

CA INTER COSTING



CA SANKALP KANSTIYA

SUPER 60

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QUESTION 1

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

Particulars	(Rs.)
Chemical A: 10,000 kgs: at Rs. 10 per kg.	1,00,000
Chemical B: 8,000 kgs at Rs. 13 per kg	1,04,000
Basic Custom Duty @ 10% (Credit is not allowed)	20,400
Railway Freight	3,840
Total Cost	2,28,240

A shortage of 500 kgs. in chemical A and 320 kgs. in chemical B is noticed due to normal breakages. You are required to COMPUTE the rate per kg of each chemical, assuming a provision of 2% for further deterioration.

SOLUTION

Working:

(i) Computation of effective quantity of each chemical available for use:

Particulars	Chemical A (kg.)	Chemical B (Kg.)
Quantity Purchased	10,000	8,000
Less: Shortage due to normal breakages	500	320
	9,500	7,680
Less: Provision for deterioration 2%	190	153.6
Quantity Available	9,310	7,526.4

(ii) Statement showing the computation of rate per kg. of each chemical

Particulars	Chemical A (Rs.)	Chemical B (Rs.)
Purchase price 10,000 @ Rs. 10 per kg , 8,000 @ Rs. 13 per kg	1,00,000	1,04,000
Add: Basic Custom Duty @ 10%	10,000	10,400
Add: Railway Freight (in the ratio of quantity purchased ie: 5:4)	2,133	1,707
Total Cost (A)	1,12,133	1,16,107
Effective Quantity (see working) (B)	9,310 kg.	7,526.4 kg.
Rate per kg. (A /B)	12.04	15.43

QUESTION 2

The quarterly production of a company's product which has a steady market is 20,000 units. Each unit of a product requires 0.5 kg. of raw material. The cost of placing one order for raw material is Rs. 100 and the inventory carrying cost is Rs. 2 per annum. The lead time for procurement of raw material is 36 days and a safety stock of 1,000 kg. of raw materials is maintained by the company. The company has been able to negotiate the following discount structure with the raw material supplier.

Order quantity (kg.)	Discount (Rs.)
Upto 6,000	NIL
6,001 - 8,000	400
8,001 - 16,000	2,000
16,001 - 30,000	3,200
30,001 - 45,000	4,000

You are required to

- (i) Calculate the re-order point taking 30 days in a month.
- (ii) Prepare a statement showing the total cost of procurement and storage of raw material after considering the discount of the company elects to place one, two, four or six orders in the year.
- (iii) State the number of orders which the company should place to minimize the costs after taking EOQ also into consideration.

SOLUTION

Working notes

- 1. Annual production (20,000 units per quarter × 4 quarters) = 80,000 units
- 2. Raw material required for 80,000 units (80,000 units × 0.5 kg.) = 40,000 kg.

$$3. \quad EOQ = \sqrt{\frac{2 \times 40,000 \text{ kgs.} \times \text{Rs. } 100}{\text{Rs. } 2}} = 2,000 \text{ kgs.}$$

- 4. Total cost of procurement and storage when the order size is equal to EOQ or 2,000 kg:

(No. of orders (40,000 kg. ÷ 2,000 kg.))	= 20 times
Ordering cost (20 orders × Rs.100)	= Rs. 2,000
Carrying cost (Rs.)($\frac{1}{2}$ × 2,000 kg. × Rs. 2)	= <u>Rs. 2,000</u>
Total cost	<u>Rs. 4,000</u>

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

$$= \frac{1,000 \text{ kg.} + 40,000 \text{ kg.} \times 36 \text{ days}}{360 \text{ days}}$$

$$= 1,000 \text{ kg.} + 4,000 \text{ kg.} = 5,000 \text{ kg.}$$

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

(after considering the discount)

Order size	No. of orders	Total cost of procurement	Average stock	Total cost of storage of rawmaterials	Discount	Total cost
Kg.		(Rs.)	Kg.	(Rs.)	(Rs.)	(Rs.)
(1)	(2)	(3)=(2)× Rs.100	(4)= $\frac{1}{2}$ ×(1)	(5)=(4)×Rs.2	(6)	(7)=[(3)+(5)] - (6)
40,000	1	100	20,000	40,000	4,000	36,100
20,000	2	200	10,000	20,000	3,200	17,000
10,000	4	400	5,000	10,000	2,000	8,400
6666.66	6	600	3,333	6,666	400	6,866

(iii) Number of orders which the company should place to minimize the costs after taking EOQ also into consideration is 20 orders each of size 2,000 kg. The total cost of procurement and storage in this case comes to Rs. 4,000, which is minimum. (Refer to working notes 3 and 4)

QUESTION 3

Following details are related to a manufacturing concern:

Re-order Level	16,000 units
Economic Order Quantity	90,000
Minimum Stock Level	100,000 units
Maximum Stock Level	190,000 units
Average Lead Time	6 days
Difference between minimum lead time and Maximum lead time	4 days

Calculate:

- (i) Maximum consumption per day (ii) Minimum consumption per day

SOLUTION

Difference between Minimum lead time & Maximum lead time = 4 days
 Max. lead time - Min. lead time = 4 days

Or, Max. lead time = Min. lead time + 4 days (I)

Average lead time is given as 6 days i.e.

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

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

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

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

Or, 2 Min. lead time = 8 days

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

Putting this Minimum lead time value in (i), we get

Maximum lead time = 4 days + 4 days = 8 days

(i) Maximum consumption per day:

Re-order level = Max. Re-order period × Maximum Consumption per day

1,60,000 units = 8 days × Maximum Consumption per day

Or, Maximum Consumption per day = $\frac{1,60,000 \text{ units}}{8 \text{ days}} = 20000 \text{ units}$

(ii) **Minimum Consumption per day:** Maximum Stock Level =
Re-order level + Re-order Quantity - (Min. lead time × Min. Consumption per day)

Or, 1,90,000 units = 1,60,000 units + 90,000 units - (4 days × Min. Consumption
per day)

Or, 4 days × Min. Consumption per day

$$= 2,50,000 \text{ units} - 1,90,000 \text{ units} = 60,000 \text{ units}$$

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

QUESTION 4 (RTP May 19) (Similar to RTP May 21)

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

- (i) The Re-order quantity is 200 kg. less than the Economic Order Quantity (EOQ).
- (ii) Maximum consumption per day is 20 kg. more than the average consumption per day.
- (iii) There is an opening stock of 1,000 kg.
- (iv) Time required to get the raw materials from the suppliers is 4 to 8 days.
- (v) The purchase price is Rs. 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 Rs. 720 on paper and documentation work. From the above information find out the following in relation to raw material Dee:

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

SOLUTION

Working Notes:

(i) Computation of annual consumption & annual demand for raw material Dee':

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

(ii) Computation of Economic Order Quantity (EOQ):

$$\begin{aligned}
 \text{EOQ} &= \sqrt{\frac{2 \times \text{Annual demand of 'Dee'} \times \text{Ordering cost}}{\text{Carrying cost per unit per annum}}} \\
 &= \sqrt{\frac{2 \times 17,200\text{kg.} \times \text{Rs. } 720}{\text{Rs.}125 \times 13.76\%}} \\
 &= \sqrt{\frac{2 \times 17,200\text{kg.} \times \text{Rs.}720}{\text{Rs. } 17.2}} \\
 &= 1,200 \text{ kg.}
 \end{aligned}$$

(iii) Re-Order level:

= (Maximum consumption per day × Maximum lead time)

$$= \left\{ \left(\frac{\text{Annual Consumption of 'Dee'}}{364 \text{ days}} + 20 \text{ kg} \right) \times 8 \text{ days} \right\}$$

$$= \left\{ \left(\frac{18,200 \text{ kg}}{364 \text{ days}} + 20\text{kg} \right) \times 8 \text{ days} \right\}$$

= 560 kg.

(iv) Minimum consumption per day of raw material 'Dee':

Average Consumption per day = 50 Kg.

Hence, Maximum Consumption per day = 50 kg. + 20 kg. = 70 kg.

So Minimum consumption per day will be

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

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

$$\text{Or, Min Consumption} = 100 \text{ kg} - 70 \text{ kg.} = 30 \text{ kg}$$

(a) Re-order quantity :

EOQ - 200 kg. = 1,200 kg. - 200 kg.= 1,000 kg.

(b) Maximum stock level:

= Re-order level + Re-order Quantity - (Min. consumption per day × Min. lead time)

= 560 kg. + 1,000 kg. - (30 kg. × 4 days) = 1,560 kg. - 120 kg. = 1,440 kg.

(c) Minimum stock level:

= Re-order level - (Average consumption per day × Average lead time)
 = 560 kg. - (50 kg. × 6 days) = 260 kg.

(d) Impact on the profitability of the company by not ordering the EOQ.

		When purchasing the ROQ	When purchasing the EOQ
I	Order quantity	1,000 kg.	1,200 kg.
II	No. of orders a year	$\frac{17,200\text{kg.}}{1,000\text{kg.}} = 17.2$ or 18 orders	$\frac{17,200\text{kg.}}{1,200\text{kg.}} = 14.33$ or 15 orders
III	Ordering Cost	18 orders × Rs. 720 = Rs.12,960	15 orders × Rs. 720 = Rs.10,800
IV	Average Inventory	$\frac{500\text{kg.}}{2} = 1,000\text{kg.}$	$\frac{1,200\text{kg.}}{2} = 600\text{kg.}$
V	Carrying Cost	500 kg. × Rs. 17.2 = Rs.8,600	600 kg. × Rs. 17.2 = Rs.10,320
VI	Total Cost	Rs. 21,560	Rs. 21,120

Extra Cost incurred due to not ordering EOQ = Rs. 21,560 - Rs. 21,120 = Rs.440

QUESTION 5 (Advance Level Question) (RTP Nov' 20)

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

Raw Material	Usage per unit of product (kgs.)	Re-order quantity (kgs.)	Price per kg.	Delivery period (in weeks)			Re-order level (kgs.)	Minimum level (kgs.)
				Minimum	Average	Maximum		
A	10	10,000	10	1	2	3	8,000	?
B	4	5,000	30	3	4	5	4,750	?
C	6	10,000	15	2	3	4	?	2,000

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

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

SOLUTION

1. Minimum stock of A

$$\begin{aligned} \text{Re-order level} &= (\text{Average rate of consumption} \times \text{Average time required to obtain fresh delivery}) \\ &= 8,000 - (200 \times 10 \times 2) = 4,000 \text{ kgs.} \end{aligned}$$

2. Maximum stock of B

$$\begin{aligned} \text{Re-order level} + \text{Re-order quantity} &= (\text{Minimum consumption} \times \text{Minimum delivery Period}) \\ &= 4,750 + 5,000 - (175 \times 4 \times 3) \\ &= 9,750 - 2,100 = 7,650 \text{ kgs.} \end{aligned}$$

3. Re- order level of C

$$\begin{aligned} &= \text{Maximum delivery period} \times \text{Maximum usage} \\ &= 4 \times 225 \times 6 = 5,400 \text{ kgs.} \end{aligned}$$

OR

Re- order level of C

$$\begin{aligned} &= \text{Minimum level of C} + (\text{Average rate of consumption} \times \text{Average time required to obtain fresh delivery}) \\ &= 2,000 + [(200 \times 6) \times 3] \text{ kgs.} = 5,600 \text{ kgs.} \end{aligned}$$

4. Average stock level of A

$$\begin{aligned} &= \text{Minimum stock level of A} + \frac{1}{2} \text{ Re-order quantity of A} \\ &= 4,000 + \frac{1}{2} \times 10,000 = 4,000 + 5,000 = 9,000 \text{ kgs.} \end{aligned}$$

OR

Average stock level of A

$$= \frac{\text{Minimum stock level of A} + \text{Maximum stock level of A}}{2} \quad (\text{Refer to working note})$$

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

Working note:

Maximum stock of A = ROL + ROQ - (Minimum consumption × Minimum reorder period)

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

QUESTION 6 (Past Paper May'18)

From the following data for the year ended 31st March, 2022, Calculate the inventory turnover ratio of the two items and put forward your comments on them.

	Material A (Rs.)	Material B (Rs.)
Opening stock 1.04.2021	10,000	9,000
Purchase during the year	52,000	27,000
Closing stock 31.03.2022	6,000	11,000

SOLUTION

First of all, it is necessary to find out the material consumed:

Cost of material consumed	Material A (Rs.)	Material B (Rs.)
Opening Stock	10,000	9,000
Add: Purchases	<u>52,000</u>	<u>27,000</u>
	62,000	36,000
Less: Closing Stock	6,000	11,000
Materials consumed	56,000	25,000
Average Inventory: (Opening Stock + Closing Stock) ÷ 2	8,000	10,000
Inventory Turnover Ratio: (Consumption ÷ Average Inventory)	7 Times	2.5 Times
Inventory Turnover (Number of Days in a year/IT Ratio)	52 Days	146 Days

Comments: Material A is moving faster than Material B.

QUESTION 7

M/s Tyrotubes trades in four wheeler tyres and tubes. It stocks sufficient quantity of tyres of almost every vehicle. In the year end 2021-22, the report of sales manager revealed that M/s Tyrotubes experienced stock-out of tyres.

The stock -out data is as follows:

Stock -Out of Tyres	No. of times of Stock Out
100	2
80	5
50	10
20	20
10	30
0	33

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

DETERMINE optimum safest stock level.

SOLUTION

Computation of Stock -out and Inventory carrying cost

Safety Stock Level (units) (1)	Stockout (units) (2)	Probability (3)	Stock-out Cost (Rs.) (4) = (2) × Rs.150	Expected Stock-out Cost (Rs.) (5)=(3)×(4)	Inventory Carrying Cost (Rs.) (6) = (1)× Rs.50	Total Cost (Rs.) (7) = (5) + (6)
100	0	0.00	0	0	5,000	5,000
80	20	0.02	3,000	60	4,000	4,060
50	50	0.02	7,500	150		
	30	0.05	4,500	225		
			12,000	375	2,500	2,875
20	80	0.02	12,000	240		
	60	0.05	9,000	450		
	30	0.10	4,500	450		
			25,500	1,140	1,000	2,140
10	90	0.02	13,500	270		
	70	0.05	10,500	525		
	40	0.10	6,000	600		
	10	0.20	1,500	300		
			31,500	1,695	500	2,195

0	100	0.02	15,000	300		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	0	2700

At safety stock level of 20 units, total cost is least ie: Rs.2,140

Working Note:

Computation of Probability of Stock -out

Stock-out (units)	100	80	50	20	10	0	Total
Nos. of Times	2	5	10	20	30	33	100
Probability	0.02	0.05	0.10	0.20	0.30	0.33	1.00

Explanation:

Stock-out means the demand of an item that could not be fulfilled because of insufficient stock level.

Safety stock is the level of stock of any item which is maintained in excess of lead time consumption. It is kept as cushion against unexpected demand for that item.

Safety stock level	Impact
100 units	Any unexpected demand up-to 100 units can be met.
80 units	Stock out will only arise if unexpected demand will be for 100 units. In this case 20 units will remain unsatisfied. The probability of any unexpected demand for 100 units is 0.02.
50 units	An unexpected demand beyond 50 units will remain unsatisfied. If unexpected demand for 100 units arises (probability is 0.02) 50 units will unsatisfied. Similarly, if unexpected demand for 80 units arises (probability is 0.05), 30 units will unsatisfied.
20 units	Any unexpected demand beyond 20 units will remain unsatisfied. If unexpected demand for 100 units arises (probability is 0.02), 80 units will remain unsatisfied. If unexpected demand for 80 units arises (probability is 0.05), 60 units will remain unsatisfied. Similarly, when unexpected demand for 50 units arises (probability is 0.10), 30 units will remain unsatisfied.

10 units	Any unexpected demand beyond 10 units will remain unsatisfied. If unexpected demand for 100 units arises (probability is 0.02), 90 units will remain unsatisfied. If unexpected demand for 80 units arises (probability is 0.05), 70 units will remain unsatisfied. If unexpected demand for 50 units arises (probability is 0.10), 40 units will remain unsatisfied. Similarly, when unexpected demand for 20 units arises (probability is 0.20), 10 units will remain unsatisfied.
0 unit	When no safety stock level is maintained, any unexpected demand cannot satisfied. If unexpected demand for 100 units arises (probability is 0.02), 100 units will remain unsatisfied. If unexpected demand for 80 units arises (probability is 0.05), 80 units will remain unsatisfied. If unexpected demand for 50 units arises (probability is 0.10), 50 units will remain unsatisfied. If unexpected demand for 20 units arises (probability is 0.20), 20 units will remain unsatisfied. Similarly, unexpected demand for 10 units (probability is 0.30), 10 units will remain unsatisfied.

QUESTION 8 (RTP May 20)

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

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

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

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

- (i) Re-order level
- (ii) Maximum stock level
- (iii) Minimum stock level
- (iv) PREPARE Store Ledger for the period January 2021 and DETERMINE the value of stock as on 31-01-2021.
- (v) Value of components used during the month of January, 2021.
- (vi) Inventory turnover ratio.

SOLUTION

Workings:

Consumption is calculated on the basis of material requisitions:

Maximum component usage = 4,500 units (Material requisition on 10-01-21)

Minimum component usage = 1,500 units (Material requisition on 24 -01-21)

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

Maximum lead time = 21 days (15-12-2020 to 05-01-2021)

Minimum lead time = 14 days (30-12-2020 to 12-01-2021)

Calculations:

(i) Re-order level

= Maximum usage × Maximum lead time

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

(ii) Maximum stock level

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

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

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

(iii) Minimum stock level

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

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

= 94,500 units - 52,500 units

= 42,000 units

(iv) Store Ledger for the month of January 2021:

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

[Note: Decimal figures may be rounded-off to the nearest rupee value wherever required)

Value of stock as on 31 01-2021 ('000) = Rs. 1,39,001

(v) Value of components used during the month of January 2021:

Sum of material requisitions 011 to 016 ('000)

$$= \text{Rs. } 29,694 + \text{Rs. } 44,541 + \text{Rs. } 21,611 + \text{Rs. } 14,734 + \text{Rs. } 39,156 + \text{Rs. } 31,325$$

$$= \text{Rs. } 1,81,061$$

(vi) Inventory Turnover Ratio

$$= \frac{\text{Value of materials used}}{\text{Average stock value}}$$

$$= \frac{\text{Rs. } 1,81,061}{(\text{Rs. } 1,39,001 + 34,335) / 2} = \frac{\text{Rs. } 1,81,061}{\text{Rs. } 86,668} = 2.09$$

QUESTION 9 (RTP Nov' 19)

HBL Limited produces product 'M' which has a quarterly demand of 20,000 units. Each product requires 3 kg. and 4 kg. of material X and Y respectively. Material X is supplied by a local supplier and can be procured at factory stores at any time, hence, no need to keep inventory for material X. The material Y is not locally available, it requires to be purchased from other states in a specially designed truck container with a capacity of 10 tons.

The cost and other information related with the materials are as follows:

Particulars	Material -X	Material -Y
Purchase price per kg. (excluding GST)	Rs. 140	Rs. 640
Rate of GST	18%	18%
Freight per trip (fixed, irrespective of quantity)	-	Rs. 28,000
Loss of materials in transit*	-	2%
Loss in process*	4%	5%

*On purchased quantity

Other information:

- The company has to pay 15% p.a. to bank for cash credit facility.
- Input credit is available on GST paid on materials.

Required:

- (i) CALCULATE cost per kg. of material X and Y.
- (ii) CALCULATE the Economic Order quantity for both the materials.

SOLUTION

Working Notes:

(a) Annual purchase quantity for material X and Y:

Annual demand for product — 20,000 units × 4 = 80,000 units

Particulars	Mat -X	Mat -Y
Quantity required for per unit of product M	3 kg.	4 kg.
Net quantity for materials required	2,40,000 kg.	3,20,000 kg.
Add: Loss in transit	-	6,881 kg.
Add: Loss in process	10,000 kg.	17,204 kg.
Purchase quantity	2,50,000 kg.	3,44,085 kg.

Note - Input credit on GST paid is available; hence, it will not be included in cost of material

(I) Calculation of cost per kg. of material X and Y:

Particulars	Mat - X	Mat - Y
Purchase quantity (WN : a)	2,50,000 kg.	3,44,085 kg.
Rate per kg.	Rs. 140	Rs. 640
Purchase price	Rs. 3,50,00,000	Rs. 22,02,14,400
Add: Freight	0	Rs. 9,80,000*
Total cost	Rs. 3,50,00,000	Rs. 22,11,94,400
Net Quantity	2,40,000 kg.	3,20,000 kg
Cost per kg.	Rs. 145.83	Rs. 691.23

$$\text{No. of trucks} = \frac{3,44,085\text{kg.}}{10 \text{ ton} \times 1,000} = 34.40 \text{ trucks or } 35 \text{ trucks}$$

Therefore, total freight = 35 trucks × Rs.28,000 = Rs.9,80,000

(ii) Calculation of Economic Order Quantity (EOQ) for Mat.-X and Y:

$$\text{EOQ} = \sqrt{\frac{2 \times \text{Annual Requirement} \times \text{Order cost}}{\text{Carrying cost per unit p.a.}}}$$

Particulars	Mat - X	Mat - Y
Annual Requirement	2,50,000 kg.	3,44,085 kg.
Ordering cost	0	Rs. 28,000
Cost per unit	Rs. 145.83	Rs. 691.23
Carrying cost	15%	15%
Carrying cost per unit p.a.	0*	Rs. 103.68
EOQ	0	13,632.62 kg.

QUESTION 10

From the following details, Draw a plan of ABC selective control:

	Units	Unit Cost (Rs.)
1	7,000	5.00
2	24,000	3.00
3	1,500	10.00
4	600	22.00
5	38,000	1.50
6	40,000	0.50
7	60,000	0.20
8	3,000	3.50
9	300	8.00
10	29,000	0.40
11	11,500	7.10
12	4,100	6.20

SOLUTION

Statement of Total Cost and Ranking

Item	Units	% of Total Units	Unit Cost (Rs.)	Total Cost (Rs.)	% of Total Cost	Ranking
1	7,000	3.1963	5.00	35,000	9.8378	4
2	24,000	10.9589	3.00	72,000	20.2378	2
3	1,500	0.6849	10.00	15,000	4.2162	7
4	600	0.2740	22.00	13,200	3.7103	8
5	38,000	17.3516	1.50	57,000	16.0216	3
6	40,000	18.2648	0.50	20,000	5.6216	6
7	60,000	27.3973	0.20	12,000	3.3730	9
8	3,000	1.3699	3.50	10,500	2.9513	11
9	300	0.1370	8.00	2,400	0.6746	12
10	29,000	13.2420	0.40	11,600	3.2605	10
11	11,500	5.2512	7.10	81,650	22.9502	1
12	4,100	1.8721	6.20	25,420	7.1451	5
	2,19,000	100		3,55,770	100	

Basis for selective control (Assumed)

Rs.50,000 & above -- 'A' items

Rs.15,000 to 50000 -- 'B' items

Below Rs.15,000 -- 'C' items

On this basis, a plan of A B C selective control is given below:

Ranking	Item Nos.	% of Total units	Cost (Rs.)	% of Total Cost	Category
1	11	5.2512	81,650	22.9502	
2	2	10.9589	72,000	20.2378	
3	5	17.3516	57,000	16.0216	
Total	3	33.5617	2,10,650	59.2096	A
4	1	3.1963	35,000	9.8378	
5	12	1.8721	25,420	7.1451	
6	6	18.2648	20,000	5.6216	
7	3	0.6849	15,000	4.2162	
Total	4	24.0181	95,420	26.8207	B
8	4	0.2740	13,200	3.7103	
9	7	27.3973	12,000	3.3730	
10	10	13.2420	11,600	3.2605	
11	8	1.3699	10,500	2.9513	
12	9	0.1370	2,400	0.6746	
Total	5	42.4202	49,700	13.9697	C
Grand Total	12	100	3,55,770	100	

Q.	Concept	Pg
11	Statement of Total Earnings	23-24
12	Labour Turnover using different Methods (Replacement / Separation / Flux)	25-27
13	Production lost on account of Employee Turnover (B.R. Ltd)	28-29
14	Profit Lost due to increased Labour Turnover	30
15	Wages Cost using Halsey - Rowan	31-32
16	Total Earnings in Slab Rate System	33
17	Loss due to Incorrect Rate & Method Selection (Halsey / Rowan)	34-35
18	Effective Earnings for Halsey + Rowan Scheme	36-38

QUESTION 11 (Module)

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

	A	B
(i) Basic Wages (Rs.)	10,000	16,000
(ii) Dearness Allowance	50%	50%
(iii) Contribution to provident Fund (on basic wages)	8%	8%
(iv) Contribution to Employee's State Insurance (on basic wages)	2%	2%
(v) Overtime (Hours)	10	--

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

Jobs	X	Y	Z
Worker A	40%	30%	30%
Worker B	50%	20%	30%

Overtime was done on job Y.

SOLUTION

Statement showing Earnings of Workers A and B

	A (Rs.)	B (Rs.)
Basic wages	10,000	16,000
Dearness Allowance (50% of Basic Wages)	5,000	8,000
Overtime wages (Refer to Working Note 1)	1,500	--
Gross wages earned	16,500	24,000
Less: Contribution to Provident fund	(800)	(1,280)
Less: Contribution to ESI	(200)	(320)
Net wages earned	15,500	22,400

Statement of Employee Cost

	A (Rs.)	B (Rs.)
Gross wages (excluding overtime)	15,000	24,000
Add: Employer's contribution to PF	800	1,280
Add: Employer's contribution to ESI	200	320
Gross wages earned	16,000	25,600
Normal working hours	200	200
Ordinary wages rate per hour	80	128

Statement showing Allocation of Wages to Jobs

	Total Wages (Rs.)	Jobs		
		X (Rs.)	Y(Rs.)	Z(Rs.)
Worker A:				
-Ordinary Wages (4:3:3)	16,000	6,400	4,800	4,800
-Overtime	1,500	--	1,500	--
Worker B:				
-Ordinary Wages (5:2:3)	25,600	12,800	5,120	7,680
	43,100	19,200	11,420	12,480

Working Notes

- Normal Wages are considered as basic wages

$$\begin{aligned} \text{Over time} &= \frac{2 \times (\text{Basic wage} + \text{DA}) \times 10 \text{ hours}}{200} \\ &= 2 \times \left(\frac{\text{Rs. } 15,000}{200} \right) \times 10 \text{ hours} = \text{Rs. } 150 \times 10 \text{ hours} = \text{Rs. } 1,500 \end{aligned}$$

QUESTION 12

Corrs Consultancy Ltd. is engaged in BPO industry. One of its trainee executives in the Personnel department has calculated labour turnover rate 24.92% for the last year using Flux method.

Following is the some data provided by the Personnel department for the last year:

Employees	At the beginning	Joined	Left	At the end
Data Processors	540	1,080	60	1,560
Payroll Processors	?	20	60	40
Supervisors	?	60	---	?
Voice Agents	?	20	20	?
Assistant Managers	?	20	---	30
Senior Voice Agents	4	---	---	12
Senior Data Processors	8	---	---	34
Team Leaders	?	---	---	?

Employees transferred from the Subsidiary Company				
Senior Voice Agents	---	8	---	---
Senior Data processors	---	26	---	---
Employees transferred to the Subsidiary Company				
Team Leaders	---	---	60	---
Assistant Managers	---	---	10	---

At the beginning of the year there were total 772 employees on the payroll of the company. The opening strength of the Supervisors, Voice Agents and Assistant Managers were in the ratio of 3:3:2.

The company has decided to abandon the post of Team Leaders and consequently all the Team Leaders were transferred to the subsidiary company.

The company and its subsidiary are maintaining separate set of books of account and separate Personnel Department.

You are required to calculate:

- (a) Labour Turnover rate using Replacement Method and Separation Method.*
- (b) Verify the Labour turnover rate calculated under Flux method by the trainee executive of the Corrs Consultancy Ltd.*

SOLUTION

Working Notes:

(i) Calculation of no. of employees at the beginning and end of the year

	At the Beginning of the year	At the End of the year
Data Processor	540	1,560
Payroll Processors (Left- 60 + Closing- 40 - Joined- 20)	80	40
Supervisors*	30	90
Voice Agents*	30	30
Assistant Managers*	20	30
Senior Voice Agents	4	12
Senior Data Processor	8	34
Team Leaders	60	0
total	772	1,796

(*) At the beginning of the year:

Strength of Supervisors, Voice Agents and Asst. Managers

= [772 - {540+80+4+8+60} employees] or [772 - 692 = 80 employees]

[{Supervisors- 80× 3/8 = 30, Voice Agents- 80× 3/8 = 30 & Asst. Managers - 80 × 2/8 = 20} employees]

At the end of the year:

[Supervisors - (Opening - 30 + 60 Joining) = 90

Voice Agents - (Opening - 30 + 20 Joined - 20 left) = 30]

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

Particulars	Separations	New Recruitment	Replacement	Total Joining
Data Processors	60	1,020	60	1,080
Payroll Processor	60	--	20	20
Supervisors	--	60	--	60
Voice Agents	20	--	20	20
Assistant Managers	10	10	10	20
Sr. Voice Agents	--	8	--	8
Sr. Data Processors	--	26	--	26
Team Leaders	60	--	--	--
Total	210	1,124	110	1,234

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

(a) Calculation of Labour Turnover:

$$\begin{aligned} \text{Replacement Method} &= \frac{\text{No. of employees replaced during the year}}{\text{Average no. of employees on roll}} \times 100 \\ &= \frac{110}{(772+1,796)/2} \times 100 = \frac{100}{1,284} \times 100 = 8.57\% \end{aligned}$$

$$\begin{aligned} \text{Separation Method} &= \frac{\text{No. of employees separated during the year}}{\text{Average no. of employees on roll}} \times 100 \\ &= \frac{210}{1,284} \times 100 = 16.36\% \end{aligned}$$

(b) Labour turnover under Flux Method:

$$\begin{aligned} &= \frac{\text{No. of employees (Joined+Separated) during the year}}{\text{Average No. of employees on roll}} \times 100 \\ &= \frac{\text{No. of employees (Replaced+New recruited+Separated) during the year}}{\text{Average No. of employees on roll}} \times 100 \\ &= \frac{1,234 + 210}{1,284} \times 10 = 112.46\% \end{aligned}$$

Labour turnover calculated by the executive trainee of the Personnel department is incorrect as it has not taken the No. of new recruitment while calculating the labour turnover under Flux method.

QUESTION 13

The management of B. R. Ltd. is worried about their increasing employee turnover in the factory and before analyzing the causes and taking remedial steps; it wants to have an idea of the profit foregone as a result of employee turnover in the last year.

Last year sales amounted to Rs.83,03,300 and P/V ratio was 20 per cent. The total number of actual hours worked by the direct employee force was 4.45 lakhs. The actual direct employee hours included 30,000 hours attributable to training new recruits, out of which half of the hours were unproductive. As a result of the delays by the Personnel Department in filling vacancies due to employer turnover, 1,00,000 potentially productive hours (excluding unproductive training hours) were lost.

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

Settlement cost due to leaving	Rs. 43,820
Recruitment costs	Rs. 26,740
Selection costs	Rs. 12,750
Training costs	Rs. 30,490

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

SOLUTION

Working Notes:

(i) Computation of productive hours

Actual hours worked(given)	4,45,000
Less: Unproductive training hours	<u>15,000</u>
Actual productive hours	<u>4,30,000</u>

(ii) Productive hours lost:

Loss of potential productive hours + Unproductive training hours
 = 1,00,000 + 15,000 = 1,15,000 hours

(iii) Loss of contribution due to unproductive hours:

$$= \frac{\text{Sales value}}{\text{Actual productive hours}} \times \text{Total unproductive hours}$$

$$= \frac{\text{Rs. 83,03,300}}{4,30,000 \text{ hours}} \times 1,15,000 \text{ hours} = \text{Rs. 22,20,650}$$

$$\text{Contribution lost for 1,15,000 hours} = \frac{\text{Rs. 22,20,650}}{100} \times 20 = \text{Rs. 4,44,130}$$

Contribution of profit foregone on account of employer turnover

	(₹)
Contribution foregone (as calculated above)	4,44,130
Settlement cost due to leaving	43,820
Recruitment cost	26,740
Selection cost	12,750
Training cost	30,490
Profit foregone	5,57,930

QUESTION 14 (RTP May 19)

XYZ Ltd. wants to ascertain the profit lost during the year 2021-22 due to increased labour turnover. For this purpose, they have given you the following information:

- (1) Training period of the new recruits is 50,000 hours. During this period their productivity is 60% of the experienced workers. Time required by an experienced workers is 10 hours per unit.
- (2) 20% of the output during training period was defective. Cost of rectification of a defective unit was Rs.25.
- (3) Potential productive hours lost due to delay in recruitment were 1,00,000 hours.
- (4) Selling price per unit is Rs. 180 and P/V ratio is 20%.
- (5) Settlement cost of the workers leaving the organisation was Rs.1,83,480.
- (6) Recruitment cost was Rs.1,56,340.
- (7) Training cost was Rs.1,13,180.

You are required to calculate the profit lost by the company due to increased labour turnover during the year 2021-22.

SOLUTION

Output by experienced workers in 50,000 hours = $\frac{50,000}{10} = 5,000$ units

Therefore, Output by new recruits = 60% of 5,000 = 3,000 units

Loss of output = 5,000 - 3,000 = 2,000 units

Output lost due to delay = $\frac{1,00,000(\text{hrs})}{10}$ units = 10,000 units

Total loss of output = 10,000 + 2,000 = 12,000 units

Contribution per unit = 20% of 180 = Rs.36

Total contribution cost = 36 × 12,000 = Rs.4,32,000

Cost of repairing defective units = 3,000 × 0.2 × 25 = Rs.15,000

Profit forgone due to labour turnover

	(Rs.)
Loss of contribution	4,32,000
Cost of repairing defective units	15,000
Recruitment cost	1,56,340
Training cost	1,13,180
Settlement cost of workers leaving	1,83,480
Profit forgone in 2021-22	9,00,000

QUESTION 15

Two workmen, 'A' and 'B', produce the same product using the same material. Their normal wage rate is also the same. 'A' is paid bonus according to the Rowan system, while 'B' is paid bonus according to the Halsey system. The time allowed to make the product is 50 hours. 'A' takes 30 hours while 'B' takes 40 hours to complete the product. The factory overhead rate is Rs. 5 per man- hour actually worked. The factory cost for the product for 'A' is Rs. 3,490 and for 'B' it is Rs. 3,600.

Required:

- (a) COMPUTE the normal rate of wages;
- (b) COMPUTE the cost of materials cost;
- (c) PREPARE a statement comparing the factory cost of the products as made by the two workmen.

SOLUTION

Step 1 : Let X be the cost of material and Y be the normal rate of wages per hour.

Step 2 : Factory Cost of Workman 'A'

	(Rs.)
A. Material Cost	X
B. Wages (Rowan Plan)	30 Y
C. Bonus = $\frac{30}{50} \times (50-30) \times Y$	12 Y
D. Overheads (30x 5)	150
E. Factory Cost	3,490
Or, $X + 42 Y = \text{Rs. } 3,490(\text{Given}) - \text{Rs. } 150 = \text{Rs. } 3,340$equation (i)	

Step 3: Factory Cost of Workman 'B'

	(Rs.)
A. Material cost	X
B. Wages (Halsey Plan)	40 Y
C. Bonus = 50% of (SH-AH) X R	5 Y
= 50% of (50-40) X R	
D. Overheads (40 x Rs.5)	200
E. Factory Cost	3,600
Or, $X + 45 Y = \text{Rs. } 3,600(\text{Given}) - \text{Rs. } 200 = \text{Rs. } 3,400$equation(ii)	

Step 4: Subtracting equation (i) from equation (ii)

$$3Y = \text{Rs. } 60$$

$$Y = \text{Rs. } 60/3 = \text{Rs. } 20 \text{ per hour.}$$

(a) The normal rate of wages: Rs. 20 per hour

(b) The cost of material: $X + 45 \text{ Rs. } 20 = \text{Rs. } 3,400$ or, $X = \text{Rs. } 3,400 - \text{Rs. } 900 = \text{Rs. } 2,500$

(C) Comparative Statement of the Factory Cost of the product made by the two workmen.

	'A'(Rs.)	'B'(Rs.)
Material cost	2,500	2,500
Direct Wages	600 (30x Rs.20)	800 (40x Rs.20)
Bonus	240 (12x Rs.20)	100 (5x Rs.20)
Factory Overhead	<u>150</u>	<u>200</u>
Factory Cost	<u>3,490</u>	<u>3,600</u>

QUESTION 16

The standard hours of job X is 100 hours. The job has been completed by Amar in 60 hours, Akbar in 70 hours and Anthony in 95 hours.

The bonus system applicable to the job is as follows:-

Percentage of time saved to time allowed (Slab rate)	Bonus
Saving upto 10%	10% of time saved
From 11% to 20%	15% of time saved
From 21% to 40%	20% of time saved
From 41% to 100%	25% of time saved

The rate of pay is Rs.1 per hour, Calculate the total earnings of each worker and also the rate of earnings per hour.

SOLUTION

Statement of total earnings and rate of earnings per hour

	Workers		
	Amar	Akbar	Anthony
Standard hours of Job	100 hours	100 hours	100 hours
Time taken on the Jobs (i)	60 hours	70 hours	95 hours
Time Saved	40 hours	30 hours	5 hours
Percentage of time same saved to time allowed	40%	30%	5%
Bonus hours (ii) (See Working Note 1)	6.5 hours	4.5 hours	0.5 hours
Total hours to be paid [(i) + (ii)]	66.5 hours	74.5 hours	95.5 hours
Total earning @ Re. 1 per hour	Rs. 66.5	Rs.74.5	Rs.95.5
Rate of earning per hour (See Working Note 2)	Rs. 1.1083	Rs. 1.0642	Rs. 1.005

Note:

1. Bonus hours as percentage of time saved:

Amar: $(10 \text{ hours} \times 10\%) + (10 \text{ hours} \times 15\%) + (20 \text{ hours} \times 20\%) = 6.5 \text{ hours}$

Akbar: $(10 \text{ hours} \times 10\%) + (10 \text{ hours} \times 15\%) + (10 \text{ hours} \times 20\%) = 4.5 \text{ hours}$

Anthony: $5 \text{ hours} \times 10\% = 0.5 \text{ hours}$

2. Rate of Earning per hour = $\frac{\text{Total earning}}{\text{Total time taken on job}}$

Amar = $\frac{\text{Rs. } 66.5}{60 \text{ Hours}} = \text{Rs. } 1.1083$

Akbar = $\frac{\text{Rs. } 74.5}{70 \text{ Hours}} = \text{Rs. } 1.0642$

Akbar = $\frac{\text{Rs. } 95.50}{95 \text{ Hours}} = \text{Rs. } 1.005$

QUESTION 17 (Similar to RTP May 21)

Jigyasa Boutiques LLP. (JBL) takes contract on job work basis. It works for various fashion houses and retail stores. It has employed 26 workers and pays them on time rate basis. On an average an employee is allowed 2 hours for boutique work on a piece of garment. In the month of March 2021, two workers Margaret and Jennifer were given 30 pieces and 42 pieces of garments respectively for boutique work. The following are the details of their work:

	Margaret	Jennifer
Work assigned	30 pcs.	42 pcs.
Time Taken	28 hours	40 hours

Workers are paid bonus as per Halsey System. The existing rate of wages is Rs. 50 per hour. As per the new wages agreement the worker will be paid Rs.55 per hour w.e.f. 1st April 2021. At the end of the month March 2021, the accountant of the company has calculated wages to these two workers taking Rs. 55 per hour.

- (i) *From the above information calculate the amount of loss that the company has incurred due to incorrect rate selection.*
- (ii) *What would be the loss incurred by the JBL due to incorrect rate selection if it had followed Rowan scheme of bonus payment.*
- (iii) *Amount that could have been saved if Rowan scheme of bonus payment was followed.*
- (iv) *Do you think Rowan scheme of bonus payment is suitable for JBL?*

SOLUTION

	Margaret	Jennifer
No. of garments assigned (Pieces)	30	42
Hours allowed per piece (Hours)	2	2
Total hours allowed (Hours)	60	84
Hours Taken (Hours)	28	40
Hours Saved (Hours)	32	44

(i) Calculation of loss incurred due to incorrect rate selection.
 (while calculating loss only excess rate per hour has been taken)

	Margaret (Rs.)	Jennifer (Rs.)	Total (Rs.)
Basic Wages	140 (28 Hrs. × Rs. 5)	200 (40 Hrs. × Rs. 5)	340
Bonus (as per Halsey Scheme) (50% of Time Saved × Excess Rate)	80 (50% of 32 Hrs. × Rs.5)	110 (50% of 44 Hrs. × Rs.5)	190
Excess Wages Paid	220	310	530

(ii) Amount of loss if Rowan scheme of bonus payment were followed

	Margaret (Rs.)	Jennifer (Rs.)	Total (Rs.)
Basic Wages	140.00 (28 Hrs. × Rs.5)	200.00 (40 Hrs. × Rs.5)	340.00
Bonus (as per Rowan Scheme)	74.67	104.76	179.43
$\left(\frac{\text{Time taken} \times \text{Time Saved} \times \text{Excess rate}}{\text{Time Allowed}} \right)$	$\left(\frac{28 \times 32 \times \text{Rs.5}}{60} \right)$	$\left(\frac{40 \times 44 \times \text{Rs.5}}{84} \right)$	
Excess Wages Paid	214.67	304.76	519.43

(iii) Calculation of amount that could have been saved if Rowan Scheme were followed

	Margaret (Rs.)	Jennifer (Rs.)	Total (Rs.)
Wages paid under Halsey System	220.00	310.00	530.00
Wages paid under Rowan Scheme	214.67	304.76	519.43
Difference (Savings)	5.33	5.24	10.57

(iv) Rowan scheme of incentive payment has the following benefits, which is suitable with the nature of business in which Jigyasa Boutique LLP operates:

- (a) Under Rowan Scheme of bonus payment, workers cannot increase their earning or bonus by merely increasing its work speed. Bonus under Rowan Scheme is maximum when the time taken by a worker on a job is half of the time allowed. As this fact is known to the workers, therefore, they work at such a speed which helps them to maintain the quality of output too.
- (b) If the rate setting department commits any mistake in setting standards for time to be taken to complete the works, the loss incurred will be relatively low.

QUESTION 18

Z Ltd is working by employing 50 skilled workers. It is considering the introduction of an incentive scheme - either Halsey Scheme (with 50% Bonus) or Rowan Scheme - of wage payment for increasing the labour productivity to adjust with the increasing demand for its products by 40%. The company feels that if the proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers, it could act as sufficient incentive for them to produce more and the company has accordingly given assurance to the workers.

Because of this assurance, an increase in productivity has been observed as revealed by the figures for the month of April, 2021:

Hourly rate of wages (guaranteed)	Rs. 50
Average time for producing one unit by one worker at the previous performance (this may be taken as time allowed)	1.975 hours
Number of working days in a month	24
Number of working hours per day of each worker	8
Actual production during the month	6,120 units

Required:

- Calculate the effective increase in earnings of workers in percentage terms under Halsey and Rowan scheme.
- Calculate the savings to Z Ltd in terms of direct labour cost per unit under both the schemes.
- Advise Z Ltd about the selection of the scheme that would fulfill its assurance of incentivising workers and also to adjust with the increase in demand.

SOLUTION**(a) Working Notes:**

1. Total time wages of 50 workers per month:

$$\begin{aligned}
 &= \text{No. of working days in the month} \times \text{No. of working hours per day of each worker} \\
 &\times \text{Hourly rate of wages} \times \text{No. of workers} \\
 &= 24 \text{ days} \times 8 \text{ hrs.} \times \text{Rs.}50 \times 50 \text{ workers} = \text{Rs.}4,80,000
 \end{aligned}$$

2. Time saved per month:

Time allowed per unit to a worker	1.975 hours
No. of units produced during the month by 50 workers	6,120 units
Total time allowed to produce 6,120 units (6,120 × 1.975 hrs)	12,087 hours
Actual time taken to produce 6,120 units (24 days × 8 hrs. × 50 workers)	9,600 hours
Time saved (12,087 hours - 9,600 hours)	2,487 hours

3. Bonus under Halsey scheme to be paid to 50 workers:

Bonus = (50% of time saved) × hourly rate of wages

$$= 50/100 \times 2,487 \text{ hours} \times \text{Rs.}50 = \text{Rs.}62,175$$

Total wages to be paid to 50 workers are (Rs.4,80,000 + Rs.62,175) Rs.5,42,175, if Z Ltd. considers the introduction of Halsey Incentive Scheme to increase the worker productivity.

4. Bonus under Rowan Scheme to be paid to 50 workers:

$$\text{Bonus} = \frac{\text{Time Saved}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Hourly Rate}$$

$$= \frac{9,600 \text{ Hours}}{12,087 \text{ Hours}} \times 2,487 \text{ Hours} \times \text{Rs.}50 = \text{Rs.} 98,764$$

Total wages to be paid to 50 workers are (Rs.4,80,000 + Rs.98,764) Rs.5,78,764, if Z Ltd. considers the introduction of Rowan Incentive Scheme to increase the worker productivity.

(i) (a) **Effective hourly rate of earnings under Halsey scheme:**

(Refer to Working Notes 1, 2 and 3)

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

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

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

(b) **Effective hourly rate of earnings under Rowan scheme:**

(Refer to Working Notes 1, 2 and 4)

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

$$= \frac{\text{Rs.}4,80,000 + \text{Rs.}96,875}{9,600 \text{ hours}} = \text{Rs.}60.29$$

$$\text{Effective increase in earnings of worker (in \%)} = \frac{\text{Rs.}60.29 - \text{Rs.}50}{\text{Rs.}50} \times 100 = 20.58\%$$

(ii) (a) Saving in terms of direct labour cost per unit under Halsey scheme:

(Refer to Working Note 3)

Labour cost per unit (under time wage scheme)

$$= 1.975 \text{ hours} \times \text{Rs.}50 = \text{Rs.}98.75$$

Labour cost per unit (under Halsey scheme)

$$= \frac{\text{Total wages paid under the scheme}}{\text{Total number of units produced}} = \frac{\text{Rs.}5,42,175}{6,120} = \text{Rs.}88.60$$

$$\text{Saving per unit} = \text{Rs.}98.75 - \text{Rs.}88.60 = \text{Rs.}10.15$$

(b) Saving in terms of direct worker cost per unit under Rowan Scheme:

(Refer to Working Note 4)

$$\text{Labour cost per unit under Rowan scheme} = \text{Rs.}5,78,764 / 6,120 \text{ units} = \text{Rs.}94.57$$

$$\text{Saving per unit} = \text{Rs.}98.75 - \text{Rs.}94.57 = \text{Rs.}4.18$$

(iii) Calculation of Productivity:

Normal Production Hours worked/Unit per Hour (9,600/1.975)	4,861
Actual Production Units	6,120
Increase in labour productivity	1,259
% Productivity i.e. increase in production/Normal production	25.9%

Advice: Rowan plan fulfills the company's assurance of 20% increase over the present earnings of workers. This would increase productivity by 25.9% only. It will not adjust with the increase in demand by 40%.

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QUESTION 19

A company has three production departments (M_1 , M_2 and A_1) and three service department, one of which Engineering service department, servicing the M_1 and M_2 only. The relevant information is as follows:

	Product X	Product Y
M_1	10 Machine hours	6 Machine hours
M_2	4 Machine hours	14 Machine hours
A_1	14 Direct Labour hours	18 Direct Labour hours

The annual budgeted overhead cost for the year are

	Indirect Wages (Rs.)	Consumable Supplies (Rs.)
M_1	46,520	12,600
M_2	41,340	18,200
A_1	16,220	4,200
Stores	8,200	2,800
Engineering Service	5,340	4,200
General Service	7,520	3,200

(Rs.)

- Depreciation on Machinery 39,600
- Insurance of Machinery 7,200
- Insurance of Building 3,240 (Total building insurance cost for M_1 is one third of annual premium)

- Power 6,480
- Light 5,400
- Rent 12,675 (The general service dept. is located in a building owned by the company. It is valued at Rs.6,000 and is charged into cost at notional value of 8% per annum. This cost is additional to the rent shown above)

The value of issues of materials to the production departments are in the same proportion as shown above for the Consumable supplies.

The following data are also available:

Department	Book value Machinery (Rs.)	Area (Sq. ft.)	Effective H.P. hours %	Production Direct Labour hour	Capacity Machine hour
M ₁	1,20,000	5,000	50	2,00,000	40,000
M ₂	90,000	6,000	35	1,50,000	50,000
A ₁	30,000	8,000	05	3,00,000	-
Stores	12,000	2,000	-	-	-
Engg. Service	36,000	2,500	10	-	-
General Service	12,000	1,500	-	-	-

Required:

- (i) Prepare an overhead analysis sheet, showing the basis of apportionment of overhead to departments.
- (ii) Allocate service department overheads to production department ignoring the apportionment of service department costs among service departments.
- (iii) Calculate suitable overhead absorption rate for the production departments.
- (iv) Calculate the overheads to be absorbed by two products, X and Y.

SOLUTION

(i) Summary of Apportionment of Overheads

Items	Basis of Apportionment	Total Amount	Production Deptt.			Service Deptt.		
			M1	M2	A1	Store Service	Engineering Service	General Service
Indirect wages	Allocation given	1,25,140	46,520	41,340	16,220	8,200	5,340	7,520
Consumable stores	Allocation given	45,200	12,600	18,200	4,200	2,800	4,200	3,200
Depreciation	Capital value of machine (20:15:5:2:6:2)	39,600	15,840	11,880	3,960	1,584	4,752	1,584

Insurance of Machine	Capital value of machine (20:15:5:2:6:2)	7,200	2,880	2,160	720	288	864	288
Insurance on Building	1/3rd to M1 Balance area basis (-:12:16:4:5:3)	3,240	1,080	648	864	216	270	162
Power	HP Hr% (10:7:1:-:2:-)	6,480	3,240	2,268	324	-	648	-
Light	Area (10:12:16:4:5:3)	5,400	1,080	1,296	1,728	432	540	324
Rent*	Area (10:12:16:4:5:-)	12,675	2,697	3,236	4,315	1,079	1,348	--
Total		2,44,935	85,937	81,028	32,331	14,599	17,962	13,078

*Rent to be apportioned among the departments which actually use the rented building. The notional rent is imputed cost and is not included in the calculation.

(ii) Allocation of service departments overheads

Service Dept.	Basis of Apportionment	Production Deptt.			Service Dept.		
		M1	M2	A1	Store Service	Engineering Service	General Service
Store	Ratio of consumable value (126 :182 : 42)	5,256	7,591	1,752	(14,599)	-	-
Engineering service	In Machine hours Ratio of M ₁ and M ₂ (4 : 5)	7,983	9,979	-	-	(17,962)	-
General service	Labour hour Basis (20 : 15 : 30)	4,024	3,018	6,036	-	-	(13,078)
Production Department allocated in (i)		85,937	81,028	32,331			
Total		1,03,200	1,01,616	40,119			

(iii) Overhead Absorption rate

	M ₁	M ₂	A ₁
Total overhead allocated	1,03,200	1,01,616	40,119
Machine hours	40,000	50,000	-
Labour hours	-	-	3,00,000
Rate per Machine hour	2.58	2.032	-
Rate per Direct labour	-	-	0.134

(iv) Statement showing overhead absorption for Product X and Y

Machine Dept.	Absorption Rate	Product X		Product Y	
		Hours	(Rs.)	Hours	(Rs.)
M ₁	2.58	10	25.80	6	15.48
M ₂	2.032	4	8.13	14	28.45
A ₁	0.134	14	1.88	18	2.41
			35.81		46.34

QUESTION 20

A machine shop cost centre contains three machines of equal capacities. To operate these three machines nine operators are required i.e. three operators on each machine. Operators are paid Rs.20 per hour. The factory works for forty eight hours in a week which includes 4 hours set up time. The work is jointly done by operators.

The operators are paid fully for forty eight hours. In additions they are paid a bonus of 10 percent of productive time. Costs are reported for this company on the basis of thirteen four weekly period.

The company for the purpose of computing machine hour rates includes the direct wages of the operator and also recoups the factory overheads allocated to the machines. The following details of the factory overheads applicable to the cost centre are available:

- Depreciation 10% per annum on original cost of the machine. Original cost of each machine is Rs.52,000.
- Maintenance and repairs per week per machine is Rs.60.
- Consumable stores per week per machine are Rs.75.
- Power: 20 units per hour per machine at the rate of 80 paise per unit. No power is used during the set-up hours.
- Apportionment to the cost centre: Rent per annum Rs.5,400, Heat and Light per annum Rs.9,720 foreman's salary per annum Rs.12, 960 and other miscellaneous expenditure per annum Rs.18,000.

REQUIRED

CALCULATE the cost of running one machine for a four week period.

SOLUTION

Effective Machine hour for four -week period

- = Total working hours - unproductive set-up time
- = {(48 hours * 4 weeks) - (4 hours * 4 weeks)}
- = (192- 16hours)
- =176 hours.

(i) Computation of cost of running one machine for a four week period

	(Rs.)	(Rs.)
(A) Standing charges (per annum)		
Rent	5,400	
Heat and light	9,720	
Forman's salary	12,960	
Other miscellaneous expenditure	18,000	
Standing charges (per annum)	46,080	
Total expenses for one machine for four week period (Rs.46,080/ (3machines * 13four-week period))		1,181.54
Wages (48hours * 4weeks * Rs.20 * 3 operators)		11,520.00
Bonus {(176hours * Rs.20 * 3operators) * 10%}		1,056.00
Total standing charges		13,757.54
(B) Machine Expenses		
Depreciation (52,000 * 10% * 1/13four -week period)		400.00
Repairs and maintenance (Rs.60 * 4weeks)		240.00
Consumable stores (Rs.75 * 4weeks)		300.00
Power (176hours * 20units * Rs.0.80)		2,816.00
Total machine expenses		3,756.00
(C) Total expenses (A) + (B)		17,513.54

(iii) Machine hour rate = Rs.17,513.54/176hours
= Rs.99.51

QUESTION 21 (Similar to Past Paper Nov 19)

The total overhead expenses of a factory is Rs.4,46,380. Taking into account the normal working of the factory, overhead was recovered in production at Rs.1.25 per hour. The actual hours worked were 2,93,104. STATE how would you proceed to close the books of accounts, assuming that besides 7,800 units produced of which 7,000 were sold, there were 200 equivalent units in work-in-progress?

On investigation, it was found that 50% of the unabsorbed overhead was an account of increase in the cost of indirect materials and indirect labour and the remaining 50% was due to factory inefficiency.

SOLUTION

Calculation of under / over absorption of overheads

	Amount (Rs.)
Actual factory overhead expenses incurred	4,46,380
Overheads absorbed (2,93,104 hours *1.25)	3,66,380
Under-absorption of Overhead	80,000

Reasons for unabsorbed overheads

- (i) 50% of the unabsorbed overhead was on account of increase in the cost of indirect materials and indirect labour.
- (ii) 50% of the unabsorbed overhead was due to factory inefficiency.

Treatment of unabsorbed overheads in cost accounting

1. Unabsorbed overhead amounting to Rs.40,000, which were due to increase in the cost of indirect material and labour should be charged to units of produced by using a supplementary rate.

$$\text{Supplementary rate} = \frac{\text{Rs.40,000}}{(7,800 + 200) \text{ units}} = \text{Rs.5 per unit}$$

The sum of ₹ 40,000 (unabsorbed overhead) should be distributed by using a supplementary rate among cost of sales, finished goods and work-in progress A/cs. The amount to be debited is calculated as below:

	Amount(Rs.)
Stock of Finished Goods {(7,800 -7,000) * Rs.5}	4,000
Work-in -progress (200 units *Rs.5)	1,000
Cost of Sales (7,000 units *Rs.5)	35,000
Total	40,000

1. The use of cost of sales figure, would reduce the profit for the period by ₹ 35,000 and will increase the value of stock of finished goods and work- in-progress by ₹ 4,000 and ₹ 1,000 respectively.
2. The balance amount of unabsorbed overheads of ₹ 40,000 due to factory inefficiency should be debited to Costing Profit & Loss Account, as this is an abnormal loss.

QUESTION 22

In an engineering company, the factory overheads are recovered on a fixed percentage basis on direct wages and the administrative overheads are absorbed on a fixed percentage basis on factory cost.

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

	Job 101 (Rs.)	Job 102 (Rs.)
Direct materials	54,000	37,500
Direct wages	42,000	30,000
Selling price	1,66,650	1,28,250
Profit percentage on total cost	10%	20%

Required:

- (i) COMPUTATION of percentage recovery rates of factory overheads and administrative overheads.
- (ii) CALCULATION of the amount of factory overheads, administrative overheads and profit for each of the two jobs.
- (iii) Using the above recovery rates DETERMINE the selling price of job 103.

The additional data being:

Direct Material	Rs.24,000
Direct Wages	Rs.20,000
Profit percentage on selling price	12-1/2%

SOLUTION

- (i)Computation of percentage recovery rates of factory overheads and administrative overheads.

Let the factory overhead recovery rate as percentage of direct wages be F and administrative overheads recovery rate as percentage of factory cost be A.

Factory cost of jobs:

Direct material +Direct wages +Factory overhead

For job 101 =Rs.54,000 +Rs.42,000 +Rs.42,000F

For job 102 =Rs.37,500 +Rs.30,000 +Rs.30,000F

Total cost of jobs:

Factory cost +Administrative overhead

For job 101 = (Rs.96,000 +Rs.42,000F) +(96,000 +42,000F) A =Rs.1,51,500* eqn.....(i)

For job 102 = (Rs.67,500 + Rs.30,000F) +(67,500 +30,000F) A =Rs.1,06,875** eqn....(ii)

The value of F & A can be found using following equation

Multiply equation (i) by 5 and equation (ii) by 7

$$4,80,000 + 2,10,000F + 4,80,000A + 2,10,000AF = 7,57,500 \dots\dots\dots \text{eqn (iii)}$$

$$4,72,500 + 2,10,000F + 4,72,500A + 2,10,000AF = 7,48,125 \dots\dots\dots \text{eqn (iv)}$$

$$\begin{array}{r} - & - & - & - & - \\ 7,500 + 7,500A & & & & = 9,325 \end{array}$$

$$7,500 A = 9,325 - 7,500$$

$$A = 0.25$$

Now put the value of A in equation (i) to find the value of F

$$96,000 + 42,000F + 24,000 + 10,500F = 1,51,500$$

$$52,500F = 1,51,500 - 1,20,000$$

$$F = 0.6$$

On solving the above relations: F = 0.60 and A = 0.25

Hence, percentage recovery rates of:

Factory overheads = 60% of wages and

Administrative overheads = 25% of factory cost.

Working note:

$$\text{Total cost} = \frac{\text{Selling Price}}{(100\% + \text{percentage of profit})}$$

$$\text{*For job 101} = \frac{\text{Rs.1,66,650}}{(100\% + 20\%)} = \text{Rs.1,51,500}$$

$$\text{**For job 102} = \frac{\text{Rs.1,28,250}}{(100\% + 20\%)} = \text{Rs.1,06,875}$$

(ii) Statement of jobs, showing amount of factory overheads, administrative overheads and profit:

	Job 101	Job 102
	(Rs.)	(Rs.)
Direct materials	54,000	37,500
Direct wages	42,000	30,000
Prime cost	96,000	67,500
<u>Factory overheads:</u>		
60% of direct wages	25,200	18,000
Factory cost	1,21,200	85,500
<u>Administrative overheads:</u>		
25% of Factory cost	30,300	21,375
Total cost	1,51,500	1,06,875
Profit(10% & 20% respectively)	15,150	21,375
Selling price	1,66,650	1,28,250

(iii) Selling price of job 103

	(Rs.)
Direct materials	24,000
Direct wages	20,000
Prime cost	44,000
Factory overheads (60% of Direct wages)	12,000
Factory cost	56,000
Administrative overheads (25% of factory cost)	14,000
Total cost	70,000
Profit margin (balancing figure)	10,000
Selling price (total cost/87.5%)	80,000

QUESTION 23

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 (Rs.)	Direct Wages (Rs.)	Factory Overheads (Rs.)	Direct labour hours (Rs.)	Machine Hours
Budget:					
Machinery	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:					
Machinery	7,80,000	96,000	3,90,000	24,000	96,000
Assembly	1,36,000	2,70,000	84,000	90,000	11,000
Packing	1,20,000	90,000	1,35,000	60,000	-

The details of one of the representative jobs produced during the month are as under:
Job No. CW 7083

Department	Direct Materials	Direct Wages	Direct Labour hours	Machine Hours
Machinery	1,200	240	60	180
Assembly	600	360	120	30
Packing	300	60	40	-

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

Required:

- (i) COMPUTE the overhead absorption rate as per the current policy of the company and determine the selling price of the Job No. CW 7083.
- (ii) Suggest any suitable alternative method(s) of absorption of factory overheads and CALCULATE the overhead recovery rates based on the method(s) so recommended by you.
- (iii) DETERMINE the selling price of job CW 7083 based on the overhead application rates calculated in (ii) above.
- (iv) CALCULATE the department-wise and total under or over recovery of overheads based on the company's current policy and the method(s) recommended by you.

SOLUTION

**(i) Computation of overhead absorption rate
(as per the current policy of the company)**

Department	Budgeted Factory Overheads	Budgeted Direct Wages
	(Rs.)	(Rs.)
Machinery	3,60,000	80,000
Assembly	1,40,000	3,50,000
Packing	1,25,000	70,000
Total	6,25,000	5,00,000

Overhead absorption rate = Budgeted factory overheads * 100

$$\begin{aligned}
 & \frac{\text{Budgeted Direct Wages}}{5,00,000} \\
 & = \frac{6,25,000 * 100}{5,00,000} \\
 & = 125\% \text{ of Direct wages}
 \end{aligned}$$

Selling price of the Job. CW - 7083

	(Rs.)
Direct materials (Rs.1,200 + Rs.600 + Rs.300)	2,100.00
Direct Wages (Rs.240 + Rs.360 + Rs.60)	660.00
Overheads (125% * 660)	825.50
Total factory cost	3,585.00
Add: Mark-up (30% * 3,585)	1,075.50
Selling Price	4,660.50

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

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:

$$\begin{aligned} \text{Machine hour rate} &= \frac{\text{Budgeted factory overheads}}{\text{Budgeted machine hours}} \\ &= \frac{\text{Rs.3,60,000}}{80,000 \text{ hours}} \\ &= \text{Rs. 4.50 per hour} \end{aligned}$$

2. **Assembly Department**

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

$$\begin{aligned} \text{Direct labour hour rate} &= \frac{\text{Budgeted factory overheads}}{\text{Budgeted direct labour hours}} \\ &= \frac{\text{Rs.1,40,000}}{1,00,000 \text{ hours}} \\ &= \text{Rs. 1.40 per hour} \end{aligned}$$

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:

Budgeted factory overheads

$$\begin{aligned} \text{Direct labour hour rate} &= \frac{\text{Budgeted factory overheads}}{\text{Direct labour hours}} \\ &= \frac{\text{Rs.1,25,000}}{50,000 \text{ hours}} \\ &= \text{Rs.2.50 per hour} \end{aligned}$$

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

	Rs.
Direct materials	2,100.00
Direct wages	660.00
Overheads (Refer to Working Note)	1,078.00
Factory cost	3,838.00
Add: Mark up (30% of 3,838)	1,151.40
Selling price	4,989.40

Working note:

Overhead summary statement

Dept.	Basis	Hours	Rate (Rs.)	Overheads (Rs.)
Machining	Machine hour	180	4.50	810
Assembly	Direct labour hour	120	1.40	168
Packing	Direct labour hour	40	2.50	100
			Total	1,078

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

(a) Under current policy

Departments

	Machining (Rs.)	Assembly (Rs.)	Packing (Rs.)	Total (Rs.)
Direct Wages (Actual)	96,000	2,70,000	90,000	
Overheads Recovered @ 125% of Direct Wages: (A)	1,20,000	3,37,500	1,12,500	5,70,000
Actual overheads: (B)	3,90,000	84,000	1,35,000	6,09,000
(Under)/over recovery of recovery of overheads: (A-B)	(2,70,000)	2,53,500	(22,500)	39,000

(b) As per methods suggested

Basis of overheads recovery

	Machine hours	Direct labour hours	Direct labour hours	Total (Rs.)
Hours worked	96,000	90,000	60,000	
Rate/hour (Rs.)	4.50	1.40	2.50	
Overhead Recovered (Rs.): (A)	4,32,000	1,26,000	1,50,000	7,08,000
Actual overheads (Rs.): (B)	3,90,000	84,000	1,35,000	6,09,000
(Under)/ Over recovery: (A-B)	42,000	42,000	15,000	99,000

QUESTION 24

A machine was purchased from a manufacturer who claimed that his machine could produce 36.5 tonnes in a year consisting of 365 days. Holidays, break-down, etc., were normally allowed in the factory for 65 days. Sales were expected to be 25 tonnes during the year and the plant actually produced 25.2 tonnes during the year. You are required to state the following figures:

- (a) Rated Capacity.
- (b) Practical Capacity.
- (c) Normal Capacity.
- (d) Actual Capacity.

SOLUTION

(a) Rated capacity	36.5 tonnes
(Refers to the capacity of a machine or a plant as indicated by its manufacturer)	
(b) Practical capacity	30.0 tonnes
[Defined as actually utilised capacity of a plant i.e. $\frac{36.5 \text{ tonnes} \times (365 - 65) \text{ days}}{365 \text{ days}}$]	
(c) Normal capacity	25.0 tonnes
(It is the capacity of a plant utilized based on sales expectancy)	
(d) Actual capacity	25.2 tonnes
(Refers to the capacity actually achieved)	

Student Notes

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QUESTION 25 (Similar to Past Paper May 19)

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, 2021 are Rs.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	Rs. 300 per unit	Rs. 450 per unit
Direct Labour Cost		
Y: 3 hours @ Rs.150 per hour	Rs. 450	- - -
X: 4 hours @ Rs. 150 per hour	- - -	Rs.600

ABC Ltd.'s overheads of Rs.12,42,500 can be identified with three major activities: Order Processing (Rs.2,10,000), machine processing (Rs.8,75,000), and product inspection (Rs.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:

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

Required:

- (i) 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.
- (ii) Assuming use of activity-based costing, COMPUTE the unit manufacturing costs of the equipment Y and Z, if the budgeted manufacturing volume is achieved.
- (iii) 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 over-costed) for each equipment.

SOLUTION

(i) Overheads application base: Direct labour hours

	Equipment	
	Y (Rs.)	Z (Rs.)
Direct material cost	300	450
Direct labour cost	450	600
Overheads*	186.38	248.50
	936.38	1,298.50

$$\begin{aligned}
 \text{*Pre-determined rate} &= \frac{\text{Budgeted Overheads}}{\text{Budgeted Direct Labour Hours}} \\
 &= \frac{\text{Rs. 12,42,500}}{20,000 \text{ hours}} = \text{Rs. 62.125}
 \end{aligned}$$

(ii) Estimation of Cost-Driver rate

Activity	Overhead Cost	Cost-driver level	Cost driver rate
	(Rs.)		(Rs.)
Order processing	2,10,000	600 Orders processed	350
Machine processing	8,75,000	50,000 Machine hours	17.50
Inspection	1,57,500	15,000 Inspection hours	10.50

	Equipment	
	Y (Rs.)	Z (Rs.)
Direct material cost	300	450
Direct labour cost	450	600
Prime Cost	750	1,050
Overhead Cost		
Order processing 350 : 250 or Rs.350 per order	1,22,500	87,500
Machine processing 23,000 : 27,000 or Rs.17.5 per hour	4,02,500	4,72,500
Inspection 4,000 : 11,000	42,000	1,15,500
Total overhead cost	5,67,000	6,75,500

Per unit cost		
5,67,000 / 2,500	Rs.226.80	Rs. 216.16
6,75,500/ 3,125		
Unit manufacturing cost (Prime Cost + Overhead per unit)	Rs. 976.80	Rs.1,266.16

(iii)	Equipment	Equipment
	Y (Rs.)	Z (Rs.)
Unit manufacturing cost- using direct labour hours as an application base	936.38	1,298.50
Unit manufacturing cost-using activity based costing	976.80	1,266.16
Cost distortion	(-)40.42	+ 32.34

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

QUESTION 26 (Similar to RTP May 18, May 19)

RST Limited specializes in the distribution of pharmaceutical products. It buys from the pharmaceutical companies and resells to each of the three different markets.

- i. General Supermarket Chains
- ii. Drugstore Chains
- iii. Chemist Shops

The following data for the month of April, 2021 in respect of RST Limited has been reported:

	<i>General Supermarket Chains (Rs.)</i>	<i>Drug store Chains (Rs.)</i>	<i>Chemist Shops (Rs.)</i>
<i>Average revenue per delivery</i>	84,975	28,875	5,445
<i>Average cost of goods sold per delivery</i>	82,500	27,500	4,950
<i>Number of deliveries</i>	330	825	2,750

In the past, RST Limited has used gross margin percentage to evaluate the relative profitability of its distribution channels.

The company plans to use activity -based costing for analysing the profitability of its distribution channels.

The Activity analysis of RST Limited is as under:

<i>Activity Area</i>	<i>Cost Driver</i>
<i>Customer purchase order processing</i>	<i>Purchase orders by customers</i>
<i>Line-item ordering</i>	<i>Line-items per purchase order</i>
<i>Store delivery</i>	<i>Store deliveries</i>
<i>Cartons dispatched to stores</i>	<i>Cartons dispatched to a store per delivery</i>
<i>Shelf-stocking at customer store</i>	<i>Hours of shelf-stocking</i>

The April, 2021 operating costs (other than cost of goods sold) of RST Limited are Rs. 8,27,970. These operating costs are assigned to five activity areas. The cost in each area and the quantity of the cost allocation basis used in that area for April, 2021 are as follows:

Activity Area	Total costs in April, 2021 (Rs.)	Total Units of Cost Allocation Base used in April, 2021
Customer purchase order processing	2,20,000	5,500 orders
Line-item ordering	1,75,560	58,520 line items
Store delivery	1,95,250	3,905 store deliveries
Cartons dispatched to store	2,09,000	2,09,000 cartons
Shelf-stocking at customer store	28,160	1,760 hours

Other data for April, 2021 include the following:

	General Supermarket Chains	Drug store Chains	Chemist Shops
Total number of orders	385	990	4,125
Average number of line items per order	14	12	10
Total number of store deliveries	330	825	2,750
Average number of cartons shipped per store delivery	300	80	16
Average number of hours of shelf-stocking per store delivery	3	0.6	0.1

Required:

- (i) COMPUTE for April, 2021 gross-margin percentage for each of its three distribution channels and compute RST Limited's operating income.
- (ii) COMPUTE the April, 2021 rate per unit of the cost-allocation base for each of the five activity areas.
- (iii) COMPUTE the operating income of each distribution channel in April, 2021 using the activity-based costing information. Comment on the results. What new insights are available with the activity-based cost information?
- (iv) DESCRIBE four challenges one would face in assigning the total April, 2021 operating costs of Rs.8,27,970 to five activity areas.

SOLUTION

RST Limited's

- i. **Statement of operating income and gross margin percentage for each of its three distribution channels**

Particulars	General Super Market Chains	Drugstore Chains	Chemist Shops	Total
Revenues: (Rs.)	2,80,41,750 (330 × Rs.84,975)	2,38,21,875 (825 × Rs. 28,875)	1,49,73,750 (2,750 × Rs. 5,445)	6,68,37,375
Less: Cost of goods sold: (Rs.)	2,72,25,000 (330 × Rs. 82,500)	2,26,87,500 (825 × Rs. 27,500)	1,36,12,500 (2,750 × Rs.4,950)	635,25,000
Gross Margin: (Rs.)	8,16,750	11,34,375	13,61,250	33,12,375
Less: Other operating costs: (Rs.)				8,27,970
Operating income: (Rs.)				24,84,405
Gross Margin	2.91%	4.76%	9.09%	4.96%
Operating income %				3.72

- ii. **Computation of rate per unit of the cost allocation base for each of the five activity areas for April 2021**

	(Rs.)
Customer purchase order processing (Rs. 2,20,000/ 5,500 orders)	40 per order
Line item ordering (Rs. 1,75,560/ 58,520 line items)	3 per line item order
Store delivery (Rs. 1,95,250/ 3,905 store deliveries)	50 per delivery
Cartons dispatched (Rs. 2,09,000/ 2,09,000 dispatches)	1 per dispatch
Shelf-stocking at customer store (Rs. 28,160/ 1,760 hours)	16 Per hour

iii. Operating Income Statement of each distribution channel in April-2021
(Using the Activity based Costing information)

	General Super Market Chains	Drugstore Chains	Chemist Shops
Gross margin (Rs.) : (A) (Refer to (i) part of the answer)	8,16,750	11,34,375	13,61,250
Operating cost (Rs.): (B)(Refer to working note)	1,62,910	1,90,410	4,74,650
Operating income (Rs.): (A-B)	6,53,840	9,43,965	8,86,600
Operating income (in %) (Operating income/ Revenue) × 100	2.33	3.96	5.92

Comments and new insights: The activity-based cost information highlights, how the 'Chemist Shops' uses a larger amount of RST Ltd.'s resources per revenue than do the other two distribution channels. Ratio of operating costs to revenues, across these markets is:

General supermarket chains (Rs.1,62,910/ Rs.2,80,41,750) × 100	0.58%
Drug store chains (Rs.1,90,410/ Rs.2,38,21,875) × 100	0.80%
Chemist shops (Rs.4,74,650/ Rs.1,49,73,750) ×100	3.17%

Student Notes

Working note:

Computation of operating cost of each distribution channel:

	General SuperMarket Chains (Rs.)	Drugstore Chains (Rs.)	Chemist Shops (Rs.)
Customer purchase order processing	15,400 (Rs. 40 × 385 orders)	39,600 (Rs.40 × 990 orders)	1,65,000 (Rs.40 × 4125 orders)
Line item Ordering	16,170 (Rs.3 × 14 × 385)	35,640 (Rs.3 × 12 × 990)	1,23,750 (Rs.3 × 10 × 4125)
Store delivery	16,500 (Rs.50 × 330 deliveries)	41,250 (Rs.50 × 825 deliveries)	1,37,500 (Rs.50 × 2750 deliveries)
Cartons dispatched	99,000 (Re.1 × 300 cartons × 300 deliveries)	66,000 (Re.1 × 80 cartons × 825 deliveries)	44,000 (Re.1 × 16 cartons × 2,750 deliveries)
Shelf stocking	15,840 (Rs.16 × 330 deliveries × 3 Av.hrs.)	7,920 (Rs.16 × 825 deliveries × 0.6 Av. hrs)	4,400 (Rs.16 × 2,750 deliveries × 0.1 Av. hrs)
Operating cost	1,62,910	1,90,410	4,74,650

iv. Challenges faced in assigning total operating cost of Rs. 8,27,970:

- Choosing an appropriate cost driver for activity area.
- Developing a reliable data base for the chosen cost driver.
- Deciding, how to handle costs that may be common across several activities.
- Choice of the time period to compute cost rates per cost driver.
- Behavioural factors.

Q.	Concept	Pg
27	Basic Format with all Items	63-66
28	Calculation of Individual Functions of Cost Sheet	67-70
29	Reverse Cost Sheet	71-72
30	Ascertaining Cost of Production & Selling Price	73-74

QUESTION 27 (Master Sum) (Similar to RTP May 21)

Arnav Inspat Udyog Ltd. has the following expenditures for the year ended 31st March, 2021:

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

(xix)	Expenses paid for pollution control and engineering & maintenance		26,600
(xx)	Expenses paid for administration of factory work		1,18,600
(xxi)	Salary paid to functional managers:		
	Production control	9,60,000	
	Finance and Accounts	9,18,000	
	Sales and Marketing	10,12,000	28,90,000
(xxii)	Salary paid to General Manager		12,56,000
(xxiii)	Packing cost paid for:		
	Primary packing necessary to maintain quality	96,000	
	For re-distribution of finished goods	1,12,000	2,08,000
(xxiv)	Interest and finance charges paid (for usage of non-equity fund)		7,20,000
(xxv)	Fee paid to auditors		1,80,000
(xxvi)	Fee paid to legal advisors		1,20,000
(xxvii)	Fee paid to independent directors		2,20,000
(xxviii)	Performance bonus paid to sales staffs		1,80,000
(xxix)	Value of stock as on 1st April, 2020:		
	Raw materials	18,00,000	
	Work-in-process	9,20,000	
	Finished goods	11,00,000	38,20,000
(xxx)	Value of stock as on 31st March, 2021:		
	Raw materials	9,60,000	
	Work-in-process	8,70,000	
	Finished goods	18,00,000	36,30,000

Amount realised by selling of scrap and waste generated during manufacturing process - Rs.86,000 /-

From the above data you are required to PREPARE a statement of cost for Arnav Ispat Udyog Ltd. for the year ended 31st March, 2021, showing:

- (i) Prime cost
- (ii) Factory cost
- (iii) Cost of Production
- (iv) Cost of goods sold and
- (v) Cost of sales.

SOLUTION

Statement of Cost of Arnav Ispat Udyog Ltd. for the year ended 31st March, 2021:

Sr. No.		Amount (Rs.)	Amount (Rs.)
(i)	Material consumed:		
	Raw materials purchased	10,00,00,000	
	Freight inwards	11,20,600	
	Add: Opening stock of raw materials	18,00,000	
	Less: Closing stock of raw materials	(9,60,000)	10,19,60,600
(ii)	Direct employee (labour) cost:		
	Wages paid to factory workers	29,20,000	
	Contribution made towards employees' PF & ESIS	3,60,000	
	Production bonus paid to factory workers	2,90,000	35,70,000
(iii)	Direct expenses:		
	Royalty paid for production	1,72,600	
	Amount paid for power and fuel	4,62,000	
	Amortised cost of moulds and patterns	4,48,000	
	Job charges paid to job workers	8,12,000	18,94,600
	Prime Cost		10,74,25,200
(iv)	Works/ Factory overheads:		
	Stores and spares consumed	1,12,000	
	Depreciation on factory building	84,000	
	Depreciation on plant and machinery	1,26,000	
	Repairs and Maintenance paid for plant & machinery	48,000	
	Insurance premium paid for plant and machinery	31,200	
	Insurance premium paid for factory building	18,100	
	Insurance premium paid for stock of raw materials & WIP	36,000	
	Salary paid to supervisors	1,26,000	
	Expenses paid for pollution control and engineering & maintenance	26,600	6,07,900
	Gross factory cost		10,80,33,100
	Add: Opening value of W-I-P		9,20,000
	Less: Closing value of W-I-P		(8,70,000)
	Factory Cost		10,80,83,100

(v)	Quality control cost: Expenses paid for quality control check activities	19,600	
	Salary paid to quality control staffs	96,200	1,15,800
(vi)	Research and development cost paid for improvement in production process		18,200
(vii)	Administration cost related with production: -Expenses paid for administration of factory work	1,18,600	
	-Salary paid to production control manager	9,60,000	10,78,600
(viii)	Less: Realisable value on sale of scrap and waste		(86,000)
(ix)	Add: Primary packing cost		96,000
	Cost of Production		10,93,05,700
	Add: Opening stock of finished goods		11,00,000
	Less: Closing stock of finished goods		(18,00,000)
	Cost of Goods Sold		10,86,05,700
(x)	Administrative overheads: Depreciation on office building	56,000	
	Repairs and Maintenance paid for vehicles used by directors	19,600	
	Salary paid to manager-Finance & Accounts	9,18,000	
	Salary paid to General Manager	12,56,000	
	Fee paid to auditors	1,80,000	
	Fee paid to legal advisors	1,20,000	
	Fee paid to independent directors	2,20,000	27,69,600
(xi)	Selling overheads: Repairs and Maintenance paid for sales office building	18,000	
	Salary paid to manager- Sales & Marketing	10,12,000	
	Performance bonus paid to sales staffs	1,80,000	12,10,000
(xii)	Distribution overheads: Depreciation on delivery vehicles	86,000	
(xiii)	Packing cost paid for re-distribution of finished goods	1,12,000	1,98,000
(xiv)	Interest and finance charges paid		7,20,000
	Cost of sales		11,35,03,300

Note: GST paid on purchase of raw materials would not be part of cost of materials as it is eligible for input tax credit.

QUESTION 28 (Reverse Cost sheet) (Past Paper Nov'19) (Very IMP Sum)

XYZ a manufacturing firm, has revealed following information for September ,2021:

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

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

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

Defective output which is 4% of targeted production, realizes Rs. 61 per unit. Closing stock is valued at cost of production (excluding administrative expenses) Cost of goods sold, excluding administrative expenses amounts to Rs. 78,26,000.

Direct employees cost is 1/2 of the cost of material consumed.

Selling price of the output is Rs. 110 per unit.

You are required to :

- (i) Calculate the Value of material purchased
- (ii) Prepare cost sheet showing the profit earned by the firm.

SOLUTION

Workings:

1. Calculation of Sales Quantity:

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

2. Calculation of Cost of Production

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

3. Calculation of Factory Cost

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

4. Calculation of Gross Factory Cost

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

5. Calculation of Prime Cost

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

(6) Calculation of Cost of Materials Consumed & Labour cost

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

Prime Cost = Cost of Material Consumed + Labour Cost

$$78,00,000 = M + 0.5M$$

$$M = 52,00,000$$

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

(I) Calculation of Value of Materials Purchased

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

Cost Sheet

Sr No.	Particulars	Total Cost (Rs.)
1.	Direct materials consumed:	
	Opening Stock of Raw Material	2,42,000
	Add: Additions/ Purchases [balancing figure as per requirement (i)]	52,50,000
	Less: Closing stock of Raw Material	(2,92,000)
	Material Consumed	52,00,000
2.	Direct employee (labour) cost	26,00,000
3.	Prime Cost (1+2)	78,00,000
4.	Add: Works/ Factory Overheads	
	Consumable stores and spares	3,50,000
	Lease rent of production asset	2,00,000
5.	Gross Works Cost (3+4)	83,50,000
6.	Add: Opening Work in Process	2,00,000
7.	Less: Closing Work in Process	(5,00,000)
8.	Works/ Factory Cost (5+6-7)	80,50,000
9.	Add: Quality Control Cost	2,00,000
10.	Add: Research and Development Cost	2,50,000
11.	Less: Credit for Recoveries/Scrap/By-Products/misc. income	(2,44,000)
12.	Cost of Production (8+9+10-11)	82,56,000
13.	Add: Opening stock of finished goods	-
14.	Less: Closing stock of finished goods (5000 Units)	(4,30,000)

15.	Cost of Goods Sold (12+13-14)	78,26,000
16.	Add: Administrative Overheads (General)	2,24,000
17.	Add: Secondary packing (91,000 unit x 2 per unit)	1,82,000
18.	Add: Selling Overheads & Distribution Overheads	4,13,000
19.	Cost of Sales (15+16+17+18)	86,45,000
20.	Profit (Balancing Figure)	13,65,000
21.	Sales 91,000 units @ Rs. 110 per unit	1,00,10,000

QUESTION 29

Preparation of Cost Sheet- Finding out missing figures by reverse working and balancing figures.

A fire occurred in the factory premises on 31st October of a year. The accounting records have been destroyed. Certain accounting records kept in another building, reveal the following for the period 1st September to 31st October.

1. Direct Material purchased	Rs. 2,50,000	6. Sales Revenues	Rs. 7,50,000
2. Work in Process Inventory on 1 st September	Rs. 40,000	7. Direct Labour	Rs. 2,22,250
3. Direct Material Inventory on 1st September	Rs. 20,000	8. Prime Cost	Rs. 3,97,750
4. Finished Goods Inventory on 1 st September	Rs. 37,750	9. Cost of goods available for sale	Rs. 555,775
5. Indirect Manufacturing Costs	40% of Conversion Costs	10. Gross of Margin percentage % based on Revenues	30%

The loss is fully covered by insurance. The Insurance company wants to know the historical cost of the inventories as a basis for negotiating a settlement, although the settlement is actually to be based on replacement cost. You are required to compute the following items as on 31st October- (1) Finished Goods Inventory, (2) Work in Process Inventory, and (3) Direct Materials Inventory.

SOLUTION

Cost Sheet for the year ended 31st October

Particulars	Computation	Rs.
Opening Stock of Raw Materials	(given)	20,000
Add: Purchase & Carriage Inwards	(given)	2,50,000
		2,70,000
Less: Closing Stock of Raw Materials	(Balancing Figure)	(94,500)
Direct Materials Consumed (by reverse working)	Prime Cost less Labour	1,75,500
Add: Direct Labour	(given)	2,22,250
Prime Cost	(given)	3,97,750
Add: Factory Overheads (See Note below)	$(2,22,250 \div 60\%) \times 40\%$	1,48,167
Add: Opening Stock of Work-in-progress	(given)	40,000
		5,85,917
Less: Closing Stock of Work-in-Progress	(Balancing Figure)	(67,892)

Factory Cost (by reverse working) Add: Administration Overheads	Rs. 5,18,025 - Nil (Not given in Question, hence ignore)	5,18,025 Nil
Cost of production (by reverse working) Add: Opening Stock of Finished Goods	Rs. 5,55,775 - Rs. 37,750 (given)	5,18,025 37,750
Cost of goods available for sale Less: Closing Stock of Finished Goods	(given) (Balancing Figure)	5,55,775 (30,775)
Cost of Goods Sold (by reverse working) Add: Selling and distribution Overheads	Rs. 5,25,000 - Nil (Not given in Question, hence ignore)	5,25,000 Nil
Cost of Sales Add: Profit/ (Loss)	Sales less 30% (30% of Sales given)	5,25,000 2,25,000
Sales	(given)	7,50,000

Note:

- Cost Sheet format is first written, and the figures available in the question are filled up. The other figures are derived by reverse working and/ or as balancing figures.
- Conversion Cost = direct Labour + Factory OH (i.e. Indirect Manufacturing Costs). Since Factory OH is 40% of Conversion Costs (100%), **Direct Labour = 100% - 40% = 60% of Conversion Costs**
- Since Direct Labour = 60% of Conversion costs = Rs. 2,22,250 (given), Factory OH is calculated at 40% proportionately.

QUESTION 30

A factory incurred the following expenditure during the year 2020.

Particulars	Amount in (Rs.)	Amount in (Rs.)
Direct Material Consumed		12,00,000
Manufacturing Wages		7,00,000
Manufacturing Overheads:	3,60,000	
Fixed		
Variable	2,50,000	6,10,000
		25,10,000

In the year 2021, following changes are expected in production and cost of production.

(i) Production will increase due

To recruitment of 60% more workers in the factory.

(ii) Overall efficiency will decline by 10% on account of recruitment of new workers.

(iii) There will be an increase of 20% in Fixed Overhead and 60% in Variable Overhead.

(iv) The cost of direct material will be decreased by 6%.

(v) The company desire to earn a profit of 10% on Selling Price.

Ascertain the Cost of Production and Selling Price.

SOLUTION

Budgeted Cost Sheet for the year 2008

Particulars	Amount in (Rs.)	Amount in (Rs.)	Amount in (Rs.)
Direct Material Consumed		12,00,000	
Add: 44% due to Increased Output		5,28,000	
		17,28,000	
Less: 6% for decline in price		1,03,680	16,24,320
Direct Wages (Manufacturing)		7,00,000	
Add: 60% Increase		4,20,000	11,20,000
Prime Cost			27,44,320

Manufactured Overhead:			
Fixed	3,60,000		
Add: 20% Increase	72,000	4,32,000	
Variable	2,50,000		
Add: 60% Increase	1,50,000	4,00,000	8,32,000
Cost of Production			35,76,320
Add: 1/9 of cost or 10% on Selling Price			3,97,369
Selling Price			39,73,689

Q.	Concept	Pg
31	Journal Entries & Ledgers in Non-Integrated Cost Accounting	75-78
32	Main Control A/c & Profit & Loss A/c (Not-Integrated)	79-83
33	Control A/c for Integrated Accounts	84-87
34	Preparation of Profit & Loss A/c, Cost Sheet & its Reconciliation	88-90
35	Memorandum Reconciliation Statement	91

QUESTION 31 (Similar to RTP May 18, Nov 19, May 20)

As on 31st March, 2020, the following balances existed in a firm's Cost Ledger:

	Dr. (Rs.)	Cr. (Rs.)
Stores Ledger Control A/c	3,01,435	
Work-in-Process Control A/c	1,22,365	
Finished Stock Ledger Control A/c	2,51,945	
Manufacturing Overhead Control A/c		10,525
Cost Ledger Control A/c		6,65,220
	6,75,745	6,75,745

During the next three months the following items arose:

	(Rs.)
Finished product (at cost)	2,10,835
Manufacturing overhead incurred	91,510
Raw materials purchased	1,23,000
Factory Wages	50,530
Indirect Labour	21,665
Cost of Sales	1,85,890
Material issued to production	1,27,315
Sales returned at Cost	5,380
Material returned to suppliers	2,900
Manufacturing overhead charged to production	77,200

You are required to PASS the Journal Entries; write up the accounts and schedule the balances, stating what each balance represents.

Student Notes

SOLUTION

Journal entries are as follows:

			Dr. (Rs.)	Cr. (Rs.)
1.	Finished stock ledger Control A/c To work-in-Process Control A/c	Dr.	2,10,835	2,10,835
2.	Manufacturing Overhead Control A/c To Cost Ledger Control A/c	Dr.	91,510	91,510
3.	Stores Ledger Control A/c To Cost Ledger Control A/c	Dr.	1,23,000	1,23,000
4.	(i) Wage Control A/c To Cost Ledger Control A/c	Dr.	72,195	72,195
	(ii) Work-in-Process Control A/c To Wages Control A/c	Dr.	50,530	50,530
	(iii) Manufacturing Overhead Control A/c To Wages Control A/c	Dr.	21,665	21,665
5.	Cost of Sales A/c To Finished Stock Ledger A/c	Dr.	1,85,890	1,85,890
6.	Work-in-Process Control A/c To Stores Ledger Control A/c	Dr.	1,27,315	1,27,315
7.	Finished Stock Ledger A/c To Cost of Sales A/c	Dr.	5,380	5,380
8.	Cost Ledger Control A/c To Stores Ledger Control A/c	Dr.	2,900	2,900
9.	Work-in-Process Control A/c To Manufacturing Overhead Control A/c	Dr.	77,200	77,200

COST LEDGERS

Cost Ledger Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Stores Ledger Control A/c (return)	2,900	By Balance b/d	6,65,220
" Balance c/d	9,49,025	" Manufacturing OH Control A/c	91,510
		" Stores Ledger Control A/c	1,23,000
		" Wages Control A/c	72,195
	9,51,925		9,51,925

Stores Ledger Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	3,01,435	By Work in Process Control A/c	1,27,315
" Cost Ledger Control A/c	1,23,000	" Cost Ledger Control A/c	2,900
	4,24,435	" Balance c/d	2,94,220
			4,24,435

Wages Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Cost Ledger Control A/c	72,195	By Work in Process Control A/c	50,530
		" Manufacturing OH Control A/c	21,665
	72,195		72,195

Manufacturing Overhead Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Cost Ledger Control A/c	91,510	By Balance b/d	10,525
" Wages Control A/c	21,665	" Work in Process Control A/c	77,200
	1,13,175	" Balance c/d	25,450
			1,13,175

Work-in-Process Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	1,22,365	By Finished Stock Ledger Control A/c	2,10,835
" Wages Control A/c	50,530	" Balance c/d	1,66,575
" Stores Ledger Control A/c	1,27,315		
" Manufacturing OH Control A/c	77,200		
	3,77,410		3,77,410

Finished Stock Ledger Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	2,51,945	By Cost of Sales Control	1,85,890
" Work in Process Control A/c	2,10,835	" A/c	
" Cost of Sales Control A/c (Return at cost)	5,380	" Balance c/d	2,82,270
	4,68,160		4,68,160

Cost of Sales Account

Particulars	(Rs.)	Particulars	(Rs.)
To Finished Stock Ledger Control	1,85,890	By Finished Stock Ledger Control (Return)	5,380
		" Balance c/d	1,80,510
	1,85,890		1,85,890

Trial Balance

Particulars	Dr. (Rs.)	Cr. (Rs.)
Stores Ledger Control A/c	2,94,220	
Work-in-Process Control A/c	1,66,575	
Finished Stock Ledger Control A/c	2,82,270	
Manufacturing Overhead Control A/c	25,450	
Cost of Sales A/c	1,80,510	
Cost Ledger Control A/c		9,49,025
	9,49,025	9,49,025

QUESTION 32

A Company operates separate cost accounting and financial accounting systems. The following is the list of opening balances as on 1.04.2021 in the Cost Ledger.

	Debit (₹)	Credit (₹)
Stores Ledger Control Account	53,375	--
WIP Control Account	1,04,595	--
Finished Goods Control Account	30,780	--
General Ledger Adjustment Account	--	1,88,750

Transactions for the quarter ended 30.06.2021 are as under:

	(₹)
Materials purchased	26,700
Materials issued to production	40,000
Materials issued to factory for repairs	900
Factory wages paid (including indirect wages ₹23,000)	77,500
Production overheads incurred	95,200
Production overheads under-absorbed and written-off	3,200
Sales	2,56,000

The Company's gross profit is 25% on Cost of Sales. At the end of the quarter, WIP stocks increased by ₹ 7,500.

Prepare the relevant Control Accounts, Costing Profit & Loss Account and General Ledger Adjustment Account to record the above transactions for the quarter ended 30.06.2021.

SOLUTION

General Ledger Adj. A/c

Dr.		Cr.	
Particulars	(₹)	Particulars	(₹)
To Sales	2,56,000	By Balance b/d	1,88,750
To Balance c/d	1,80,150	By Stores ledger control A/c (Materials purchased)	26,700
		By Wages control A/c (Factory wages paid)	77,500
		By Factory Overheads control A/c (Production overhead incurred)	95,200
		By Costing Profit & Loss A/c	48,000
	4,36,150		4,36,150

Stores Ledger Control A/c

Dr.		Cr.	
Particulars	(₹)	Particulars	(₹)
To Balance b/d	53,375	By WIP control A/c (Materials issued to production)	40,000
To General ledger adj. A/c (Materials purchased)	26,700	By Factory overhead control A/c (Materials issued for repairing)	900
		By Balance c/d	39,175
	80,075		80,075

WIP Control A/c

Dr.		Cr.	
Particulars	(₹)	Particulars	(₹)
To Balance b/d	1,04,595	By Finished goods control A/c (Balancing figure)	2,02,900
To Stores ledger control A/c	40,000	By Balance c/d	1,12,095
To Wages control A/c	54,500		
To Factory Overhead control A/c	1,15,900		
	3,14,995		3,14,995

Finished Goods Control A/c

Dr.		Cr.	
Particulars	(₹)	Particulars	(₹)
To Balance b/d	30,780	By Cost of sales A/c (Refer to note)	2,04,800
To WIP control A/c	2,02,900	By Balance c/d	28,880
	2,33,680		2,33,680

Note: Gross profit is 25% of Cost of Sales or 20% on sales.
Hence cost of sales = ₹ 2,56,000 - 20% of ₹ 2,56,000 = ₹ 2,04,800

Factory Overhead Control A/c

Dr.		Cr.	
Particulars	(₹)	Particulars	(₹)
To Stores ledger control A/c	900	By Costing Profit & Loss A/c (Under-absorption of overhead)	3,200
To Wages control A/c	23,000	By WIP control A/c	1,15,900
To General ledger adj. A/c	95,200		
	1,19,100		1,19,100

Cost of Sales A/c

Dr.		Cr.	
Particulars	(₹)	Particulars	(₹)
To Finished goods control A/c	2,04,800	By Costing Profit & Loss A/c	2,04,800

Sales A/c

Dr.		Cr.	
Particulars	(₹)	Particulars	(₹)
To Costing Profit & Loss A/c	2,56,000	By GLA A/c	2,56,000

Wages Control A/c

Dr.		Cr.	
Particulars	(₹)	Particulars	(₹)
To General ledger adj. A/c	77,500	By Factory overhead control A/c (Wages paid for direct labour)	23,000
		By WIP control A/c (Wages paid for indirect labour)	54,500
	77,500		77,500

Costing Profit & Loss A/c

Dr.		Cr.	
Particulars	(₹)	Particulars	()
To Factory O/H Control A/c	3,200	By Sales A/c	2,56,000
To Cost of sales A/c	2,04,800		
To General ledger adj. A/c (Profit)	48,000		
	2,56,000		2,56,000

Trial Balance (as on 30.06.2021)

	Dr.	Cr.
	(₹)	(₹)
Stores ledger control A/c	39,175	
WIP control A/c	1,12,095	
Finished goods control A/c	28,880	
To General ledger adjustment A/c		1,80,150
	1,80,150	1,80,150

QUESTION 33

In the absence of Chief Accountant, you have been asked to prepare a month's cost accounts for a company which operates a batch costing system fully integrated with the financial accounts. The following relevant information is provided to you:

	(Rs.)	(Rs.)
Balances at the beginning of the month:		
Stores Ledger Control Account		25,000
Work-in-Process Control Account		20,000
Finished Goods Control Account		35,000
Prepaid Production Overheads brought forward from previous month		3,000
Transactions during the month:		
Materials purchased		75,000
Materials Issued:		
To production	30,000	
To factory maintenance	4,000	34,000
Materials transferred between batches		5,000
Total wages paid:		
To direct workers	25,000	
To indirect workers	5,000	30,000
Direct wages charged to batches		20,000
Recorded non-productive time of direct workers		5,000
Selling and Distribution Overheads Incurred		6,000
Other Production Overheads Incurred		12,000
Sales		1,00,000
Cost of Finished Goods Sold		80,000
Cost of Goods completed and transferred into finished Goods during the month		65,000
Physical value of work-in-Process at the end of the month		40,000

The production overhead absorption rate is 150% of direct wages charged to work-in-Process.

Required:

PREPARE the following accounts for the month:

- (a) Stores Ledger Control Account
- (b) Work-in-Process Control Account
- (c) Finished Goods Control Account
- (d) Production Overhead Control Account
- (e) Costing Profit and Loss Account

SOLUTION

(a) Stores Ledger Control Account

		(Rs.)			(Rs.)
To	Balance b/d	25,000	By	Work in Process	30,000
"	Creditors/ Bank A/c	75,000		Control A/c	
			"	Production OH Control	4,000
			"	A/c	
			"	Balance c/d	66,000
		1,00,000			1,00,000

(b) Wages Control Account

		(Rs.)			(Rs.)
To	Bank A/c (Paid to direct workers)	25,000	By	Work in Process	20,000
"	Bank A/c (Paid to indirect workers)	5,000		Control A/c (Charged to batches)	
			"	Production OH Control	5,000
			"	A/c	
			"	Production OH Control	5,000
			"	A/c (Non-productive wages)	
		30,000			30,000

(C) Production Overhead Control Account

		(Rs.)			(Rs.)
To	Balance b/d (Prepaid amount)	3,000	By	Work-in-Process Control	30,000
"	Stores Ledger Control A/c:	4,000		A/c (150% of direct wages)	
"	Wages Control A/c (5,000 + 5,000)	10,000			
"	Bank A/c	12,000			
"	Costing P&L A/c* (Over-absorption, Balancing figure)	1,000			
		30,000			30,000

*Alternatively the over absorbed overhead may be carried forward.

(d) Work-in-Process Control A/c

		(Rs.)			(Rs.)
To	Balance b/d (Prepaid amount)	20,000	By	Finished Goods Control A/c	65,000
"	Stores Ledger Control A/c:	30,000	"	Balance c/d (Physical value)	40,000
"	Wages Control A/c	20,000			
"	Production OH Control A/c (150% of direct wages)	30,000			
"	Costing P&L A/c (Stock Gains)	5,000			
		1,05,000			1,05,000

(e) Finished Goods Control Account

		(Rs.)			(Rs.)
To	Balance b/d	35,000	By	Cost of Goods Sold*	80,000
"	Work in Process Control A/c	65,000	"	Balance c/d	20,000
		1,00,000			1,00,000

*Alternatively, Costing Profit & Loss Account

(f) Costing Profit & Loss Account

		(Rs.)			(Rs.)
To	Finished Goods Control A/c or Cost of Goods Sold A/c	80,000	By	Sales A/c	1,00,000
"	Selling & distribution OH A/c	6,000	"	Production OH Control A/c	1,000
"	Balance c/d	20,000	"	Work-in-Process Control A/c (Stock gain)	5,000
		1,06,000			1,06,000

Notes:

- (1) Materials transferred between batches will not affect the Control Accounts.
- (2) Non-production time of direct workers is a production overhead and therefore will not be charged to work-in-Process control A/c.
- (3) Production overheads absorbed in work-in-Process Control A/c equals to Rs.30,000 (150% of Rs.20,000).
- (4) In the work-in-Process Control A/c the excess physical value of stock is taken resulting in stock gain. Stock gain is transferred to Profit & Loss A/c.

QUESTION 34

The following figures have been extracted from the Financial Accounts of a manufacturing firm for the first year of its operation:

	(Rs.)
Direct material Consumption	50,00,000
Direct wages	30,00,000
Factory Overheads	16,00,000
General administrative overheads	7,00,000
Selling and Distribution overheads	9,60,000
Bad debts	80,000
Preliminary expenses written off	40,000
Legal charges	10,000
Dividends received	1,00,000
Interest received on deposits	20,000
Sales (1,20,000 units)	1,20,00,000
Closing stock:	
Finished goods(4,000 units)	3,20,000
Work-in-Process	2,40,000

The cost accounts for the same period reveal that the direct material consumption was Rs. 56,00,000. Factory overhead is recovered at 20% on prime cost. Administration overhead is recovered at Rs. 6 per unit of production. Selling and distribution overheads are recovered at Rs. 8 per unit sold.

PREPARE the Profit and Loss Accounts both as per financial records and as per cost records. RECONCILE the profits as per the two records.

SOLUTION

**Profit and Loss Account
(As per financial records)**

	(Rs.)		(Rs.)
To Direct Material	50,00,000	By Sales (1,20,000 Units)	1,20,00,000
To Direct Wages	30,00,000	By Closing Stock	
To Factory Overheads	16,00,000	Work-in-process	2,40,000
To Gross Profit c/d	29,60,000	Finished Goods (4,000 units)	3,20,000
	1,25,60,000		1,25,60,000

To General Administrative Overheads	7,00,000	By Gross Profit b/d	29,60,000
To Selling and Dist. OH	9,60,000	By Dividend received	1,00,000
To Bad debts	80,000	By Interest received	20,000
To Preliminary Expenses written off	40,000		
To Legal Charges	10,000		
To Net Profit	12,90,000		
	30,80,000		30,80,000

Statement of Cost and Profit
(As per Cost Records)

	Total (Rs.)
Direct Material	56,00,000
Direct Wages	30,00,000
Prime Cost	86,00,000
Factory overhead (20% of 86,00,000)	17,20,000
	1,03,20,000
Less: Closing Stock (WIP)	(2,40,000)
Works Cost or cost of Production (1,24,000 units)	1,00,80,000
Less: Finished Goods (4,000 units @ 81.29)	(3,25,160)
Cost of goods sold (1,20,000 units)	97,54,840
Administrative overhead (1,24,000 units @ 6 p.u.)	7,44,000
Selling and Distribution Overhead (1,20,000 units @ 8 p.u.)	9,60,000
Cost of Sales	1,14,58,840
Net profit (Balancing figure)	5,41,160
Sales Revenue	1,20,00,000

Statement of Reconciliation of profit as obtained under Cost and Financial Accounts

	(Rs.)	Total (Rs.)
Profit as per Cost Records		5,41,160
Add: Excess of Material Consumption	6,00,000	
Factory Overhead	1,20,000	
Administrative Overhead	44,000	
Dividends received	1,00,000	
Interest received	20,000	8,84,000
		14,25,160
Less: Bad debts	80,000	
Preliminary expenses written off	40,000	
Legal charges	10,000	
Over-valuation of stock in cost book (3,25,160- 3,20,000)	5,160	(1,35,160)
Profit as per Financial Records		12,90,000

QUESTION 35 (Similar to Past Paper May 19, RTP Nov 20)

M/s H.K. Piano Company showed a net loss of Rs. 4,16,000 as per their financial accounts for the year ended 31st March, 2021. The cost accounts, however, disclosed a net loss of Rs. 3,28,000 for the same period. The following information was revealed as a result of scrutiny of the figures of both the sets of books:

	(Rs.)
(i) Factory overheads under-recovered	6,000
(ii) Administration overheads over-recovered	4,000
(iii) Depreciation charged in financial accounts	1,20,000
(iv) Depreciation recovered in costs	1,30,000
(v) Interest on investment not included in costs	20,000
(vi) Income -tax provided	1,20,000
(vii) Transfer fees (credit in financial books)	2,000
(viii) Stores adjustment (credit in financial books)	2,000

PREPARE a Memorandum reconciliation account.

SOLUTION

Memorandum Reconciliation Account

		(Rs.)			(Rs.)
To	Net loss as per costing books	3,28,000	By	Administration overhead - over-recovered in costs	4,000
To	Factory overheads under-recovered in costs	6,000	By	Depreciation overcharged in costs	10,000
To	Income-tax not provided in costs	1,20,000	By	Interest on investments not included in costs	20,000
			By	Transfer fees in financial books	2,000
			By	Stores adjustment	2,000
			By	Net loss as per financial books	4,16,000
		4,54,000			4,54,000

Q.	Concept	Pg
36	Calculation of Cost/ Profit on Batch Basis	92-93
37	Economic Batch Quantity	94
38	Batch order Profitability	95-96

QUESTION 36

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 equal to per labour hour. The selling price contracted for is Rs. 8 per piece. From the following data **CALCULATE** the cost and profit per piece of each batch order and overall position of the order for 1,200 pieces.

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

The other details are:

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

Student Notes

SOLUTION

Particulars	Jan.	Feb.	March	April	May	June	Total
Batch output (in units)	210	200	220	180	200	220	1,230
Sale value (₹)	1,680	1,600	1,760	1,440	1,600	1,760	9,840
Material cost (₹)	650	640	680	630	700	720	4,020
Direct wages (₹)	120	140	150	140	150	160	860
Chargeable expenses* (₹)	600	672	672	621	780	800	4,145
Total cost (₹)	1,370	1,452	1,502	1,391	1,630	1,680	9,025
Profit per batch (₹)	310	148	258	49	(30)	80	815
Total cost per unit (₹)	6.52	7.26	6.83	7.73	8.15	7.64	7.34
Profit per unit (₹)	1.48	0.74	1.17	0.27	(0.15)	0.36	0.66

Overall position of the order for 1,200 units

Sales value of 1,200 units @ ₹ 8 per unit	₹ 9,600
Total cost of 1,200 units @ ₹ 7.34 per unit	₹ <u>8,808</u>
Profit	<u>₹ 792</u>

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

QUESTION 37

Arnav Motors Ltd. manufactures pistons used in car engines. As per the study conducted by the Auto Parts Manufacturers Association, there will be a demand of 80 million pistons in the coming year. Arnav Motors Ltd. is expected to have a market share of 1.15% of the total market demand of the pistons in the coming year. It is estimated that it costs Rs. 1.50 as inventory holding cost per piston per month and that the set-up cost per run of piston manufacture is Rs. 3,500.

- (i) What would be the optimum run size for piston manufacturing?
- (ii) Assuming that the company has a policy of manufacturing 40,000 pistons per run, how much extra costs the company would be incurring as compared to the optimum run suggested in (i) above?

SOLUTION

(i) Optimum run size or Economic Batch Quantity (EBQ) = $\sqrt{\frac{2 \times D \times S}{C}}$

Where, D = Annual demand i.e. 1.15% of 8,00,00,000
 = 9,20,000 units
 S = Set-up cost per run = Rs. 3,500
 C = Inventory holding cost per unit per annum
 = Rs. 1.5 × 12 months = Rs. 18

EBQ = $\sqrt{\frac{2 \times 9,20,000 \text{ units} \times 3,500}{\text{Rs. 18}}} = 18,915 \text{ units}$

(ii) calculation of Total Cost of set-up and inventory holding

	Batch size	No. of set-ups	Set-up Cost (Rs.)	Inventory holding cost (Rs.)	Total Cost (Rs.)
A	40,000 units	23 $\left(\frac{9,20,000}{40,000}\right)$	80,500 (23 × Rs. 3,500)	3,60,000 $\left(\frac{40,000 \times \text{Rs. 18}}{2}\right)$	4,40,500
B	18,915 units	49 $\left(\frac{9,20,000}{18,915}\right)$	1,71,500 (49 × Rs. 3,500)	1,70,235 $\left(\frac{18,915 \times \text{Rs. 18}}{2}\right)$	3,41,735
	Extra Cost (A - B)				98,765

QUESTION 38

Rio Limited undertakes to supply 1000 units of a component per month for the months of January, February and March 2020. Every month a batch order is opened against which materials and labour cost are booked at actual. Overheads are levied at a rate per labour hour. The selling price is contracted at Rs. 15 per unit.

From the following data, CALCULATE the profit per unit of each batch order and the overall position of the order for the 3,000 units.

Month	Batch Output (Numbers)	Material Cost (Rs.)	Labour Cost (Rs.)
January 2020	1,250	6,250	2,500
February 2020	1,500	9,000	3,000
March 2020	1,000	5,000	2,000

Labour is paid at the rate of Rs. 2 per hour. The other details are:

Month	Overheads (Rs.)	Total Labour Hours
January 2020	12,000	4,000
February 2020	9,000	4,500
March 2020	15,000	5,000

SOLUTION

Statement of Cost and Profit per unit of each batch

	Jan. 2020	Feb. 2020	March. 2020	Total
a) Batch Output (Nos.)	1,250	1,500	1,000	3,750
b) Sales Value (@ Rs. 15 per unit)	(Rs.) 18,750	(Rs.) 22,500	(Rs.) 15,000	(Rs.) 56,250
Cost				
Material	6,250	9,000	5,000	20,250
Wages	2,500	3,000	2,000	7,500
Overheads	3,750	3,000	3,000	9,750
c) Total	12,500	15,000	10,000	37,500

d) Profit per batch (b) - (c)	6,250	7,500	5,000	18,750
e) Cost per unit (c) ÷ (a)	10	10	10	
f) Profit per unit (d) ÷ (a)	5	5	5	

Overall Position of the Order for 3,000 Units

Sales value (3,000 units × Rs. 15)	Rs. 45,000
Less: Total cost (3,000 units × Rs. 10)	<u>30,000</u>
Profit	<u>15,000</u>

Calculation of overhead per hour:

	Jan. 2020	Feb. 2020	March 2020
i. Labour hours:			
= $\frac{\text{Labour cost}}{\text{Labour rates per hour}}$	$\frac{\text{Rs. 2,500}}{2} = 1,250$	$\frac{\text{Rs. 3,000}}{2} = 1,500$	$\frac{\text{Rs. 2,000}}{2} = 1,000$
ii. Overhead per hour:			
= $\frac{\text{Total Overheads}}{\text{Total labour hour}}$	$\frac{\text{Rs. 12,000}}{4,000} = \text{Rs. 3}$	$\frac{\text{Rs. 9,000}}{4,500} = \text{Rs. 2}$	$\frac{\text{Rs. 15,000}}{5,000} = \text{Rs. 3}$
iii. Overhead for batch (i) × (ii)	Rs. 3,750	Rs. 3,000	Rs. 3,000

Student Notes

Q.	Concept	Pg
39	Job Cost Sheet	97-98

QUESTION 39 (Similar to Past Paper Nov 19)

A shop floor supervisor of a small factory presented the following cost for Job No. 303, to determine the selling price.

	Per unit (₹)
Materials	70
Direct wages 18 hours @ ₹ 2.50 (Deptt. X 8 hours; Deptt. Y 6 hours; Deptt. Z 4 hours)	45
Chargeable expenses	5
	120
Add : 33-1/3 % for expenses cost	40
	160

Analysis of the Profit/Loss Account (for the year 2020)

	(₹)		(₹)
Materials used	1,50,000	Sales less returns	2,50,000
Direct wages:			
Deptt. X 10,000			
Deptt. Y 12,000			
Deptt. Z <u>8,000</u>	30,000		
Special stores items	4,000		
Overheads:			
Deptt. X 5,000			
Deptt. Y 9,000			
Deptt. Z <u>2,000</u>	<u>16,000</u>		
Works cost	2,00,000		
Gross profit c/d	<u>50,000</u>		
	<u>2,50,000</u>		<u>2,50,000</u>
Selling expenses	20,000	Gross profit b/d	50,000
Net profit	<u>30,000</u>		
	<u>50,000</u>		<u>50,000</u>

It is also noted that average hourly rates for the three Departments X, Y and Z are similar.

You are required to:

- (i) PREPARE a job cost sheet.
- (ii) CALCULATE the entire revised cost using 2020 actual figures as basis.
- (iii) Add 20% to total cost to DETERMINE selling price.

It is also noted that average hourly rates for the three Departments X, Y and Z are similar.

You are required to:

- (i) PREPARE a job cost sheet.
- (ii) CALCULATE the entire revised cost using 2020 actual figures as basis.
- (iii) Add 20% to total cost to DETERMINE selling price.

SOLUTION

Job Cost Sheet

Customer Details ---- Job No. _____
 Date of commencement --- Date of completion _____

Particulars	Amount (₹)
Direct materials	70
Direct wages:	
Deptt. X ₹ 2.50 × 8 hrs. = ₹ 20.00	
Deptt. Y ₹ 2.50 × 6 hrs. = ₹ 15.00	
Deptt. Z ₹ 2.50 × 4 hrs. = ₹ <u>10.00</u>	45
Chargeable expenses	<u>5</u>
Prime cost	120
Overheads:	
Deptt. X = ₹ $\frac{5,000}{10,000} \times 100 = 50\%$ of ₹ 20 = ₹ 10.00	
Deptt. Y = ₹ $\frac{9,000}{12,000} \times 100 = 75\%$ of ₹ 15 = ₹ 11.25	
Deptt. Z = ₹ $\frac{2,000}{8,000} \times 100 = 25\%$ of ₹ 10 = ₹ 2.50	23.75
Works cost	<u>143.75</u>
Selling expenses = ₹ $\frac{20,000}{2,00,000} \times 100 = 10\%$ of work cost	<u>14.38</u>
Total cost	158.13
Profit (20% of total cost)	<u>31.63</u>
Selling price	<u>189.76</u>

Q.	Concept	Pg
40	Process A/c (WAM)	99-102
41	Process A/c (FIFO)	103-104
42	Process Costing with Profit Centres	105-108
43	Value of work completion (WAM)	109-111
44	Detailed Process A/c (Normal / Abnormal Loss)	112-114

QUESTION 40 (Similar to Past Paper Nov 20)

Following details are related to the work done in Process-I by XYZ Company during the month of March, 2021:

	(Rs.)
Opening work-in-process (2,000 units)	
Materials	80,000
Labour	15,000
Overheads	45,000
Materials introduced in Process-I (38,000 units)	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 process: 2,000 units	
Degree of completion:	
Materials	100%
Labour and overheads	80%

Units finished and transferred to Process-II: 35,000 units

Normal Loss:

5% of total input including opening work-in-process.

Scrapped units fetch Rs. 20 per piece.

You are required to PREPARE using average method:

- (i) Statement of equivalent production.
- (ii) Statement of cost.
- (iii) Statement of distribution cost, and
- (iv) Process-I Account, Normal Loss Account and Abnormal Loss Account.

SOLUTION

(i) Statement of Equivalent Production

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & O.H.	
				%	Units	%	Units
Opening WIP	2,000	Completed and transferred to Process-II	35,000	100	35,000	100	35,000
Units introduced	38,000	Normal Loss (5% of 40,000)	2,000	--	--	--	--
		Abnormal loss (Balancing figure)	1,000	100	1,000	80	800
		Closing WIP	2,000	100	2,000	80	1,600
	40,000		40,000		38,000		37,400

(ii) Statement showing cost for each element

Particulars	Materials (Rs.)	Labour (Rs.)	Overhead (Rs.)	Total (Rs.)
Cost of opening work-in-process	80,000	15,000	45,000	1,40,000
Cost incurred during the month	14,80,000	3,59,000	10,77,000	29,16,000
Less: Realisable Value of normal scrap (Rs. 20 × 2,000 units)	(40,000)	--	--	(40,000)
Total cost: (A)	15,20,000	3,74,000	11,22,000	30,16,000
Equivalent units: (B)	38,000	37,400	37,400	
Cost per equivalent unit: (C) = (A ÷ B)	40.00	10.00	30.00	80.00

(iii) Statement of Distribution of cost

	Amount (Rs.)	Amount (Rs.)
1. Value of units completed and transferred (35,000 units × Rs. 80)		28,00,000
2. Value of Abnormal Loss:		
- Materials (1,000 units × Rs. 40)	40,000	
- Labour (800 units × Rs. 10)	8,000	
- Overheads (800 units × Rs. 30)	24,000	72,000
3. Value of Closing W-I-P:		
- Materials (2,000 units × Rs. 40)	80,000	
- Labour (1,600 units × Rs. 10)	16,000	
- Overheads (1,600 units × Rs. 30)	48,000	1,44,000

(iv) Process-I A/c

Particulars	Units	(Rs.)	Particulars	Units	(Rs.)
To Opening W.I.P:			By Normal Loss (Rs.20 × 2,000 units)	2,000	40,000
- Materials	2,000	80,000	By Abnormal loss	1,000	72,000
- Labour	--	15,000	By Process-I A/c	35,000	28,00,000
- Overheads	--	45,000	By Closing WIP	2,000	1,44,000
To Materials introduced	38,000	14,80,000			
To Direct Labour		3,59,000			
To Overheads		10,77,000			
	40,000	30,56,000		40,000	30,56,000

Normal Loss A/c

Particulars	Units	(Rs.)	Particulars	Units	(Rs.)
To Process-I A/c	2,000	40,000	By Cost Ledger Control A/c	2,000	40,000
	2,000	40,000		2,000	40,000

Abnormal Loss A/c

Particulars	Units	(Rs.)	Particulars	Units	(Rs.)
To Process-I A/c	1,000	72,000	By Cost Ledger Control A/c	1,000	20,000
			By Costing Profit & Loss A/c		52,000
	1,000	72,000		1,000	72,000

QUESTION 41

Following information is available regarding Process A for the month of October 2021:

Production Record:

(i) Opening work-in progress	40,000 Units
(Material: 100% complete, 25% complete for labour & overheads)	
(ii) Units Introduced	1,80,000 Units
(iii) Units Completed	1,50,000 Units
(iv) Units in-process on 31.10.2021	70,000 Units

(Material: 100% complete, 50% complete for labour & overheads)

Cost Record:

Opening Work-in-progress:	(Rs.)
Material	1,00,000
Labour	25,000
Overhead	45,000

Cost incurred during the month:

Material	6,60,000
Labour	5,55,000
Overheads	9,25,000

Assure that FIFO method is used for W.I.P. inventory valuation. Required:

- (i) Statement of Equivalent Production
- (ii) Statement showing Cost for each element
- (iii) Statement of apportionment of Cost
- (iv) Process- A Account

SOLUTION

(i) Statement of Equivalent Production

(FIFO Method)

Input		Output		Equivalent Production			
Particulars	Units	Particulars	Units	Material		Labour & Overheads	
				(%)	Units	(%)	Units
Opening WIP	40,000	Transfer to Process II:	40,000	--	--	75	30,000
Introduced	1,80,000	Opening WIP completed	1,10,000	100	1,10,000	100	1,10,000
		Introduced & completed	70,000	100	70,000	50	35,000
	2,20,000	Closing WIP	2,20,000		1,80,000		1,75,000

(ii) Statement showing Cost for each element

Item of Cost	Equivalent Production	Cost Incurred (Rs.)	Cost per Unit (Rs.)
Material	1,80,000	6,60,000	3.66667
Labour & Overheads	1,75,000	14,80,000	8.45714
			12.12381

(iii) Statement of Apportionment of Cost

Transfer to Process II		
Opening WIP Completed		
Cost already Incurred Rs. (1,00,000 + 25,000 + 45,000)	1,70,000	
Cost Incurred during the Month		
Labour & Overheads (30,000 units × Rs. 8.45714)	2,53,714	4,23,714
Introduced & Completed (1,10,000 units × Rs. 12.12381)		13,33,619
		17,57,333
Closing WIP		
Material (70,000 units × Rs. 3.66667)	2,56,667	
Labour and Overheads (35,000 units × Rs. 8.45714)	2,96,000	5,52,667

(iv) Process - A A/c

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Opening WIP	40,000	1,70,000	By Process II A/c	1,50,000	17,57,333
To Materials	1,80,000	6,60,000	By Closing WIP	7,000	5,52,667
To Labour		5,55,000			
To Overheads		9,25,000			
	2,20,000	23,10,000		2,20,000	23,10,000

QUESTION 42

M J Pvt. Ltd. produces a product "SKY" which passes through two processes, viz. Process-A and Process-B. The details for the year ending 31st March, 2021 are as follows:

	Process A	Process - B
40,000 Units introduced at a cost of	Rs. 3,60,000	-
Material Consumed	Rs. 2,42,000	2,25,000
Direct Wages	Rs. 2,58,000	1,90,000
Manufacturing Expenses	Rs. 1,96,000	1,23,720
Output in Units	37,000	27,000
Normal Wastage of Input	5%	10%
Scrap Value (per unit)	Rs. 15	20
Selling Price (per unit)	Rs. 37	61

Additional Information:

- (a) 80% of the output of Process-A, was passed on to the next process and the balance was sold. The entire output of Process- B was sold.
- (b) Indirect expenses for the year was Rs. 4,48,080.
- (c) It is assumed that Process-A and Process-B are not responsibility centres.

Required:

- (i) Prepare Process-A and Process-B Account.
- (ii) Prepare Profit & Loss Account showing the net profit / net loss for the year.

SOLUTION

(i)

Process - A Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Input	40,000	3,60,000	By Normal wastage (2,000 units × Rs. 15)	2,000	30,000
To Material	---	2,42,000	By Abnormal loss A/c (1,000 units × Rs. 27)	1,000	27,000
To Direct wages	---	2,58,000	By Process- B (29,600 units × Rs. 27)	29,600	7,99,200
To Manufacturing Exp.	---	1,96,000	By Profit & Loss A/c (7,400 units × Rs. 27)	7,400	1,99,800
	40,000	10,56,000		40,000	10,56,000

Cost per unit = $\frac{\text{Rs. } 10,56,000 - \text{Rs. } 30,000}{40,000 \text{ units} - 2,000 \text{ units}}$ = Rs. 27 per unit

Normal wastage = 40,000 units × 5% = 2,000 units

Abnormal loss = 40,000 units - (37,000 units + 2,000 units) = 1,000 units

Transfer to Process- B = 37,000 units × 80% = 29,600 units

Sale = 37,000 units × 20% = 7,400 units

Process- B Account

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Process- A A/c	29,600	7,99,200	By Normal wastage (2,960 units × ₹ 20)	2,960	59,200
To Material	---	2,25,000	By Profit & Loss A/c (27,000 units × ₹ 48)	27,000	12,96,000
To Direct Wages	---	1,90,000			
To Manufacturing Exp.	---	1,23,720			
To Abnormal Gain A/c (360 units × ₹ 48)	360	17,280			
	29,960	13,55,200		29,960	13,55,200

$$\text{Cost per unit} = \frac{\text{₹ } 13,37,920 - \text{₹ } 59,200}{29,600\text{units} - 2,960\text{units}} = \text{₹ } 48 \text{ per unit}$$

$$\text{Normal wastage} = 29,600 \text{ units} \times 10\% = 2,960 \text{ units}$$

$$\text{Abnormal gain} = (27,000 \text{ units} + 2,960 \text{ units}) - 29,600 \text{ units} = 360 \text{ units}$$

(ii) Profit & Loss Account

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Process- A A/c	1,99,800	By Sales:	
To Process- B A/c	12,96,000	Process-A	
		(7,400 units × Rs. 37)	2,73,800
To Abnormal loss A/c	12,000	Process- B	
		(27,000 units × Rs. 61)	16,47,000
To Indirect Expenses	4,48,080	By Abnormal gain	10,080
		By Net loss	25,000
	19,55,880		19,55,880

Student Notes

Working Notes:

Normal wastage (Loss) Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process- A A/c	2,000	30,000	By Abnormal Gain A/c (360 units × Rs. 20)	360	7,200
To Process- B A/c	2,960	59,200	By Bank (Sales)	4,600	82,000
	4,960	89,200		4,960	89,200

Abnormal Loss Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process- A A/c	1,000	27,000	By Bank A/c (1,000 units × Rs. 15)	1,000	15,000
			By Profit & Loss A/c	---	12,000
	1,000	27,000		1,000	27,000

Abnormal Gain Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Normal loss A/c (360 units × Rs. 20)	360	7,200	By Process- B A/c	360	17,280
To Profit & Loss A/c		10,080			
	360	17,280		360	17,280

QUESTION 43

A Chemical Company carries on production operation in two processes. The material first pass through Process I, where Product 'A' is produced. Following data are given for the month just ended:

Material input quantity	2,00,000 kg.
Opening work-in-progress quantity (Material 100% and conversion 50% complete)	40,000 kg.
Work completed quantity	1,60,000 kg.
Closing work-in-progress quantity (Material 100% and conversion two-third complete)	30,000 kg.
Material input cost	Rs. 75,000
Processing cost	Rs. 1,02,000
Opening work-in-progress cost:	
Material cost	Rs. 20,000
Processing cost	Rs. 12,000

Normal process loss in quantity may be assumed to be 20% of material input. It has no realisable value. Any quantity of Product 'A' can be sold for Rs. 1.60 per kg. Alternatively, it can be transferred to Process II for further processing and then sold as Product 'AX' for Rs. 2 per kg. Further materials are added in Process II, which yield two kg. of Product 'AX' for every kg. of Product 'A' of Process I. Of the 1,60,000 kg. per month of work completed in Process I, 40,000 kg. are sold as Product 'A' and 1,20,000 kg. are passed through Process II for sale as Product 'AX'. Process II has facilities to handle upto 1,60,000 kg. of Product 'A' per month, if required.

The monthly costs incurred in Process II (other than the cost of Product 'A') are:

	1,20,000 kg. of Product 'A' input (Rs.)	1,60,000 kg. of Product 'A' input (Rs.)
Materials Cost	1,32,000	1,76,000
Processing Costs	1,20,000	1,40,000

Required:

(i) Determine, using the weighted average cost method, the cost per kg. of Product 'A' in Process I and value of both work completed and closing work-in-progress for the month just ended.

(ii) *Is it worthwhile processing 1,20,000 kg. of Product 'A' further?*

(iii) *Calculate the minimum acceptable selling price per kg., if a potential buyer could be found for additional output of Product 'AX' that could be produced with the remaining Product 'A' quantity.*

SOLUTION

**Process- I
Statement of Equivalent Production**

Inputs		Output		Equivalent output			
Particulars	Kg.	Particulars	Kg.	Material		Conversion	
				(%)	kg.	(%)	kg.
Opening W.I.P.	40,000	Normal loss	40,000	--	--	--	--
New material introduced	2,00,000	Units introduced & completed	1,60,000	100	1,60,000	100	1,60,000
		Abnormal loss	10,000	100	10,000	100	10,000
		Closing WIP	30,000	100	30,000	2/3rd	20,000
	2,40,000		2,40,000		2,00,000		1,90,000

**Process- I
Statement of Cost for each element**

Elements of cost	Costs of opening WIP	Costs in process	Total cost	Equivalent units	Cost per Kg.
	(Rs)	(Rs)	(Rs)	Kg.	(Rs)
Material	20,000	75,000	95,000	2,00,000	0.475
Conversion cost	12,000	1,02,000	1,14,000	1,90,000	0.600
	32,000	1,77,000	2,09,000		1.075

Process- I
Statement of Apportionment of Cost

Units completed	Elements	Equivalent units (Kg.)	Cost/unit (Rs.)	Cost (Rs.)	Total cost (Rs.)
Work completed	Material	1,60,000	0.475	76,000	1,72,000
	Conversion	1,60,000	0.600	<u>96,000</u>	
Closing WIP	Material	30,000	0.475	14,250	26,250
	Conversion	20,000	0.600	<u>12,000</u>	

(ii) Statement showing comparative data to decide whether 1,20,000 kg. of product 'A' should be processed further into 'AX'.

Alternative I - To sell product 'A' after Process - I

	(Rs.)
Sales 1,20,000 kg. × Rs. 1.60	1,92,000
Less: Cost from Process- I - 1,20,000 kg. × Rs. 1.075	<u>1,29,000</u>
Profit	<u>63,000</u>

Alternative II - Process further into 'AX'

Sales 2,40,000 kg. × Rs. 2.00		4,80,000
Less: Cost from Process- I -1,20,000 kg. × Rs. 1.075	= Rs. 1,29,000	
Material in Process- II	= Rs. 1,32,000	
Processing cost in Process- II	= Rs. <u>1,20,000</u>	<u>3,81,000</u>
Profit		<u>99,000</u>

Hence company should process further

It will increase profit by Rs. 99,000 - Rs. 63,000 = Rs. 36,000

(iii) Calculation of minimum selling price per kg. :

Cost of processing remaining 40,000 kg. further	(Rs.)
Material Rs. 1,76,000 × Rs. 1,32,000	44,000
Processing cost Rs. 1,40,000 - Rs. 1,20,000	20,000
Cost from Process- I relating to 40,000 kg. 'A' (40,000 kg. × Rs. 1.075)	43,000

Benefit foregone if 40,000 kg. 'A' are further Processed 40,000 kg. (Rs.1.60 - Rs. 1.075)	<u>21,000</u>
Total cost	<u>1,28,000</u>
Additional quantity of product 'AX' (40,000 kg. × Rs. 2)	<u>80,000</u>

∴ Minimum selling price $\left(\frac{\text{Rs.1,28,000}}{80,000 \text{ kg.}} \right) = \text{Rs. 1.60}$

QUESTION 44 (RTP May 20, Similar to RTP May 18)

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

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

- Opening work-in-process at the beginning of the month was 1,600 litres, 70% complete for labour and 60% complete for overheads. Opening work-in-process was valued at Rs. 1,06,560.
- Closing work-in-process at the end of the month was 320 litres, 30% complete for labour and 20% complete for overheads.
- Normal loss is 10% of input and total losses during the month were 1,200 litres partly due to the fire damage.
- Output sent to finished goods warehouse was 8,400 litres.
- Losses have a scrap value of Rs. 15 per litre.
- All raw materials are added at the commencement of the process.
- The cost per equivalent unit (litre) is Rs.78 for the month made up as follows:

	(Rs.)
Raw Material	46
Labour	14
Overheads	18
	78

Required:

- CALCULATE the quantity (in litres) of raw material inputs during the month.
- CALCULATE the quantity (in litres) of normal loss expected from the process and the quantity (in litres) of abnormal loss / gain experienced in the month.
- CALCULATE the value of raw materials, labour and overheads added to the process during the month.
- PREPARE the process account for the month.

SOLUTION

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

Quantities Entering Process	Litres	Quantities Leaving Process	Litres
Opening WIP	1,600	Transfer to Finished Goods	8,400
Raw material input (balancing figure)	8,320	Process Losses	1,200
		Closing WIP	320
	9,920		9,920

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

	Litres
Total process losses for month	1,200
Normal Loss (10% input)	832
Abnormal Loss (balancing figure)	368

(iii) Calculation of values of Raw Material, Labour and Overheads added to the process:

	Material	Labour	Overheads
Cost per equivalent unit	Rs. 46.00	Rs. 14.00	Rs. 18.00
Equivalent units (litre) (refer the working note)	7,488	7,744	7,872
Cost of equivalent units	Rs. 3,44,448	Rs. 1,08,416	Rs. 1,41,696
Add: Scrap value of normal loss (832 units × Rs. 15)	Rs. 12,480	--	--
Total value added	Rs. 3,56,928	Rs. 1,08,416	Rs. 1,41,696

Workings:

Statement of Equivalent Units (litre):

Input Details	Units	Output details	Units	Equivalent Production					
				Material		Labour		Overheads	
				Units	(%)	Units	(%)	Units	(%)
Opening WIP	1,600	Units completed:							
Units introduced	8,320	- Opening WIP	1,600	--	--	480	30	640	40
		- Fresh inputs	6,800	6,800	100	6,800	100	6,800	100
		Normal loss	832	--	--	--	--	--	--
		Abnormal loss	368	368	100	368	100	368	100
		Closing WIP	320	320	100	96	30	64	20
	9,920		9,920	7,488		7,744		7,872	

(iv) Process Account for the month

	Litres	Amount (Rs.)		Litres	Amount (Rs.)
To Opening WIP	1,600	1,06,560	By Finished goods [8400 x Rs. 78]	8,400	6,55,200
To Raw Materials	8,320	3,56,928	By Normal loss [832 x Rs. 15]	832	12,480
To Wages	--	1,08,416	By Abnormal loss [368 x Rs. 78]	368	28,704
To Overheads	--	1,41,696	By Closing WIP [(320 x Rs. 46) + (320 x .30 x Rs. 14) + (320 x .20 x Rs. 18)]	320	17,216
	9,920	7,13,600		9,920	7,13,600

Q.	Concept	Pg
45	Joint Cost with Different Method (Sales Value at Split o/s, Physical Measure, NRV, Gross Margin % NRV)	115-118
46	Cost of Inventories (NRV)	119-121
47	Monthly Profitability for Further Processing	122-123
48	Joint Cost/ Split off Point	124-127

QUESTION 45

Pokemon Chocolates manufactures and distributes chocolate products. It purchases Cocoa beans and processes them into two intermediate products:

Chocolate powder liquor base

Milk-chocolate liquor base

These two intermediate products become separately identifiable at a single split off point. Every 500 pounds of cocoa beans yields 20 gallons of chocolate - powder liquor base and 30 gallons of milk-chocolate liquor base.

The chocolate powder liquor base is further processed into chocolate powder. Every 20 gallons of chocolate-powder liquor base yields 200 pounds of chocolate powder. The milk- chocolate liquor base is further processed into milk-chocolate. Every 30 gallons of milk- chocolate liquor base yields 340 pounds of milk chocolate.

Production and sales data for October, 2021 are:

Cocoa beans processed	7,500 pounds
Costs of processing Cocoa beans to split off point (including purchase of beans)	Rs. 7,12,500

	Production	Sales	Selling price
Chocolate powder	3,000 pounds	3,000 pounds	Rs. 190 per pound
Milk chocolate	5,100 Pounds	5,100 Pounds	Rs. 237.50 per pound

The October, 2021 separable costs of processing chocolate-powder liquor into chocolate powder are Rs. 3,02,812.50. The October 2021 separable costs of processing milk-chocolate liquor base into milk-chocolate are Rs. 6,23,437.50.

Pokemon full processes both of its intermediate products into chocolate powder or milk- chocolate. There is an active market for these intermediate products. In October, 2021, Pokemon could have sold the chocolate powder liquor base for Rs. 997.50 a gallon and the milk-chocolate liquor base for Rs. 1,235 a gallon.

Required:

- (i) Calculate how the joint cost of Rs. 7,12,500 would be allocated between the chocolate powder and milk-chocolate liquor bases under the following methods:
- Sales value at split off point
 - Physical measure (gallons)
 - Estimated net realisable value, (NRV) and
 - Constant gross-margin percentage NRV.

- (ii) What is the gross-margin percentage of the chocolate powder and milk-chocolate liquor bases under each of the methods in requirements (i) above?
- (iii) Could Pokemon have increased its operating income by a change in its decision to fully process both of its intermediate products? Show your computations.

SOLUTION

(i) Comparison of alternative Joint-Cost Allocation Methods:

(a) Sales Value at Split-off Point Method

	Chocolate powder liquor base	Milk chocolate liquor base	Total
Sales value of products at split off	Rs. 2,99,250*	Rs. 5,55,750**	Rs. 8,55,000
Weights	0.35	0.65	1.00
Joint cost allocated	Rs. 2,49,375	Rs. 4,63,125	Rs. 7,12,500
	(Rs. 7,12,500 × 0.35)	(Rs. 7,12,500 × 0.65)	

* $(3,000 \text{ lbs} / 200 \text{ lbs}) \times 20 \text{ gallon} \times \text{Rs. } 997.50 = \text{Rs. } 2,99,250$

** $(5,100 \text{ lbs} / 340 \text{ lbs}) \times 30 \text{ gallon} \times \text{Rs. } 1,235 = \text{Rs. } 5,55,750$

(b) Physical Measure Method

	Chocolate powder liquor base	Milk chocolate liquor base	Total
Output	300 gallon*	450 gallon**	750 gallons
Weight	$300/750 = 0.40$	$450/750 = 0.60$	1.00
Joint cost allocated	Rs. 2,85,000	Rs. 4,27,500	Rs. 7,12,500
	(Rs. 7,12,500 × 0.40)	(Rs. 7,12,500 × 0.60)	

* $(3,000 \text{ lbs} / 200 \text{ lbs}) \times 20 \text{ gallon} = 300 \text{ gallon}$

** $(5,100 \text{ lbs} / 340 \text{ lbs}) \times 30 \text{ gallon} = 450 \text{ gallon}$

(c) Net Realisable Value (NRV) Method

	Chocolate powder liquor base	Milk chocolate liquor base	Total
Final sales value of production	Rs. 5,70,000 (3,000 lbs × Rs. 190)	Rs. 12,11,250 (5,100 lbs × Rs. 237.50)	Rs. 17,81,250
Less: Separable costs	Rs. 3,02,812.50	Rs. 6,23,437.50	Rs. 9,26,250
Net realisable value at split off point	Rs. 2,67,187.50	Rs. 5,87,812.50	Rs. 8,55,000
Weight	0.3125 (2,67,187.50 / 8,55,000)	0.6875 (5,87,812.5 / 8,55,000)	1.00
Joint cost allocated	Rs. 2,22,656.25 (Rs. 7,12,500 × 0.3125)	Rs. 4,89,843.75 (Rs. 7,12,500 × 0.6875)	Rs. 7,12,500

(d) Constant Gross Margin (%) NRV method

	Chocolate powder Liquor base	Milk chocolate liquor Base	Total
Final sales value of production	Rs. 5,70,000	Rs. 12,11,250	Rs. 17,81,250
Less: Gross margin* 8%	Rs. 45,600	Rs. 96,900	Rs. 1,42,500
Cost of goods available for sale	Rs. 5,24,400	Rs. 11,14,350	Rs. 16,38,750
Less: Separable costs	Rs. 3,02,812.50	Rs. 6,23,437.50	Rs. 9,26,250
Joint cost allocated	Rs. 2,21,587.50	Rs. 4,90,912.50	Rs. 7,12,500

*Final sales value of total production = Rs. 17,81,250
 Less: Joint and separable cost = Rs. 16,38,750 (Rs. 7,12,500 + Rs. 9,26,250)
 Gross Margin = Rs. 1,42,500
 Gross margin (%) = $\frac{\text{Rs. 1,42,500}}{\text{Rs. 17,81,250}} \times 100 = 8\%$

(ii) Chocolate powder liquor base

(Amount in Rs.)

	Sales value at Split off	Physical Measure	Estimated net Realisable Value	Constant Gross Margin NRV
Final sale value of Chocolate powder	5,70,000	5,70,000	5,70,000	5,70,000
Less: Separable costs	3,02,812.50	3,02,812.50	3,02,812.50	3,02,812.50
Less: Joint costs	2,49,375	2,85,000	2,22,656.25	2,21,587.50
Gross Margin	17,812.50	(17,812.50)	44,531.25	45,600
Gross Margin %	3.125%	(3.125%)	7.8125%	8.00%

Milk chocolate liquor base

(Amount in Rs.)

	Sales value at split off	Physical measure	Estimated net realisable	Constant Gross margin NRV
Final sale value of milk chocolate	12,11,250	12,11,250	12,11,250	12,11,250
Less: Separable costs	6,23,437.50	6,23,437.50	6,23,437.50	6,23,437.50
Less: Joint costs	4,63,125	4,27,500	4,89,843.75	4,90,912
Gross Margin	1,24,687.50	1,60,312.50	97,968.75	96,900.50
Gross Margin %	10.29%	13.24%	8.09%	8.00%

(iii) Further processing of Chocolate powder liquor base in Chocolate powder

	(Amount in Rs.)
Incremental revenue {Rs. 5,70,000 - (Rs. 997.50 × 300 gallon)}	2,70,750
Less: Incremental costs	3,02,812.50
Incremental operating income	(32,062.50)

Further processing of Milk Chocolate liquor base into Milk Chocolate.

	(Amount in Rs.)
Incremental revenue {Rs. 12,11,250 - (Rs. 1,235 × 450 gallon)}	6,55,500
Less: Incremental cost	6,23,437.50
Incremental operating income	32,062.50

The above computations show that Pokemon Chocolates could increase operating income by Rs. 32,062.50 if chocolate liquor base is sold at split off point and milk chocolate liquor base is processed further.

QUESTION 46 (RTP Nov' 20)

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

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

The selling prices quoted here are expected to remain the same in the coming year. During 2020-21, the selling prices of the items and the total amounts sold were:

X - 186 tons sold for Rs. 1,500 per ton

Y - 527 tons sold for Rs. 1,125 per ton

Z - 736 tons sold for Rs. 750 per ton

The total joint manufacturing costs for the year were Rs 6,25,000. An additional Rs.3,10,000 was spent to finish product Z.

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

X 180 tons

Y 60 Tons

Z 25 tons

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

Required:

Compute the cost of inventories of X, Y and Z and cost of goods sold for income statement purpose as of March 31, 2021, using Net realizable value (NRV) method of joint cost allocation.

Student Notes

SOLUTION

(a) Statement of Joint Cost allocation of inventories of X, Y and Z

(By using Net Realisable Value Method)

	Products			Total (Rs.)
	X	Y	Z	
	(Rs.)	(Rs.)	(Rs.)	
Final sales value of total production (Working Note 1)	5,49,000 (366 x Rs. 1,500)	6,60,375 (587 x Rs.1,125)	5,70,750 (761 x Rs. 750)	17,80,125
Less: Additional cost	--	--	3,10,000	3,10,000
Net realisable value (at split-off point)	5,49,000	6,60,375	2,60,750	14,70,125
Joint cost allocated (Working Note 2)	2,33,398	2,80,748	1,10,854	6,25,000

(b) Cost of goods sold for income statement purpose as of March 31, 2021 (By using Net Realisable Value Method)

	Products			Total (Rs.)
	X	Y	Z	
	(Rs.)	(Rs.)	(Rs.)	
Allocated joint cost	2,33,398	2,80,748	1,10,854	6,25,000
Additional costs	--	--	3,10,000	3,10,000
Cost of goods available for sale (CGAS)	2,33,398	2,80,748	4,20,854	9,35,000
Less: Cost of ending inventory (Working Note 1)	1,14,785 (CGAS x 49.18%)	28,692 (CGAS x 10.22%)	13,846 (CGAS x 3.29%)	1,57,323
Cost of goods sold	1,18,613	2,52,056	4,07,008	7,77,677

Working Notes

1. Total production of three products for the year 2020-2021

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

2. Joint cost apportioned to each product:

$$\frac{\text{Total Joint Cost}}{\text{Total Net Realisable Value}} \times \text{Rs. } 10,98,000 = \text{Rs. } 4,66,797$$

$$\text{Total Cost of Product X} = \frac{\text{Rs. } 12,50,000}{\text{Rs. } 29,40,250} \times \text{Rs. } 10,98,000 = \text{Rs. } 4,66,797$$

$$\text{Total Cost of Product Y} = \frac{\text{Rs. } 12,50,000}{\text{Rs. } 29,40,250} \times \text{Rs. } 13,20,750 = \text{Rs. } 5,61,496$$

$$\text{Total Cost of Product Z} = \frac{\text{Rs. } 12,50,000}{\text{Rs. } 29,40,250} \times \text{Rs. } 5,21,500 = \text{Rs. } 2,21,707$$

QUESTION 46

A company's plant processes 1,50,000 kg. of raw material in a month to produce two products, viz, 'P' and 'Q'. The cost of raw material is Rs. 12 per kg. The processing costs per month are:

	(Rs.)
Direct Materials	90,000
Direct Wages	1,20,000
Variable Overheads	1,00,000
Fixed Overheads	1,00,000

The loss in process is 5% of input and the output ratio of P and Q which emerge simultaneously is 1:2. The selling prices of the two products at the point of split off are: P Rs. 12 per kg. and Q Rs. 20 per kg. A proposal is available to process P further by mixing it with other purchased materials. The entire current output of the plant can be so processed further to obtain a new product 'S'. The price per kg. of S is Rs. 15 and each kg of output of S will require one kilogram of input P. The cost of processing of P into S (including other materials) is Rs. 1,85,000 per month.

You are required to prepare a statement showing the monthly profitability based both on the existing manufacturing operations and on further processing.

Will you recommend further processing?

SOLUTION

Working Notes:

	(Kg.)
Material input	1,50,000
Less: Loss of Material in process (5% of 1,50,000 kg.)	7,500
Total output	1,42,500

2. Output of P and Q are in the ratio of 1 : 2 of the total output

$$P = \frac{1,42,500 \text{ Kg.} \times 1}{3} = 47,500 \text{ kg.}$$

$$Q = \frac{1,42,500 \text{ kg.} \times 2}{3} = 95,000 \text{ kg.}$$

3. Joint Costs:

	(Rs.)
Material (input) (1,50,000 kg. × Rs. 12)	18,00,000
Direct materials	90,000
Direct Wages	1,20,000
Variable overheads	1,00,000
Fixed overheads	1,00,000
	22,10,000

4. Sales Revenue of P, Q and S
 $P = 47,500 \text{ Kg.} \times \text{Rs. } 12 = \text{Rs. } 5,70,000$
 $Q = 95,000 \text{ Kg.} \times \text{Rs. } 20 = \text{Rs. } 19,00,000$
 $S = 47,500 \text{ Kg.} \times \text{Rs. } 15 = \text{Rs. } 7,12,500.$
5. Apportionment of joint costs viz. Rs. 22,10,000 over P and Q in proportion of their sales value i.e. Rs. 5,70,000 and Rs. 19,00,000, i.e., 3 : 10 is:

	Total (Rs.)	P (Rs.)	Q (Rs.)
Joint cost apportionment In the ratio of 3 : 10	22,10,000	5,10,000 $\left(\frac{\text{Rs. } 22,10,000 \times 3}{13} \right)$	17,00,000 $\left(\frac{\text{Rs. } 22,10,000 \times 10}{13} \right)$

6. Total Cost of 47,500 kg. of S = Joint Cost of P + Cost of Processing P into S. = Rs. 5,10,000 + Rs. 1,85,000 = Rs. 6,95,000.

Statement showing the Monthly Profitability

	Based on existing manufacturing operations			Based on further processing of P into S		
	Products			Products		
	P	Q	Total	S	Q	Total
Sales quantity (kg.)	47,500	95,000	1,42,500	47,500	95,000	1,42,500
	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Sales Revenue (Working Note 4)	5,70,000	19,00,000	24,70,000	7,12,500	19,00,000	26,12,500
Less: Joint Costs (Working Note 5)	5,10,000	17,00,000	22,10,000	6,95,000*	17,00,000	23,95,000
Profit	60,000	2,00,000	2,60,000	17,500	2,00,000	2,17,500

*Working Note 6

Recommendation: Further processing of P is not recommended as it results in a lower profit of P.

QUESTION 47

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

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

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

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

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

You are required to:

- Prepare a statement showing apportionment of joint costs, in the ratio of value of sales, net of selling expenses.
- Statement showing profitability at split off point.
- Statement of profitability of 'YP1'.
- Would you recommend further processing of P1?

SOLUTION

Working Notes:

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

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

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

Output 'P1' = $\frac{60 \times 8,10,000}{100} = 4,86,000$ kgs.

Output 'P2' = $\frac{40 \times 8,10,000}{100} = 3,24,000$ kgs.

Statement showing ratio of net sales

Product	P1	P2	Total
Quantity (kgs)	4,86,000	3,24,000	8,10,000
Selling price per kg (Rs.)	110.00	325.00	
Sales Value (Rs. Lakhs)	534.60	1,053.00	1,587.60
Less: Selling Expenses	28.38	25.00	53.38
Net Sales	506.22	1,028.00	1,534.22
Ratio	33%	67%	100.00

Computation of Joint Costs

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

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

Particulars	Amount (Rs. In lakhs)
Joint cost of P1 - 33% of Rs.1,205 lakhs	397.65
Joint cost of P2 - 67% of Rs. 1,205 lakhs	807.35
Total	1,205.00

(ii) Statement showing profitability at split off point

Product	P1	P2	Total
Net Sales Value (Rs. in lakhs) - [A]	506.22	1028.00	1534.22
Less: Joint costs (Rs. in lakhs)	397.65	807.35	1205.00
Profit (Rs. in lakhs) [A] - [B]	108.57	220.65	329.22

(iii) Statement of profitability of product 'YP1

Particulars		YP1
Sales Value (Rs. In lakhs) [A]		629.55
Less: Cost of P1	397.65	807.35
Cost of Department Y	128.00	
Selling Expenses of Product 'YP1'	19.00	
Total Costs [B]		544.65
Profit (Rs. In Lakhs) [A] - [B]		147.90

Working Note: Computation of Product 'YP1'

Quantity of product P1 input used = 4,86,000 kgs

Input output ratio of material processed in Department Y = 100 : 95

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

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

- (iv) Further processing of product P1 and converting to product YP1 is beneficial as the profit of the company increases by Rs. 39.33 lakhs.

Working Note:

Profit of Product 'YP1'	Rs. 147.90L
Profit of Product 'P1'	Rs. 108.57L
Increase in profit after further processing	Rs. 39.33 L

Q.	Concept	Pg
49	Calculation of Absolute & Commercial MT-KM	128-130
50	Service Cost of a School	131-134
51	Service Cost of a Hospital	135-137

QUESTION 49

GTC has a lorry of 6-ton carrying capacity. It operates lorry service from city A to city B. It charges Rs. 2,400 per ton from city 'A' to city 'B' and Rs. 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 2020, the truck made 12 outward journeys for city 'B'. The details of journeys are as follows:

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

Annual fixed costs and maintenance charges are ₹ 6,00,000 and ₹ 1,20,000 respectively. Running charges spent during January 2020 are ₹ 2,94,400 (includes ₹ 12,400 paid as penalty for overloading).

You are required to:

- (i) CALCULATE the cost as per (a) Commercial ton-kilometre. (b) Absolute ton-kilometre
- (ii) CALCULATE Net Profit/ loss for the month of January, 2020.

SOLUTION

(i) Calculation of total monthly cost for running truck:

Particulars	Amount per annum (Rs.)	Amount per month (Rs.)
(i) Standing Charges:		
Annual fixed costs	6,00,000	50,000
(ii) Maintenance Charges:	1,20,000	10,000
(iii) Running Cost:		
Running charges	2,94,400	
Less: Penalty paid for overloading	(12,400)	2,82,000
Total monthly cost		3,42,000

$$(a) \text{ Cost per commercial ton-km} = \frac{\text{Rs. } 3,42,000}{44,856 \text{ ton-km.}} = \text{Rs. } 7.62$$

(Refer to working note-1)

$$(b) \text{ Cost per absolute ton-km.} = \frac{\text{Rs. } 3,42,000}{44,720 \text{ ton-km.}} = \text{Rs. } 7.65$$

(Refer to working note-2)

(ii) Calculation of Net Profit/Loss for the month of January 2020:

Particulars	(Rs.)	(Rs.)
Truck hire charges received during the month:		
From Outward journey (12 trips × 6 ton × Rs. 2,400)	1,72,800	
From return journey {(5 trips × 8 ton × ₹ 2,200) + (7 trips × 6 ton × Rs. 2,200)}	1,80,400	3,53,200
Less: Monthly running cost {as per (i) above}		(3,42,000)
Operating profit		11,200
Less: Penalty paid for overloading		(12,400)
Net Loss for the month		(1,200)

Working Notes:

1. Calculation of Commercial Ton-km:

Particulars		Ton-km.
A. Total Distance travelled		
To and fro (300 km × 2 × 12 trips) (in km)		7,200
B. Average weight carried:		
Outward (12 journeys × 6 ton + 2 journeys × 4 ton)	80	
Return (5 journeys × 8 ton + 6 journeys × 6 ton + 1 journey × 6 ton)	82	
Total weight	162	
No. of journeys	26	
Average weight (in ton) (162 ÷ 26)	6.23	
Total Commercial Ton-km (A × B)		44,856

2. Calculation of Absolute Ton-km:

Particulars	Ton-km.	Ton-km.
Outward journeys:		
From city A to city B (10 journey × 300 km. × 6 ton)	18,000	
From city A to city C (2 journeys × 140 km. × 6 ton)	1,680	
From city C to city B (2 journeys × 160 km. × 4 ton)	1,280	20,960
Return journeys:		
From city B to city A (5 journeys × 300 km. × 8 ton) + (6 journeys × 300 km. × 6 ton)	22,800	
From city B to city C (1 journey × 160 km. × 6 ton)	960	23,760
Total Absolute Ton-km		44,720

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

QUESTION 50 (Similar to RTP May 18, May 20)

AD Higher Secondary School (AHSS) offers courses for 11th & 12th standard in three streams i.e. Arts, Commerce and Science. AHSS runs higher secondary classes along with primary and secondary classes, but for accounting purpose it treats higher secondary as a separate responsibility centre. The Managing committee of the school wants to revise its fee structure for higher secondary students. The accountant of the school has provided the following details for a year:

	Amount (Rs.)
Teachers' salary (25 teachers × Rs. 35,000 × 12 months)	1,05,00,000
Principal's salary	14,40,000
Lab attendants' salary (2 attendants × Rs. 15,000 × 12 months)	3,60,000
Salary to library staff	1,44,000
Salary to peons (4 peons × Rs. 10,000 × 12 months)	4,80,000
Salary to other staffs	4,80,000
Examinations expenditure	10,80,000
Office & Administration cost	15,20,000
Annual day expenses	4,50,000
Sports expenses	1,20,000

Other information:

(i)

	Standard 11 & 12			Primary & Secondary
	Arts	Commerce	Science	
No. of students	120	360	180	840
Lab classes in a year	0	0	144	156
No. of examinations in a year	2	2	2	2
Time spent at library per student per year	180 hours	120 hours	240 hours	60 hours
Time spent by principal for administration	208 hours	312 hours	480 hours	1,400 hours
Teachers for 11 & 12 standard	4	5	6	10

- (ii) One teacher who teaches economics for Arts stream students also teaches commerce stream students. The teacher takes 1,040 classes in a year, it includes 208 classes for commerce students.
- (iii) There is another teacher who teaches mathematics for Science stream students also teaches business mathematics to commerce stream students. She takes 1,100 classes a year, it includes 160 classes for commerce students.
- (iv) One peon is fully dedicated for higher secondary section. Other peons dedicate their 15% time for higher secondary section.
- (v) All school students irrespective of section and age participates in annual functions and sports activities.

Required:

- (a) CALCULATE cost per student per annum for all three streams.
- (b) If the management decides to take uniform fee of Rs. 1,000 per month from all higher secondary students, CALCULATE stream wise profitability.
- (c) If management decides to take 10% profit on cost, COMPUTE fee to be charged from the students of all three streams respectively.

SOLUTION**Calculation of Cost per annum**

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Teachers' salary (W.N-1)	16,80,000	21,00,000	25,20,000	63,00,000
Re-apportionment of Economics & Mathematics teachers' salary (W.N_2)	(84,000)	1,45,091	(61,091)	-
Principal's salary (W.N-3)	1,24,800	1,87,200	2,88,000	6,00,000
Lab assistants' salary (W.N-4)	-	-	1,72,800	1,72,800
Salary to library staff (W.N-5)	43,200	28,800	57,600	1,29,600
Salary to peons (W.N-6)	31,636	94,909	47,455	1,74,000
Salary to other staffs (W.N-7)	38,400	1,15,200	57,600	2,11,200

Examination expenses (W.N- 8)	86,400	2,59,200	1,29,600	4,75,200
Office & Administration expenses (W.N- 7)	1,21,600	3,64,800	1,82,400	6,68,800
Annual Day expenses (W.N-7)	36,000	1,08,000	54,000	1,98,000
Sports expenses (W.N- 7)	9,600	28,800	14,400	52,800
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400

(i) Calculation of cost per student per annum

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400
No. of students	120	360	180	660
Cost per student per annum	17,397	9,533	19,238	13,610

(ii) Calculation of profitability

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Total Fees per annum	12,000	12,000	12,000	
Cost per student per annum	17,397	9,533	19,238	
Profit/ (Loss) per student per annum	(5,397)	2,467	(7,238)	
No. of students	120	360	180	
Total Profit/ (Loss)	(6,47,640)	8,88,120	(13,02,840)	(10,62,360)

(iii) Computation of fees to be charged to earn a 10% profit on cost

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)
Cost per student per annum	17,397	9,533	19,238
Add: Profit @10%	1,740	953	1,924
Fees per annum	19,137	10,486	21,162
Fees per month	1,595	874	1,764

Working Notes:

(1) Teachers' salary

Particulars	Arts	Commerce	Science
No. of teachers	4	5	6
Salary per annum (Rs.)(Rs. 35,000 × 12)	4,20,000	4,20,000	4,20,000
Total salary	16,80,000	21,00,000	25,20,000

(2) Re-apportionment of Economics and Mathematics teachers' salary

Particulars	Economics		Mathematics	
	Arts	Commerce	Science	Commerce
No. of classes	832	208	940	160
Salary re- apportionment (Rs.)	(84,000)	84,000	(61,091)	61,091
	$\frac{\text{Rs.4,20,000}}{1,040} \times 208$		$\frac{\text{Rs.4,20,000}}{1,100} \times 160$	

(3) Principal's salary has been apportioned on the basis of time spent by him for administration of classes.

(4) Lab attendants' salary has been apportioned on the basis of lab classes attended by the students.

(5) Salary of library staffs are apportioned on the basis of time spent by the students in library.

(6) Salary of Peons are apportioned on the basis of number of students. The peons' salary allocable to higher secondary classes is calculated as below:

	Amount (Rs.)
Peon dedicated for higher secondary (1 peon × Rs.10,000 × 12 months)	1,20,000
Add: 15% of other peons' salary {15% of (3 peons × Rs.10,000 × 12 months)}	54,000
	1,74,000

(7) Salary to other staffs, office & administration cost, Annual day expenses and sports expenses are apportioned on the basis of number of students.

(8) Examination expenditure has been apportioned taking number of students into account (It may also be apportioned on the basis of number of examinations).

QUESTION 51 (Similar to Past Paper May 18)

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 - Rs. 75,000

Supervisors - 2 persons - Rs. 25,000 Per month - each

Nurses - 4 persons - Rs. 20,000 per month - each

Ward Boys - 4 persons - Rs. 5,000 per month - each

Doctors paid Rs. 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) - Rs. 81,000

Food to Patients (Variable) - Rs. 8,80,000

Other services to patients (Variable) - Rs. 3,00,000

Laundry charges (Variable) - Rs. 6,00,000

Medicines (Variable) - Rs. 7,50,000

Other fixed expenses - Rs. 10,80,000

Administration expenses allocated - Rs. 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 Rs. 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 Rs. 2,000 per day from each patient

(b) FIND OUT Breakeven point for the hospital.

Student Notes

SOLUTION

Working notes:

(i) Calculation of number of Patient days

35 Beds × 150 days	=	5,250
25 Beds × 80 days	=	2,000
Extra beds	=	<u>750</u>
Total	=	<u>8,000</u>

Statement of Profitability

Particulars	Amount	Amount
Income for the year (Rs. 2,000 per patient perday × 8,000 patient days)		1,60,00,000
Variable Costs:		
Doctor Fees (Rs. 2,50,000 per month × 12)	30,00,000	
Food to Patients (Variable)	8,80,000	
Other services to patients (Variable)	3,00,000	
Laundry charges (Variable) - (Rs.)	6,00,000	
Medicines (Variable) - (Rs.)	7,50,000	
Bed Hire Charges (Rs.100 × 750 Beds)	75,000	
Total Variable costs		56,05,000
Contribution		1,03,95,000
Fixed Costs:		
Rent (Rs. 75,000 per month × 12)	9,00,000	
Supervisor (2 persons × Rs.25,000 × 12)	6,00,000	
Nurses (4 persons × Rs. 20,000 × 12)	9,60,000	
Ward Boys (4 persons × Rs. 5,000 × 12)	2,40,000	
Repairs (Fixed)	81,000	
Other fixed expenses - (Rs.)	10,80,000	
Administration expenses allocated - (Rs.)	10,00,000	
Total Fixed Costs		48,61,000
Profit		55,34,000

(1) Calculation of Contribution per Patient day

Total Contribution - Rs. 1,03,95,000

Total Patient days - 8,000

Contribution per Patient day - Rs. 1,03,95,000 / 8,000 = Rs. 1,299.375

(2) Breakeven Point = Fixed Cost / Contribution per Patient day

= Rs. 48,61,000 / Rs.1,299.375

= 3,741 patient days

Q.	Concept	Pg
52	Material & Labour Variances	138-140
53	Fixed & Variable Variance	141-143
54	All Variances	144-145

QUESTION 52

KPR Limited operates a system of standard costing in respect of one of its products which is manufactured within a single cost centre. The Standard Cost Card of a product is as under:

Standard	Unit cost (Rs.)
Direct material 5 kg. @ Rs. 4.20	21.00
Direct labour 3 hours @ Rs. 3.00	9.00
Factory overhead Rs. 1.20 per labour hour	3.60
Total manufacturing cost	33.60

The production schedule for the month of June, 2013 required completion of 40,000 units. However, 40,960 units were completed during the month without opening and closing work-in-process inventories.

Purchases during the month of June, 2013, 2,25,000 kg. of material at the rate of Rs. 4.50 per kg. Production and Sales records for the month showed the following actual results.

Material used	2,05,600 kg.
Direct labour 1,21,200 hours; cost incurred	Rs.3,87,840
Total factory overhead cost incurred	Rs.1,00,000
Sales	40,000 units

Selling price to be so fixed as to allow a mark-up of 20 percent on selling price.

The production schedule for the month of June, 2013 required completion of 40,000 units. However, 40,960 units were completed during the month without opening and closing work-in-process inventories.

Purchases during the month of June, 2013, 2,25,000 kg. of material at the rate of Rs. 4.50 per kg. Production and Sales records for the month showed the following actual results.

Material used	2,05,600 kg.
Direct labour 1,21,200 hours; cost incurred	Rs.3,87,840
Total factory overhead cost incurred	Rs.1,00,000
Sales	40,000 units

Selling price to be so fixed as to allow a mark-up of 20 percent on selling price.

Required:

- (i) Calculate material variances based on consumption of material.
- (ii) Calculate labour variances and the total variance for factory overhead.
- (iii) Prepare Income statement for June, 2013 showing actual gross margin.
- (iv) An incentive scheme is in operation in the company whereby employees are paid a bonus of 50% of direct labour hour saved at standard direct labour hour rate. Calculate the Bonus amount.

SOLUTION

(i) **Material variances:**

- (a) **Material Cost Variance** = Standard Cost - Actual Cost
 = $(40,960 \text{ units} \times 5 \text{ kg.} \times \text{Rs. } 4.20) - (2,05,600 \text{ kg.} \times \text{Rs. } 4.50)$
 = Rs. 8,60,160 - Rs. 9,25,200 = Rs. 65,040 (A)
- (b) **Material Price Variance** = Actual Qty. (Std.Price - Actual Price)
 = $2,05,600^* \text{ kg.} (\text{Rs. } 4.20 - \text{Rs. } 4.50)$
 = Rs. 61,680 (A)

(*Material variances are calculated on the basis of consumption)

- (c) **Material Usages Variance** = Std. Price (Std. Qty. - Actual Qty.)
 = $\text{Rs. } 4.20 (40,960 \text{ units} \times 5 \text{ kg.} - 2,05,600 \text{ kg.})$
 = Rs. 3,360 (A)

(ii) **Labour Variances and Overhead Variances:**

- (a) **Labour Cost Variance** = Standard cost - Actual cost
 = $(40,960 \text{ units} \times 3 \text{ hours} \times \text{Rs. } 3) - \text{Rs. } 3,87,840$
 = Rs.19,200 (A)
- (b) **Labour Rate Variance** = Actual Hours (Std. Rate - Actual Rate)
 = $1,21,200 \text{ hours} (\text{Rs. } 3 - \text{Rs. } 3.20)$
 = Rs. 24,240 (A)
- (c) **Labour Efficiency Variance** = Std. Rate (Std. Hour - Actual Hour)
 = $\text{Rs. } 3 (40,960 \text{ units} \times 3 \text{ hour} - 1,21,200 \text{ hour})$
 = Rs. 5,040 (F)
- (d) **Total Factory Overhead Variance**
 = Factory Overhead Absorbed - Actual Factory Overhead
 = $(\text{Actual Hours} \times \text{Std. Rate}) - \text{Actual Factory Overhead}$
 = $(40,960 \text{ units} \times 3 \text{ hours} \times \text{Rs. } 1.20) - \text{Rs. } 1,00,000$
 = Rs. 47,456 (F)

(iii) Preparation of Income Statement

Calculation of unit selling price	(Rs.)
Direct material	21.00
Direct labour	9.00
Factory overhead	3.60
Factory cost	33.60
Margin 25% on factory cost	8.40
Selling price	42.00

Income Statement

	(Rs.)	(Rs.)
Sales (40,000 units × Rs. 42)		16,80,000
Less: Standard cost of goods sold (40,000 units × Rs.33.60)		13,44,000
		3,36,000
Less: Adverse Variances:		
Material Price variance	61,680	
Material Usage variance	3,360	
Labour Rate variance	24,240	89,280
		2,46,720
Add:Favourable variances:		
Labour efficiency variance	5,040	
Factory overhead	47,456	52,496
Actual gross margin		2,99,216

(iv)

Labour hour saved	(Rs.)
Standard labour hours (40,960 units × 3 hours)	1,22,880
Actual labour hour worked	1,21,200
Labour hour saved	1,680

Bonus for saved labour = 50% (1,680 hours × Rs. 3) = Rs. 2,520

QUESTION 53

XYZ Ltd. has furnished you the following information for the month of August, 2020:

	Budget	Actual
Output (units)	30,000	32,500
Hours	30,000	33,000
Fixed overhead	Rs.45,000	50,000
Variable overhead	Rs.60,000	68,000
Working days	25	26

CALCULATE overhead variances.

SOLUTION

$$\text{Standard hours per unit} = \frac{\text{Budgeted hours}}{\text{Budgeted units}} = \frac{30,000 \text{ Hrs}}{30,000 \text{ Units}} = 1 \text{ hour per unit}$$

$$\text{Std. hrs. for actual output} = 32,500 \text{ units} \times 1 \text{ hr.} = 32,500$$

$$\text{Standard overhead rate per hour} = \frac{\text{Budgeted overhead}}{\text{Budgeted hours}}$$

$$\text{For fixed overhead} = \frac{45,000}{30,000} = \text{Rs. } 1.50 \text{ per hour}$$

$$\text{For Variable Overhead} = \frac{60,000}{30,000} = \text{Rs. } 2 \text{ per hour}$$

$$\text{Std. F.O. rate per day} = \text{Rs. } 45,000 \div 25 \text{ days} = \text{Rs. } 1,800$$

$$\text{Recovered overhead} = \text{Std. hrs. for actual output} \times \text{Std. rate}$$

$$\text{For fixed overhead} = 32,500 \text{ hrs.} \times \text{Rs. } 1.50 = \text{Rs. } 48,750$$

$$\text{For variable overhead} = 32,500 \text{ hrs.} \times \text{Rs. } 2 = \text{Rs. } 65,000$$

$$\text{Standard overhead} = \text{Actual hours} \times \text{Std. rate}$$

$$\text{For fixed overhead} = 33,000 \times 1.50 = \text{Rs. } 49,500$$

$$\text{For variable overhead} = 33,000 \times 2 = \text{Rs. } 66,000$$

$$\text{Revised budget hours} = \frac{\text{Budgeted hours} \times \text{Actual days}}{\text{Budgeted days}}$$

$$= \frac{30,000 \times 26}{25} = 31,200 \text{ hours}$$

Calculation of variances**Fixed Overhead Variances:**

- (i) F.O. cost Variance = Recovered Overhead - Actual Overhead
= 48,750 - 50,000
= Rs. 1,250 (A)
- (ii) F.O. Expenditure Variance = Budgeted Overhead - Actual Overhead
= 45,000 - 50,000
= Rs. 5,000 (A)
- (iii) F.O. Volume Variance = Recovered Overhead - Budgeted Overhead
= 48,750 - 45,000
= Rs. 3,750 (F)
- (iv) F.O. Efficiency Variance = Recovered Overhead - Standard Overhead
= 48,750 - 49,500
= Rs. 750 (A)
- (v) F.O. Capacity Variance = Standard Overhead - Revised budgeted Overhead
= 49,500 - 46,800
= Rs. 2,700 (F)
- (vi) Calendar Variance = Actual Days - Budget Days¹ × St. rate per day.
= (26 - 25) × 1,800
= Rs. 1,800 (F)

Variable Overhead Variances

- (i) V.O. Cost variance = Recovered Overhead - Actual Overhead
= 65,000 - 68,000 = Rs. 3,000 (A)
- (ii) V.O. Expenditure Variance = Standard Overhead - Actual Overhead
= 66,000 - 68,000 = Rs. 2,000 (A)
- (iii) V.O. Efficiency Variance = Recovered Overhead - Standard Overhead
= 65,000 - 66,000 = Rs. 1,000 (A)

Check

(i) F.O. Cost Variance = Expenditure variance + Volume Variance

$$1,250 (A) = 5,000 (A) + 3,750 (F)$$

(ii) F.O Volume Variance = Efficiency Variance + Capacity Variance + Calendar Variance

$$3,750 (F) = 750 (A) + 2,700 (F) + 1,800 (F)$$

(iii) V.O. Cost Variance = Expenditure Variance + Efficiency Variance

$$3,000 (A) = 2,000 (A) + 1,000 (A).$$

QUESTION 54

SP Limited produces a product 'Tempex' which is sold in a 10 Kg. packet. The standard cost card per packet of 'Tempex' are as follows:

	(Rs.)
Direct materials 10 kg @ Rs. 45 per kg	450
Direct labour 8 hours @ Rs. 50 per hour	400
Variable Overhead 8 hours @ Rs. 10 per hour	80
Fixed Overhead	<u>200</u>
	<u>1,130</u>

Budgeted output for the third quarter of a year was 10,000 Kg. Actual output is 9,000 Kg. Actual cost for this quarter are as follows:

	(Rs.)
Direct Materials 8,900 Kg @Rs. 46 per Kg.	4,09,400
Direct Labour 7,000 hours @Rs. 52 per hour	3,64,000
Variable Overhead incurred	72,500
Fixed Overhead incurred	1,92,000

You are required to calculate:

- (i) Material Usage Variance
- (ii) Material Price Variance
- (iii) Material Cost Variance
- (iv) Labour Efficiency Variance
- (v) Labour Rate Variance
- (vi) Labour Cost Variance
- (vii) Variable Overhead Cost Variance
- (viii) Fixed Overhead Cost Variance.

SOLUTION

(i) Material Usage Variance = Std. Price (Std. Quantity - Actual Quantity)
 = Rs. 45 (9,000 kg. - 8,900 kg.)
 = Rs. 4,500 (Favourable)

(ii) Material Price Variance = Actual Quantity (Std. Price - Actual Price)
 = 8,900 kg. (Rs. 45 - Rs. 46) = Rs. 8,900 (Adverse)

(iii) Material Cost Variance = Std. Material Cost - Actual Material Cost
 = (SQ × SP) - (AQ × AP)
 = (9,000 kg. × Rs. 45) - (8,900 kg. × Rs. 46)
 = Rs. 4,05,000 - Rs. 4,09,400
 = Rs. 4,400 (Adverse)

- (iv) Labour Efficiency Variance = Std. Rate (Std. Hours - Actual Hours)
 = Rs 50 $\frac{9,000 \times 8 \text{ hours} - 7,000 \text{ hrs.}}{10}$
 = Rs. 50 (7,200 hrs. - 7,000 hrs.)
 = Rs. 10,000 (Favourable)
- (v) Labour Rate Variance = Actual Hours (Std. Rate - Actual Rate)
 = 7,000 hrs. (Rs. 50 - Rs.52)
 = Rs. 14,000 (Adverse)
- (vi) Labour Cost Variance = Std. Labour Cost - Actual Labour Cost
 = (SH × SR) - (AH × AR)
 = (7,200 hrs. × Rs. 50) - (7,000 hrs. × Rs. 52)
 = Rs. 3,60,000 - Rs. 3,64,000
 = Rs.4,000 (Adverse)
- (vii) Variable Cost Variance = Std. Variable Cost - Actual Variable Cost
 = (7,200 hrs. × Rs. 10) - Rs. 72,500
 = Rs. 500 (Adverse)
- (viii) Fixed Overhead Cost Variance = Absorbed Fixed Overhead-Actual Fixed Overhead
 = $\frac{\text{Rs } 200 \times 9000 \text{ kgs.}}{10 \text{ kgs.}} - \text{Rs.1,92,000}$
 = Rs. 1,80,000 - Rs. 1,92,000 = Rs. 12,000 (Adverse)

Q.	Concept	Pg
55	Breakeven Sales	146
56	BES/ MOS/ Profit	147
57	Profitability Calculation	148-149
58	Difference between Absorption & Marginal Costing	150-152
59	Opportunity Cost	153
60	Cost Indifference Point	154-157
61	Contribution per Limiting Factor	158-159

QUESTION 55

PQR Ltd. has furnished the following data for the two years:

	2021	2022
Sales	Rs. 8,00,000	?
Profit/Volume Ratio (P/V ratio)	50%	37.5%
Margin of Safety sales as a % of total sales	40%	21.875%

There has been substantial savings in the fixed cost in the year 2020 due to the restructuring process. The company could maintain its sales quantity level of 2019 in 2020 by reducing selling price.

You are required to CALCULATE the following:

- (i) Sales for 2020 in Value,
- (ii) Fixed cost for 2020 in Value,
- (iii) Break-even sales for 2020 in Value.

SOLUTION

In 2019, PV ratio = 50%
 Variable cost ratio = 100% - 50% = 50%
 Variable cost in 2019 = Rs.8,00,000 x 50% = Rs.4,00,000
 In 2020, sales quantity has not changed. Thus, variable cost in 2020 is Rs.4,00,000.
 In 2020, P/V ratio = 37.50%
 Thus, Variable cost ratio = 100% - 37.5% = 62.5%

(i) Thus, sales in 2020 = $\frac{4,00,000}{62.5\%} = \text{Rs.}6,40,000$

- In 2020, Break-even sales = 100% - 21.875% (Margin of safety) = 78.125%
- (ii) Break-even sales = 6,40,000 x 78.125% = Rs.5,00,000
- (iii) Fixed cost = B.E. sales x P/V ratio
 = 5,00,000 x 37.50% = Rs.1,87,500.

QUESTION 56 (Similar to RTP May 20)

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

<i>Elements of Cost</i>	<i>Variable Cost portion</i>	<i>Fixed Cost</i>
<i>Direct Material</i>	<i>30% of Cost of Goods Sold</i>	<i>--</i>
<i>Direct Labour</i>	<i>15% of Cost of Goods Sold</i>	<i>--</i>
<i>Factory Overhead</i>	<i>10% of Cost of Goods Sold</i>	<i>Rs. 2,30,000</i>
<i>General & Administration Overhead</i>	<i>2% of Cost of Goods Sold</i>	<i>Rs. 71,000</i>
<i>Selling & Distribution Overhead</i>	<i>4% of Cost of Sales</i>	<i>Rs. 68,000</i>

Last Year 5,000 units were sold at Rs. 185 per unit. From the given data find the followings:

- (a) Break-even Sales (in rupees).
- (b) Profit earned during last year.
- © Margin of safety (in %).
- (d) Profit if the sales were 10% less than the actual sales.

SOLUTION

Working Notes:

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

$$\text{COGS} = \{(DM - 0.3 \text{ COGS}) + (DL - 0.15 \text{ COGS}) + (FOH - 0.10 \text{ COGS} + \text{Rs. } 2,30,000) + (G\&AOH - 0.02 \text{ COGS} + \text{Rs. } 71,000)\}$$

$$\text{Or COGS} = 0.57 \text{ COGS} + \text{Rs. } 3,01,000$$

$$\text{Or} \quad \text{COGS} = \frac{\text{Rs. } 3,01,000}{0.43} = \text{Rs. } 7,00,000$$

QUESTION 57

A single product company sells its product at Rs.60 per unit. In 2021, the company operated at a margin of safety of 40%. The fixed costs amounted to Rs.3,60,000 and the variable cost ratio to sales was 80%.

In 2022, it is estimated that the variable cost will go up by 10% and the fixed cost will increase by 5%.

(i) FIND the selling price required to be fixed in 2022 to earn the same P/V ratio as in 2021.

(ii) Assuming the same selling price of Rs.60 per unit in 2022, Find the number of units required to be produced and sold to earn the same profit as in 2021.

SOLUTION

(I) Profit earned in 2021

Particulars	(Rs.)
Total contribution (50,000 x Rs.12)	6,00,000
Less: Fixed cost	<u>3,60,000</u>
Profit	<u>2,40,000</u>
Selling price to be fixed in 2022:	
Revised variable cost (Rs.48 x 1.10)	52.80
Revised fixed cost (3,60,000 x 1.05)	3,78,000
P/V Ratio (Same as of 2021)	20%
Variable cost ratio to selling price	80%

Therefore, revised selling price per unit = Rs. 52.80 / 80% = Rs.66

(ii) No. of units to be produced and sold in 2022 to earn the same profit:

We know that Fixed Cost plus profit =	Contribution
	(Rs.)
Profit in 2021	2,40,000
Fixed cost in 2022	<u>3,78,000</u>
Desired contribution in 2022	<u>6,18,000</u>

Contribution per unit = Selling price per unit - Variable cost per unit.
= Rs.60 - Rs.52.80 = Rs.7.20.

No. of units to be produced in 2022 = Rs. 6,18,000 / Rs.7.20 = 85,834 units.

Working notes:

1. PV Ratio in 2021

	(Rs.)
Selling price per unit	60
Variable cost (80% of Selling Price)	<u>48</u>
Contribution	<u>12</u>
P/V Ratio	20%

2. No. of units sold in 2021

Break-even point = Fixed cost / Contribution per unit
 = Rs.3,60,000 / Rs.12 = 30,000 units.

Margin of safety is 40%. Therefore, break-even sales will be 60% of units sold.

No. of units sold = Break-even point in units / 60%
 = 30,000 / 60% = 50,000 units.

QUESTION 58

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

Activity Level	50%	100%
Sales and production (units)	400	800
	(Rs.)	(Rs.)
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:

- i) Compute the fixed production costs absorbed by ZEST if absorption costing is used?
- ii) Calculate the under/over-recovery of overheads during the period?
- iii) Calculate the profit using absorption costing?
- iv) Calculate the profit using marginal costing?

SOLUTION

(i) Fixed production costs absorbed:	(Rs.)
Budgeted fixed production costs	1,60,000
Budgeted output (normal level of activity 800 units)	
Therefore, the absorption rate: $1,60,000/800 =$	Rs.200 per unit
During the first quarter, the fixed production cost absorbed by ZEST would be $(220 \text{ units} \times \text{Rs. } 200)$	44,000

(ii) Under /over-recovery of overheads during the period:	(Rs.)
Actual fixed production overhead (1/4 of Rs.1,60,000)	40,000
Absorbed fixed production overhead	44,000
Over-recovery of overheads	4,000

(iii) Profit for the Quarter (Absorption Costing)

	(Rs.)	(Rs.)
Sales revenue (160 units × Rs.2,000): (A)		3,20,000
Less: Production costs:		
- Variable cost (220 units × Rs.800)	1,76,000	
- Fixed overheads absorbed (220 units × Rs. 200)	44,000	2,20,000
Add: Opening stock		--
Less: Closing Stock $\left[\frac{\text{Rs.2,20,000}}{220\text{units}} \times 60\text{units} \right]$		(60,000)
Cost of Goods sold		1,60,000
Less: Adjustment for over-absorption of fixed production overheads		(4,000)
Add: Selling & Distribution Overheads:		
- Variable (160 units × Rs.400)	64,000	
- Fixed (1/4 th of Rs.2,40,000)	60,000	1,24,000
Cost of Sales (B)		2,80,000
Profit {(A) - (B)}		40,000

Student Notes

(iv) Profit for the Quarter (Marginal Costing)

	(Rs.)	(Rs.)
Sales revenue (160 units × Rs.2,000): (A)		3,20,000
Less: Production costs:		
- Variable cost (220 units × Rs.800)		1,76,000
Add: Opening stock		--
Less: Closing Stock $\left[\frac{\text{Rs.1,76,000}}{220\text{units}} \times 60\text{units} \right]$		(48,000)
Variable cost of goods sold		1,28,000
Add: Selling & Distribution Overheads:		
- Variable (160 units × Rs.400)		64,000
Cost of Sales (B)		1,92,000
Contribution {(C) = (A) - (B)}		1,28,000
Less: Fixed Costs:		
- Production cost	(40,000)	
- Selling & distribution cost	(60,000)	(1,00,000)
Profit		28,000

Student Notes

QUESTION 59

A company can make any one of the 3 products X, Y or Z in a year. It can exercise its option only at the beginning of each year.

Relevant information about the products for the next year is given below.

	X	Y	Z
Selling Price (Rs./ unit)	10	12	12
Variable Costs (Rs./ unit)	6	9	7
Market Demand (unit)	3,000	2,000	1,000
Production Capacity (unit)	2,000	3,000	900
Fixed Costs (Rs.)	30,000		

Required

Compute the opportunity costs for each of the products.

SOLUTION

	X	Y	Z
I. Contribution per unit (Rs.)	4	3	5
II. Units (Lower of Production / Market Demand)	2,000	2,000	900
III. Possible Contribution (Rs.) [I × II]	8,000	6,000	4,500
IV. Opportunity Cost* (Rs.)	6,000	8,000	8,000

(* Opportunity cost is the maximum possible contribution forgone by not producing alternative product i.e. if Product X is produced then opportunity cost will be maximum of (Rs. 6,000 from Y, Rs.4,500 from Z).

QUESTION 60

The following are cost data for three alternative ways of processing the clerical work for cases brought before the LC Court System:

	A Manual (Rs.)	B Semi- Automatic (Rs.)	C Fully- Automatic (Rs.)
Monthly fixed costs:			
Occupancy	15,000	15,000	15,000
Maintenance contract	---	5,000	10,000
Equipment lease	---	25,000	1,00,000
Unit variable costs (per report):			
Supplies	40	80	20
Labour	Rs.200 (5 hrs × Rs.40)	Rs.60 (1 hr × Rs.60)	Rs.20 (0.25 hr × Rs.80)

Required:

- 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, SELECT most appropriate on cost considerations.

SOLUTION

(i) Cost Indifference Point

	A and B (Rs.)	A and C (Rs.)	B and C (Rs.)
Differential Fixed Cost (I)	Rs.30,000 (Rs.45,000 - Rs.15,000)	Rs.1,10,000 (Rs.1,25,000 - Rs.15,000)	Rs.80,000 (Rs.1,25,000 - Rs.45,000)
Differential Variable Costs (II)	Rs.100 (Rs.240 -Rs.140)	Rs.200 (Rs.240 - Rs.40)	Rs.100 (Rs.140 - Rs.40)
Cost Indifference Point (I/II) (Differential Fixed Cost / Differential Variable Costs per case)	300 Cases	550 Cases	800 Cases

Interpretation of Results

(i) At activity level below the indifference points, the alternative with lower fixed costs and higher variable costs should be used. At activity level above the indifference point alternative with higher fixed costs and lower variable costs should be used.

No. of Cases	Alternative to be Chosen
Cases \leq 300	Alternative 'A'
300 \geq Cases \leq 800	Alternative 'B'
Cases \geq 800	Alternative 'C'

(ii) 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.

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

$$COS = COGS + (S\&DOH - 0.04 COS + Rs. 68,000)$$

Or

$$COS = Rs. 7,00,000 + (0.04 COS + Rs. 68,000)$$

Or

$$COS = \frac{Rs. 7,68,000}{0.96} = Rs. 8,00,000$$

(iii) Calculation of Variable Costs:

Direct Material-	(0.3 × Rs. 7,00,000)	Rs. 2,10,000
Direct Labour-	(0.15 × Rs. 7,00,000)	Rs. 1,05,000
Factory Overhead -	(0.10 × Rs. 7,00,000)	Rs. 70,000
General & Administration OH-	(0.02 × Rs. 7,00,000)	Rs. 14,000
Selling & Distribution OH -	(0.04 × Rs. 8,00,000)	<u>Rs. 32,000</u>
		<u>Rs. 4,31,000</u>

(iv) Calculation of total Fixed Costs:

Factory Overhead-	Rs. 2,30,000
General & Administration OH-	Rs. 71,000
Selling & Distribution OH	Rs. 68,000
	<u>Rs. 3,69,000</u>

(v) Calculation of P/V Ratio:

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

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

(a) Break- Even Sales = $\frac{\text{Fixed Cost}}{P/V \text{ Ratio}} = \frac{Rs. 3,69,000}{53.41\%} = Rs. 6,90,882$

(b) Profit earned during the last year

$$= (\text{Sales} - \text{Total Variable Costs}) - \text{Total Fixed Costs}$$

$$= (Rs. 9,25,000 - Rs. 4,31,000) - Rs. 3,69,000$$

$$= Rs. 1,25,000$$

$$\begin{aligned} \text{(c) Margin of Safety (\%)} &= \frac{\text{Sales} - \text{Break even sales}}{\text{Sales}} \times 100 \\ &= \frac{\text{Rs. } 9,25,000 - \text{Rs. } 6,90,000}{\text{Rs. } 9,25,000} \times 100 = 25.31\% \end{aligned}$$

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

$$\begin{aligned} \text{Profit} &= 90\% (\text{Rs. } 9,25,000 - \text{Rs. } 4,31,000) - \text{Rs. } 3,69,000 \\ &= \text{Rs. } 4,44,600 - \text{Rs. } 3,69,000 = \text{Rs. } 75,600 \end{aligned}$$

QUESTION 61

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:

	Part A	Part B
Per unit		
Alloy usage	1.6 kgs.	1.6 kgs.
Machine Time: Machine P	0.6 hrs	0.25 hrs.
Machine Time: Machine Q	0.5 hrs.	0.55 hrs.
Target Price (Rs.)	145	115
Total hours available	Machine P 4,000	Machine Q 4,500 hours
Alloy available is 13,000 kgs. @ Rs.12.50 per kg.		
Variable overheads per machine hours	Machine P: Rs.80	Machine Q: Rs.100

Required

- i) IDENTIFY the spare part which will optimize contribution at the offered price.
- ii) If Y Ltd. reduces target price by 10% and offers Rs.60 per hour of unutilized machine hour, CALCULATE the total contribution from the spare part identified above?

SOLUTION

(i)

	Part A	Part B
Machine "P" (4,000 hrs)	6,666	16,000
Machine "Q" (4,500 hrs)	9,000	8,181
Alloy Available (13,000 kg.)	8,125	8,125
Maximum Number of Parts to be manufactured (Minimum of the above three)	6,666	8,125

	(Rs.)	(Rs.)
Material (Rs.12.5 × 1.6 kg.)	20.00	20.00
Variable Overhead: Machine "P"	48.00	20.00
Variable Overhead: Machine "Q"	50.00	55.00
Total Variable Cost per unit	118.00	95.00
Price Offered	145.00	115.00
Contribution per unit	27.00	20.00
Total Contribution for units produced ... (I)	1,79,982	1,62,500

(ii) Spare Part A will optimize the contribution.

	Part A
Parts to be manufactured numbers	6,666
Machine P : to be used	4,000
Machine Q : to be used	3,333
Underutilized Machine Hours (4,500 hrs. - 3,333 hrs.)	1,167
Compensation for unutilized machine hours (1,167hrs. × Rs.60) (II)	70,020
Reduction in Price by 10%, Causing fall in Contribution of Rs.14.50 per unit (6,666 units × Rs.14.5) (III)	96,657
Total Contribution (I + II - III)	1,53,345

Q.	Concept	Pg
62	Production / RM Consumption/ Purchase Budget	160-162
63	Calculation of All Ratios	163-166
64	Flexible Budget	167-168

QUESTION 62 (Similar to RTP May 19)

ABC Ltd. is currently operating at 75% of its capacity. In the past two years, the levels of operations were 55% and 65% respectively. Presently, the production is 75,000 units. The company is planning for 85% capacity level during 2020-21. The cost details are as follows:

	55% (Rs.)	65% (Rs.)	75% (Rs.)
Direct Materials	11,00,000	13,00,000	15,00,000
Direct Labour	5,50,000	6,50,000	7,50,000
Factory Overheads	3,10,000	3,30,000	3,50,000
Selling Overheads	3,20,000	3,60,000	4,00,000
Administrative Overheads	<u>1,60,000</u>	<u>1,60,000</u>	<u>1,60,000</u>
	<u>24,40,000</u>	<u>28,00,000</u>	<u>31,60,000</u>

Profit is estimated @ 20% on sales.

The following increases in costs are expected during the year:

	In percentage
Direct Materials	8
Direct Labour	5
Variable Factory Overheads	5
Variable Selling Overheads	8
Fixed Factory Overheads	10
Fixed Selling Overheads	15
Administrative Overheads	10

Prepare flexible budget for the period 2020-21 at 85% level of capacity. Also ascertain profit and contribution.

SOLUTION

ABC Ltd.

Budget for 85% capacity level for the period 2020-21

Budgeted production (units)	85,000	
	Per Unit (Rs.)	Amount (Rs.)
Direct Material (note 1)	21.60	18,36,000
Direct Labour (note 2)	10.50	8,92,500
Variable factory overhead (note 3)	2.10	1,78,500
Variable selling overhead (note 4)	4.32	3,67,200
Variable cost	38.52	32,74,200
Fixed factory overhead (note 3)		2,20,000

Fixed selling overhead (note 4)	1,15,000
Administrative overhead	1,76,000
Fixed cost	5,11,000
Total cost	37,85,200
Add: Profit 20% on sales or 25% on total cost	9,46,300
Sales	47,31,500
Contribution (Sales - Variable cost)	14,57,300

Working Notes:

1. Direct Materials:

	(Rs.)		(Rs.)
75% Capacity	15,00,000	65% Capacity	13,00,000
65% Capacity	13,00,000	55% Capacity	11,00,000
10% change in capacity	2,00,000	10% change in capacity	2,00,000

For 10% increase in capacity, i.e., for increase by 10,000 units, the total direct material cost regularly changes by Rs. 2,00,000

Direct material cost (variable) = Rs. 2,00,000/10,000 = Rs. 20

After 8% increase in price, direct material cost per unit

= Rs. 20 × 1.08 = Rs. 21.60

Direct material cost for 85,000 budgeted units

= 85,000 × Rs. 21.60 = Rs. 18,36,000

2. Direct Labour:

	(Rs.)		(Rs.)
75% Capacity	7,50,000	65% Capacity	6,50,000
65% Capacity	6,50,000	55% Capacity	5,50,000
10% change in capacity	1,00,000	10% change in capacity	1,00,000

For 10% increase in capacity, direct labour cost regularly changes by Rs. 1,00,000.

Direct labour cost per unit = Rs. 1,00,000 ÷ 10,000 = Rs. 10

After 5% increase in price, direct labour cost per unit

= Rs. 10 × 1.05 = Rs. 10.50

Direct labour for 85,000 units = 85,000 units × Rs. 10.50

= Rs. 8,92,500.

3. Factory overheads are semi-variable overheads:

	(Rs.)		(Rs.)
75% Capacity	3,50,000	65% Capacity	3,30,000
65% Capacity	3,30,000	55% Capacity	3,10,000
10% change in capacity	20,000	10% change in capacity	20,000

Variable factory overhead = Rs. 20,000 / 10,000 = Rs. 2

Variable factory overhead for 75,000 units = 75,000 × Rs. 2 = Rs. 1,50,000

Fixed factory overhead = Rs. 3,50,000 - Rs. 1,50,000 = Rs. 2,00,000.

Variable factory overhead after 5% increase = Rs. 2 × 1.05 = Rs. 2.10

Fixed factory overhead after 10% increase = Rs. 2,00,000 × 1.10
= Rs. 2,20,000.

4. Selling overhead is semi-variable overhead:

	(Rs.)		(Rs.)
75% Capacity	4,00,000	65% Capacity	3,60,000
65% Capacity	3,60,000	55% Capacity	3,20,000
10% change in capacity	40,000	10% change in capacity	40,000

Variable selling overhead = Rs. 40,000 / 10,000 units = Rs. 4

Variable selling overhead for 75,000 units = 75,000 × Rs. 4 = Rs. 3,00,000.

Fixed selling overhead = Rs. 4,00,000 - Rs. 3,00,000 = Rs. 1,00,000

Variable selling overhead after 8% increase = Rs. 4 × 1.08 = Rs. 4.32

Fixed selling overhead after 15% increase = Rs. 1,00,000 × 1.15
= Rs. 1,15,000

5. Administrative overhead is fixed:

After 10% increase = Rs. 1,60,000 × 1.10 = Rs. 1,76,000

QUESTION 63

A single product company estimated its quarter-wise sales for the next year as under:

Quarter	Sales (Units)
I	30,000
II	37,500
III	41,250
IV	45,000

The opening stock of finished goods is 6,000 units and the company expects to maintain the closing stock of finished goods at 12,250 units at the end of the year. The production pattern in each quarter is based on 80% of the sales of the current quarter and 20% of the sales of the next quarter. The company maintains this 20% of sales of next quarter as closing stock of current quarter.

The opening stock of raw materials in the beginning of the year is 10,000 kg. and the closing stock at the end of the year is required to be maintained at 5,000 kg. Each unit of finished output requires 2 kg. of raw materials.

The company proposes to purchase the entire annual requirement of raw materials in the first three quarters in the proportion and at the prices given below:

Quarter	Purchase of raw materials % to total annual requirement in quantity	Price per kg. (Rs.)
I	30%	2
II	50%	3
III	20%	4

The value of the opening stock of raw materials in the beginning of the year is Rs. 20,000. You are required to PREPARE the following for the next year, quarter wise:

- (i) Production budget (in units).
- (ii) Raw material consumption budget (in quantity).
- (iii) Raw material purchase budget (in quantity and value).
- (iv) Priced stores ledger card of the raw material using First in First out method.

SOLUTION

Working Note:

Calculation of total annual production

	(Units)
Sales in 4 quarters	1,53,750
Add: Closing balance	12,250
	1,66,000
Less: Opening balance	(6,000)
Total number of units to be produced in the next year	1,60,000

(i) Production Budget (in units)

Quarters	I Units	II Units	III Units	IV Units	Total Units
Sales	30,000	37,500	41,250	45,000	1,53,750
Production in current quarter (80% of the sale of current quarter)	24,000	30,000	33,000	36,000	
Production for next quarter (20% of the sale of next quarter)	7,500	8,250	9,000	12,250	
Total production	31,500	38,250	42,000	48,250	1,60,000

(ii) Raw material consumption budget in quantity

Quarters	I	II	III	IV	Total
Units to be produced in each quarter: (A)	31,500	38,250	42,000	48,250	1,60,000
Raw material consumption p.u. (kg.): (B)	2	2	2	2	
Total raw material consumption (Kg.) : (A × B)	63,000	76,500	84,000	96,500	3,20,000

(iii) Raw material purchase budget (in quantity)

	Qty. (kg.)
Raw material required for production	3,20,000
Add : Closing balance of raw material	5,000
	3,25,000
Less : Opening balance	(10,000)
Material to be purchased	3,15,000

Raw material purchase budget (in value)

Quarters	% of annual requirement	Qty. of material	Rate per kg. (Rs.)	Amount (Rs.)
(1)	(2)	(3)	(4)	(5)=(3×4)
I	30	94,500 (3,15,000 kg. × 30%)	2	1,89,000
II	50	1,57,500 (3,15,000 kg. × 50%)	3	4,72,500
III	20	63,000 (3,15,000 kg. × 20%)	4	2,52,000
Total		3,15,000		9,13,500

(iv) Priced Stores Ledger Card

(of the raw material using FIFO method)

	Quarters											
	I			II			III			IV		
	Kg.	Rate	Value	Kg.	Rate	Value	Kg.	Rate	Value	Kg.	Rate	Value
	(Rs.)	(Rs.)		(Rs.)	(Rs.)		(Rs.)	(Rs.)		(Rs.)	(Rs.)	
Opening balance	10,000	2	20,000	41,500	2	83,000	1,22,500	3	3,67,500	38,500	3	1,15,500
(A)										63,000	4	2,52,000
Purchases: (B)	94,500	2	1,89,000	1,57,500	3	4,72,500	63,000	4	2,52,000	-	-	-
Consumption: (C)	63,000	2	1,26,000	41,500	2	83,000	84,000	3	2,52,000	38,500	3	1,15,500
				35,000	3	1,05,000				58,000	4	2,32,000
Balance: (D)	41,500	2	83,000	1,22,500	3	3,67,500	38,500	3	1,15,500	5,000	4	20,000
(D) = (A)+(B)-(C)							63,000	4	2,52,000			

QUESTION 64 (Similar to Past Paper May 19)

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
Std. 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 the following ratios:

(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.

SOLUTION

Maximum Capacity in a budget period

$$= 50 \text{ Employees} \times 8 \text{ Hrs.} \times 5 \text{ Days} \times 4 \text{ Weeks} = 8,000 \text{ Hrs.}$$

Budgeted Hours

$$40 \text{ Employees} \times 8 \text{ Hrs.} \times 5 \text{ Days} \times 4 \text{ Weeks} = 6,400 \text{ Hrs.}$$

Actual Hrs. = 6,000 Hrs. (given)

Standard Hrs. for Actual Output = 7,000 Hrs.

Budgeted No. of Days = 20 Days (4 Weeks \times 5 Days)

Actual No. of Days = 20 - 1 = 19 Days

1. Efficiency Ratio = $\frac{\text{Standard Hrs.} \times 100}{\text{Actual Hrs.}}$

$$= \frac{7,000 \text{ hours} \times 100}{6,000} = 116.67\%$$

2. Activity Ratio = $\frac{\text{Standard Hrs} \times 100}{\text{Budgeted Hrs.}}$

$$= \frac{7,000 \text{ hours} \times 100}{6,400 \text{ hours}} = 109.375\%$$

$$\begin{aligned}
 3. \text{ Calendar Ratio} &= \frac{\text{Available working days} \times 100}{\text{Budgeted Working Days}} \\
 &= \frac{19 \text{ days} \times 100}{20 \text{ days}} = 95\%
 \end{aligned}$$

$$\begin{aligned}
 4. \text{ Standard Capacity Usage Ratio} \\
 &= \frac{\text{Budgeted Hours} \times 100}{\text{Max. possible working hours in a period}} \\
 &= \frac{6,400 \text{ hours} \times 100}{8,000 \text{ hours}} = 80\%
 \end{aligned}$$

$$\begin{aligned}
 5. \text{ Actual Capacity usage Ratio} \\
 &= \frac{\text{Actual Hours worked} \times 100}{\text{Max. possible working hours in a year}} \\
 &= \frac{6,000 \text{ hours} \times 100}{8,000 \text{ hours}} = 75\%
 \end{aligned}$$

$$\begin{aligned}
 6. \text{ Actual usage of Budgeted Capacity Ratio} \\
 &= \frac{\text{Actual working Hours} \times 100}{\text{Budgeted hours}} \\
 &= \frac{6,000 \text{ hours} \times 100}{6,400 \text{ hours}} = 93.75\%
 \end{aligned}$$

Student Notes