \frac{9,80,600 - 2,500}{10,000 - 600} = ₹104$$

**(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           |                        |              |                  |
|                      | <b>7,090</b> | <b>10,16,720</b> |                        | <b>7,090</b> | <b>10,16,720</b> |

$$\text{Production OH} = \frac{3,00,000}{52,000 + 78,000} \times 78,000 = ₹1,80,000$$

$$\text{Normal cost per unit} = \frac{9,86,700 - 5,520}{6,900 - 690} = ₹158$$

**(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        |
|                  | <b>200</b> | <b>20,800</b> |                    | <b>200</b> | <b>20,800</b> |

**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        |                  |            |               |
|                    | <b>190</b> | <b>30,020</b> |                  | <b>190</b> | <b>30,020</b> |

**(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         |                      |              |                  |
|                         | <b>8,700</b> | <b>15,43,500</b> |                      | <b>8,700</b> | <b>15,43,500</b> |

**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- $\frac{2}{3}$ % | Direct wages | 33- $\frac{1}{3}$ % |
| Production overhead    | 16- $\frac{2}{3}$ % |              |                     |

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**

| <i>Particulars</i>  | <i>Units</i> | <i>₹</i>      | <i>Particulars</i>   | <i>Units</i> | <i>₹</i>      |
|---------------------|--------------|---------------|----------------------|--------------|---------------|
| 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         |
|                     | <b>5,000</b> | <b>42,555</b> |                      | <b>5,000</b> | <b>42,555</b> |

**Abnormal Loss A/c**

| <i>Particulars</i> | <i>Units</i> | <i>₹</i>   | <i>Particulars</i>     | <i>Units</i> | <i>₹</i>   |
|--------------------|--------------|------------|------------------------|--------------|------------|
| To Process A/c     | 120          | 696        | By Cash A/c            | 120          | 120        |
|                    |              |            | By Profit and Loss A/c |              | 576        |
|                    | <b>120</b>   | <b>696</b> |                        | <b>120</b>   | <b>696</b> |

**Working Notes:**

**Statement of Equivalent Production (Process I)**

| <i>Particulars</i> | <i>Units</i> | <i>Materials 1</i> |                | <i>Materials 2</i> |                | <i>Labour</i> |                | <i>Overhead</i> |                |
|--------------------|--------------|--------------------|----------------|--------------------|----------------|---------------|----------------|-----------------|----------------|
|                    |              | <i>%</i>           | <i>E. Unit</i> | <i>%</i>           | <i>E. Unit</i> | <i>%</i>      | <i>E. Unit</i> | <i>%</i>        | <i>E. Unit</i> |
| 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            |
| <b>Total</b>       | <b>5,000</b> | <b>-</b>           | <b>4,850</b>   | <b>-</b>           | <b>4,610</b>   | <b>-</b>      | <b>4,370</b>   | <b>-</b>        | <b>4,150</b>   |

**Statement of Cost**

| <i>Elements</i>     | <i>Cost</i>           | <i>Equivalent Units</i> | <i>Cost Per Unit</i> |
|---------------------|-----------------------|-------------------------|----------------------|
| 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**

| <i>Particulars</i> | <i>Elements</i> | <i>Equivalent Units</i> | <i>Cost Per Unit</i> | <i>Total</i> |
|--------------------|-----------------|-------------------------|----------------------|--------------|
| 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         |
|               |             |       |      | <b>36,549</b> |
| Abnormal Loss | Materials 1 | 120   | 3.00 | 360           |
|               | Materials 2 | 80    | 3.00 | 240           |
|               | Labour      | 40    | 1.50 | 60            |
|               | Overhead    | 20    | 1.80 | 36            |
|               |             |       |      | <b>696</b>    |
| 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           |
|               |             |       |      | <b>5,160</b>  |

**BBQ 73**

The following data are available in respect of process 1 for March 2023:

- Opening stock of work in process 800 units at a total cost of ₹4,000.
- Degree of completion of opening work in progress:
 

|           |      |
|-----------|------|
| Materials | 100% |
| Labour    | 60%  |
| Overheads | 60%  |
- Input of materials at a total cost of ₹36,800 for 9,200 units.
- Direct wages incurred ₹16,740
- Production overhead ₹8,370
- Unit scrapped 1,200 units. The state of completion of these units was:
 

|           |      |
|-----------|------|
| Materials | 100% |
| Labour    | 80%  |
| Overheads | 80%  |
- Closing work in progress 900 units. The stage of completion of these units was:
 

|           |      |
|-----------|------|
| Materials | 100% |
| Labour    | 70%  |
| Overheads | 70%  |
- 7,900 units were completed and transferred to the next process.
- Normal loss is 8% of the total input.
- Scrap value is ₹4 per unit.

**You are required to:**

- Compute equivalent production.
- Calculate the cost per equivalent unit for each element.
- Calculate the value of abnormal loss (or gain) closing work in progress and the units transferred to the next process by using **FIFO Method**.
- 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          |
| <b>Total</b>             | <b>10,000</b> | <b>-</b> | <b>8,400</b> | <b>-</b> | <b>8,370</b> |

**(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        |
| <b>Add:</b> Cost of Opening WIP<br>(Used in completed units) |            |           |               | 4,000         |
|  |            |           |               | <b>54,660</b> |
| Closing WIP  | Materials  | 900       | 4.00          | 3,600         |
|  | Labour, OH | 630       | 2.00 + 1.00   | 1,890         |
|  |            |           |               | <b>5,490</b>  |
| Abnormal Loss  | Materials  | 400       | 4.00          | 1,600         |
|  | Labour, OH | 320       | 2.00 + 1.00   | 960           |
|  |            |           |               | <b>2,560</b>  |

**(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         |
|                | <b>10,000</b> | <b>65,910</b> |                     | <b>10,000</b> | <b>65,910</b> |

**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         |
| <b>Total</b>    | <b>40,000</b> | <b>-</b>  | <b>38,000</b> | <b>-</b>        | <b>37,400</b> |

**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         |
|           |   |                  | <b>80.00</b>  |

**3. Statement of Evaluation**

| Particulars     | Elements                     | Eq. Units | Cost Per Unit | Total            |
|-----------------|------------------------------|-----------|---------------|------------------|
| Units Completed | Materials, Labour, Overheads | 35,000    | 80.00         | <b>28,00,000</b> |
| Abnormal Loss   | Materials                    | 1,000     | 40.00         | 40,000           |
|                 | Labour, Overheads            | 800       | 10.00 + 30.00 | 32,000           |
|                 |                              |           |               | <b>72,000</b>    |
| Closing WIP     | Materials                    | 2,000     | 40.00         | 80,000           |
|                 | Labour, Overheads            | 1,600     | 10.00 + 30.00 | 64,000           |
|                 |                              |           |               | <b>1,44,000</b>  |

**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         |
|                  | <b>40,000</b> | <b>30,56,000</b> |                      | <b>40,000</b> | <b>30,56,000</b> |

**Normal Loss Account**

| <b>Particulars</b> | <b>Units</b> | <b>₹</b>      | <b>Particulars</b> | <b>Units</b> | <b>₹</b>      |
|--------------------|--------------|---------------|--------------------|--------------|---------------|
| To Process A A/c   | 2,000        | 40,000        | By Cash A/c        | 2,000        | 40,000        |
|                    | <b>2,000</b> | <b>40,000</b> |                    | <b>2,000</b> | <b>40,000</b> |

**Abnormal Loss Account**

| <b>Particulars</b> | <b>Units</b> | <b>₹</b>      | <b>Particulars</b>           | <b>Units</b> | <b>₹</b>      |
|--------------------|--------------|---------------|------------------------------|--------------|---------------|
| To Process A A/c   | 1,000        | 72,000        | By Cash A/c                  | 1,000        | 20,000        |
|                    | <b>1,000</b> | <b>72,000</b> | By Costing P&L A/c<br>(b.f.) | <b>1,000</b> | <b>72,000</b> |

**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.

|  | <b>Process I</b> | <b>Process II</b> | <b>Finished Stock</b> |
|--|------------------|-------------------|-----------------------|
| 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**

| <b>Particulars</b> | <b>Total</b>  | <b>Cost</b>   | <b>Profit</b> | <b>Particulars</b> | <b>Total</b>  | <b>Cost</b>   | <b>Profit</b> |
|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|
| 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        |                    |               |               |               |
|                    | <b>57,700</b> | <b>44,200</b> | <b>13,500</b> |                    | <b>57,700</b> | <b>44,200</b> | <b>13,500</b> |

**Process II A/c**

| <b>Particulars</b> | <b>Total</b> | <b>Cost</b> | <b>Profit</b> | <b>Particulars</b> | <b>Total</b> | <b>Cost</b> | <b>Profit</b> |
|--------------------|--------------|-------------|---------------|--------------------|--------------|-------------|---------------|
| 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        |               |                 |               |               |
|                  | <b>1,17,000</b> | <b>79,500</b> | <b>37,500</b> |               | <b>1,17,000</b> | <b>79,500</b> | <b>37,500</b> |

**Finished Stock A/c**

| <b>Particulars</b> | <b>Total</b>    | <b>Cost</b>   | <b>Profit</b> | <b>Particulars</b> | <b>Total</b>    | <b>Cost</b>   | <b>Profit</b> |
|--------------------|-----------------|---------------|---------------|--------------------|-----------------|---------------|---------------|
| 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        |                    |                 |               |               |
|                    | <b>1,51,250</b> | <b>90,000</b> | <b>61,250</b> |                    | <b>1,51,250</b> | <b>90,000</b> | <b>61,250</b> |

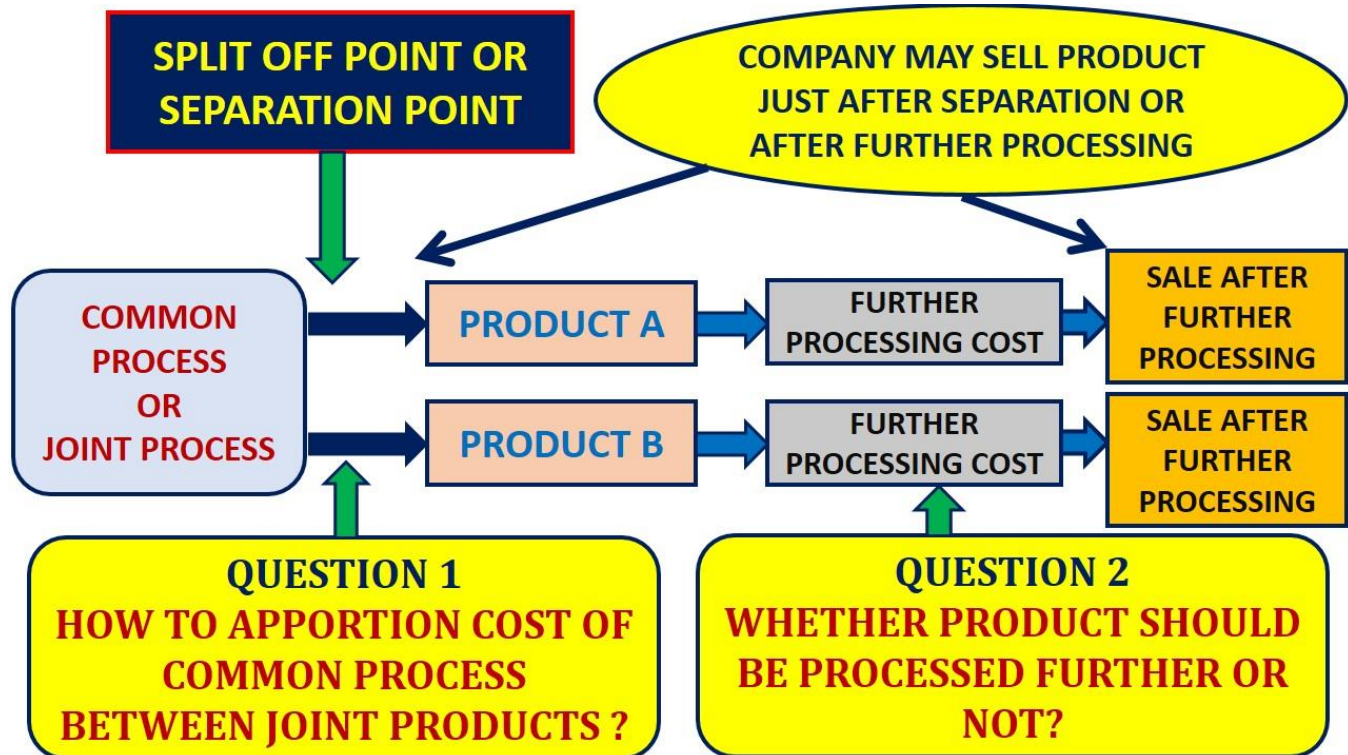
\* Stock reserve in closing stock of Process II =  $\frac{15,000}{90,000} \times 4,500 = 750$

\* Stock reserve in closing stock of FG =  $\frac{36,750}{1,12,500} \times 11,250 = 3,675$

## CHAPTER 9

## JOINT PRODUCTS &amp; BY PRODUCTS

- 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.
- Understanding of Chapter:**



- 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)**

| <i>Particulars</i>                                | <i>Product A</i> | <i>Product B</i> |
|---|------------------|------------------|
| <i>Physical units or output at split of point</i> | XXX              | XXX              |
| <i>Joint Cost in proportion of Physical units</i> | XXX              | XXX              |

- **Average unit cost method:** Apportionment of joint cost on the basis of *average cost per unit*.

**Step 1:** Calculate Average unit cost



$$\text{Average unit cost} = \frac{\text{Total Joint Cost}}{\text{Total Units at Separation Point}}$$

**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<br><i>Less: Selling expenses at separation point</i> | XXX<br>(XXX) | XXX<br>(XXX) |
| Net Market value at separation point  | XXX          | XXX          |
| <b>Joint Cost in proportion of Net MV at separation point</b>   | <b>XXX</b>   | <b>XXX</b>   |

- **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        |
| <b>Joint Cost in proportion of MV after further processing</b>                 | <b>XXX</b> | <b>XXX</b> |

- **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.

$$\text{NRV} = \text{Sale value after further processing} - \text{further processing cost} - \text{selling expenses after further processing if any}$$

**Statement Showing Apportionment of Joint Cost  
(NRV Method)**

| Particulars  | Product A             | Product B             |
|--|-----------------------|-----------------------|
| Market value after further processing of total output after further processing<br><i>Less: Further processing cost</i><br><i>Less: Selling expenses after further processing</i> | XXX<br>(XXX)<br>(XXX) | XXX<br>(XXX)<br>(XXX) |
| Net Realizable Value   | XXX                   | XXX                   |
| <b>Joint Cost in proportion of NRV</b>   | <b>XXX</b>            | <b>XXX</b>            |

➤ **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**

$$\text{Incremental Revenue (IR)} = \text{Sale value of total output after further processing} - \text{Sale value of total output at separation Point}$$



**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         |
| <b>Estimated Joint Cost</b>   | <b>₹1,40,000</b> | <b>₹1,37,500</b> | <b>₹44,000</b> |
| <b>Joint Cost ₹3,50,000 in 1,400 : 1,375 : 440</b>                              | <b>₹1,52,411</b> | <b>₹1,49,689</b> | <b>₹47,900</b> |
| <b>Profit</b><br><b>(Sales–Selling expenses–Further cost–Actual Joint cost)</b> | <b>₹43,839</b>   | <b>₹12,811</b>   | <b>(₹900)</b>  |

### BBQ 77

**From the following details advise whether products should be processed further or not:**

| Particulars                                 | Product A | Product B | Product C |
|---|-----------|-----------|-----------|
| <b>Sale value:</b> After further processing | 1,50,000  | 2,40,000  | 70,000    |

|                          |                          |        |          |        |
|--------------------------|--------------------------|--------|----------|--------|
|                          | At separation point      | 80,000 | 1,50,000 | 50,000 |
| <b>Selling expenses:</b> | After further processing | 20,000 | 30,000   | 12,000 |
|                          | At separation point      | 15,000 | 20,000   | 7,000  |
| <b>Further cost</b>      |                          | 30,000 | 80,000   | 35,000 |

**Answer****Statement Showing Further Processing Decision**

| Product  | Calculation Incremental Revenue and Cost                                      | Status  | Decision           |
|----------|---|---------|--------------------|
| <b>A</b> | IR = 1,50,000 - 80,000 = 70,000<br>IC = 30,000 + (20,000 - 15,000) = 35,000   | IR > IC | <b>Yes</b>         |
| <b>B</b> | IR = 2,40,000 - 1,50,000 = 90,000<br>IC = 80,000 + (30,000 - 20,000) = 90,000 | IR = IC | <b>Indifferent</b> |
| <b>C</b> | IR = 70,000 - 50,000 = 20,000<br>IC = 35,000 + (12,000 - 7,000) = 40,000      | IR < IC | <b>No</b>          |

**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:

- 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?
- 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.
- What sales strategy could the company have planned to maximize its profits in the year?
- 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        |
| <b>Joint Cost (in NRV proportion)</b> | <b>27,20,000</b> | <b>1,28,000</b> | <b>1,28,000</b> | <b>9,28,000</b> | <b>39,04,000</b> |
| 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        |
| <b>Annual Income</b>                  | <b>6,80,000</b>  | <b>32,000</b>   | <b>32,000</b>   | <b>2,32,000</b> | <b>9,76,000</b>  |

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         |
| <b>Annual Income</b>                                       | <b>2,80,000</b> | <b>52,000</b> | <b>32,000</b> | <b>1,52,000</b> | <b>5,16,000</b>   |
| <b>Increase/(Decrease) in Income (5,16,000 - 9,76,000)</b> |                 |               |               |                 | <b>(4,60,000)</b> |

**(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       |
| <b>Annual Income</b>                                | <b>6,80,000</b> | <b>52,000</b> | <b>32,000</b> | <b>2,32,000</b> | <b>9,96,000</b> |
| <b>Net Increase in Income (9,96,000 - 9,76,000)</b> |                 |               |               |                 | <b>20,000</b>   |

**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<br>(₹30 × 28 × 1000) | 76,80,000<br>(₹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 | <b>5,10,000</b>               | <b>45,90,000</b>                |

$$\text{Joint cost} = (\text{₹}100 \times 50 \times 1000) + \text{₹}1,00,000 = \text{₹}51,00,000$$

**(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:**

- Statement showing income forecast of the company assuming that none of its products are to be further processed.
- Statement showing income forecast of the company assuming that products A, B, C and E are to be processed further.
- 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        |
| <b>Profit</b>          |           |          |          |          |           | <b>6,30,000</b> |





**(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         |
| <b>Profit</b>          |           |          |          |          |           | <b>13,00,000</b> |

**(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         |
| <b>Profit</b>          |           |          |          |          |           | <b>13,30,000</b> |

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       |
| <b>Joint cost (in NRV proportion)</b> | <b>26,25,000</b> | <b>2,52,000</b> | <b>1,75,000</b> | <b>1,40,000</b> | <b>9,45,000</b> |

$$\begin{aligned}
 \text{Joint cost} &= \text{Raw material cost} + \text{other manufacturing expenses} \\
 &= 35,90,000 + 5,47,000 \\
 &= \mathbf{41,37,000}
 \end{aligned}$$

**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.

| <i>Particulars</i>    | <i>Product A</i> | <i>Product B</i> | <i>By Product</i> |
|-----------------------|------------------|------------------|-------------------|
| 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:**

| <i>Particulars</i>                                  | <i>Amount (₹)</i> |
|---|-------------------|
| 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          |

$$\begin{aligned} \text{Joint cost allocable to Product B} &= \frac{\text{Net joint cost allocable to products}}{\text{Total Units}} \times \text{Physical qty of Product B} \\ &= \frac{7,50,000}{60,000+1,20,000} \times 1,20,000 = \text{₹5,00,000} \end{aligned}$$

### **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**

| <i>Particulars</i>                                      | <i>M1</i> | <i>B1</i> | <i>B2</i> |
|---|-----------|-----------|-----------|
| 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**

| <i>Particulars</i>                                   | <i>B1</i>     | <i>B2</i>     |
|--|---------------|---------------|
| 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        |
| <b>Joint Cost</b>                                    | <b>11,800</b> | <b>25,500</b> |
| Total Joint Cost                                     |               | 2,12,400      |
| Less: Joint cost allocable to B1                     |               | 11,800        |



|                                   |                 |
|-----------------------------------|-----------------|
| Less: Joint cost allocable to B2  | 25,500          |
| <b>Joint Cost allocable to M1</b> | <b>1,75,100</b> |

## 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        |
| <b>Profit</b>                        | <b>1,44,900</b> | <b>14,400</b> | <b>27,000</b> | <b>1,86,300</b> |

### 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         |
|           | <b>₹10,000</b> |

Subsequent costs are given below:

|           | A             | B             |
|-----------|---------------|---------------|
| Material  | ₹3,000        | ₹1,500        |
| Labour    | ₹1,400        | ₹1,000        |
| Overheads | ₹600          | ₹500          |
|           | <b>₹5,000</b> | <b>₹3,000</b> |

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        |
| <b>Joint cost</b>                           | <b>6,733</b> | <b>3,267</b> |

\* Calculation of selling expenses:

$$\begin{aligned}
 \text{Selling expenses} &= \text{Total sales} - \text{Total profit} - \text{Total subsequent cost} - \text{Total joint cost} \\
 &= (16,000 + 8,000) - (4,000 + 1,600) - (5,000 + 3,000) - 10,000 \\
 &= \mathbf{400}
 \end{aligned}$$

**Statement Showing Cost of Production**

| <i>Particulars</i>        | <i>Article A</i> | <i>By-product B</i> |
|---------------------------|------------------|---------------------|
| Joint cost                | 6,733            | 3,267               |
| Subsequent cost           | 5,000            | 3,000               |
| <b>Cost of Production</b> | <b>11,733</b>    | <b>6,267</b>        |

**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:**

|                    | <b>Department X<br/>(In Lakh)</b> | <b>Department Y<br/>(In Lakh)</b> |
|--------------------|-----------------------------------|-----------------------------------|
| Direct materials   | ₹95.00                            | ₹14.00                            |
| Direct labour      | ₹80.00                            | ₹27.00                            |
| Variable overheads | ₹100.00                           | ₹35.00                            |
| Fixed overheads    | ₹75.00                            | ₹52.00                            |
| <b>Total</b>       | <b>₹350.00</b>                    | <b>₹128.00</b>                    |

**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 |
| <b>Ratio of output for 'P1' and 'P2'</b> | = | <b>60 : 40</b>      |                |
| 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**

| <i>Particulars</i>   | <i>Product 'P1'</i><br><i>(₹ in Lakh)</i> | <i>Product 'P2'</i><br><i>(₹ in Lakh)</i> |
|--|---|---|
| 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                                  |
| <b>Share of joint cost of *₹1,205 lakh (in 506.22 : 1,028)</b> | <b>397.59</b>                             | <b>807.41</b>                             |

**\* Calculation of joint cost:**

|                                    |   |                   |
|------------------------------------|---|-------------------|
| Raw materials (9,00,000 kgs × ₹95) | = | 855 lakh          |
| Process cost of department X       | = | 350 lakh          |
| <b>Joint cost</b>                  | = | <b>1,205 lakh</b> |

**(2) Statement of Profitability at Split Off Point**

| <i>Particulars</i>                                | <i>Product 'P1'</i><br><i>(₹ in Lakh)</i> | <i>Product 'P2'</i><br><i>(₹ in Lakh)</i> |
|---|---|---|
| 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)                                  |
| <b>Profit</b>                                     | <b>108.63</b>                             | <b>220.59</b>                             |

**(3) Statement of Profitability of 'YP1'**

| <i>Particulars</i>                                      | <i>Product 'YP1'</i><br><i>(₹ in Lakh)</i> |
|---|--|
| 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)                                   |
| <b>Profit</b>   | <b>147.96</b>                              |

**Calculation of output of product 'YP1':**

|        |   |                     |   |                     |
|--------|---|---------------------|---|---------------------|
| Output | = | 95% of 4,86,000 kgs | = | <b>4,61,700 kgs</b> |
|--------|---|---------------------|---|---------------------|

**(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:

| <i>Process</i> | <i>Variable cost per kg (₹)</i> | <i>Fixed cost of Input (₹)</i> |
|----------------|---------------------------------|--------------------------------|
| 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**

| <b>Particulars</b>  | <b>Product X</b> | <b>By-Product Z</b> |
|---|------------------|---------------------|
| 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           |
| <b>Apportionment of Joint Cost ₹6,21,900 in sales ratio</b> | <b>₹5,52,800</b> | <b>₹69,100</b>      |
| <b>Profit (Sales value - Joint cost)</b>                    | <b>₹3,22,000</b> | <b>₹40,250</b>      |

**Working Notes:**

(a) Output of Product X at split off point = 14,580 kg  
 $\therefore$  Output of By-product Z =  $(14,580 \div 80) \times 20 = 3,645$  kgs

(b) Input of raw material into each process:

Output of Process T =  $14,580 + 3,645 = 18,225$  kgs  
 Input of process T =  $18,225 \div 90\% = 20,250$  kgs  
 Input of Process S =  $20,250 \div 90\% = 22,500$  kgs  
 Input of Process R =  $22,500 \div 90\% = 25,000$  kgs

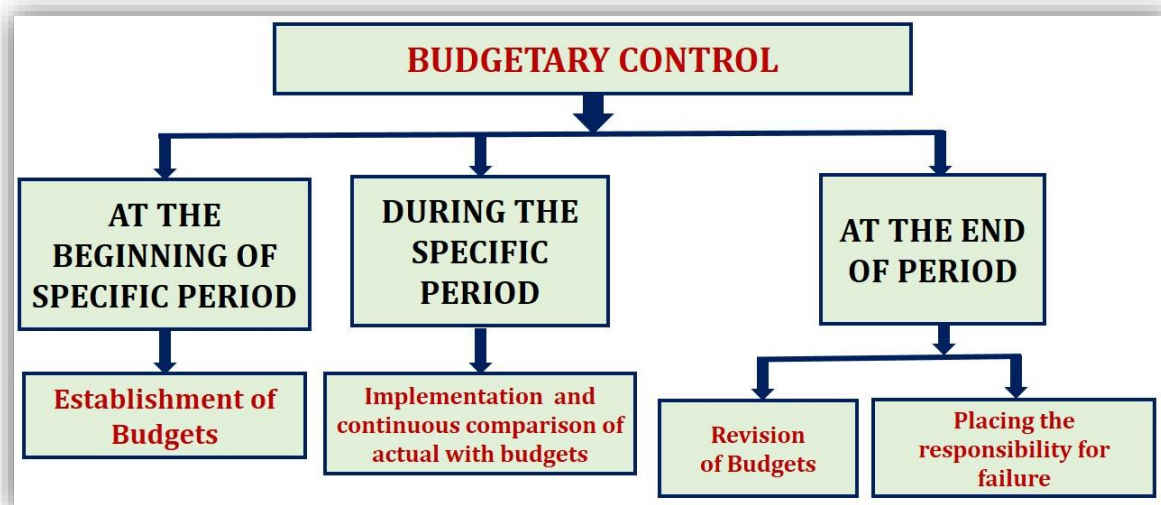
(c) Calculation of Joint Cost:

| <b>Particulars</b>                           | <b>Process R</b> | <b>Process S</b> | <b>Process T</b> | <b>Total</b>    |
|--|------------------|------------------|------------------|-----------------|
| Material input (in kg)                       | 25,000           | 22,500           | 20,250           | -               |
| Material cost:                               |                  |                  |                  |                 |
| Material J $(25,000 \times 40\% \times ₹15)$ | 1,50,000         | -                | -                | 1,50,000        |
| Material K $(25,000 \times 40\% \times ₹9)$  | 90,000           | -                | -                | 90,000          |
| Material L $(25,000 \times 20\% \times ₹7)$  | 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          |
| <b>Joint Cost</b>                            | <b>4,42,000</b>  | <b>1,06,250</b>  | <b>73,650</b>    | <b>6,21,900</b> |

## CHAPTER 10

## BUDGETS &amp; BUDGETARY CONTROL

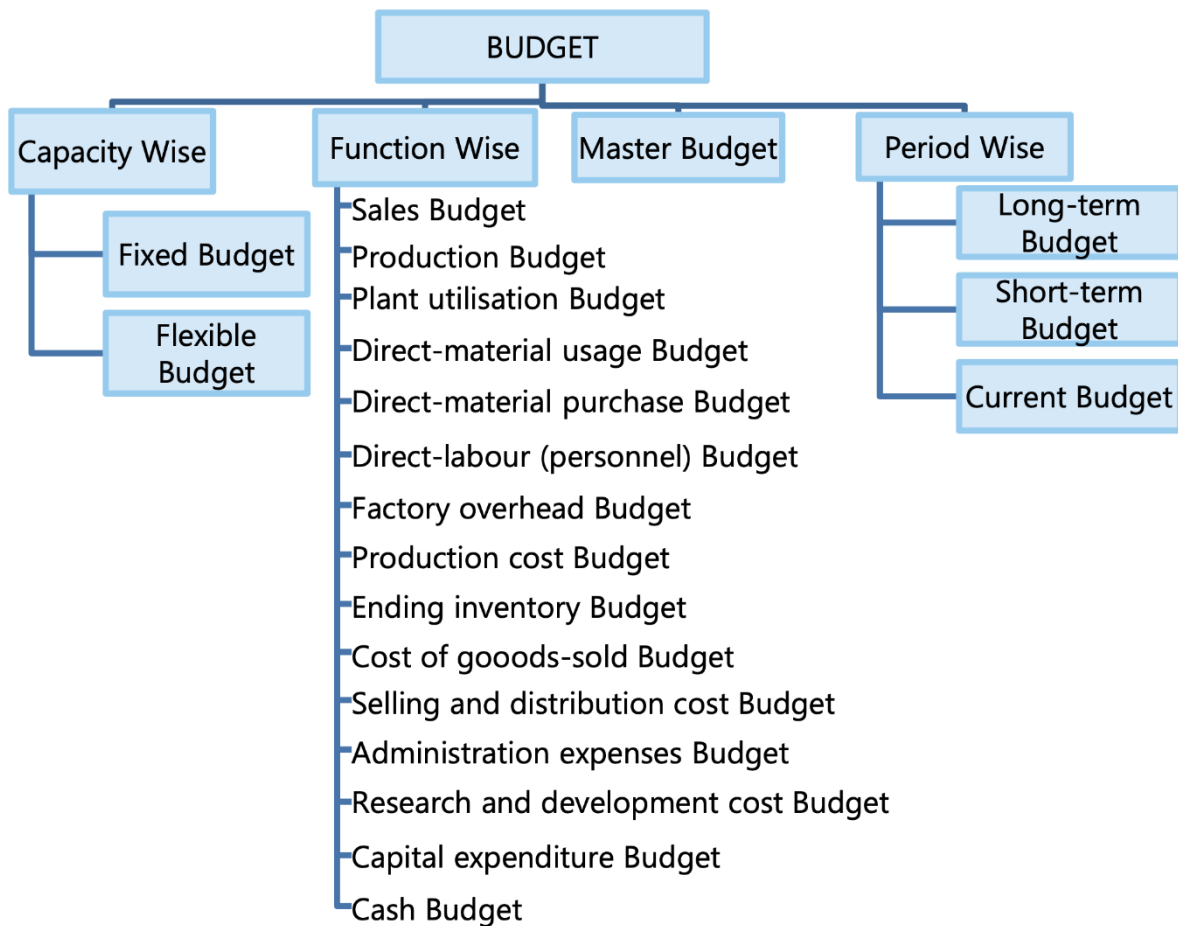
- Budget:** A budget is an instrument of management used as an aid in the planning, programming and control of business activity. The Chartered Institute of Management Accountants (CIMA) UK defines budget as "A financial and/or quantitative statement, prepared and approved prior to a defined period of 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.
- 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.

$$7. \text{ Variable Cost Per Unit} = \frac{\Delta \text{in Cost}}{\Delta \text{in Units}}$$

$$8. \text{ Fixed Cost} = \text{Total Cost} - \text{Variable Cost}$$



**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          |
| <b>Total (B)</b>   | <b>652</b>   | <b>3,91,20,000</b> |
| (C) Contribution (A - B)                                     | <b>148</b>   | <b>88,80,000</b>   |
| (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           |
| <b>Total (D)</b>   |              | <b>28,80,000</b>   |
| <b>Net Profit (C - D)</b>                                    | <b>-</b>     | <b>60,00,000</b>   |

**(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          |
| <b>Total (B)</b>                           | <b>782.40</b> | <b>4,69,44,000</b> | <b>782.40</b> | <b>5,63,32,800</b> |
| (C) Contribution (A - B)                   | <b>97.60</b>  | <b>58,56,000</b>   | <b>97.60</b>  | <b>70,27,200</b>   |

|   |          |                  |          |                  |
|---|----------|------------------|----------|------------------|
| <b>(D) Fixed Cost:</b>                        |          |                  |          |                  |
| 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         |
| <b>Total (D)</b>                              |          | <b>33,12,000</b> |          | <b>33,12,000</b> |
| <b>Net Profit (C - D)</b>                     | <b>-</b> | <b>25,44,000</b> | <b>-</b> | <b>37,15,200</b> |

**BBQ 87**

S Ltd. has prepared budget for the coming year for its two products A and B.

|                             | <b>Product A</b> | <b>Product B</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**

| <b>Particulars</b> | <b>Product A (6,000 units)</b> |                 | <b>Product B (9,000 units)</b> |                 |
|--------------------|--------------------------------|-----------------|--------------------------------|-----------------|
|                    | <b>Per unit</b>                | <b>Total</b>    | <b>Per unit</b>                | <b>Total</b>    |
| 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          |
| <b>Total cost</b>  | <b>110.00</b>                  | <b>6,60,000</b> | <b>70.00</b>                   | <b>6,30,000</b> |
| <b>Profit</b>      | <b>10.00</b>                   | <b>60,000</b>   | <b>8.00</b>                    | <b>72,000</b>   |

**(b) Flexible Budget After Marketing Efforts**

| <b>Particulars</b>                   | <b>Product A (7,500 units)</b> |                 | <b>Product B (9,500 units)</b> |                 |
|--------------------------------------|--------------------------------|-----------------|--------------------------------|-----------------|
|                                      | <b>Per unit</b>                | <b>Total</b>    | <b>Per unit</b>                | <b>Total</b>    |
| 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          |
| <b>Total cost</b>                    | <b>109.92</b>                  | <b>8,24,400</b> | <b>70.58</b>                   | <b>6,70,500</b> |
| <b>Profit</b>                        | <b>10.08</b>                   | <b>75,600</b>   | <b>7.42</b>                    | <b>70,500</b>   |

**BBQ 88**

The Budget manager of Jaypee Electricals Ltd. is preparing a flexible budget for the accounting year commencing from 1<sup>st</sup> 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:

| <i>Particulars</i>                  | <i>1,20,000 units</i> | <i>1,50,000 units</i> |
|-------------------------------------|-----------------------|-----------------------|
| 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                |
| <b>Total Manufacturing Overhead</b> | <b>9,70,000</b>       | <b>11,50,000</b>      |

*Prepare a budget of total cost at 1,40,000 units of output.*

**Answer**

**Flexible Budget**

| <i>Particulars</i>  | <i>Amount (₹)</i> |
|---|-------------------|
| <b>(A) Variable Cost:</b>   |                   |
| 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 $\{(\text{₹}2,64,000 \div 1,20,000) \times 1,40,000\}$ | 3,08,000          |
| Indirect Labour $\{(\text{₹}1,50,000 \div 1,20,000) \times 1,40,000\}$    | 1,75,000          |
| Inspection $\{(\text{₹}90,000 \div 1,20,000) \times 1,40,000\}$           | 1,05,000          |
| <b>Total (A)</b>  | <b>22,68,000</b>  |
| <b>(B) Fixed Cost:</b>  |                   |
| Selling and administration  | 85,000            |
| Depreciation  | 90,000            |
| Engineering services  | 94,000            |
| <b>Total (B)</b>  | <b>2,69,000</b>   |
| <b>(C) Semi Variable Cost:</b>  |                   |
| 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            |
| <b>Total (C)</b>  | <b>3,18,000</b>   |
| <b>Total Cost (A + B + C)</b>   | <b>28,55,000</b>  |

**Working Note:**

**Calculation of variable cost per unit and fixed cost portion of semi variable items:**

$$\text{Variable cost per unit} = \frac{\text{Difference in Total Cost}}{\text{Difference in Units}}$$

$$\text{Variable Maintenance cost per unit} = \frac{1,02,000 - 84,000}{1,50,000 - 1,20,000} = ₹0.60 \text{ per unit}$$

$$\text{Variable Supervision cost per unit} = \frac{2,34,000 - 1,98,000}{1,50,000 - 1,20,000} = ₹1.20 \text{ per unit}$$

$$\text{Fixed cost} = \text{Total cost} - \text{Variable Cost}$$

$$\text{Fixed Maintenance cost} = 84,000 - 1,20,000 \times 0.60 = ₹12,000$$

$$\text{Fixed Supervision cost} = 1,98,000 - 1,20,000 \times 1.20 = ₹54,000$$

**BBQ 89**

A Limited has furnished the following information for the months from 1<sup>st</sup> January to 30<sup>th</sup> 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 1<sup>st</sup> January : 6,020 kg. (Cost ₹63, 210)  
 Closing stock of raw material on 30<sup>th</sup> April : 5,100 kg.

All the purchases of material are made at the start of each month.

**Required:**

- Calculate the consumption of raw materials (in kgs) month-by-month and in total.
- Calculate the month-wise quantity and value of raw materials purchased.
- 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         |
| <b>Raw Material Consumption @ 4 kg p.u.</b> | <b>5,000</b> | <b>5,280</b> | <b>6,240</b> | <b>5,200</b> | <b>21,720</b> |

**(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            |
| <b>Purchase in Value</b>                     | <b>₹43,680</b> | <b>₹64,896</b> | <b>₹81,120</b> | <b>₹52,624</b> |

**Working note:**

$$\begin{aligned} \text{Total Purchase of Raw Material (January to April)} &= \text{Consumption} + \text{Closing Stock} - \text{Opening Stock} \\ &= 21,720 + 5,100 - 6,020 \\ &= 20,800 \text{ Kgs.} \end{aligned}$$



## (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   | 10.5 | 10,710 |
|          |          |      |        |        |      |        | 4,368   | 10   | 43,680 |
| February | 5,408    | 12   | 64,896 | 1,020  | 10.5 | 10,720 | 108     | 10   | 1,080  |
|          |          |      |        | 4,260  | 10   | 42,600 | 5,408   | 12   | 64,896 |
| March    | 6,240    | 13   | 81,120 | 108    | 10   | 1,080  | 5,516   | 13   | 71,708 |
|          |          |      |        | 5,408  | 12   | 64,896 |         |      |        |
|          |          |      |        | 724    | 13   | 9,412  |         |      |        |
| April    | 4,784    | 11   | 52,624 | 5,200  | 13   | 67,600 | 316     | 13   | 4,108  |
|          |          |      |        |        |      |        | 4,784   | 11   | 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:

- Prepare a production budget for the first quarter in month-wise.
- 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<br>(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         |
| <b>Production in units</b>                        | <b>8,500</b> | <b>6,500</b> | <b>10,500</b> | <b>8,250</b> | <b>13,000</b> | <b>10,250</b> | <b>32,000</b> | <b>25,000</b> |

**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: $(₹4,00,000 \div 1,80,000) \times 32,000$ | 2.22          | 71,111             | -              | -                  |
| HH: $(₹5,00,000 \div 1,20,000) \times 25,000$ | -             | -                  | 4.167          | 1,04,167           |
| <b>Production Cost</b>                        | <b>352.22</b> | <b>1,12,71,111</b> | <b>404.167</b> | <b>1,01,04,167</b> |

**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**

- Prepare a production budget for the said quarter in quantity.
- Prepare a raw material purchase budget for 'Y', 'Z' and 'Empty Bags' for the said quarter in quantity as well as in rupees.
- 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<br>(1,38,000 × 2.5) | 10,35,000<br>(1,38,000 × 7.5) | 1,38,000<br>(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)                 |
| <b>Quantity to be Purchased</b> | <b>3,27,000</b>              | <b>10,05,000</b>              | <b>1,11,000</b>            |
| Cost per mtr./Bag               | ₹160                         | ₹30                           | ₹110                       |
| <b>Cost of Purchase</b>         | <b>₹5,23,20,000</b>          | <b>₹3,01,50,000</b>           | <b>₹1,22,10,000</b>        |

### 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         |
| <b>Variable Cost of Production per bag</b>     | <b>805.50</b> |

### 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          |
| <b>Total</b> | <b>2,450</b> | <b>-</b> | <b>49,000</b> | <b>2,040</b> | <b>-</b> | <b>81,600</b> | <b>1,30,600</b> |

**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          |
| <b>Total</b> | <b>2,000</b> | <b>-</b> | <b>36,000</b> | <b>1,600</b> | <b>-</b> | <b>67,200</b> | <b>1,03,200</b> |

**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        |
| <b>Total</b> | <b>2,400</b> | <b>-</b> | <b>43,200</b> | <b>1,200</b> | <b>-</b> | <b>50,400</b> | <b>93,600</b> |

**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:





|                           |          |
|---------------------------|----------|
|                           | <b>C</b> |
| 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        |
| <b>Marginal Cost</b> | <b>2,50,000</b>   | <b>2,05,000</b> | <b>4,55,000</b> | <b>1,87,500</b>   | <b>1,02,500</b> | <b>2,30,000</b> | <b>5,20,000</b> |
| <b>Contribution</b>  | <b>1,50,000</b>   | <b>1,45,000</b> | <b>2,95,000</b> | <b>1,12,500</b>   | <b>72,500</b>   | <b>1,20,000</b> | <b>3,05,000</b> |
| Less: Fixed cost     |                   |                 |                 |                   |                 |                 |                 |
| Factory              |                   |                 | 1,00,000        |                   |                 |                 | 1,00,000        |
| Other                |                   |                 | 80,000          |                   |                 |                 | 80,000          |
| <b>Profit</b>        |                   |                 | <b>1,15,000</b> |                   |                 |                 | <b>1,25,000</b> |

**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:

|   | <b>Product A</b> | <b>Product B</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 $(25,300/20 \text{ days} \times 10 \text{ days})$ | 12,650           | -                |
| Materials Y $(35,720/20 \text{ days} \times 6 \text{ days})$  | -                | 10,716           |
| Less: Opening Stock of Raw Material                           | (1,000)          | (500)            |
| <b>Quantity of materials to be purchased (in kg)</b>          | <b>36,950</b>    | <b>45,936</b>    |
| Rate per kg   | ₹4               | ₹6               |
| <b>Material Purchase (in ₹)</b>                               | <b>₹1,47,800</b> | <b>₹2,75,616</b> |

(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 $(7,440 \div 80\%)$                                | 9,300         | -                 |
| Product B $(21,500 \div 80\%)$                               | -             | 26,875            |
| Add: Non-productive down time @ 20% of productive hours      | 1,860         | 5,375             |
| <b>Total hours to be paid</b>                                | <b>11,160</b> | <b>32,250</b>     |
| 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            |
| <b>Wages to be paid:</b>                                     |               |                   |
| 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         |
| <b>Total Wages paid (in ₹)</b>                               |               | <b>₹12,67,875</b> |

Working notes:

(1) Number of days in budget period = 4 weeks × 5 days = 20 days

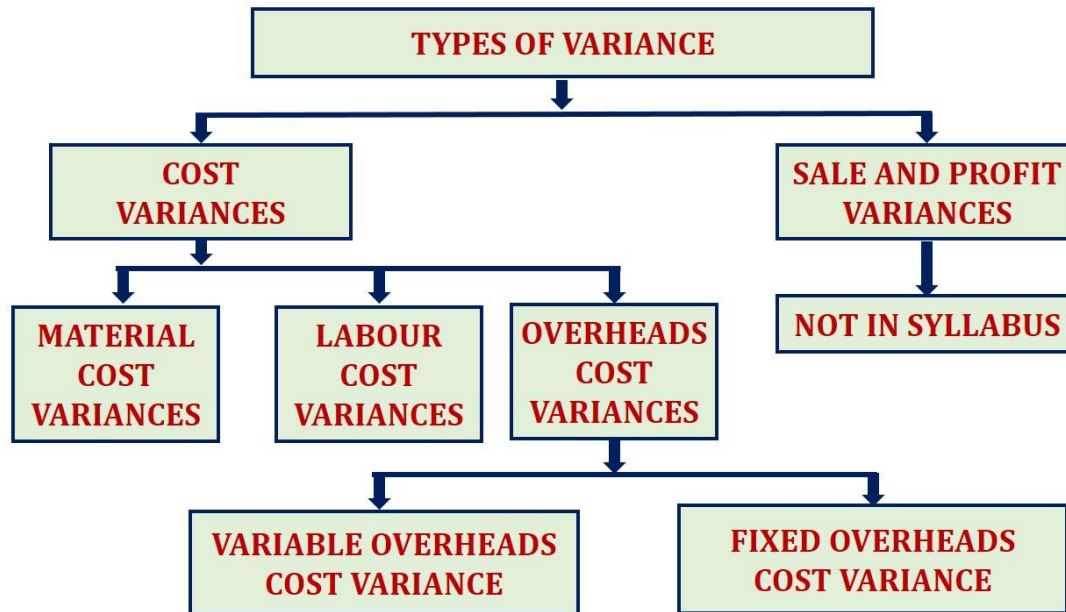
(2) Calculation of number of units to be produced:

| <i>Particulars</i>  | <i>Product A</i>    | <i>Product B</i>    |
|---|---------------------|---------------------|
| Units to be sold  | 2,400               | 3,600               |
| Add: Closing Stock:   |                     |                     |
| Product A ( $2,400/20 \text{ days} \times 4 \text{ days}$ ) | 480                 | -                   |
| Product B ( $3,600/20 \text{ days} \times 5 \text{ days}$ ) | -                   | 900                 |
| Less: Opening Stock   | (400)               | (200)               |
| <b><i>Units to be produced</i></b>                          | <b><i>2,480</i></b> | <b><i>4,300</i></b> |

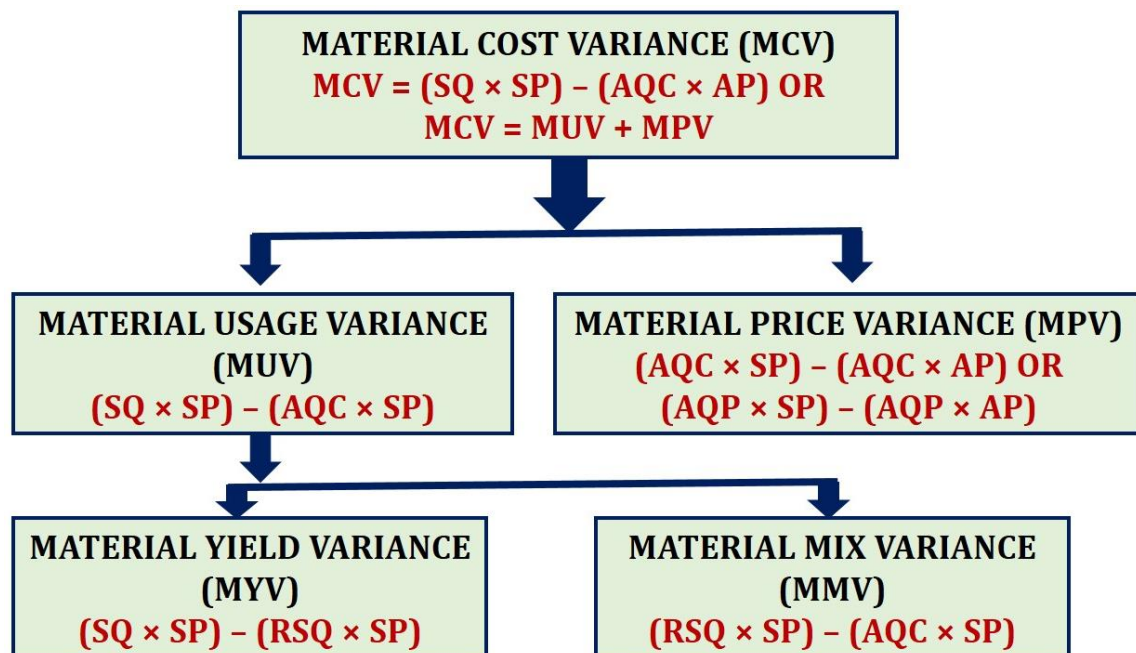
## CHAPTER 11

## STANDARD COSTING

- 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."
- Cost Variance:** Difference between actual cost and standard cost to produce actual output.
- Types of Variance:**



- Material Variances:**





- (a) **Material Cost Variance**  
(MPV Based on consumption) =  $(SQ \times SP) - (AQC \times AP)$
- Material Cost Variance**  
(MPV Based on purchase) =  $MUV + MPV$  or  $MYV + MMV + MPV$
- (b) **Material Usage Variance** =  $(SQ \times SP) - (AQC \times SP)$  or  $MYV + MMV$
- (c) **Material Yield Variance** =  $(SQ \times SP) - (RSQ \times SP)$  or  $MUV - MMV$
- (d) **Material Mix Variance** =  $(RSQ \times SP) - (AQC \times SP)$  or  $MUV - MYV$
- (e) **Material Price Variance**  
(Based on consumption) =  $(AQC \times SP) - (AQC \times AP)$  or  $MCV - MUV$
- (f) **Material Price Variance**  
(Based on purchase) =  $(AQP \times SP) - (AQP \times AP)$  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.

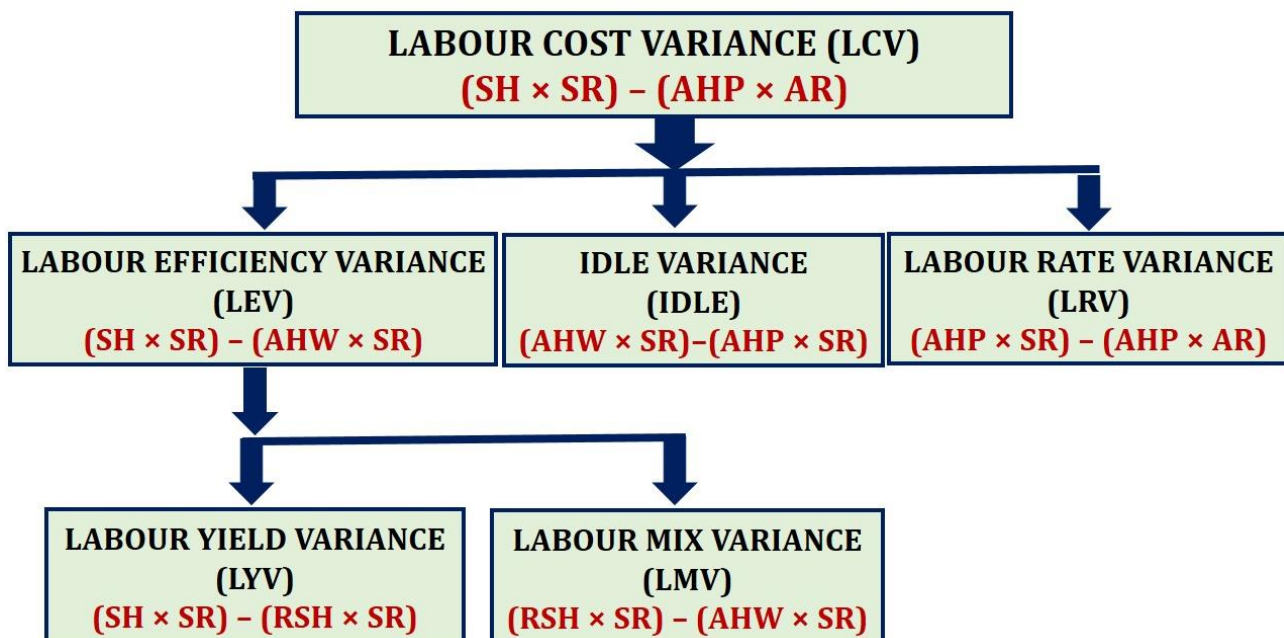
**AQC (Actual Quantity Consumed):** Actual quantity of raw materials consumed to produce actual output.

**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** =  $(SH \times SR) - (AHP \times AR)$  or  $LEV + Idle + LRV$
- (b) **Labour Efficiency Variance** =  $(SH \times SR) - (AHW \times SR)$  or  $LYV + LMV$
- (c) **Labour Yield Variance** =  $(SH \times SR) - (RSH \times SR)$  or  $LEV - LMV$
- (d) **Labour Mix/Gang Variance** =  $(RSH \times SR) - (AHW \times SR)$  or  $LEV - LYV$
- (e) **Labour Idle Variance** =  $(AHW \times SR) - (AHP \times SR)$  or  $LCV - LEV - LRV$
- (f) **Labour Rate Variance** =  $(AHP \times SR) - (AHP \times AR)$  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.

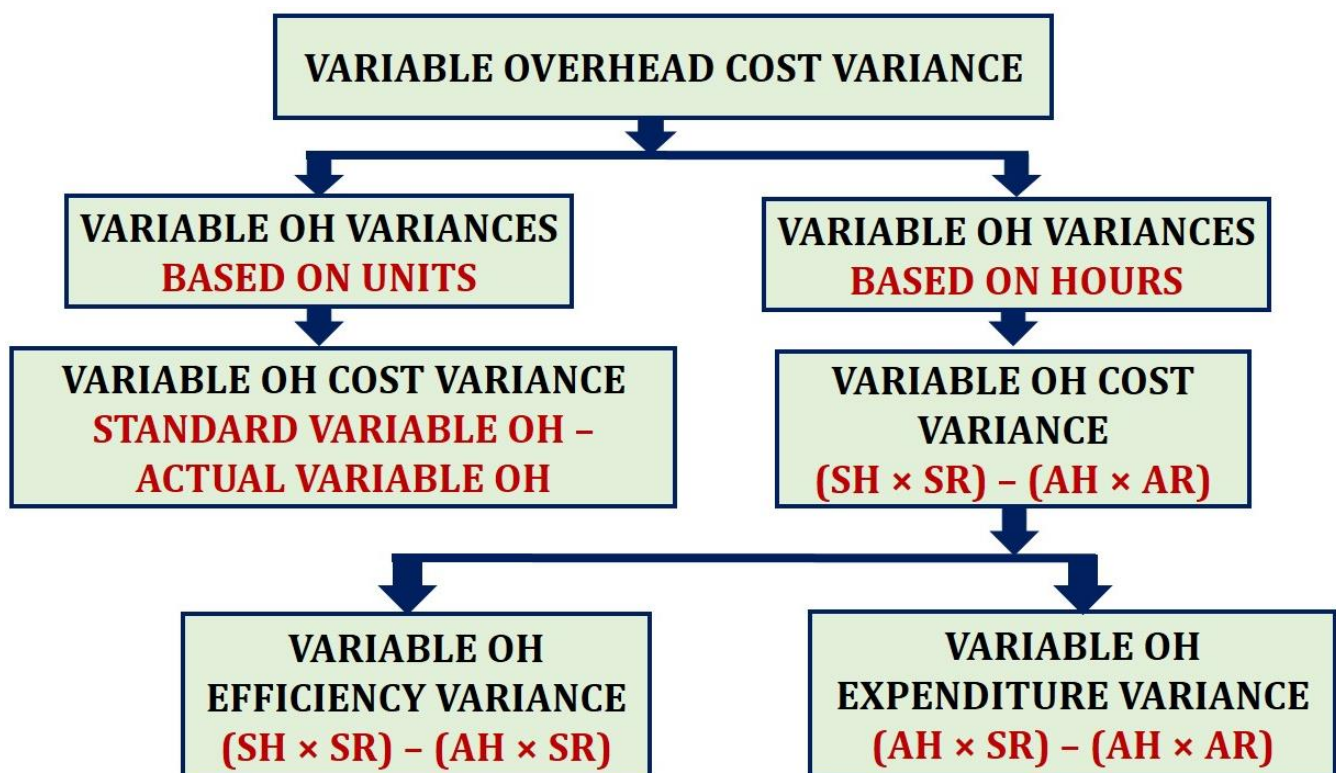
$$AHW = AHP \text{ (actual hours paid) - Abnormal idle time hours}$$

**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.

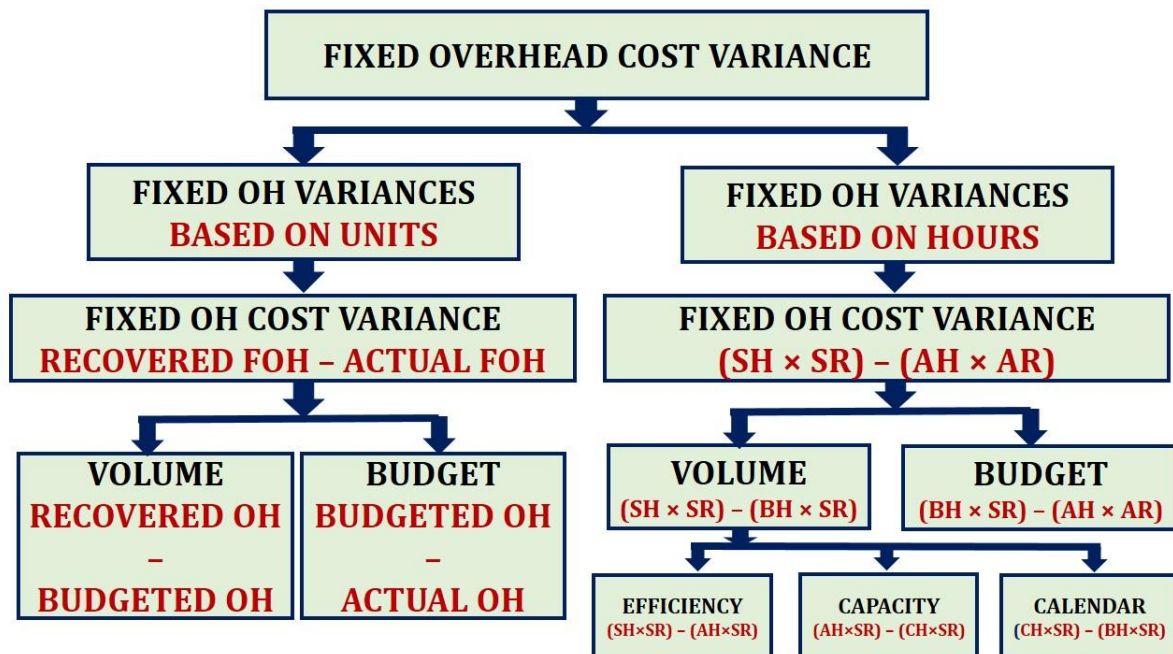
**Method 2: Variable Overhead Variance based on hours:**

(a) **Variable OH Cost Variance** = **(SH × SR) – (AH × AR)**

(b) **Variable OH Efficiency Variance** = **(SH × SR) – (BH × SR)**

(c) **Variable OH Expenditure/Budget Variance** = **(AH × SR) – (BH × SR)**

**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 =  $(SH \times SR) - (AH \times AR)$
- (b) Fixed OH Expenditure/Budget Variance =  $(BH \times SR) - (AH \times AR)$
- (c) Fixed OH Volume Variance =  $(SH \times SR) - (BH \times SR)$
- (d) Fixed OH Efficiency Variance =  $(SH \times SR) - (AH \times SR)$
- (e) Fixed OH Capacity Variance =  $(AH \times SR) - (CH \times SR)$
- (f) Fixed OH Calendar Variance =  $(CH \times SR) - (BH \times SR)$

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.

$$SR = \text{Budgeted Fixed OH} \div \text{Budgeted Hours}$$

**AR (Actual Rate):** Actual wage rate.

**$(SH \times SR)$ :** Absorbed or recovered fixed overheads.

**$(BH \times SR)$ :** Budgeted fixed overheads.

**$(AH \times AR)$ :** 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        |
|            | <b>240</b> |                      | <b>₹5,000</b> |

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        |
|            | <b>2,460</b> |                         | <b>₹52,225</b> |

**Calculate all material variances.**

**Answer**

|    |                         |   |                        |   |                 |
|----|-------------------------|---|------------------------|---|-----------------|
| 1. | Material Cost Variance  | = | (SQ × SP) – (AQ × AP)  | = |                 |
|    |                         | = | ₹50,000 – ₹52,225      | = | <b>₹2,225 A</b> |
| 2. | Material Price Variance | = | (AQ × SP) – (AQ × AP)  | = |                 |
|    |                         | = | ₹50,350 – ₹52,225      | = | <b>₹1,875 A</b> |
| 3. | Material Usage Variance | = | (SQ × SP) – (AQ × SP)  | = |                 |
|    |                         | = | ₹50,000 – ₹50,350      | = | <b>₹350 A</b>   |
| 4. | Material Mix Variance   | = | (RSQ × SP) – (AQ × SP) | = |                 |
|    |                         | = | ₹51,250 – ₹50,350      | = | <b>₹900 F</b>   |
| 5. | Material Yield Variance | = | (SQ × SP) – (RSQ × SP) | = |                 |
|    |                         | = | ₹50,000 – ₹51,250      | = | <b>₹1,250 A</b> |

**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)  | = | ₹500 F   |
|                             | = | ₹45,900 – ₹45,400      | = |          |
| (2) Material Price Variance | = | (AQ × SP) – (AQ × AP)  | = | ₹2,800 A |
|                             | = | ₹42,600 – ₹45,400      | = |          |
| (3) Material Usage Variance | = | (SQ × SP) – (AQ × SP)  | = | ₹3,300 F |
|                             | = | ₹45,900 – ₹42,600      | = |          |
| (4) Material Mix Variance   | = | (RSQ × SP) – (AQ × SP) | = | ₹600 F   |
|                             | = | ₹43,200 – ₹42,600      | = |          |
| (5) Material Yield Variance | = | (SQ × SP) – (RSQ × SP) | = | ₹2,700 F |
|                             | = | ₹45,900 – ₹43,200      | = |          |

**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 (kg) |
|-----------|----------|--------------|--------|--------------|--------------------------|
|           | Mix      | Price per kg | Mix    | Price per 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**

- 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
- Material Mix Variance = (RSQ × SP) – (AQ × SP)  
= ₹1,05,000 – ₹1,12,500 = ₹7,500 A
- Material Yield Variance = (SQ × SP) – (RSQ × SP)  
= ₹98,000 – ₹1,05,000 = ₹7,000 A
- Material Usage Variance = (SQ × SP) – (AQ × SP)  
= ₹98,000 – ₹1,12,500 = ₹14,500 A
- 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   |

- 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.
- 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.
- 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.

$$\text{Materials C} = 7,000 \text{ kgs.} \times 20\% = 1,400 \text{ kgs.}$$

**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:

| <i>Labour</i> | <i>Hours</i> | <i>Rate (₹)</i> |
|---------------|--------------|-----------------|
| 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:

| <i>Labour</i> | <i>Hours</i> | <i>Rate (₹)</i> | <i>Amount (₹)</i> |
|---------------|--------------|-----------------|-------------------|
| 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)   | = | ₹83,500 A |
|                            | = | ₹3,90,000 – ₹4,73,500   |   |           |
| Labour Rate Variance       | = | (AH × SR) – (AH × AR)   | = | ₹59,500 A |
|                            | = | ₹4,14,000 – ₹4,73,500   |   |           |
| Labour Efficiency Variance | = | (SH × SR) – (AHW × SR)  | = | ₹15,800 A |
|                            | = | ₹3,90,000 – ₹4,05,800   |   |           |
| Labour Mix Variance        | = | (RSH × SR) – (AHW × SR) | = | ₹11,500 F |
|                            | = | ₹4,17,300 – ₹4,05,800   |   |           |
| Labour Yield Variance      | = | (SH × SR) – (RSH × SR)  | = | ₹27,300 A |
|                            | = | ₹3,90,000 – ₹4,17,300   |   |           |
| Labour Idle Variance       | = | (AHW × SR) – (AH × SR)  | = | ₹8,200 A  |
|                            | = | ₹4,05,800 – ₹4,14,000   |   |           |

(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) | = | Nil      |
|     |                       | = | ₹45,600 – ₹45,600       | = |          |
| (4) | Labour Yield Variance | = | (SH × SR) – (RSH × SR)  | = | ₹480 F   |
|     |                       | = | ₹46,080 – ₹45,600       | = |          |
| (5) | Labour Idle Variance  | = | (AHW × SR) – (AH × SR)  | = | ₹2,400 A |
|     |                       | = | ₹45,600 – ₹48,000       | = |          |

**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) |
|-----|---------------------------------|---|-----------------------|

|  |   |   |   |              |
|--|---|---|---|--------------|
|  | = | $(360 \times 20 \text{ hours} \times ₹1.25) - ₹9,150$               | = | <b>150 A</b> |
| <b>(ii)</b> Variable OH Expenditure Variance | = | $(AH \times SR) - (AH \times AR)$                                   |   |              |
|  | = | $(7,000 \times ₹1.25) - ₹9,150$                                     | = | <b>400 A</b> |
| <b>(iii)</b> Variable OH Efficiency Variance | = | $(SH \times SR) - (AH \times SR)$                                   |   |              |
|  | = | $(360 \times 20 \text{ hours} \times ₹1.25) - (7,000 \times ₹1.25)$ | = | <b>250 F</b> |

**Working Notes:**

|                               |   |   |
|-------------------------------|---|---|
| <b>(a)</b> Standard Rate (SR) | = | Budgeted Variable Overheads ÷ Budgeted Hours                |
|                               | = | $₹10,000 \div 8,000 \text{ hours} = ₹1.25 \text{ per hour}$ |

**BBQ 101**

Following information is available from the records of a factory:

| <i>Particulars</i>               | <i>Budget</i> | <i>Actual</i> |
|----------------------------------|---------------|---------------|
| 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**

|   |   |   |   |                |
|---|---|---|---|----------------|
| <b>(i)</b> Fixed Overhead Variance        | = | Absorbed Overheads – Actual Overheads                                   |   |                |
|   | = | $(2,100 \text{ units} \times 10 \text{ hours} \times ₹0.50^*) - 12,000$ |   |                |
|   | = | $10,500 - 12,000$   | = | <b>1,500 A</b> |
| <b>(ii)</b> Fixed OH Expenditure Variance | = | Budgeted Overheads - Actual Overheads                                   |   |                |
|   | = | $10,000 - 12,000$   | = | <b>2,000 A</b> |
| <b>(iii)</b> Fixed OH Volume Variance     | = | Absorbed Overheads – Budgeted Overheads                                 |   |                |
|   | = | $10,500 - 10,000$   | = | <b>500 F</b>   |
| *Standard Rate (SH) per hour              | = | $\frac{\text{Budgeted OH}}{\text{Budgeted Hours}}$                      |   |                |
|   | = | $\frac{10,000}{2,000 \text{ Units} \times 10 \text{ Hours per unit}}$   | = | <b>₹0.50</b>   |

**BBQ102**

AB Ltd. has furnished the following data:

| <i>Particulars</i>  | <i>Budget</i> | <i>Actual, July</i> |
|---------------------|---------------|---------------------|
| 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:**

|                                |                                  |                              |
|--------------------------------|----------------------------------|------------------------------|
| <b>(a)</b> Efficiency Variance | <b>(b)</b> Capacity Variance     | <b>(c)</b> Calendar Variance |
| <b>(d)</b> Volume Variance     | <b>(e)</b> Expenditure Variance. |                              |

**Answer**

|                                   |   |                               |   |                |
|-----------------------------------|---|-------------------------------|---|----------------|
| (a) Fixed OH Efficiency Variance  | = | (SH × SR) – (AH × SR)         | = |                |
|                                   | = | (33,000 × ₹1) – (31,500 × ₹1) | = | <b>1,500 F</b> |
| (b) Fixed OH Capacity Variance    | = | (AH × SR) – (CH × SR)         | = |                |
|                                   | = | (31,500 × ₹1) – (32,400 × ₹1) | = | <b>900 A</b>   |
| (c) Fixed OH Calendar Variance    | = | (CH × SR) – (BH × SR)         | = |                |
|                                   | = | (32,400 × ₹1) – ₹30,000       | = | <b>2,400 F</b> |
| (d) Fixed OH Volume Variance      | = | (SH × SR) – (BH × SR)         | = |                |
|                                   | = | (33,000 × ₹1) – ₹30,000       | = | <b>3,000 F</b> |
| (e) Fixed OH Expenditure Variance | = | (BH × SR) – (AH × AR)         | = |                |
|                                   | = | ₹30,000 – ₹31,000             | = | <b>1,000 A</b> |

**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 × <sup>27</sup> / <sub>25</sub> 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   | = | <b>11,400 F</b> |
| Variable Expenditure Variable    | = | (AH × SR) – (AH × AR) | = |                 |
|                                  | = | 2,22,000 – 2,35,500   | = | <b>10,500 A</b> |
| (ii) Fixed Overhead Efficiency   | = | (SH × SR) – (AH × SR) | = |                 |
|                                  | = | 77,800 – 74,000       | = | <b>3,800 F</b>  |





$$\begin{aligned} \text{Fixed OH Capacity Variance} &= (\text{AH} \times \text{SR}) - (\text{BH} \times \text{SR}) \\ &= 74,000 - 60,000 = \mathbf{14,000 F} \end{aligned}$$

### Working Notes:

#### For variable overheads:

$$\begin{aligned} \text{SH} \times \text{SR} &= 15,560 \text{ units} \times 5 \text{ hours per unit} \times \text{₹}3 \text{ per hour} \\ &= \mathbf{2,33,400} \end{aligned}$$

$$\text{AH} \times \text{SR} = 74,000 \text{ hours} \times \text{₹}3 \text{ per hour} = \mathbf{2,22,000}$$

$$\text{AH} \times \text{AR} = 2,95,000 - 62,500 = \mathbf{2,32,500}$$

#### For fixed overheads:

$$\text{SH} \times \text{SR} = 15,560 \text{ units} \times 5 \text{ hours} \times \text{₹}1 \text{ per hour} = \mathbf{77,800}$$

$$\text{AH} \times \text{SR} = 74,000 \times \text{₹}1 \text{ per hour} = \mathbf{74,000}$$

$$\begin{aligned} \text{BH} \times \text{BR} &= 12,000 \text{ units} \times 5 \text{ hours per unit} \times \text{₹}1 \text{ per hour} \\ &= \mathbf{60,000} \end{aligned}$$

$$\text{Standard OH (variable + fixed)} = \mathbf{₹20 \text{ per unit}}$$

$$\begin{aligned} \text{Standard hours per unit} &= \frac{\text{Standard overhead per unit}}{\text{Standard rate per hour}} = \frac{20.00}{4.00} \\ &= \mathbf{5 \text{ hours per unit}} \end{aligned}$$

$$\begin{aligned} \text{Budgeted variable cost per unit} &= \frac{\text{Difference in expense}}{\text{Difference in units}} = \frac{2,10,000 - 1,80,000}{10,000 - 8,000} \\ &= \mathbf{₹15.00 \text{ per unit}} \end{aligned}$$

$$\text{Standard variable overhead per hour} = \frac{15.00}{5 \text{ hours}} = \mathbf{₹3 \text{ per hour}}$$

$$\begin{aligned} \text{Standard fixed overhead per hour} &= \text{Total Standard OH per hour} - \text{Standard Variable OH per hour} \\ &= 4.00 - 3.00 = \mathbf{₹1 \text{ per hour}} \end{aligned}$$

### 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 × 5 Days)**

Actual Number of Days = 20 – 1 = **19 Days**

$$\begin{aligned} (1) \quad \text{Efficiency Ratio} &= \frac{\text{Standard Hours}}{\text{Actual Hours}} \times 100 = \frac{7,000 \text{ Hours}}{6,000 \text{ Hours}} \times 100 \\ &= \mathbf{116.67\%} \end{aligned}$$

$$\begin{aligned} (2) \quad \text{Activity Ratio} &= \frac{\text{Standard Hours}}{\text{Budgeted Hours}} \times 100 = \frac{7,000 \text{ Hours}}{6,400 \text{ Hours}} \times 100 \\ &= \mathbf{109.375\%} \end{aligned}$$

$$\begin{aligned} (3) \quad \text{Calendar Ratio} &= \frac{\text{Available Working Days}}{\text{Budgeted Working Days}} = \frac{19 \text{ Days}}{20 \text{ Days}} \\ &= \mathbf{95\%} \end{aligned}$$

$$\begin{aligned} (4) \quad \text{Standard Capacity Usage Ratio} &= \frac{\text{Budgeted Hours}}{\text{Max. Possible Hours in Budget Period}} \times 100 \\ &= \frac{6,400 \text{ Hours}}{8,000 \text{ Hours}} \times 100 = \mathbf{80\%} \end{aligned}$$

$$\begin{aligned} (5) \quad \text{Actual Capacity Usage Ratio} &= \frac{\text{Actual Hours Worked}}{\text{Max. Possible Working Hours in a Period}} \times 100 \\ &= \frac{6,000 \text{ Hours}}{8,000 \text{ Hours}} \times 100 = \mathbf{75\%} \end{aligned}$$

$$\begin{aligned} (6) \quad \text{Actual Usage of Budgeted Capacity Ratio} &= \frac{\text{Actual Working Hours}}{\text{Budgeted Hours}} \times 100 \\ &= \frac{6,000 \text{ Hours}}{6,400 \text{ Hours}} \times 100 = \mathbf{93.75\%} \end{aligned}$$

## 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.

$$\text{Contribution} = \text{Sales} - \text{Variable cost}$$

3. **Contribution ratio or Profit Volume ratio (PV ratio):**

$$\text{Profit volume ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100$$

$$\text{Profit volume ratio} = 100 - \text{Variable cost ratio}$$

$$\text{Profit volume ratio} = \frac{\text{Fixed Cost}}{\text{BEP Sales}} \times 100$$

$$\text{Profit volume ratio} = \frac{\text{Profit}}{\text{MOS Sales}} \times 100$$

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

$$\text{BEP Sales} = \text{Variable cost} + \text{Fixed cost} + \text{Profit}$$

$$\text{BEP Sales in units} = \frac{\text{Fixed Cost}}{\text{Contribution Per Unit}}$$

$$\text{BEP Sales in units} = \text{BEP Sales in amount} \div \text{Sale price per unit}$$

$$\text{BEP Sales in units} = \text{Total Sales in units} - \text{MOS Sales in units}$$

$$\text{BEP Sales (in amount)} = \frac{\text{Fixed Cost}}{\text{PV Ratio}} \times 100$$

$$\text{BEP Sales (in amount)} = \text{BEP Sales in units} \times \text{Sale price per unit}$$

$$\text{BEP Sales (in amount)} = \text{Total Sales in amount} - \text{MOS Sales in amount}$$

5. **Margin of Safety (MOS):**

- Level of sales over and **above BEP sales**
- Level of sales at which contribution and profit are same

$$\text{MOS Sales} = \text{Variable cost} + \text{Fixed cost} + \text{Profit}$$

$$\text{MOS Sales in units} = \frac{\text{Profit}}{\text{Contribution Per Unit}}$$

$$\begin{aligned} \text{MOS Sales in units} &= \text{MOS Sales in amount} \div \text{Sale price per unit} \\ \text{MOS Sales in units} &= \text{Total Sales in units} - \text{BEP Sales in units} \end{aligned}$$

$$\text{MOS Sales (in amount)} = \frac{\text{Profit}}{\text{PV Ratio}}$$

$$\text{MOS Sales (in amount)} = \text{MOS Sales in units} \times \text{Sale price per unit}$$

$$\text{BEP Sales (in amount)} = \text{Total Sales in amount} - \text{BEP Sales in amount}$$

#### 6. Profit Planning:

$$\text{Target sales in units} = \frac{\text{Fixed Cost} + \text{Profit}}{\text{Contribution Per Unit}}$$

$$\text{Target sales in amount} = \frac{\text{Fixed Cost} + \text{Profit}}{\text{PV Ratio}}$$

$$\text{Target sales in units} = \frac{\text{Fixed Cost}}{\text{Contribution Per Unit} - \text{Profit Per Unit}}$$

$$\text{Target sales in amount} = \frac{\text{Fixed Cost}}{\text{PV Ratio} - \% \text{ of Profit To Sales}}$$

#### 7. PV Ratio and Variable Cost Ratio under two periods data:

$$\text{Variable Cost ratio} = \frac{\text{Change in Total Cost}}{\text{Change in Sales}} \times 100$$

$$\text{Profit Volume ratio} = \frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$$

$$\text{Variable cost per unit} = \frac{\text{Change in Total Cost}}{\text{Change in Sales Units}}$$

$$\text{Contribution per unit} = \frac{\text{Change in Profit}}{\text{Change in Sales Units}}$$

#### 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:

$$\text{Indifference point} = \frac{\text{Difference in Fixed Cost}}{\text{Difference in Variable Cost Per unit}}$$

| <b>Situation</b>                       | <b>Suggestion</b>                                 |
|--|---|
| 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:

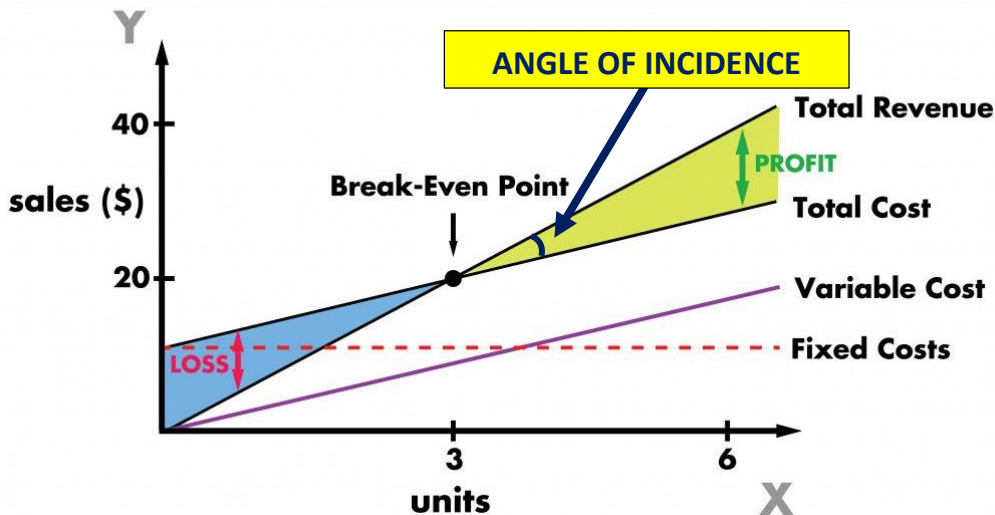
| Particulars   | ₹          |
|---|------------|
| Sales   | XXX        |
| Production costs:   |            |
| Variable (Actual)   | XXX        |
| Fixed (Recovered)   | XXX        |
| <b>Cost of Production</b>   | <b>XXX</b> |
| <b>Add:</b> Opening stock (Opening Units @ standard rate of cost of production) | XXX        |
| <b>Less:</b> Closing stock (Closing Units @ current rate of cost of production) | (XXX)      |
| <b>Cost of Goods Sold</b>   | <b>XXX</b> |
| <b>Add:</b> Under absorbed fixed production overhead (If any)                   | XXX        |

|   |            |
|---|------------|
| <i>Less: Over absorbed fixed production overhead (If any)</i> | (XXX)      |
| <i>Add: Variable administrative and selling costs</i>         | XXX        |
| <i>Add: Fixed administrative and selling costs</i>            | XXX        |
| <b>Total Cost</b>   | <b>XXX</b> |
| <b>Profit (Sales - Total Cost)</b>                            | <b>XXX</b> |

**14. Income Statement Under Marginal Costing:**

| Particulars  | ₹     |
|--|-------|
| Sales  | XXX   |
| Production costs:  |       |
| Variable (Actual)  | XXX   |
| Variable Cost of Production  | XXX   |
| <i>Add: Opening stock (Opening Units @ standard rate of variable COP)</i>                | XXX   |
| <i>Less: Closing stock (Closing Units @ current rate of variable cost of production)</i> | (XXX) |
| Variable Cost of Goods Sold  | XXX   |
| <i>Add: Variable administrative and selling costs</i>                                    | XXX   |
| Variable Cost of Sales   | XXX   |
| Contribution (Sales - Variable Cost of sales)  | XXX   |
| <i>Less: Fixed cost (all)</i>  | (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,

| <i>Particulars</i>                | <i>Current</i> | <i>Proposed</i> |
|-----------------------------------|----------------|-----------------|
| Sales                             | 100            | 80              |
| Less: Variable cost (60% of ₹100) | 60             | 60              |
| <b>Contribution</b>               | <b>40</b>      | <b>20</b>       |

$$\text{Revised Sales (in ₹)} = \frac{\text{Desired Contribution}}{\text{Revised PV Ratio}} = \frac{40}{25\%} = \mathbf{₹160}$$

$$\text{Revised Sales (in units)} = \frac{\text{Desired Contribution}}{\text{Revised Contribution p.u.}} = \frac{40}{20} = \mathbf{2 \text{ units}}$$

$$\begin{aligned} \text{*Revised P/V Ratio} &= \text{Revised Contribution} \div \text{Revised Selling Price} \\ &= (20 \div 80) \times 100 = 25\% \end{aligned}$$

*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:

| <i>Year</i> | <i>Sales</i> | <i>Profit</i> |
|-------------|--------------|---------------|
| 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):**

$$\begin{aligned} \text{Fixed cost} &= \text{Contribution} - \text{profit} = (\text{Sales} \times \text{PV Ratio}) - 10\% \text{ of Sale} \\ &= (\text{₹}25,00,000 \times 18\%) - 10\% \text{ of } \text{₹}25,00,000 = \mathbf{₹2,00,000} \end{aligned}$$

(ii) **Calculation of Break Even Point:**

$$\text{BEP} = \frac{\text{Fixed Cost}}{\text{PV Ratio}} = \frac{2,00,000}{18\%} = \mathbf{₹11,11,111.11}$$

(iii) **Calculation of Amount of profit, if Sale is ₹30,00,000:**

$$\begin{aligned} \text{Profit} &= \text{Contribution} - \text{Fixed Cost} \\ &= \text{₹}30,00,000 \times 18\% - 2,00,000 = \mathbf{₹3,40,000} \end{aligned}$$

(iv) **Sales, when desired profit is ₹4,75,000:**

$$\begin{aligned} \text{Sales} &= \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{PV Ratio}} = \frac{2,00,000 + 4,75,000}{18\%} \\ &= \mathbf{₹37,50,000} \end{aligned}$$

(v) **Margin of Safety at a profit of ₹2,70,000:**

$$\text{MOS} = \frac{\text{Profit}}{\text{PV Ratio}} = \frac{2,70,000}{18\%} = \mathbf{₹15,00,000}$$

**Working Note:**

$$\begin{aligned} \text{PV Ratio} &= \frac{\text{Difference in Profit}}{\text{Difference in Sales}} \times 100 = \frac{10\% \text{ of } 25,00,000 - 8\% \text{ of } 20,00,000}{25,00,000 - 20,00,000} \times 100 \\ &= \frac{90,000}{5,00,000} \times 100 = \mathbf{18\%} \end{aligned}$$

### 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**

$$\begin{aligned} \text{(a) Break even sales} &= \frac{\text{Fixed cost}}{\text{Contribution per unit}} = \frac{35,00,000}{37.50 - 17.50} \\ &= \mathbf{1,75,000 \text{ units.}} \end{aligned}$$

$$\begin{aligned} \text{Cash BEP (in Quantity)} &= \frac{\text{Fixed cost (excluding depreciation)}}{\text{Contribution per unit}} \\ &= \frac{35,00,000 - 15,00,000}{37.50 - 17.50} = \mathbf{1,00,000 \text{ units.}} \end{aligned}$$

$$\begin{aligned} \text{(b) P/V ratio} &= \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{37.50 - 17.50}{37.50} \times 100 \\ &= \mathbf{53.33\%} \end{aligned}$$

$$\begin{aligned} \text{(c) No. of units must be sold} &= \frac{\text{Fixed cost} + \text{Desired EBIT}}{\text{Contribution per unit}} \\ &= \frac{35,00,000 + 2,50,000}{20.00} = \mathbf{1,87,500 \text{ units.}} \end{aligned}$$

$$\text{(d) Desired Sales level (₹)} = \frac{\text{Fixed cost} + \text{Desired Profit Before Tax}}{\text{PV ratio}}$$





$$= \frac{35,00,000 + 4,16,667}{53.33\%} = \mathbf{₹73,43,750}$$

**WN:**

$$\begin{aligned} \text{Desired PAT} &= ₹2,50,000 \\ \text{Tax rate} &= 40\% \\ \text{Desired Profit before tax} &= \frac{\text{Desired PAT}}{(1 - t)} = \frac{2,50,000}{(1 - 0.40)} = \mathbf{₹4,16,667} \end{aligned}$$

### 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**

$$\begin{aligned} \text{(i) Break Even Sales} \times \text{PV Ratio} &= \text{Fixed Cost} \\ \text{Break Even Sales} \times 40\% &= ₹5,00,000 \\ \mathbf{Break\ Even\ Sales} &= ₹5,00,000 \div 40\% = \mathbf{₹12,50,000} \end{aligned}$$

$$\begin{aligned} \text{(ii) Total Sales} &= \text{Break Even Sales} + \text{Margin of Safety} \\ \text{Total Sales} &= ₹12,50,000 + 37.50\% \text{ of Total Sales} \\ 62.50\% \text{ of Total Sales} &= ₹12,50,000 \\ \mathbf{Total\ Sales} &= ₹12,50,000 \div 62.50\% = \mathbf{₹20,00,000} \end{aligned}$$

$$\begin{aligned} \text{(iii) Contribution to Sales Ratio} &= 40\% \\ \text{Therefore, Variable cost to Sales Ratio} &= 60\% \\ \text{Variable cost} &= 60\% \text{ of sales} \\ \mathbf{Variable\ cost} &= 60\% \text{ of } ₹20,00,000 = \mathbf{₹12,00,000} \end{aligned}$$

$$\begin{aligned} \text{(iv) Current Profit} &= \text{Sales} - (\text{Variable Cost} + \text{Fixed Cost}) \\ &= ₹20,00,000 - (₹12,00,000 + ₹5,00,000) \\ &= \mathbf{₹3,00,000} \end{aligned}$$

$$\begin{aligned} \text{(v) New Sales value} &= ₹20,00,000 + 7.50\% \text{ of } ₹20,00,000 \\ &= \mathbf{₹21,50,000} \end{aligned}$$

$$\begin{aligned} \mathbf{New\ Margin\ of\ Safety} &= \text{New Sales value} - \text{BES} \\ &= ₹21,50,000 - ₹12,50,000 = \mathbf{₹9,00,000} \end{aligned}$$

### 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**

| <i>Particulars</i>     | <i>Existing</i> | <i>Estimated</i> |
|------------------------|-----------------|------------------|
| 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           |
| <b>Contribution</b>    | <b>1,10,000</b> | <b>1,51,580</b>  |
| Less: Fixed Cost       | 60,000          | 58,800           |
| <b>Profit</b>          | <b>50,000</b>   | <b>92,780</b>    |

$$\begin{aligned} \text{Fixed Cost} &= \text{Existing Sales} - \text{Existing Marginal Cost} - 12.5\% \text{ on } ₹4,00,000 \\ &= ₹5,00,000 - ₹3,90,000 - ₹50,000 = ₹60,000 \end{aligned}$$

$$\text{Percentage Profit on Capital Employed equals to } 23.19\% \left( \frac{92,780}{4,00,000} \times 100 \right)$$

*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:

| <i>Name of Expense</i>  | <i>Total Annual Cost</i> | <i>% of Total annual cost which is variable</i> |
|-------------------------|--------------------------|---|
| 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:**

$$\begin{aligned} \text{Sales value} &= \text{Fixed cost} + \text{Variable cost} + \text{Profit} \\ \text{Sales value} &= (2,10,000 \times 0\% + 1,50,000 \times 20\% + 92,000 \times 40\% + 40,000 \times 65\%) + \\ &\quad (2,10,000 \times 100\% + 1,50,000 \times 80\% + 92,000 \times 60\% + 40,000 \times 35\% + \\ &\quad \text{Commission @ 8\% on sales}) + \text{Profit @10\% on sales} \\ \text{Sales value} &= 92,800 + 3,99,200 + 8\% \text{ of sales} + 10\% \text{ of sales} \\ \text{Sales value} &= 4,92,000 \div 82\% = ₹6,00,000 \end{aligned}$$



$$\begin{aligned} \text{Sales Price} &= \text{Sales value} \div \text{No. of units} \\ &= 6,00,000 \div 40,000 \text{ units} &= \mathbf{₹15.00} \end{aligned}$$

## 2. Calculation of Break Even Point:

$$\begin{aligned} \text{Break Even Point (in units)} &= \text{Fixed cost} \div \text{Contribution per unit} \\ &= 92,800 \div 2.90 (14 - 11.10) &= \mathbf{32,000 \text{ units}} \\ \text{Break Even Point (in ₹)} &= \text{BEP in units} \times \text{Sales price per unit} \\ &= 32,000 \text{ units} \times 14.00 &= \mathbf{₹4,48,000} \end{aligned}$$

### Working notes:

$$\begin{aligned} \text{Total variable cost} &= 3,99,200 + 8\% \text{ on sales } (8\% \text{ of } 40,000 \times 14.00) \\ &= 4,44,000 \\ \text{Variable cost per unit} &= \text{Total variable cost} \div \text{No. of units} \\ &= 4,44,000 \div 40,000 \text{ units} &= \mathbf{₹11.10} \end{aligned}$$

### 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<br>(₹) | 'B' Semi Automatic<br>(₹) | 'C' Fully Automatic<br>(₹) |
|---|-------------------|---------------------------|----------------------------|
| <b>Monthly fixed costs:</b>             |                   |                           |                            |
| Occupancy                               | 15,000            | 15,000                    | 15,000                     |
| Maintenance contract                    | -                 | 5,000                     | 10,000                     |
| Equipment lease                         | -                 | 25,000                    | 1,00,000                   |
| <b>Unit variable cost (per report):</b> |                   |                           |                            |
| Supplies                                | 40                | 80                        | 20                         |
| Labour                                  | 200               | 60                        | 20                         |
|   | (5 hours × 40)    | (1 hour × 60)             | (0.25 hour × 80)           |

- Calculate cost indifference points. Interpret your results.
- 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<br>(45,000 - 15,000) | 1,10,000<br>(1,25,000 - 15,000) | 80,000<br>(1,25,000 - 45,000) |
| (b) Differential Variable Cost           | 100<br>(240 - 140)          | 200<br>(240 - 40)               | 100<br>(140 - 40)             |
| (c) Cost Indifference Point<br>(a) ÷ (b) | <b>300 cases</b>            | <b>550 cases</b>                | <b>800 cases</b>              |

### 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 $\leq$ 300            | Alternative 'A' |
| 300 $\geq$ Cases $\leq$ 800 | Alternative 'B' |
| Cases $\geq$ 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**

$$\begin{aligned} P/V \text{ Ratio} &= 100 - \text{Variable cost ratio} \\ &= 100 - 60\% &= & \mathbf{40\%} \end{aligned}$$

$$\begin{aligned} \text{(i) Break-even point} &= \text{Fixed cost} \div \text{PV ratio} \\ &= 80,000 \div 40\% &= & \mathbf{₹2,00,000} \end{aligned}$$

$$\begin{aligned} \text{(ii) Sales volume required} &= \frac{\text{Fixed cost} + \text{Desired profit}}{\text{PV ratio}} \\ &= \frac{80,000 + 15\% \text{ of } 2,00,000}{40\%} &= & \mathbf{₹2,75,000} \end{aligned}$$

$$\begin{aligned} \text{(iii) Shut down point} &= \frac{\text{Avoidable fixed cost}}{\text{PV ratio}} \\ &= \frac{80,000 - 25,000}{40\%} &= & \mathbf{₹1,37,500} \end{aligned}$$

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**

$$(a) \text{ Rate of net return on sales} = \frac{4,32,000}{20,00,000} \times 100 = 21.60\%$$

$$(b) \text{ Break Even Point} = \frac{\text{Fixed Cost}}{\text{Composite Contribution Per Unit}} = \frac{6,66,600}{28.80} = 23,145.80 \text{ units}$$

Break even Sales Mix:

|           |   |                        |   |                                  |
|-----------|---|------------------------|---|----------------------------------|
| Product X | = | 70% of 23,145.80 units | = | <b>16,202 units or ₹6,48,080</b> |
| Product Y | = | 30% of 23,145.80 units | = | <b>6,944 units or ₹3,47,200</b>  |

**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         |
| <b>Contribution</b>                     | <b>12,00,000</b> |
| Less: Fixed cost                        | 4,80,000         |
| <b>Profit Before Tax</b>                | <b>7,20,000</b>  |
| Less: Income Tax @ 40%                  | 2,88,000         |
| <b>Profit After Tax</b>                 | <b>4,32,000</b>  |

$$\text{BEP in units} = \frac{\text{Fixed cost}}{\text{contribution per unit}} = \frac{4,80,000}{40 - 16} = 20,000 \text{ units}$$

$$\text{Total sales} = \text{BEP} + \text{MOS (60\% of sales)} = 20,000 \text{ units} + 60\% \text{ sales}$$

$$\text{Total sales} = 20,000 \text{ units} \div 40\% = 50,000 \text{ units}$$

$$(2) \text{ Composite Contribution per unit} = (40 - 16) \times 7/10 + (50 - 10) \times 3/10 = 28.80 \text{ per unit}$$

**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:**

$$\begin{aligned} \text{Break-Even Sales} &= \text{Fixed Cost} \div \text{P/V Ratio} \\ &= ₹14,00,000 \div 45.67\% &= ₹30,65,470 \\ \\ \text{Capacity Utilization} &= (\text{BEP Sales} \div \text{Sales at 100\% Capacity}) \times 100 \\ &= (₹30,65,470 \div ₹75,00,000) \times 100 &= 40.87\% \end{aligned}$$

- (2) **Profitability of merged plant at 80% Capacity:**

$$\begin{aligned} \text{Profit} &= \text{Contribution} - \text{Fixed Cost} \\ &= \{(\₹75,00,000 \times 80\%) \times 45.67\% - ₹14,00,000\} = ₹13,40,200 \end{aligned}$$

- (3) **Sales to earn a profit of ₹30,00,000:**

$$\begin{aligned} \text{Sales} &= (\text{Fixed Cost} + \text{Profit}) \div \text{P/V Ratio} \\ &= (₹14,00,000 + ₹30,00,000) \div 45.67\% &= ₹96,34,333 \end{aligned}$$

- (4) **% increase in selling price:**

$$\begin{aligned} \text{Increase in fixed cost} &= ₹14,00,000 \times 5\% &= ₹70,000 \\ \therefore \% \text{ increase in sales price} &= (₹70,000 \div ₹96,34,333) \times 100 &= 0.727\% \end{aligned}$$

**Working Notes:**

**Calculation of Sales, Variable Cost, P/V Ratio and Fixed Cost at 100% capacity of merged plant:**

$$\begin{aligned} \text{Sales} &= (\₹31,50,000 \div 90\%) + (\₹24,00,000 \div 60\%) &= ₹75,00,000 \\ \text{Variable Cost} &= (\₹19,80,000 \div 90\%) + (\₹11,25,000 \div 60\%) &= ₹40,75,000 \\ \text{P/V Ratio} &= (\text{Contribution} \div \text{Sales}) \times 100 \\ &= \{(\₹75,00,000 - ₹40,75,000) \div ₹75,00,000\} \times 100 &= 45.67\% \\ \text{Fixed Cost} &= ₹6,50,000 + ₹7,50,000 &= ₹14,00,000 \end{aligned}$$

**BBQ 116**

Moon Ltd. produces products 'X', 'Y', 'Z' and has decided to analyse its 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              | Y  | Z  |
| Department A | 4                 | 6              | 10 | 5  |
| Department B | 8                 | 6              | 15 | 11 |

From the current budget, further details are as below:

| <i>Particulars</i>   | <i>X</i> | <i>Y</i> | <i>Z</i> |
|--|----------|----------|----------|
| 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.**

| <i>Rank</i> | <i>Product</i>         | <i>Units/Mix</i> | <i>Labour hours dept. A</i> |
|-------------|------------------------|------------------|-----------------------------|
| 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.)               |
|             | <b>Total</b>           | <b>37,600</b>    | <b>2,80,000</b>             |

Best possible mix of X, Y, Z is 12,000 : 16,000 : 9,600

**(ii) Calculation of contribution from best possible mix:**

$$\begin{aligned} \text{Total contribution} &= 12,000 \text{ units of X} \times 72 + 16,000 \text{ units of Y} \times 100 + 9,600 \text{ units of Z} \times 40 \\ &= \mathbf{₹28,48,000} \end{aligned}$$

**Working notes:**

**(3) Calculation of total available labour hours in department A:**

$$\begin{aligned} \text{Total available labour hours} &= 10,000 \text{ units of X} \times 6 \text{ hours} + 12,000 \text{ units of Y} \times 10 \text{ hours} \\ &\quad + 20,000 \text{ units of Z} \times 5 \text{ hours} \\ &= 2,80,000 \text{ hours} \end{aligned}$$

**(4) Calculation of Contribution per labour hour of department A and Rank:**

| <i>Particulars</i>                   | <i>X</i> | <i>Y</i>  | <i>Z</i>   |
|--------------------------------------|----------|-----------|------------|
| 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       | 40        | 20         |
|                                      | (6 × 4)  | (10 × 4)  | (5 × 4)    |
| Department B                         | 48       | 120       | 88         |
|                                      | (6 × 8)  | (15 × 8)  | (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          |
| <b>Rank</b>                          | <b>I</b> | <b>II</b> | <b>III</b> |



**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:

| <i>Per unit</i>         | <i>Part A</i> | <i>Part B</i> |
|-------------------------|---------------|---------------|
| 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**

- Identify the spare part which will optimize contribution at the offered price.
- 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**

| <i>Particulars</i>   | <i>Part A</i>   | <i>Part B</i>   |
|--|-----------------|-----------------|
| 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              |
| <b>Contribution per unit</b>                                     | <b>27</b>       | <b>20</b>       |
| <b>Maximum Contribution (Contribution per unit × Max. units)</b> | <b>1,79,982</b> | <b>1,62,500</b> |

**Calculation of maximum number of units that can be produced under various limiting factor:**

| <i>Particulars</i>   | <i>Part A</i>           | <i>Part B</i>            |
|--|-------------------------|--------------------------|
| Machine A (4,000 hours)  | 6,666<br>(4,000 ÷ 0.6)  | 16,000<br>(4,000 ÷ 0.25) |
| Machine B (4,500 hours)  | 9,000<br>(4,500 ÷ 0.5)  | 8,181<br>(4,500 ÷ 0.55)  |
| Alloy Available (13,000 kg.)                                     | 8,125<br>(13,000 ÷ 1.6) | 8,125<br>(13,000 ÷ 1.6)  |
| <b>Maximum number of part to be manufactured (Lowest of all)</b> | <b>6,666</b>            | <b>8,125</b>             |

**Spare Part A will optimize the contribution.**

**2. Statement Showing Revised Contribution**

| <i>Particulars</i>   | <i>Part A</i>   |
|--|-----------------|
| 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          |
| <b>Total revised contribution (1,79,982 + 70,020 - 96,657)</b> | <b>1,53,345</b> |

**BBQ 118**

Wonder Ltd manufactures a single product, ZEST. The following figures relate to ZEST for a one year period:

| <i>Activity Level</i>           | <i>50%</i> | <i>100%</i> |
|---------------------------------|------------|-------------|
| 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  |
| <b>Fixed cost recovered (During the first quarter, 220 units × ₹200)</b> | <b>₹44,000</b> |

**(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       |
| <b>Over-recovery of overheads</b>                 | <b>₹4,000</b> |

**(c) Profit for the Quarter (Absorption Costing)**

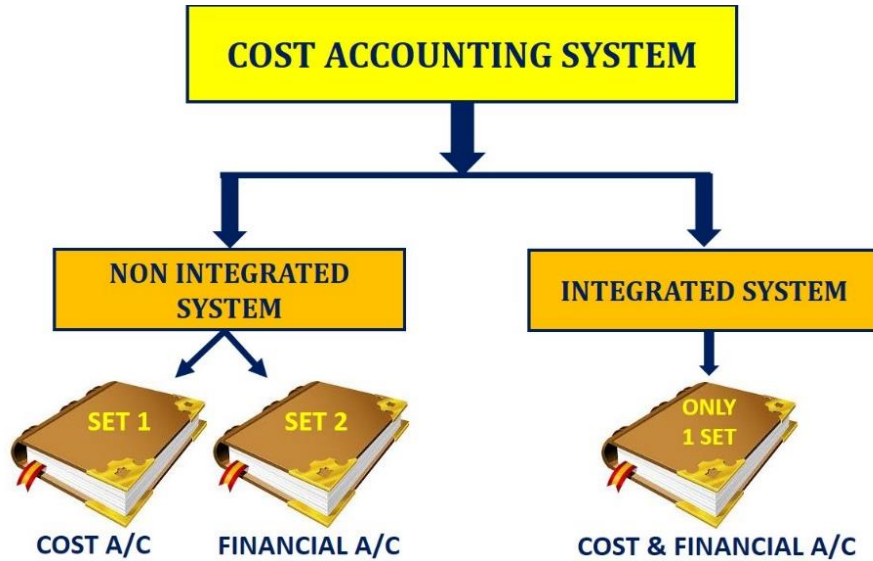
| <i>Activity Level</i>                                  | <i>₹</i> | <i>₹</i>        |
|--|----------|-----------------|
| Sales revenue (160 units × ₹2,000)                     |          | 3,20,000        |
| Production costs:                                      |          |                 |
| Variable (220 units × ₹800)                            | 1,76,000 |                 |
| Fixed overheads absorbed (220 units × ₹200)            | 44,000   | 2,20,000        |
| <b>Cost of production</b>                              |          | <b>2,20,000</b> |
| Add: Opening stock                                     |          | Nil             |
| Less: Closing stock (₹2,20,000 ÷ 220 units) × 60 units |          | (60,000)        |
| <b>Cost of goods sold</b>                              |          | <b>1,60,000</b> |
| 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        |
| <b>Cost of sales</b>                                   |          | <b>2,80,000</b> |
| <b>Profit (Sales - Cost of sales)</b>                  |          | <b>40,000</b>   |



**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<br>To Stores A/c<br>To Wages A/c<br>To Production OH A/c | Opening WIP<br>Direct Mat.<br>Direct Lab.<br>Recovered | By Finished Goods A/c<br>By Balance c/d | <b>Completed</b><br>Closing WIP |
|   | -  |   | -                               |

### Administration Overhead A/C

| Particulars | ₹           | Particulars   | ₹  |
|-------------|-------------|---|--|
| To Bank A/c | OH Incurred | By Finished Goods A/c<br>By Cost of Sales A/c<br>By Costing P/L A/c | Prod. Related<br>General<br>Under Recovery |
|             | -           |   | -  |

### Finished Goods Control A/C

| Particulars  | ₹                                       | Particulars                            | ₹                         |
|--|---|--|---------------------------|
| To Balance c/d<br>To Work-in-process A/c<br>To Administration OH A/c | Opening FG<br>Completed<br>Prod Related | By Cost of sales A/c<br>By Balance c/d | <b>COGS</b><br>Closing FG |
|  | -                                       |  | -                         |

### Selling and Distribution Overhead A/C

| Particulars | ₹           | Particulars                                | ₹                           |
|-------------|-------------|--|-----------------------------|
| To Bank A/c | OH Incurred | By Cost of Sales A/c<br>By Costing P/L A/c | Recovered<br>Under Recovery |
|             | -           |  | -                           |

### Cost of Sales A/C

| Particulars   | ₹                                  | Particulars  | ₹     |
|---|------------------------------------|--------------|-------|
| To Finished Good A/c<br>To Administration OH A/c<br>To Selling OH A/c<br>To Costing P/L A/c | COGS<br>General<br>S & D<br>Profit | By Sales A/c | Sales |
|   | -                                  |              | -     |

### Costing Profit & Loss A/C

| Particulars   | ₹  | Particulars   | ₹                       |
|---|--|---|-------------------------|
| To Stores A/c<br>To Wages A/c<br>To Production OH A/c<br>To Administration OH A/c<br>To Selling OH A/c<br>To Net Profit | Abnormal Loss<br>Abnormal Loss<br>Under Recovery<br>Under Recovery<br>Under Recovery<br>Net Profit | By Cost of Sales A/c<br>By Abnormal Gain and Over<br>Recovery | Profit<br>Abnormal Gain |
|   | -  |   | -                       |

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     |
| To Wages A/c | Ind. L + NL | By Balance c/d        | Recovery  |
|              | -           |                       | -         |

**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<br>By Costing P/L A/c | Recovered<br>Under Recovery |
|             | -           |  | -                           |

**Cost of Sales A/C**

| Particulars   | ₹                                  | Particulars | ₹     |
|---|------------------------------------|-------------|-------|
| To Finished Good A/c<br>To Administration OH A/c<br>To Selling OH A/c<br>To Costing P/L A/c | COGS<br>General<br>S & D<br>Profit | By CLC A/c  | Sales |
|   | -                                  |             | -     |

**Costing Profit & Loss A/C**

| Particulars  | ₹  | Particulars   | ₹                       |
|--|--|---|-------------------------|
| To Stores A/c<br>To Wages A/c<br>To Production OH A/c<br>To Administration OH A/c<br>To Selling OH A/c<br>To CLC A/c | Abnormal Loss<br>Abnormal Loss<br>Under Recovery<br>Under Recovery<br>Under Recovery<br>Net Profit | By Cost of Sales A/c<br>By Abnormal Gain and Over<br>Recovery | Profit<br>Abnormal Gain |
|  | -  |   | -                       |

**Cost Ledger Control A/C**

| Particulars   | ₹                                     | Particulars   | ₹  |
|---|---------------------------------------|---|--|
| To Stores A/c<br>To Cost of Sales A/c<br>To Balance c/d | Return<br>Sales<br>Closing<br>Balance | By Balance b/d<br>By Stores A/c<br>By Wages A/c<br>By Production OH A/c<br>By Admin OH A/c<br>By Selling OH A/c<br>By Costing P/L A/c | Opening Bal<br>Purchase<br>Wages Paid<br>OH Incurred<br>OH Incurred<br>OH Incurred<br>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:

| <i>Particulars</i>                                 | <i>(in ₹)</i> |
|--|---------------|
| 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**

| <i>S. No.</i> | <i>Entries</i>   | <i>Dr.</i>           | <i>Cr.</i>    |
|---------------|--|----------------------|---------------|
| <b>(a)</b>    | Work-in-progress Ledger Control A/c<br>To Store Ledger Control A/c<br>(Being issue of direct materials to production)                  | Dr.<br>5,88,000<br>- | -<br>5,88,000 |
| <b>(b)</b>    | Factory Overhead Control A/c<br>To Wages Control A/c<br>(Being allocation of indirect wages)   | Dr.<br>7,50,000<br>- | -<br>7,50,000 |
| <b>(c)</b>    | Factory Overhead Control A/c<br>To Costing Profit & Loss A/c<br>(Being transfer of over absorption of factory overhead)                | Dr.<br>2,25,000<br>- | -<br>2,25,000 |
| <b>(d)</b>    | Costing Profit & Loss A/c<br>To Administration Overhead Control A/c<br>(Being transfer of under absorption of administration overhead) | Dr.<br>1,55,000<br>- | -<br>1,55,000 |
| <b>(e)</b>    | Factory Overhead Control A/c<br>To Store Ledger Control A/c<br>(Being transfer of deficiency in stock of raw material)                 | Dr.<br>2,00,000<br>- | -<br>2,00,000 |

**BBQ 120**

The following information is available from a company's records for March, 2016:

|  |            |
|--|------------|
| <b>(a)</b> Opening balance of Creditors Account                        | ₹25,000    |
| <b>(b)</b> Closing balance of Creditors Account                        | ₹40,000    |
| <b>(c)</b> Payment made to Creditors                                   | ₹5,80,000  |
| <b>(d)</b> Opening balance of Stores Ledger Control Account            | ₹40,000    |
| <b>(e)</b> Closing balance of Stores Ledger Control Account            | ₹65,000    |
| <b>(f)</b> Wages paid (for 8,000 hours) 20% relate to indirect workers | ₹4,00,000  |
| <b>(g)</b> Various indirect expenses incurred                          | ₹60,000    |
| <b>(h)</b> Opening balance of WIP Control Account                      | ₹50,000    |
| <b>(i)</b> Inventory of WIP at the end includes:                       |            |
| Material worth   | ₹35,000    |
| Labour hours booked  | 400 hours  |
| <b>(j)</b> 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<br>(Balancing figure) | 5,95,000        |
|                     | <b>6,20,000</b> |  | <b>6,20,000</b> |

## Stores Ledger Control A/c

| Particulars  | ₹               | Particulars   | ₹               |
|--|-----------------|---|-----------------|
| To Balance b/d   | 40,000          | By Work-in-progress Control A/c<br>(Balancing figure) | 5,70,000        |
| To Creditors A/c<br>(Purchase: figure from creditor A/c) | 5,95,000        | By Balance b/d  | 65,000          |
|  | <b>6,35,000</b> |   | <b>6,35,000</b> |

## 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                             | ₹35,000          |
| To Factory Overhead Control A/c | 1,28,000         | Labour (400 hrs × ₹50)               | 63,000           |
|                                 | <b>10,68,000</b> | ₹20,000                              |                  |
|                                 |                  | Overheads (400 hrs × ₹20) ₹8,000     | <b>10,68,000</b> |

## Wages Control A/c

| Particulars | ₹               | Particulars   | ₹               |
|-------------|-----------------|---|-----------------|
| To Bank A/c | 4,00,000        | By WIP Ledger Control A/c<br>(8,000 hours × 80% × 50)       | 3,20,000        |
|             |                 | By Factory Overhead Control A/c<br>(8,000 hours × 20% × 50) | 80,000          |
|             | <b>4,00,000</b> |   | <b>4,00,000</b> |

## Factory Overhead Control A/c

| Particulars          | ₹               | Particulars                                      | ₹               |
|----------------------|-----------------|--|-----------------|
| To Bank A/c          | 60,000          | By WIP Ledger Control A/c<br>(6,400 hrs × ₹20)   | 1,28,000        |
| To Wages Control A/c | 80,000          | By Costing P/L A/c<br>(Under-absorbed Overheads) | 12,000          |
|                      | <b>1,40,000</b> |  | <b>1,40,000</b> |

## Working notes:

- Direct Labour Hour Rate = Labour Cost ÷ Labour Hour  
= ₹4,00,000 ÷ 8,000 hours = **₹50 per hour**
- 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.<br>To Cost Ledger Control A/c                       | 27,000<br>- | -<br>27,000 |
| (b)    | Work-in-progress Ledger Control A/c Dr.<br>To Manufacturing Overhead Control A/c | 6,000<br>-  | -<br>6,000  |
| (c)    | Cost of Sales A/c Dr.<br>To Selling & Distribution Overhead Control A/c          | 4,000<br>-  | -<br>4,000  |
| (d)    | Wages Control A/c Dr.<br>To Cost Ledger Control A/c                              | 8,000<br>-  | -<br>8,000  |
| (e)    | Store Ledger Control A/c Dr.<br>To Work-in-progress Ledger Control A/c           | 9,000<br>-  | -<br>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<br>(Purchases) | 80,000<br>40,000 | By Cost Ledger Control A/c<br>(Materials sold at cost) | 5,000  |
| To Work in progress Control A/c           |                  | By Overhead Control A/c                                | 10,000 |

|                   |                 |   |                 |
|-------------------|-----------------|---|-----------------|
| (Return from WIP) |                 | By Overhead Control A/c<br>(assumed normal) | 3,000           |
|                   |                 | By Balance c/d                              | 37,000          |
|                   | <b>1,35,000</b> |   | <b>1,35,000</b> |

**Wages Control Account**

| <b>Particulars</b>         | <b>Amount</b> | <b>Particulars</b>      | <b>Amount</b> |
|----------------------------|---------------|-------------------------|---------------|
| To Cost Ledger Control A/c | 35,000        | By WIP Control A/c      | 30,000        |
|                            |               | By Overhead Control A/c | 5,000         |
|                            | <b>35,000</b> |                         | <b>35,000</b> |

**Overhead Control Account**

| <b>Particulars</b>          | <b>Amount</b>   | <b>Particulars</b>               | <b>Amount</b>   |
|-----------------------------|-----------------|----------------------------------|-----------------|
| 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           |                                  |                 |
|                             | <b>1,43,000</b> |                                  | <b>1,43,000</b> |

**Work in Progress Control Account**

| <b>Particulars</b>           | <b>Amount</b>   | <b>Particulars</b>                                      | <b>Amount</b>   |
|------------------------------|-----------------|---|-----------------|
| 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<br>(i.e., cost of sales) | 2,00,000        |
| To Wages Control A/c         | 30,000          | By Balance c/d  | 20,000          |
| To Overhead Control A/c      | 1,20,000        |   |                 |
|                              | <b>2,60,000</b> |   | <b>2,60,000</b> |

**Costing Profit & Loss Account**

| <b>Particulars</b> | <b>Amount</b>   | <b>Particulars</b>         | <b>Amount</b>   |
|--------------------|-----------------|----------------------------|-----------------|
| 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%)    |                 |
|                    | <b>2,20,000</b> |                            | <b>2,20,000</b> |

**(Alternatively) Statement of Profit as per Costing Records**

| <b>Particulars</b>                      | <b>Amount</b> |
|---|---------------|
| 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**

| <b>Particulars</b>            | <b>Amount</b> | <b>Particulars</b>     | <b>Amount</b> |
|-------------------------------|---------------|------------------------|---------------|
| 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        |             |                 |
|                       | <b>2,80,000</b> |             | <b>2,80,000</b> |

**Reconciliation statement**

| <b>Particulars</b>             | <b>₹</b> |
|--------------------------------|----------|
| 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 30<sup>th</sup> June 2018:

| <b>Name of Account</b>        | <b>Dr.</b>      | <b>Cr.</b>      |
|-------------------------------|-----------------|-----------------|
| 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        |
| <b>Total</b>                  | <b>9,13,250</b> | <b>9,13,250</b> |

The following transactions took place during the quarter ended 30<sup>th</sup> 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**

| <b>Particulars</b>               | <b>Amount</b>    | <b>Particulars</b>                      | <b>Amount</b>    |
|----------------------------------|------------------|---|------------------|
| 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         |
|                                  | <b>15,26,260</b> |   | <b>15,26,260</b> |

**Work-in-Process Control A/c**

| <b>Particulars</b> | <b>Amount</b> | <b>Particulars</b> | <b>Amount</b> |
|--------------------|---------------|--------------------|---------------|
|--------------------|---------------|--------------------|---------------|

|                             |                  |  |                  |
|-----------------------------|------------------|--|------------------|
| 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<br>(Rejected) | 12,300           |
| To Wages Control A/c        | 2,56,800         | By Balance c/d (Bal. figure)                   | 6,03,380         |
| To Factory OH Control A/c   | 1,36,350         |  |                  |
|                             | <b>19,91,880</b> |  | <b>19,91,880</b> |

**Finished Stock Control A/c**

| <b>Particulars</b>              | <b>Amount</b>    | <b>Particulars</b>           | <b>Amount</b>    |
|---------------------------------|------------------|------------------------------|------------------|
| 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           |                              |                  |
|                                 | <b>18,14,600</b> |                              | <b>18,14,600</b> |

**General Ledger Adjustment A/c**

| <b>Particulars</b>                       | <b>Amount</b>    | <b>Particulars</b>          | <b>Amount</b>    |
|--|------------------|-----------------------------|------------------|
| To Raw Material Control A/c<br>(Returns) | 27,200           | By Balance b/d              | 9,13,250         |
| To Raw Materials Control A/c (Loss)      | 6,000            | By Raw Material Control A/c | 12,43,810        |
| To WIP Control A/c (Rejected)            | 12,300           | By Wages Control A/c        | 2,56,800         |
| To Balance c/d                           | 25,04,710        | By Factory OH Control A/c   | 1,36,350         |
|  | <b>25,50,210</b> |                             | <b>25,50,210</b> |

## 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       |
|--|--------|--------------|
| <b>Profit/(Loss) as per Cost Books</b>                         |        | <b>XXX</b>   |
| <b>Add:</b> 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    | <b>XXX</b>   |
| <b>Less:</b> 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    | <b>(XXX)</b> |
| <b>Profit/(Loss) as per Financial Books</b>                    |        | <b>XXX</b>   |



### 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 31<sup>st</sup> 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**

| <i>Particulars</i>                                      | <i>Amount</i> | <i>Amount</i>     |
|---|---------------|-------------------|
| <b>Loss as per Cost Records</b>                         |               | <b>(2,48,300)</b> |
| <b>Add:</b> 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            |
| <b>Less:</b> 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)          |
| <b>Profit as per Financial Books</b>                    |               | <b>(2,43,300)</b> |

**BBQ 125**

A manufacturing company has disclosed net loss of ₹48,700 as per their cost accounting records for the year ended 31<sup>st</sup> 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                  | ₹               |
|---|-----------------|------------------------------|-----------------|
| <b>To Net loss as per Costing Books</b> | <b>48,700</b>   | 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          |
| <b>To Net profit as per Fin. Books</b>  | <b>35,400</b>   | By Opening stock over valued | 23,000          |
|   | <b>1,97,200</b> |                              | <b>1,97,200</b> |

**BBQ 126**

The financial books of a company reveal the following data for the year ended 31<sup>st</sup> 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:**

- Prepare statements for the year ended 31<sup>st</sup> March, 2023 to show
  - The profit as per financial records
  - The profit as per costing records.
- 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

| <i>Particulars</i>                  | <i>Amount</i>    | <i>Particulars</i>         | <i>Amount</i>    |
|-------------------------------------|------------------|----------------------------|------------------|
| 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         |                            |                  |
|                                     | <b>23,66,850</b> |                            | <b>23,66,850</b> |
| 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           |                            |                  |
|                                     | <b>9,01,725</b>  |                            | <b>9,01,725</b>  |

## (i) (b) Cost Sheet showing Costing P/L (Production 12,405 units)

| <i>Particulars</i>                                   | <i>Amount</i>    |
|--|------------------|
| Direct Material                                      | 8,40,000         |
| Direct labour  | 6,10,000         |
| <b>Prime Cost</b>                                    | <b>14,50,000</b> |
| Factory overhead (70% of direct wages)               | 4,27,000         |
| Add: Opening WIP                                     | 46,000           |
| Less: Closing WIP                                    | (41,200)         |
| <b>Factory Cost</b>                                  | <b>18,81,800</b> |
| Administrative overhead (15% of factory cost)        | 2,82,270         |
| <b>Cost of Production</b>                            | <b>21,64,070</b> |
| Add: Opening finished goods (₹120 × 625 units)       | 75,000           |
| Less: Closing Stock of finished goods (W.N. 2)       | (72,397)         |
| <b>Cost of Goods Sold</b>                            | <b>21,66,673</b> |
| Selling & distribution overheads (₹3 × 12,615 units) | 37,845           |
| <b>Cost of sales</b>                                 | <b>22,04,518</b> |
| Profit (balancing figure)                            | 75,482           |
| <b>Sales</b>   | <b>22,80,000</b> |

## (ii) Reconciliation Statement

| <i>Particulars</i>  | <i>Amount</i> | <i>Amount</i>     |
|---|---------------|-------------------|
| <b>Profit as per Cost Records (Cost Sheet)</b>                |               | <b>75,482</b>     |
| <b>Add:</b> 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         |                   |
|   |               | <b>1,95,145</b>   |
| <b>Less:</b> 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        |                   |
|   |               | <b>(2,00,902)</b> |
| <b>Profit as per Financial Records</b>                        |               | <b>69,725</b>     |

Working note:

$$\begin{aligned}
 (1) \text{ Number of units produced} &= \text{Units sold} + \text{Closing finished units} - \text{Opening finished units} \\
 &= 12,615 + 415 - 625 = \mathbf{12,405 \text{ units}} \\
 \\
 (2) \text{ Value of closing finished goods} &= \frac{\text{Cost of Production}}{\text{Units Produced}} \times \text{Closing finished goods units} \\
 &= \frac{21,64,070}{12,405} \times 415 = \mathbf{₹72,397}
 \end{aligned}$$

**Note:** Closing stock is valued as per FIFO method.

### BBQ 127

The Profit and Loss account of ABC Ltd. for the year ended 31<sup>st</sup> March, 2021 is given below:

#### Profit & Loss Account (For the year ended 31<sup>st</sup> 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           |                         |                  |
|                                | <b>15,09,000</b> |                         | <b>15,09,000</b> |

#### 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 31<sup>st</sup> 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         |
| <b>Prime Cost</b>                                   | <b>10,00,000</b> |
| Factory Overheads:                                  |                  |
| Variable (2,60,000 × 50%)                           | 1,30,000         |
| Fixed {(2,60,000 × 50%) × 15,000/20,000}            | 97,500           |
| <b>Factory Cost</b>                                 | <b>12,27,500</b> |
| Administrative Overheads (1,05,000 × 15,000/20,000) | 78,750           |
| Notional rent                                       | 12,000           |
| <b>Cost of Production</b>                           | <b>13,18,250</b> |
| Selling Overheads (completely variable)             | 85,000           |
| <b>Cost of sales</b>                                | <b>14,03,250</b> |

|                           |                  |
|---------------------------|------------------|
| Profit (balancing figure) | 96,750           |
| <i>Sales</i>              | <b>15,00,000</b> |

**(2) Reconciliation Statement**

| <i>Particulars</i>   | <i>Amount</i> |
|--|---------------|
| <b><i>Profit as per Cost Accounts</i></b>  | <b>96,750</b> |
| <b><i>Add:</i></b> Dividend received   | 9,000         |
| Notional rent  | 12,000        |
| <b><i>Less:</i></b> 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         |
| <b><i>Profit as per Financial Accounts</i></b>                                       | <b>57,000</b> |