CA-INTER

NOV 23 & Onwards Edition

COST & MANAGEMENT ACCOUNTING

MARATHON REVISION SUMMARY BOOK

CA PURUSHOTTAM AGGARWAL
100 Plus Satellite Classes All Over India

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About CA Purushottam Aggarwal Sir

Purushottam Aggarwal is a throughout first class graduate from Delhi University in the Year 2005. He is a Fellow member of The Institute of Chartered Accountants of India. **He Qualified CA in November 2007**.

a) **Presence All Over India** - CA Purushottam Sir is most respected, loved & well known faculty of India. Currently Purushottam Sir Costing Classes has **113 satellite centers** All Over India.

b) **Rankers & Toppers in Every attempt** - Our students always gets ranks in every attempt of ICAI & ICMAI e.g. **Arjun Mehra got All India Rank 1**, **Diksha Goyal got All Indian Rank 1** etc. Hundreds of students gets 90+ Marks in costing paper in every attempt under guidance of Purushottam Sir. Thousands of students gets exemptions in every attempt of CA & CMA exams under guidance of CA Purushottam Sir.

c) **Practical Exposure of Sir** - After professional education, he worked in a reputed CA firm and later on worked in "**Bharat Heavy Electricals Limited**" (A Mahanavratna Company) in managerial capacity handling the **Costing Department**.

d) **Teaching is Sir's first Love** - After getting professional practical experience of Business Environment. He started doing what he loves i.e.Teaching. He has been faculty of Cost and Management Accounting in various Management and Professional Institutes.

e) **Vast Experience of Sir** - His technique of approaching the subject matter, strategy for preparation of examination and scientific method of teaching are quite popular among the students.

He is teaching costing paper at various levels for more than 10 Years.

His **arrears of specialization** include Costing Paper.
At Present he is a professional financial consultant and faculty of Costing Paper at various professional levels e.g. CMA Final, CMA Inter, CA Final & CA Inter.

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Disclaimer about this Revision Book

DISCLAIMER:- This Revision Book & Revision Video uploaded on Youtube can never replace highly valuable content of Regular Pen Drive Classes given by Purushottam Sir. Difference between 2 is explained below.

a) **Difference in Approach** – "What approach" is followed in You tube Revision Video while Purushottam Sir follow "Why approach" in Regular Pen Drive Classes as explained below:-

In You Tube Revision Video – What approach	Sir will tell What is formula of EQO
In Regular Pen Drive Classes – Why Approach	Sir will tell • How Formula of EQO was derived? • Why entity uses EOQ Formula? • When EOQ is used? • What is formula of EOQ

b) **Difference in Question Bank** – Only "ICAI Study material" is used in YT revision Video while question content base is highly exhaustive in Regular PD Classes as explained below:-

In You Tube Revision Video – Limited Source of Questions	Only ICAI Study Material is considered
In Regular Pen Drive Classes – Wide Source of Questions	Questions from following sources are considered • Study Material of ICAI • Revision Test Papers of ICAI • Mock Test Series of ICAI • Past Attempt Question Papers of ICAI • Questions self-developed by Purushottam Sir to teach concept in Depth • Practice Manual of ICAI • Study material of cost accounting of CMA Institute at CMA Inter Level • Questions from IPCC Level of ICAI • Questions from Books of ACCA

c) **Difference in Theory Coverage**:- Only Highly important theory questions from Study material are deeply taught in You tube Revision Video while

Purushottam Sir teaches all theory questions (Category A Questions, Category B & Category C Questions) from his own written "Summary Theory Book".

d) **Unique approach in Regular PD Classes Only** – Sir has developed many techniques & unique approaches to teach concepts in depth. **For Examples**

    a. Red light approach for chapter integrated & Non-Integrated Accounts
    b. DCP Approach for Reconciliation chapter
    c. 8 Box approach for Standard costing chapter
    d. Saas Bahu approach
    e. Ghar me ghuskar maaro approach for EOQ.

Sir **will not tell any of his self-developed unique approaches** in YT Revision Video.

Now you must be asking following questions to yourself

1) **What is Purpose of This Revision Book?"**

2) **Why should I follow this Book?**

3) **Why should I watch Revision Video from This Book?**

This "Marathon Revision Summary Book" is specifically designed

1) To Provide **Exhaustive Revision** of all Concepts of all Chapters, Practice of all conceptual Questions along with Deep & detailed coverage of highly important Theory Questions of Cost & Management Accounting Paper.

2) To **help Financial weak students** who could not manage to buy Purushottam Sir's Costing Classes

3) To help students who wasted their time & money by choosing wrong classes & **not getting confidence** over costing paper.

4) To **Easily get 50 Marks** in Costing Paper.

Minimum 50 Marks Guranteed - This Summary Book along with Revision Videos can easily help you in getting minimum 50 marks in costing paper even if you are studying costing paper first time if you do following things

a) Watch Revision Video with Full Concentration
b) Revise All concepts, Practical Questions & Theory covered in this Revision Video at least 3 times.
c) Solve 1 Past Year Question Paper at home to check & improve answer accuracy & writing speed.
d) Solve 1 Past Year Question Paper at home to check & improve answer accuracy & writing speed.

SCAN & GET VIDEO LINK - Scan Following QR Code using your android phone & get link of You Tube Revision Video which has been recorded using this "Marathon Revision Summary Book".

INDEX TO
Cost & Management Accounting
Marathon Revision Summary Book

CHAPTER 1

INTRODUCTION TO COST AND MANAGEMENTACCOUNTING

Methods for Segregating Semi-variable cost into Fixed cost & Variable Cost

Concept –
- Total Fixed Cost remains fixed irrespective of change in Total produced units.
- Total Variable Cost changes (in same direction) as total produced units changes.
- A cost which is neither FC nor VC is called SVC which is further divided into FC & VC.

How to Identify
- A cost, which remains same on per unit basis at different level of production, is VC.
- A cost, which remains same in Totality at different level of production, is FC.

(a) High Low Method

Share of Variable cost in Total cost as a % of Sales = $\frac{\text{Difference in Total Cost}}{\text{Difference in Total Sales}}$ x 100

ILLUSTRATION 1: (Segregation of fixed cost and variable cost) – Page 26

	Sales value	Total cost
	(Rs.)	(Rs.)
At the Highest volume	1,40,000	72,000
At the Lowest volume	80,000	60,000
	60,000	12,000

Solution

Share of Variable cost in Total cost as a % of Sales = $\frac{\text{Rs.}12,000}{\text{Rs.}60,000}$ x 100 =20% of Sales

Fixed Cost

a) Considering Highest Sales Volume

Fixed Cost = Total Cost – Total Variable cost

= Rs.72,000 – Rs.1,40,000 x 20% = Rs.44,000

b) Considering Lowest Sales Volume

Fixed Cost = Total Cost – Total Variable cost

= Rs.60,000 – Rs.80,000 x 20% = Rs.44,000

Hence FC = Rs.44,000 & VC = 20% of Sales

(b) **Analytical Method:** Under this method an experienced cost accountant tries to judge empirically what proportion of the semi- variable cost would be variable and what would be fixed.

ILLUSTRATION 2: (Segregation of fixed cost and variable cost) – Page 27

Suppose, last month the total semi-variable expenses amounted to Rs. 3,000.

- **If the degree of variability is assumed to be 70%**,

- then variable cost = 70% of Rs. 3,000 = Rs. 2,100.

- Fixed cost = Rs. 3,000 – Rs. 2,100 = Rs. 900.

- Now in the future months, the fixed cost will remain constant, but the variable cost will vary according to the change in production volume. Thus, if in the next month production increases by 50%,

  Total SVC = TFC + TVC = Rs.900 + Rs.2100 x 150% = Rs.4050

c) Comparison by period or level of activity method:

Variable cost Per unit $= \dfrac{\text{Difference in Total Semi−Variable Cost}}{\text{Difference in Total units}}$

Suppose the following information is available:

	Production Units	Semi-variable expenses
		(Rs.)
January	100 units	260
February	140 units	300
Difference	40 units	40

Variable cost: $\dfrac{\text{Change in Semi−variable expenses}}{\text{Change in production volume}} = \dfrac{RS.40}{40\ Units} = $ Rs. 1/unit

- Thus, in January, the variable cost will be 100 × Rs. 1 = Rs. 100 and the fixed cost will be (Rs. 260 – Rs. 100) or Rs. 160.

- In February, the variable cost will be 140 × Rs. 1 = Rs. 140 whereas the fixed cost will remain the same, i.e., Rs. 160.

d) Least Square Method: It is equation method
TC = TFC + VC p.u. X Units produced
Y = c + mx, where
Where Y = Total Cost
C = Total Fixed Cost
M = Variable cost per unit
X = Volume of Output

ILLUSTRATION 3: (Segregation of fixed cost and variable cost) – Page 28

	Level of activity	
Capacity %	60%	80%
Volume (Labour hours) or 'x'	150	200
Semi-variable expenses (maintenance of plant) or 'y'	Rs. 1,200	Rs. 1,275

Substituting the values of 'x' and 'y' in the equation, $y = mx + c$, at both the levels of activity, we get

1,200 = 150 m + c ------- **Equation 1**

1,275 = 200 m + c ------- **Equation 2**

Subtract Equation 1 from Equation 2

1275 – 1200 = 200 m + c – (150 m + c)

75 = 200 m + c – 150 m – c

75 = 50m

M = 1.50 -------**It is Variable cost per unit**

On putting value of m in Equation 1, We will get c (FC)

1200 = 150 x 1.50 + C

C = 975 ------------**It is Total Fixed Cost**

Exam Importance
1. No Direct Question to calculate FC & VC
2. Indirectly Segregation into FC & VC will be required to solve the Question.

Chapter 2 - MATERIAL COST

Concept - **Valuation of raw material**:- while calculating per unit cost of raw material purchased, some items are considered as follows:-

1.	Trade Discount	Deduct from purchase price
2.	Quantity Discount	Deduct from purchase price
3.	Cash Discount	**Not Deduct** from purchase price since it is finance benefit.
4.	Road Tax/Toll Tax / Octroi / Entry Tax	Add to purchase cost
5.	GST (Integrated GST, State GST & Central GST)	Add to purchase cost if no input tax credit availed. Unless specifically mentioned in question, it will be excluded from cost of purchase assuming that credit is available.
6.	Demurrages / Detention Charges / Fine / Penalty	**Deduct** from purchase price since it is a penalty
7.	Insurance Cost / Comm. / Brokerage Paid / Freight Inwards	Add to purchase cost
8.	Cost of containers (if specifically charged)	• Add to purchase cost if it is non-returnable. • Don't add to purchase cost if it is returnable.
9.	Normal Loss	Good units shall absorb cost of normal loss of material.

Note:- Cost per unit $= \dfrac{\text{Total Cost}}{\text{Total units} - \text{normal loss units}}$

ILLUSTRATION 1 – Page 14

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

Listed price of one lot	Rs. 50,000
Trade discount	@ 10% on Listed price
CGST and SGST (Credit Not available)	12% (6% CGST + 6% SGST)
Cash discount	@10%
(Will be given only if payment is made within 30 days.)	
Freight and Insurance	Rs. 3,400
Toll Tax paid	Rs. 1,000

Demurrage	Rs. 1,000
Commission and brokerage on purchases	Rs. 2,000
Amount deposited for returnable containers	Rs. 6,000
Amount of refund on returning the container	Rs. 4,000
Other Expenses	@ 2% of total cost

20% of material shortage is due to normal reasons.

The payment to the supplier was made within 20 days of the purchases.

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

Solution Computation of Total cost of material purchased

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

Note:
1. GST is payable on net price i.e., listed price less discount.
2. Cash discount is treated as interest and finance charges; hence it is ignored.
3. Demurrage is penalty imposed by the transporter for delay in uploading or off-loading of materials. It is an abnormal cost and not included.
4. Shortage due to normal reasons should not be deducted from cost to ascertain total cost of good units.

ILLUSTRATION 2 – Page 15

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

	(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:

Computation of effective quantity of each chemical available for use

	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**

Statement showing the computation of rate per kg. of each chemical

	Chemical A (Rs.)	Chemical B (Rs.)
Purchase price [10000 Kg x Rs.10, 8000Kg X Rs.13]	1,00,000	1,04,000
Add: Basic Custom Duty @10%	10,000	10,400
Add: Railway freight (Rs.3840 in the ratio of quantity purchased i.e. 10000:8000)	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**

ILLUSTRATION 3 – Page 16

At WHAT price per unit would Part No. A 32 be entered in the Stores Ledger, if the following invoice was received from a supplier:

Invoice	(Rs.)
200 units Part No. A 32 @ Rs. 5	1,000.00
Less: 20% discount	(200.00)
	800.00
Add: CGST @ 12%	96.00
	896.00
Add: Packing charges (5 non-returnable boxes)	50.00
	946.00

(i) A 2 per cent cash discount will be given if payment is made in 30 days.

(ii) Documents substantiating payment of CGST is enclosed for claiming Input credit.

SOLUTION

Computation of cost per unit

	(Rs.)
Net purchase Price	800.00
Add: Packing charges (5 non-returnable boxes)	50.00
	850.00
No. of units purchased	200 units
Cost per unit	**4.25**

Note: (i) Cash discount is treated as interest and finance charges hence, it is not considered for valuation of material.

(ii) Input credit is available for SGST paid; hence it will not be added to purchase cost.

Concept – Economic Order Quantity - means order size at which both carrying and ordering cost will be minimum

---

EOQ = $\sqrt{\dfrac{2 \times A \times O}{C}}$

A = Annual Requirement of Material

O = Ordering Cost

C = Carrying Cost

Annual Ordering cost = Total number of orders in a year X Ordering cost per order

$= \dfrac{\text{Annual requirement of raw material (A)}}{\text{Quanity ordered each time (Q)}}$ X Ordering cost per order (O) $\quad = \dfrac{A \times O}{Q}$

Annual carrying cost = Average Inventory X Average carrying cost per unit

$= \dfrac{\text{Quantity ordered each time (Q)}}{2}$ X Avg. carrying cost per unit (C) $\quad = \dfrac{Q \times C}{2}$

ILLUSTRATION 4 – Page 23

CALCULATE the Economic Order Quantity from the following information. Also state the number of orders to be placed in a year.

Consumption of materials per annum	: 10,000 kg.
Order placing cost per order	: Rs. 50
Cost per kg. of raw materials	: Rs. 2
Storage costs	: 8% on average inventory

SOLUTION

$$EOQ = \sqrt{\dfrac{2 \times A \times O}{C}}$$

A = Units consumed during year = 10000 KG

O = Ordering cost per order = Rs.50 per order

C = Inventory carrying cost per unit per annum = Rs.2 x 8% = Rs.0.16

$$EOQ = \sqrt{\dfrac{2 \times 10000 \text{ Kg} \times \text{Rs.50}}{\text{Rs.0.16}}} = 2500 \text{ Kg.}$$

No. of orders to be placed in a year $= \dfrac{\textit{Total consumption of materials per annum}}{\textit{EOQ}}$

$= \dfrac{10,000 \; kg.}{2,500 \; kg.} = 4$ Orders per year

ILLUSTRATION 5 – Page 24

(i) COMPUTE E.O.Q. and the total variable cost for the following:

Annual Demand	= 5,000 units
Unit price	= Rs. 20.00
Order cost	= Rs. 16.00

Storage rate	= 2% per annum
Interest rate	= 12% per annum
Obsolescence rate	= 6% per annum

(ii) DETERMINE the total cost that would result for the items if an incorrect price of Rs. 12.80 is used.

SOLUTION

1. Carrying cost =

Storage rate	=	2%
Interest Rate	=	12%
Obsolescence Rate	=	6 %
Total	=	20% per annum

C = 20% of Rs. 20 = Rs. 4 per unit per annum.

$$EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 5000 \text{ units} \times Rs.16}{Rs.4 \text{ per unit per annum}}} = 200 \text{ units}$$

Total Material Cost

Particulars	Amount (Rs.)
Purchase Price (5,000 units@Rs.20 per unit)	1,00,000
Ordering Cost ($\frac{5000 \text{ units}}{200 \text{ units}}$ X Rs.16)	400
Carrying Cost ($\frac{200 \text{ units}}{2}$ X Rs. 4)	400
Total Material Cost	1,00,800

2. If an incorrect price of Rs. 12.80 is used:

Carrying cost per unit p.a. = Rs. 12.80 X 20% = Rs. 2.56 p.a. per unit

$$EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 5000 \text{ units} \times Rs.16}{Rs.2.56 \text{ per unit per annum}}} = 250 \text{ units}$$

Total Material Cost

Particulars	Amount (Rs.)
Purchase Price (5,000 units @ 12.80per unit)	64,000
Ordering Cost ($\frac{5000 \text{ units}}{250 \text{ units}}$ X Rs.16)	320
Carrying Cost ($\frac{250 \text{ units}}{2}$ X Rs. 2.56)	320
Total Material Cost	64,640

Concept – Different Stock Levels

Re-Order Level
Formula 1:- Maximum Usage X Max lead time
Formula 2:- Minimum Stock + Avg. Usage X Avg. Lead Time
Formula 3:- Safety Stock + Avg. Usage X Avg. Lead Time
(Minimum stock called safety stock)

Minimum Level: it is that level of stock below which stock in hand of raw material should not be allowed to fall.
Min. Level
F1 - Re-order Level – Avg. Usage X Avg. Lead Time **OR**
F2 - Max. Lead Time X Max. Usage – Avg. Lead Time X Avg. Usage **OR**
F3 - Safety Stock

Maximum level: it is that level of stock above which stock in hand of raw material should not be allowed to exceed. Like 25 litre in car petrol.
F1-Re-order Level + Re-order quantity – Minimum Usage X Minimum Lead Time.

Average Stock Level
Formula 1:- Avg. stock held by an organization = $\frac{Max.Stock\ Level+Minimum\ Stock\ Level}{2}$
Formula 2 :- Min. Stock Level + $\frac{Re-order\ Quanity}{2}$

Danger Level
F1:- Avg. Usage X Max. Lead Time for emergency purchase

ILLUSTRATION 6 – Page 27

Two components, A and B are used as follows:

Normal usage	*50 per week each*
Maximum usage	*75 per week each*
Minimum usage	*25 per week each*
Re-order quantity	*A: 300; B: 500*
Re-order period	*A: 4 to 6 weeks*
	B: 2 to 4 weeks

CALCULATE for each component (a) Re-ordering level, (b) Minimum level, (c) Maximum level, (d) Average stock level.

SOLUTION

(a) Re-ordering level: Formula 1

Maximum usage per week × Maximum Lead Time.

Re-ordering level for component A   = 75 units × 6 weeks = **450 units**

Re-ordering level for component B   = 75 units × 4 weeks = **300 units**

(b) Minimum level: Formula 1

Re-order level – (Average usage × Average Lead Time)

Minimum level for component A = 450 units – (50 units × 5 weeks) = 200 units

Minimum level for component B = 300 units – (50 units × 3 weeks) = 150 units

(c) Maximum level: Formula 1

Re-order level + Re-order quantity – (Min. usage × Minimum Lead Time)

Maximum level for component A = (450 units + 300 units) – (25 units × 4 weeks) = 650 units

Maximum level for component B = (300 units + 500 units) – (25 units × 2 weeks) = 750 units

(d) Average stock level: Formula 1

$$\frac{Max.\,Stock\,Level + Minimum\,Stock\,Level}{2}$$

Average stock level for component A = ½ (200 units + 650 units) = 425 units.

Average stock level for component B = ½ (150 units + 750 units) = 450 units.

ILLUSTRATION 7 – Page 28

From the details given below, CALCULATE:

(i) Re-ordering level

(ii) Maximum level

(iii) Minimum level

(iv) Danger level.

*Re-ordering quantity is to be calculated on the basis of following information: Cost of placing a purchase order is **Rs.** 20*

Number of units to be purchased during the year is 5,000 Purchase price per unit inclusive of

transportation cost is **Rs.** 50 Annual cost of storage per units is **Rs.** 5.

Details of lead time : Average- 10 days, Maximum- 15 days, Minimum- 5 days.

For emergency purchases- 4 days.

Rate of consumption : Average: 15 units per day, Maximum: 20 units per day.

SOLUTION
Basic Data:

A (Number of units to be purchased annually)   = 5,000 units

O (Ordering cost per order)   = Rs.20

C (Annual cost of storage per unit)   = Rs.5

Purchase price per unit inclusive of transportation cost   = Rs.50.

Computations:

(i) Re-ordering level = Maximum usage per period × Maximum lead time

(ROL)   = 20 units per day × 15 days = 300 units

(ii) Maximum level = ROL + ROQ – [Min. rate of consumption × Min. lead time

= 300 units + 200 units – [10 units per day × 5 days]= **450 units**

Working Notes 1. Minimum Usage Per day

Avg. Usage Per day = $\frac{Max.Usage\ per\ day+Min.Usage\ per\ day}{2}$

15 units = $\frac{20\ units+min.Usage}{2}$

Min. Usage per day = 10 units

W.N. 2 ROQ/EOQ = $\sqrt{\frac{2\times A\times O}{C}}$ = $\sqrt{\frac{2\times5,000\ units\times Rs.20}{Rs.5}}$ = 200 units

(iii) Minimum level = ROL – Average rate of consumption × Average re-order-period

= 300 units – (15 units per day × 10 days) =150 units

(iv) Danger level = Average consumption × Lead time for emergency purchases

= 15 units per day × 4 days = 60 units

Concept - Inventory Stock-out

Stock out cost = stock out units x Stock out cost per unit x probability (%).

ILLUSTRATION 8: - Page 30

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

The castings are used evenly throughout the year in the production process on a 360-days-per-year basis. The company estimates that it costs Rs.9,000 to place a single purchase order and about Rs.300 to carry one casting in inventory for a year. The high carrying costs result from the need to keep the castings in carefully controlled temperature and humidity conditions, and from the high cost of insurance.

Delivery from the foundry generally takes 6 days, but it can take as much as 10 days. The days of delivery time and percentage of their occurrence are shown in the following tabulation:

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

Required:

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

Solution:- A = 54,000 castings, O = Rs. 9,000, C = Rs. 300

1. EOQ = $\sqrt{\dfrac{2 \times A \times O}{C}}$ = $\sqrt{\dfrac{2 \times 54,000 \text{ castings} \times \text{Rs.9,000}}{\text{Rs.300 per unit per annum}}}$ = 1,800castings

2. Statement showing risk of being out of stock (stock-out situation)

Delivery Time (Days)	% of occurrence	Cumulative %	Stock-out (%)
6	75%	75%	100%-75%=25%
7	10%	85%	100%-85%=15%
8	5%	90%	100%-90%=10%
9	5%	95%	100%-95%=5%
10	5%	100%	100%-100%=0%

Normal annual requirement = 54,000 castings

Average daily consumption = $\dfrac{54,000 \text{ castings}}{360 \text{ days}}$ = 150 castings

If the company is willing to take 15% risk of stock-out situation then lead time will be 7 days while normal lead time is 6 days as given in question hence safety stock is required to maintain for 1 day.

Safety stock = 1 day x average consumption per day = 1 day x 150 castings = 150 castings

Re-order level = safety stock + normal lead time x normal consumption per day
= 150 castings + 6 days x 150 castings = 1050 castings

3. If the company is willing to take 5% risk of stock-out situation then lead time will be 9 days while normal lead time is 6 days as given in question hence safety stock is required to maintain for 3 day.

Safety stock = 3 day x average consumption per day = 3 day x 150 castings = 450 castings

Re-order level = safety stock + normal lead time x normal consumption per day
= 450 castings + 6 days x 150 castings = 1350 castings

4. Annual relevant cost = annual ordering cost + annual carrying cost for normal stock + annual carrying cost for safety stock

= ($\dfrac{54,000 \text{ castings}}{1800 \text{ castings}}$xRs.9,000 + ($\dfrac{1800 \text{ castings}}{2}$x Rs. 300) + (450 castings x RS. 300)

= Rs. 6,75,000

5. A = 54,000 castings, O = Rs. 600, C = Rs. 720

EOQ = = $\sqrt{\dfrac{2 \times 54,000 \text{ castings} \times \text{Rs.600}}{\text{Rs.720 per unit per annum}}}$ = 300castings

Statement showing frequency of orders

	Old Policy	New Policy
No. of orders	$\frac{54,000 \text{ castings}}{1800 \text{ castings}}$ = 30 orders	$\frac{54,000 \text{ castings}}{300 \text{ castings}}$ = 180 orders
Frequency of orders (Time gap between 2 orders)	$\frac{360 \text{ days}}{30 \text{ orders}}$ = 12 days	$\frac{360 \text{ days}}{180 \text{ orders}}$ = 2 days

Concept – ABC Analysis

ABC Analysis suggests to divide all raw material into 3 categories A, B and C. then exercise more control over A category raw material, moderate control over category B raw material and least control over category C raw material.

1. Category A consists of raw material which contain nearly around 70% of total value of raw material. (consists approx. 10% of total items of stores) (Proper use of EQO, Re-order Level, Maximum level, Minimum level, safety stock etc.)

2. Category B consists of raw material which contain nearly around 20% of total value of raw material. (Consists approx. 20% of total items of stores)

3. Category C consists of raw material which contain nearly around 10% of total value of raw material. (consists approx. 70% of total items of stores) (Rare use of levels)

ILLUSTRATION 9 – Page 34

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

Item	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 showing Total cost and ranking of items

Item	Units	% of total units	Unit Cost (Rs.)	Total Cost (Rs.)	% of total Cost	Ranking based on % of total cost	Category
1	7,000	3.1963	5.00	35,000	9.8378	4	A
2	24,000	10.9589	3.00	72,000	20.2378	2	A
3	1,500	0.6849	10.00	15,000	4.2162	7	B
4	600	0.2740	22.00	13,200	3.7103	8	B
5	38,000	17.3516	1.50	57,000	16.0216	3	A
6	40,000	18.2648	0.50	20,000	5.6216	6	B
7	60,000	27.3973	0.20	12,000	3.3730	9	C
8	3,000	1.3699	3.50	10,500	2.9513	11	C
9	300	0.1370	8.00	2,400	0.6746	12	C
10	29,000	13.2420	0.40	11,600	3.2605	10	C
11	11,500	5.2512	7.10	81,650	22.9502	1	A
12	4,100	1.8721	6.20	25,420	7.1451	5	B
Total	**2,19,000**	**100.00**		**3,55,770**	**100.00**		

Category A items holds approx.. 70% of total cost, Category B items holds approx.. 20% of total cost while category C holds items approx.. 10% of total cost.

Ranking	Item Nos	Cost (Rs.)	% of total cost	Category
1	11	81,650	22.9502	
2	2	72,000	20.2378	
3	5	57,000	16.0216	
4	1	35,000	9.8378	
Total	**4**	**2,45,650**	**69.0474**	**A**
5	12	25,420	7.1451	
6	6	20,000	5.6216	
7	3	15,000	4.2162	
8	4	13,200	3.7103	
Total	**4**	**73,620**	**20.6932**	**B**
9	7	12,000	3.3730	
10	10	11,600	3.2605	
11	8	10,500	2.9513	
12	9	2,400	0.6746	
Total	**4**	**36,500**	**10.2594**	**C**

ILLUSTRATION 10 – Page 36

A factory uses 4,000 varieties of inventory. In terms of inventory holding and inventory usage, the following information is compiled:

No. of varieties of inventory	%	% value of inventory holding (average)	% of inventory usage (in end- product)
3,875	96.875	20	5
110	2.750	30	10
15	0.375	50	85
4,000	100.00	100	100

CLASSIFY the items of inventory as per ABC analysis with reasons.

SOLUTION

(1) 15 number of varieties of inventory will be classified as category "A" since it contains 50% of value of inventory holding (average) which is maximum according to information given.

(2) 110 number of varieties of inventory will be classified as category "B" since it contains 30% of value of inventory holding (average) which is moderate according to information given.

(3) 3875 number of varieties of inventory will be classified as category "C" since it contains 20% of value of inventory holding (average) which is least according to information given.

Concept – Inventory Turnover Ratio

1. Inventory turnover ratio for Raw Material = $\dfrac{\text{Cost of Raw Material Consumed}}{\text{Average inventory of Raw Material}}$

2. Average inventory of Raw Material = $\dfrac{\text{Op.stock of Raw Material + cl.stock of Raw Material}}{2}$

3. No. of Days for which Avg. stock is held = $\dfrac{\text{365 days or 12 months}}{\text{inventory turnover ratio of Raw Material}}$

ILLUSTRATION 11 – Page 40

The following data are available in respect of material X for the year ended 31st March, 20X9.   (Rs.)

Opening stock   90,000
Purchases during the year   2,70,000
Closing stock   1,10,000
CALCULATE:

(i) Inventory turnover ratio, and

(ii) The number of days for which the average inventory is held.

SOLUTION

Inventory turnover ratio (Refer to working note) $= \frac{Cost\ of\ stock\ of\ raw\ material\ consumed}{Average\ stock\ of\ raw\ material}$

$= \frac{Rs.2,50,000}{Rs.1,00,000} = 2.5$

Average number of days for which the average inventory is held $= \frac{365}{inventory\ turnover\ ratio} = \frac{365}{2.5} = 146$ days

Working note :   *(Rs.)*

Opening stock of raw material	90,000
Add: Material purchases during the year	2,70,000
Less: Closing stock of raw material	(1,10,000)
Cost of stock of raw material consumed	2,50,000

ILLUSTRATION 12 –Page 41

From the following data for the year ended 31st December, 20X9, CALCULATE the inventory turnover ratio of the two items and put forward your comments on them.

	Material A (Rs.)	Material B (Rs.)
Opening stock 1.1.20X9	10,000	9,000
Purchase during the year	52,000	27,000
Closing stock 31.12.20X9	6,000	11,000

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

Cost of materials consumed	Material A (Rs.)	Material B (Rs.)
Opening stock	10,000	9,000
Add: Purchases	52,000	27,000
	62,000	36,000
Less: Closing stock	6,000	11,000
Materials consumed	56,000	25,000
Average inventory: (Opening Stock + Closing Stock) ÷ 2	8,000	10,000
Inventory Turnover ratio: (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.

Concept - How to Calculate cost of material consumed and cost of closing stock of material if material purchase prices keeps on changing

3 methods

1. **FIFO** (First in First Out):- Material issued for production shall be priced at the price of material purchased**first** till its quantity exhausts. When the quantity exhausts, **next** price shall be used as basis.

2. **LIFO** (Last in First Out):-Material issued for production shall be priced at the price of material purchased**LAST** till its quantity exhausts. When the quantity exhausts, **previous** price shall be used as basis.

3. **Weighted Average method**:- With every receipt of material, price is averaged and this averaged price used for issue of material till next receipt of material. On next receipt of material, average price changes. Used when difficult to identify material physically e.g. petrol storage in a tank.

Note:- We will prepare stores ledger Account to find out cost of material issued and closing stock.

ILLUSTRATION 13 – Page 49

The following transactions in respect of material Y occurred during the six months ended 30th June, 20X8:

Month	Purchase (units)	Price per unit (Rs.)	Issued Units
January	200	25	Nil
February	300	24	250
March	425	26	300
April	475	23	550
May	500	25	800
June	600	20	400

Required:

(a) The Chief Accountant argues that the value of closing stock remains the same no matter which method of pricing of material issues is used. Do you agree? Why or why not?

EXPLAIN. Detailed stores ledgers are not required.

(b) STATE when and why would you recommend the LIFO method of pricing material issues?

SOLUTION

1) The Closing Stock at the end of six months period *i.e.,* on 30th June, 2016 will be 200 units, Since up to the end of May 2016, total purchases are equal to total issues *i.e.,* 1,900 units. It means that at the end of May 2016, there was no closing stock.

In themonth of June 2016, 600 units were purchased out of which 400 units were issued. Since there was **only one purchase and one issue** in the month of June, 2016and the Closing Stock of 200 units is to be valued at Rs. 20 per unit.

In view of this, the argument of the Chief Accountant appears to be correct. **Where there is only one purchase and one issue in a month with no opening stock, the method of pricing of material issues becomes irrelevant.**

Therefore, in the given case one should agree with the argument of the Chief Accountant that the value of Closing Stock remains the same no matter which method of pricing the issue is used.

2) LIFO method has an **advantage** over FIFO or any other method of pricing material issues due to the following reasons:

   (a) The cost of the materials issued will reflect the current market price or will be nearer to current market price because it represents cost of recent purchase

   (b) In the period of rising prices, lower income is reported since currents costs are matched with current revenue. As a result, income tax liability is reduced.

SPECIAL ILLUSTRATION 14

The following information is provided by Sunrise Industries for the fortnight of April, 2016:
Material Exe :
Stock on 1-4-2016 100 units at Rs. 5 per unit.

Purchases
5-4-16   300units at Rs. 6
8-4-16   500units at Rs. 7
12-4-16   600Unitsat Rs. 8
Issues
6-4-16   250units
10-4-16   400units
14-4-16   500units

The stock verifier of the company reported a shortage of 30 units on 15-04-2016. This shortage is treated as inflating the price of remaining material on account of shortage.

On 20-04- 2016, There happened fire in company which resulted in loss of 20 units of material.

Required:
1. Calculate using FIFO, LIFO & weighted average methods of pricing issues :
   a. The value of materials consumed during the period
   b. The value of stock of materials on 30-4-16.

Solution:-

Store Ledger (FIFO)

Date	Receipts Qty	Rate	Amt	Issue Qty	Rate	Amt	Balance Qty	Rate	Amt
1/4/16							100	5	500
5/4/16	300	6	1800				100	5	500
							300	6	1800
6/4/16				100	5	500	150	6	900
				150	6	900			
8/4/16	500	7	3500				150	6	900
							500	7	3500
10/4/16				150	6	900	250	7	1750
				250	7	1750			
12/4/16	600	8	4800				250	7	1750
							600	8	4800
14/4/16				250	7	1750	350	8	**2800**
				250	8	2000			
15/4/16 Normal Loss				30	-	-	320	8.75	2800
20/4/16 Abnormal Loss				20	8.75	175	300	8.75	2625
Total						**7800**			

Value of material consumed = Rs. 7800

Cost of closing stock = Rs. 2625

Cost of abnormal loss = 175

Cost of normal loss = Zero (Absorbed by good units)

Store Ledger (LIFO)

Date	Receipts Qty	Rate	Amt	Issue Qty	Rate	Amt	Balance Qty	Rate	Amt
1/4/16							100	5	500
5/4/16	300	6	1800				100	5	500
							300	6	1800
6/4/16				250	6	1500	100	5	500
							50	6	300
8/4/16	500	7	3500				100	5	500
							50	6	300
							500	7	3500
10/4/16				400	7	2800	100	5	500
							50	6	300
							100	7	700
12/4/16	600	8	4800				100	5	500
							50	6	300
							100	7	700
							600	8	4800
14/4/16				500	8	4000	100	5	500
							50	6	300
							100	7	700
							100	8	800
15/4/16				30	--	--	100	5	500
Normal							50	6	300
Loss							100	7	700
							70	11.42	800(Same)
20/4/16				20	11.42	228.40	100	5	500
Abnormal							50	6	300
Loss							100	7	700
							50	11.42	571
Total						**8300**			**2300**

Value of material consumed = Rs. 8,300,   Cost of closing stock = Rs. 2071
Cost of abnormal loss = 228.40   Cost of normal loss = Zero (Absorbed by good units)

Store Ledger (Weighted Average Method)

Date	Receipts			Issue			Balance		
	Qty	Rate	Amt	Qty	Rate	Amt	Qty	Amt	Rate
1/4/16							100	500	5
5/4/16	300	6	1800				400	2300	5.75
6/4/16				250	5.75	1437.50	150	862.50	5.75
8/4/16	500	7	3500				650	4362.50	6.71
10/4/16				400	6.71	2684	250	1678.50	6.71
12/4/16	600	8	4800				850	6478.50	7.62
14/4/16				500	7.62	3810	350	2668.50	7.62
15/4/16				30	-	-	320	2668.50	8.34
20/4/16				20	8.34	166.78	300	2501.72	8.34
Total						**7931.50**		**2668.50**	

Value of material consumed = Rs. 7931.50

Cost of closing stock = Rs. 2501.72

Cost of abnormal loss = 166.78

Cost of normal loss = Zero (Absorbed by good units)

CHAPTER 3 - EMPLOYEE COST

Concept – Effective Hourly Cost of Employee

Effective Hourly Cost of Employee $= \dfrac{\text{Total Earnings of Employee}}{\text{Total Effective Working Hours}}$

Total Effective Working Hours = Total Actual Working Hours – Normal Idle Time

Note:-

1. **Idle Time** - The time during which no production is carried-out because the worker remains idle but are paid.

2. **Normal Idle Time** - time which cannot be avoided or reduced in the normal course of business e.g. Normal rest time, break for lunch. It is **treated as a part of cost**.

3. **Abnormal Idle Time** – Power Failure, Breakdown of machines etc. – It is **not included as a part of cost** and is shown as a separate item in the Costing Profit and Loss Account.

ILLUSTRATION 1 – Page 13
'X' an employee of ABC Co. gets the following emoluments and benefits:
(a) Basic pay Rs. 10,000 p.m.
(b) Dearness allowance Rs. 2,000 p.m.
(c) Bonus 20% of salary and D.A.
(d) Other allowances Rs. 2,500 p.m.
(e) Employer's contribution to P.F.10% of salary and D.A.

'X' works for 2,400 hours per annum, out of which 400 hours are non-productive and treated as normal idle time. You are required to COMPUTE the effective hourly cost of employee 'X'.

SOLUTION

Statement showing computation of effective hourly cost of employee 'X'

	Per month (Rs.)	Per annum (Rs.)
(A) Earning of Employee 'X':		
Basic pay	10,000	1,20,000
Dearness Allowance	2,000	24,000
Bonus	2,400	28,800
Employer's contribution to provident fund	1,200	14,400
Other allowances	2,500	30,000
	18,100	2,17,200
(B) Effective working hours (refer workings)		2,000 hours

(C) Effective hourly cost {(A) ÷ (B)}		Rs.108.60

Workings:

Calculation of effective working hours:

Annual working hours less Normal idle time = 2,400 hours – 400 hours = 2,000 hours.

ILLUSTRATION 2 – Page 14

In a factory working six days in a week and eight hours each day, a worker is paid at the rate of Rs. 100 per day basic plus D.A. @ 120% of basic. He is allowed to take 30 minutes off during his hours shift for meals-break and a 10 minutes recess for rest. During a week, his card showed that his time was chargeable to :

Job X	15 hrs.
Job Y	12 hrs.
Job Z	13 hrs.

The time not booked was wasted while waiting for a job. In Cost Accounting, STATE how would you allocate the wages of the workers for the week?

SOLUTION Working notes:

(i)   Total effective hours in a week: [(8 hrs. – (30 mts. + 10 mts.)] × 6 days = 44 hours

(ii)   Total wages for a week:(Rs. 100 + 120% of Rs. 100) × 6 days = Rs. 1,320

(iii) Wage rate per hour = Rs. 30

(iv) Time wasted waiting for job (Abnormal idle time):

= 44 hrs. – (15 hrs. + 12 hrs. + 13 hrs.) = 4 hrs.

Allocation of wages in Cost Accounting

		(Rs.)
Allocated to Job X	: 15 hours × Rs. 30	450
Allocated to Job Y	: 12 hours × Rs. 30	360
Allocated to Job Z	: 13 hours × Rs. 30	390
Charged to Costing Profit & Loss A/c	: 4 hours × Rs. 30	120
Total		1,320

Concept – Treatment of Overtime

Overtime:- It is working for extra time over and above normal working hours. Payment is made at a rate higher than payment made under normal working hours.

Cases	Treatment of overtime
1. When overtime is required regularly as a policy due to shortage of labour. (Workers are not available in market hence overtime always needed by available workers)	Overtime payment is charged to product using **inflated wage rate.** (Example 1 for inflated wage rate)
2. When overtime is desired at customer request to complete the work instantly.	Overtime payment to charged to job (Recovered from customer)
3. When overtime is required to make up any shortfall in production due to abnormal situations e.g. earthquake, flood, breakdown of machine.	Overtime payment is charged as loss in costing profit and loss account.
4. When overtime is worked irregularly to meet requirements of production.	Overtime payment is treated as production overhead. (Indirectly charged to products)

Example 1 for inflated wage rate

Normal hours worked in a month (8 hours a day x 22 Days)	176 Hours	Rs.10 Per hour	Rs. 1760
Overtime hours worked before and after normal working day (2 hours a day x 22 days)	44 Hours	Rs. 15 per hour	Rs. 660
Overtime hours worked on Saturday and Sundays (5 hours per day x 8 days)	40 Hours	Rs. 20 per hour	Rs. 800
Total	**260 Hours**		**3220**

Inflated wage rate = $\frac{Rs.3220}{260\ hours}$ = Rs. 12.38 per hour

DLC for a job which took 30 hours = Rs. 12.38 per hour x 30 Hours = Rs. 371.40

ILLUSTRATION 3 - – Page 17

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 employees' 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 worker A and B

Particlulars	Worker A (Rs.)	Worker B (Rs.)
Basic Wages	10000	16000
D.A.	5000	8000
Overtime W.N.1	1500	---
Gross Wages earned	**16500**	**24000**
Less Contribution to PF	(800)	(1280)
Less Contribution to ESI	(200)	(320)
Net wages earned	**15500**	**22400**

W.N.1 Rs. 15000 (Basic wages and DA) was paid to worker A for working for normal hours of 200 hence he is paid Rs. 75 for each hour in normal work but overtime will be paid twice hence overtime rate will be Rs. 150 per hour so overtime cost for 10 hours will be Rs. 1500

Statement of labour cost to the employer

Particlulars	Worker A (Rs.)	Worker B (Rs.)
Basic Wages	10000	16000
D.A.	5000	8000
Contribution to PF	800	1280
Contribution to ESI	200	320
Gross Wages without overtime	**16000**	**25600**
Overtime	1500	--
Gross wages with overtime	**17500**	**25600**

Statement showing allocation of wages to jobs

Particulars	Total Amount	Job X (Rs.)	Job Y (Rs.)	Job Z (Rs.)
WORKER A:				
ORDINARY WAGES (40:30:30)	16000	6400	4800	4800
OVERTIME	1500		1500	
WORKER B				
ORDINARY WAGES (50:20:30)	25600	12800	5120	7680
TOTAL	**43100**	**19200**	**11420**	**12480**

ILLUSTRATION 5 – Page 21

In a factory, the basic wage rate is Rs. 100 per hour and overtime rates are as follows:

Before and after normal working hours	175% of basic wage rate
Sundays and holidays	225% of basic wage rate
During the previous year, the following hours were worked	
- Normal time	1,00,000 hours
- Overtime before and after working hours	20,000 hours
Overtime on Sundays and holidays	5,000 hours
Total	1,25,000 hours

The following hours have been worked on job 'Z'

Normal	1,000 hours
Overtime before and after working hrs.	100 hours.
Sundays and holidays	25 hours.
Total	1,125 hours

You are required to CALCULATE the labour cost chargeable to job 'Z' and overhead in each of the

following instances:

(a)   Where overtime is worked regularly throughout the year as a policy due to the workers' shortage.

(b)   Where overtime is worked irregularly to meet the requirements of production.

(c)   Where overtime is worked at the request of the customer to expedite the job.

SOLUTION

Computation *of average inflated wage rate (including overtime premium) :*

Basic wage rate   :   Rs.100 per hour
Overtime wage rate before and after working hours   : Rs.100 × 175% = Rs. 175 per hour
Overtime wage rate for Sundays and holidays   :   Rs.100 × 225% =Rs. 225 per hour
Annual wages for the previous year for normal time : 1,00,000 hrs. × Rs. 100 = Rs. 1,00,00,000
Wages for overtime before and after working hours   : 20,000 hrs. × Rs. 175=Rs. 35,00,000
Wages for overtime on Sundays and holidays   :   5,000 hrs. × Rs. 225 = Rs.11,25,000
Total wages for 1,25,000 hrs.   = Rs.146,25,000

Average inflated wage rate = $\frac{Rs.14,62,500}{125000\ hours}$ = Rs. 117

(i)   ***Where overtime is worked regularly as a policy due to labour shortage*** :- if labour is in shortage then all the jobs has to bear overtime payment cost.
   Hence,
   Labour cost chargeable to job Z   = Total hours × Inflated wage rate
                                                              = 1,125 hrs. × Rs. 117 = Rs. 1,31,625

   (ii)   ***Where overtime is worked irregularly to meet the requirements of production***, :- if overtime is due to requirement of production then overtime payment shall be treated as factory overhead cost.
      Labour cost chargeable to
      Job Z : 1,125 hours @ Rs. 100 per hour   =   Rs. 112500

      Factory overhead : 100 hrs. × Rs. (175 – 100)=   Rs. 7500
      25 hrs. × Rs. (225 – 100)   =   Rs. 3125
      Total factory overhead   **Rs. 10625**

   (iii) ***Where overtime is worked at the request of the customer***, overtime premium is alsocharged to the job as under :

                                                                                     (Rs.)
      Job Z labour cost   1,000 hrs. @ Rs. 100   = 100000
      Overtime premium before and after working hours 100 hrs. @ Rs. (175)   =17500
      Overtime pymt on Sundays 25 hour x Rs. 225   = 5625
      Total   **1,23,125**

Concept – Halsey & Rowan Scheme

1 **Halsey Plan**

Total wages = hours worked x wage rate + hours saved x $\frac{50}{100}$x hourly wage rate **(Called Bonus)**

2 **Rowan Scheme**(Copied Halsey since he got famous)

Total Wages = hours worked x wage rate + hours saved x $\frac{time\ taken}{time\ allowed}$x hourly wage rate **(Called Bonus)**

ILLUSTRATION 6 - – Page 25

CALCULATE the earnings of a worker under Halsey System. The relevant data is as below:

Time Rate (per hour)	Rs. 60
Time allowed	8 hours
Time taken	6 hours
Time saved	2 hours

SOLUTION

Calculation of total earnings:

= hours worked x wage rate + 50% (Time Allowed – Time Taken) × wage rate

= 6 hrs. × Rs.60 + 1/2 × (2 hrs. × Rs. 60) or Rs. 360 + Rs.60 = Rs. 420

Of his total earnings, Rs. 360 is on account of the time worked and Rs.60 is on account of his share of the premium bonus.

ILLUSTRATION 7 – Page 26

CALCULATE the earnings of a worker under Rowan System. The relevant data is given as below:

Time rate (per Hour)	Rs. 60
Time allowed	8 hours.
Time taken	6 hours.
Time saved	2 hours.

SOLUTION

Calculation of total earnings:

= hours worked x wage rate + $\frac{\text{Time Saved}}{\text{Time Allowed}}$ × Time taken × wage rate

= 6 hours × Rs.60 +$\frac{2\text{ hours}}{8\text{ hours}}$ × 6 hours × Rs.60 = Rs. 360 + Rs.90 = Rs. **450**

ILLUSTRATION 8 – Page 27

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

W.N. 1 Pl note material cost is not provided in question. Wage rate per hour is also not provided in question. Factory cost is provided in amount and we also know that factory cost is equal to sum total of direct material cost, direct labour cost and factory overhead cost.

Let us assume M be the total material cost and W be the wage rate per hour then
Statement showing factory cost of product is as follows:

	Worker A (Rs.)	Worker B (Rs.)
Material Cost	M	M
Wages Cost	30W	40W
Bonus	12W	5W
Factory overhead	30 hours x Rs. 5 = Rs. 150	40 hours x Rs. 5 = 200
Total factory cost	M+42W+150	M+45W+200

Bonus Under Rowan Scheme = hours saved x $\frac{time\ taken}{time\ allowed}$ x hourly wage rate = 20 hours x $\frac{30\ hours}{50\ hours}$xW = 12W

Bonus under Halsey Scheme = hours saved x $\frac{50}{100}$ x hourly wage rate = 10 hours x 50% x W = 5W

Please note that we are given factory cost in amount in the question so equations shall be as under:-
M+42W+150 = 3490 i.e. M+42W = 3340
M+45W+200 = 3600 i.e. M + 45W = 3400
On solving the both equation W =Rs. 20 per hour and M (Material Cost) = Rs. 2500

    i.   Normal rate of wages = Rs. 20 per hour

ii.   Cost of materails = Rs. 2500
iii.   Comparative Statement of Factory Cost

Particulars	Worker A	Worker B
Material Cost	2500	2500
Wages	30 hours x Rs. 20 = 600	40 hours x Rs. 20 =800
Bonus	12 x Rs. 20 = 240	5 x Rs. 20 = 100
Factory Overheads	150	200
Factory Cost	**3490**	**3600**

ILLUSTRATION 10 – Page 30

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

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

SOLUTION
Let T be the total hours worked by machine man
We know

Effective Wage Rate = $\dfrac{\text{Total Wages}}{\text{Total Actual hours worked}}$

Earning under Rowan Scheme = hours worked x Rate per hour + Time saved x $\dfrac{Time\ taken}{Time\ allowed}$x rate per hour

T x Rs. 37.50 = T x Rs. 30 + (4-T) x $\dfrac{T}{4}$xRs. 30

37.50T = 30T + (4-T) x T x 7.50

37.50T – 30T = (4-T) X 7.50T
7.50T = (4-T) X 7.50T

7.50T / 7.50T = 4-T
1 = 4 –T
T = 4 -1 = 3

Hence T (Actual Time taken) = 3 hours so Time saved is 1 hour.

Total earning under Halsey = hours worked x Rate per hour + Time saved x 50% x rate per hour
= 3 hours x Rs. 30 + 1 hour X 50% x Rs. 30 = Rs. 105

Effective hourly Rate = $\frac{Total\ earnings}{Time\ taken}$ = $\frac{Rs.105}{3\ hours}$ = Rs. 35

Concept – Components of Wages for Costing Purpose

1) In addition to wages (including allowances, such as D.A.) that are paid to workers, a firm may have to spend on many other items (such as **premium to the ESI or provident fund or bonus**).

2) Further, the worker does not spend all the time for which he is paid on productive work. This is because he is **entitled to weekly holiday and various type of leave**.

3) There is also a certain amount of unavoidable idle time (**Normal Idle Time**).

4) But in the case of direct workers, two alternatives are possible.

   a) The additional charges may be treated as overheads.

   b) Alternatively, the wage rates being charged to job may be computed by including such payments; automatically then, such payments will be charged to the work done along with wages of the worker.

Note - It should be remembered that **such wage rate will be only for costing purposes and not for payment to workers**. The total of wages and additional payment should be divided by effective hours of work to get such wage rates for costing purposes.

ILLUSTRATION 12 – Page 35

A worker is paid Rs.10,000 per month and a dearness allowance of Rs. 2,000 p.m. Worker contribution to provident fund is @ 10% and employer also contributes the same amount as the employee. The Employees State Insurance Corporation premium is 6.5% of wages of which 1.75% is paid by the employees. It is the firm's practice to pay 2 months' wages as bonus each year.

The number of working days in a year are 300 of 8 hours each. Out of these the worker is entitled to 15 days leave on full pay. CALCULATE the wage rate per hour for costing purposes.

SOLUTION

	(Rs.)
Wages paid to worker during the year {(Rs. 10,000 +2,000) × 12}	1,44,000
Add: Employer Contribution to:	

Provident Fund @ 10%	14,400
E.S.I. Premium @ 4.75% (6.5 – 1.75)	6,840
Bonus at 2 months' wages (Basic + DA)	24,000
Total	1,89,240

Effective hours per year: 285 days × 8 hours = 2,280 hours

Wage-rate per hour (for costing purpose): Rs. 1,89,240 / 2,280 hours = Rs.83

Concept – Holiday & Leave Wages

1) One alternative to account for wages paid on account of paid holiday and leave can be to include them as departmental **overheads**. In such a case, it is necessary to record such wages separately from "**worked for wages**". Such a segregation can be made possible by providing a separate column in the payroll for holiday and leave wages in the same way as there are columns for dearness allowance, provident fund deductions, etc.

   If, however, a separate or additional column cannot be provided for this purpose it would be necessary to analyse the payroll periodically to ascertain how much of the total payment pertains to "worked for wages" and how much is attributed to leave and holiday wages.

2) Another way could be to **inflate the wage rate for costing purposes to include holiday and leave wages**. This can be done only in the case of **direct workers**.

ILLUSTRATION 13 – Page 36

CALCULATE the Employee hour rate of a worker X from the following data:

Basic pay	Rs. 10,000 p.m.
D.A.	Rs. 3,000 p.m.
Fringe benefits	Rs. 1,000 p.m.

Number of working days in a year 300. 20 days are availed off as holidays on full pay in a year. Assume a day of 8 hours.

SOLUTION

1.	**Effective working days in a year**	300
	Less: Leave days on full pay	20
	Effective working days	280 days
	Total effective working hours (280 days × 8 hours)	2,240

2. **Total wages paid in a year** (Rs.)

Basic pay	1,20,000
D.A.	36,000
Fringe benefits	12,000
	1,68,000

(iii) **Hourly rate**: Rs. 1,68,000/2,240 hours   Rs.75.00

Concept – Labour Turnover Rate

Labour turnover means change in work force of company as follows

1. Old worker resigns from company if they get better opportunity **(Called Resignation / Retirement / Left).**
2. Old workers are fired from company if they does not perform well **(Called retrenchment / discharged).**
3. New workers are recruited to fill in vacancy due to resignation/retrenchment **(Called Replacement).** It is not due to expansion plan of company.
4. New workers are recruited as additional work force due to expansion plan of company **(Called Fresh recruitment).**

1. Labour turnover under **separation method**:- $\dfrac{No.of\ separations\ in\ a\ year}{Average\ no.of\ workers\ on\ the\ roll\ during\ the\ period}$x100

Separations (S) = **Resignation + Retirement + left + retrenchment+ discharged**

Note:- Average no. of workers on roll =
$$\dfrac{workers\ on\ the\ beginning\ of\ the\ period + workers\ at\ the\ end\ of\ period}{2}$$

2. Labour turnover under **replacement method** = $\dfrac{No.of\ replacements\ in\ the\ period}{Average\ no.of\ workers\ on\ roll\ during\ the\ period}$x100

Replacement (R)= New workers are recruited to fill in vacancy due to resignation/retrenchment

Replacement does not include those works who are engaged due to expansion scheme.

3. Labour turnover under **accession method** = $\dfrac{No.of\ accessions\ in\ the\ period}{Average\ No.of\ workers\ on\ the\ roll\ during\ the\ period}$x100

Accession (A) = Replacement + Fresh recruitment

4. Labour turnover under **Flux method** (If fresh recruitment due to expansion considered) =

$$\frac{(No.of\ separtions\ in\ a\ year+ No.of\ accessions}{Average\ no.of\ workers\ on\ the\ roll\ during\ the\ period}\ \text{x 100}$$

Since Accession includes **both replacement and fresh recruitment.**

Note:-Calculation of Equivalent Annual Labour Hour Rate
   ✓ If in the question, data is given for a period lesser than a year then first we shall calculate labour turnover rate for that period and then it will be converted into "Equivalent annual labour turnover rate" by using following formula:-

Equivalent annual Labour turnover rate = $\frac{Turnover\ rate\ for\ the\ lesser\ period}{No.of\ days\ in\ the\ period}$x365 days
Data may be given in weeks, months, quarters etc.
Note:-workers recruited and joined =Accession = Replaced + Fresh recruited
Note:-workers left and discharged = S = Separation

ILLUSTRATION 14 – Page 41

The Accountant of Y Ltd. has computed employee turnover rates for the quarter ended 31st March, 20X1 as 10%, 5% and 3% respectively under 'Flux method', 'Replacement method' and 'Separation method' respectively. If the number of workers replaced during that quarter is 30, FIND OUT the number of workers for the quarter

(i) recruited and joined and (ii) left and discharged and (iii) Equivalent employee turnover rates for the year.

SOLUTION
Average no. of workers on roll during the year
Labour turnover rate under replacement method = $\frac{No.of\ replacements}{Average\ number\ of\ workers\ on\ roll}$x100

$$5\% = \frac{30}{Abg\ no.of\ workers\ on\ roll}\text{x100}$$

Avg. No. of workers on roll = 600

1. Number of workers left and discharged

Labour turnover rate under separation method (3%) = $\dfrac{No.of\ separations}{Avg.no\ of\ workers\ on\ roll(\ 600)}$ x100

No. of separations = 18

2.   No. of workers recruited and joined

Labour turnover rate under flux method (10%) = $\dfrac{S\ (18)+\ Accession}{Avg.no.of\ workers\ on\ roll}$ x100

No. of accessions = 42

3.   Calculation of Equivalent employee turnover rates:

= $\dfrac{Employee\,Turnover\,rate\,for\ the\,quarter(s)}{Number\,of\ quarter(s)}$ ×4 quarters

Using Flux method	=	$\dfrac{10\%}{1}$×4	= 40%
Using Replacement method	=	$\dfrac{5\%}{1}$×4	= 20%
Using Separation method	=	$\dfrac{3\%}{1}$×4	= 12%

ILLUSTRATION 15 – Page 45

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. As a result of the delays by the Personnel Department in filling vacancies due to employee turnover, 1,00,000 potentially productive hours were lost. The actual direct employee hours included 30,000 hours attributable to training new recruits, out of which half of the hours were unproductive.

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

Actual Sales = Rs. 83,03,000

Productive hours = total hours – unproductive hours = 445000 hours – (30000 hours x $\frac{1}{2}$) = 4,30,000 hours

Hours lost due to to delay in filling vacancy due to labour turnover = 1,00,000 hours

Contribution lost due to loss of 1,00,000 hours = $\frac{Rs.83,03,000}{4,30,000\ hours}$ x 1,15,000 hours x 20% = Rs. 4,44,130

Statement showing profit foregone last year on account of labour turnover

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

CHAPTER 4 - OVERHEADS

Concept – Apportionment of Overhead)related to more than one department) among departments – Page 12

Concept – Re-apportionment of Service Department Overheads over production departments – Page 15

Method 1 – Direct Re-distribution method

Following steps shall be applied under this method assuming 3 production deptt. As P1, P2, P3 and 3 service deptt. S1, S2 and S3.

- S1 provides services to P1, P2 & P3.
- S2 provides services to P1, P2 & P3.
- S3 provides services to P1, P2 & P3.

S.1 Original Cost of S1 is distributed among P1, P2, P3 in given % (Ratio).**(1:3)**
S.2 Original Cost of S2 is distributed among P1, P2, P3 in given % (Ratio).**(1:3)**
S.3 Original Cost of S3 is distributed among P1, P2, P3 in given % (Ratio).**(1:3)**

ILLUSTRATION 1 – Page 17

XL Ltd., has three production departments and four service departments. The expenses for these departments as per Primary Distribution Summary are as follows:

Production Departments:	(Rs.)	(Rs.)
A	30,00,000	
B	26,00,000	
C	24,00,000	80,00,000
Service Departments:	**(Rs.)**	**(Rs.)**
Stores	4,00,000	
Time-keeping and Accounts	3,00,000	
Power	1,60,000	
Canteen	1,00,000	9,60,000

The following information is also available in respect of the production departments:

	Dept. A	Dept. B	Dept. C

		300	300	200
Horse power of Machine		300	300	200
Number of workers		20	15	15
Value of stores requisition in (Rs.)		2,50,000	1,50,000	1,00,000

PREPARE a statement apportioning the costs of service departments over the production departments.

SOLUTION

Secondary Overhead Distribution Statement

Items of cost (as per primary distribution summary)	Basis of apportionment	Total (Rs.)	Production Departments		
			A (Rs.)	B (Rs.)	C (Rs.)
Cost as per primary distribution summary		80,00,000	30,00,000	26,00,000	24,00,000
Stores (25:15:10)	Value of Store requisition	4,00,000	2,00,000	1,20,000	80,000
Time-keeping and Accounts (20:15:15)	No. of workers	3,00,000	1,20,000	90,000	90,000
Power (3:3:2)	H.P. of Machine	1,60,000	60,000	60,000	40,000
Canteen (20:15:15)	No. of workers	1,00,000	40,000	30,000	30,000
		89,60,000	34,20,000	29,00,000	26,40,000

Method 2 – Step Ladder Method / Non-Reciprocal Method

The sequence here begins with the department that renders maximum number of services to the other service department(s).

Following steps are applied under this method assuming 3 production deptt. As P1, P2, P3 and 4 service deptt. S1, S2, S3 & S4.

- ✓ S1 provide services to P1, P2, P3, S2, S3 & S4. **(1:6)**
- ✓ S2 provide services to P1, P2, P3, S3 & S4. **(1:5)**
- ✓ S3 provides services to P1, P2, P3 and S4. **(1:4)**
- ✓ S4 provides services to P1, P2 & P3.**(1:3)**

S.1 Original Cost of S1 is distributed among P1, P2, P3, S2, S3 & S4.
S. 2 Original Cost of S2 along with **shared cost from S1** is distributed among P1, P2, P3, S3 & S4.
S.3 Original Cost of S3 along with **shared cost from S1 & S2**is distributed among P1, P2, P3 and S4.
S.4 Original Cost of S4 along with **shared cost from S1, S2& S3**is distributed among P1, P2 & P3.

ILLUSTRATION 2 – Page 19

Suppose the expenses of two production departments A and B and two service departments X and Y are as under:

	Amount (Rs.)	Apportionment Basis		
		Y	A	B
X	2,00,000	25%	40%	35%
Y	1,50,000	—	40%	60%
A	3,00,000			
B	3,20,000			

SOLUTION

Summary of Overhead Distribution

Departments	X (Rs.)	Y (Rs.)	A (Rs.)	B (Rs.)
Amount as given above	2,00,000	1,50,000	3,00,000	3,20,000
Expenses of X Dept. apportioned over Y, A and B Dept. in the ratio (25%, 40% & 35%)	(2,00,000)	50,000	80,000	70,000
Total		**2,00,000**	3,80,000	3,90,000
Expenses of Y Dept. apportioned over A and B Dept. in the ratio (40% & 60%)	-	(2,00,000)	80,000	1,20,000
Total	**Nil**	**Nil**	**4,60,000**	**5,10,000**

Method 3 - Simultaneous Equation Method:

According to this method firstly, the costs of service departments are ascertained. These costs are then re-distributed to production departments on the basis of given percentages. (Refer to the following illustration to understand the method)

Following steps are applied under this method assuming 3 production deptt. As P1, P2, P3 and 2 service deptt. S1 and S2.
S.1 Make2 equation to show the total cost of S1 & S2 including its share (%) in S2 & S1 respectively.
S.2 Solve these 2 equationsto find out the cost of S1 and S2.(Called Calculated Cost)
S.3 This calculated cost of S1 and S2 is then distributed only once over production deptt and service deptt. in given %.

ILLUSTRATION 3 – Page 20

Service departments' expenses

	(Rs.)
Boiler House	3,00,000
Pump Room	60,000
	3,60,000

The allocation is :

	Production Department		Service Department	
	A	**B**	**A**	**B**
Boiler House	60%	35%	-	5%
Pump Room	10%	40%	50%	

SOLUTION

Simultaneous equation:-   Cost of Boiler Department= B   &   Cost of Pump Room = P

B = 3,00,000 + 0.50 P **------Equation 1**

P = 60,000 + 0.05 B **------Equation 2**

Substituting the value of B,

P   = 60,000 + 0.05 x (3,00,000 + 0.50 P)
      = 60,000 + 15,000 + 0.025 P
      = 75,000 + 0.025 P

P – 0.025P = 75,000

0.975P = 75,000
P   = Rs.76,923

Now Calculation Amount of B from **Equation 1**
B = 300000 + 0.50 x 76,923
B = Rs.3,38,462

Statement Showing apportionment of Service Departments Expenses

Production departments:	A	B
	(Rs.)	(Rs.)
Boiler House (60% and 35% of Rs. 3,38,462)	2,03,077	1,18,462
Pump Room (10% and 40% of Rs. 76,923)	7,692	30,769
Total	2,10,769	1,49,231

The total of expenses apportioned to A and B is Rs. 3,60,000.

Method 4 - Trial and error method

Following steps are applied under this method assuming 3 production deptt. As P1, P2, P3 and 3 service deptt. S1, S2 and S3.

S.1 Original Cost of S1 is distributed among S2 and S3 in given %.**(1:2) (No amount shall be reduced from S1)**

S.2 Original Cost of S2 along with **shared cost from S1** is distributed among S1 & S3 in given %.**(1:2) (No amount shall be reduced from S2)**

S.3 Original Cost of S3 along with **shared cost from S1 & S2** is distributed among S1 & S2 in given %.**(1:2)(No amount shall be reduced from S3)**

S.4 Repeat the process of distribution again beginning with S1 until the **additional amount** becomes small amount (Rs.1 or Rs.2)

Note:- Original cost is shared only once and additional cost is shared again and again.

S.5 Now distribute the [**100% - Share of other Service Deptt**.] cost of S1, S2 and S3 among P1, P2 and P3 **only once.**

ILLUSTRATION 4 – Page 22

Sanz Ltd., is a manufacturing company having three production departments, 'A', 'B' and 'C' and two service departments 'X' and 'Y'. The following is the budget for December 20X3:

	Total (Rs.)	A (Rs.)	B (Rs.)	C (Rs.)	X (Rs.)	Y (Rs.)
Direct material		1,00,000	2,00,000	4,00,000	2,00,000	1,00,000
Direct wages		5,00,000	2,00,000	8,00,000	1,00,000	2,00,000
Factory rent	4,00,000					
Power	2,50,000					
Depreciation	1,00,000					
Other overheads	9,00,000					
Additional information:						
Area (Sq. ft.)		500	250	500	250	500
Capital value of assets (Rs. lakhs)		20	40	20	10	10
Machine hours		1,000	2,000	4,000	1,000	1,000
Horse power of machines		50	40	20	15	25

A technical assessment of the apportionment of expenses of service departments is as under:

	A	B	C	X	Y
Service Dept. 'X' (%)	45	15	30	–	10
Service Dept. 'Y' (%)	60	35	–	5	–

Required:
   (i)   PREPARE a statement showing distribution of overheads to various depts..
   (ii) PREPARE a statement showing re-distribution of service departments expenses to production departments using Trial and error method.

SOLUTION   **(i) Overhead Distribution Summary**

	Basis	Total (Rs)	A (Rs)	B (Rs)	C (Rs)	X (Rs)	Y (Rs)
Direct materials	Direct	–	–	–	–	2,00,000	1,00,000
Direct wages	Direct	–	–	–	–	1,00,000	2,00,000
Factory rent	Area	4,00,000	1,00,000	50,000	1,00,000	50,000	1,00,000
Power (10:16:16:3:5)	H.P. × M/c Hrs	2,50,000	50,000	80,000	80,000	15,000	25,000
Depreciation	Cap. Value	1,00,000	20,000	40,000	20,000	10,000	10,000
Other overheads	M/c hrs	9,00,000	1,00,000	2,00,000	4,00,000	1,00,000	1,00,000
		16,50,000	2,70,000	3,70,000	6,00,000	4,75,000	5,35,000

(i)   Redistribution of Service Department's expenses:

	Service Departments	
	X (Rs)	Y (Rs)
Overheads as per primary distribution	4,75,000	5,35,000
(i) Apportionment of Dept-X expenses to Dept-Y (10% of Rs 47,500)	---	47,500
(ii) Apportionment of Dept-Y expenses to Dept-X [5% of (Rs 5,35,000 + Rs 47,500)]	29,125	---
(i) Apportionment of Dept-X expenses to Dept-Y (10% of Rs 29125)	---	2913
(ii) Apportionment of Dept-Y expenses to Dept-X (5% of Rs.2913)	146	---
Total	**5,04,271**	**5,85,413**

Observation:- Amount to be distributed has increased hence this amount shall be reduced that's why 90% or 95%.

Distribution of Service departments' overheads to Production departments

	Production Departments		
	A (Rs.)	B (Rs.)	C (Rs.)
Overhead as per primary distribution	2,70,000	3,70,000	6,00,000
Dept- X (90% of Rs. 5,04,271) (in 45:15:30)	2,26,921	75,640	1,51,282
Dept- Y (95% of Rs. 5,85,413) (in 60:35:0)	3,51,248	2,04,895	-
Total	**848169**	**650535**	**751282**

Please Note:-
1. 90% of Rs. 5,04,271+ 95% of Rs. 5,85,413= Rs. 10,10,000
2. Rs. 4,75,000 + Rs. 5,35,000 = Rs. 10,10,000

Method 5 – Repeated distribution method

Following steps shall be applied under this method assuming 3 production deptt. As P1, P2, P3 and 3 service deptt. S1, S2 and S3.

S.1 Original Cost of S1 is distributed among P1, P2, P3, S2 and S3 in given %.**(1:5)**
S.2 Original Cost of S2 Plus **shared cost** from S1 is distributed among P1, P2, P3, S1, S3 in given %.**(1:5)**
S.3 Original cost of S3 plus **shared cost** from S1 & S2 is distributed among P1, P2, P3, S1 and S2 in given %.**(1:5)**
S.4 Repeat the above step -1, step – 2 and then step -3 until cost of S1, S2 and S3 becomes small figure i.e. (Rs. 1 or Rs. 2). Now distribute this small figure over P1, P2 and P3

ILLUSTRATION 5 – Page 24

PH Ltd., is a manufacturing company having three production departments, 'A', 'B' and 'C' and two service departments 'X' and 'Y'. The following is the budget for December 20X8:

	Total (Rs.)	A (Rs.)	B (Rs.)	C (Rs.)	X (Rs.)	Y (Rs.)
Direct material		1,00,000	2,00,000	4,00,000	2,00,000	1,00,000
Direct wages		5,00,000	2,00,000	8,00,000	1,00,000	2,00,000
Factory rent	4,00,000					
Power	2,50,000					

Depreciation	1,00,000					
Other overheads	9,00,000					
Additional information:						
Area (Sq. ft.)		500	250	500	250	500
Capital value of assets (Rs. lakhs)		20	40	20	10	10
Machine hours		1,000	2,000	4,000	1,000	1,000
Horse power of machines		50	40	20	15	25

A technical assessment of the apportionment of expenses of service departments is as under:

	A	B	C	X	Y
Service Dept. 'X' (%)	45	15	30	–	10
Service Dept. 'Y' (%)	60	35	–	5	–

Required:

(i) PREPARE a statement showing distribution of overheads to various departments.

(ii) PREPARE a statement showing re-distribution of service departments expenses to production departments.

(iii) CALCULATE machine hour rates of the production departments 'A', 'B' and 'C'.

SOLUTION

(i)   **Overhead Distribution Summary**

	Basis	Total (Rs.)	A (Rs.)	B (Rs.)	C (Rs.)	X (Rs.)	Y (Rs.)
Direct materials	Direct	–	–	–	–	2,00,000	1,00,000
Direct wages	Direct	–	–	–	–	1,00,000	2,00,000
Factory rent	Area	4,00,000	1,00,000	50,000	1,00,000	50,000	1,00,000
Power	H.P. × Machine Hrs.	2,50,000	50,000	80,000	80,000	15,000	25,000
Depreciation	Capital value	1,00,000	20,000	40,000	20,000	10,000	10,000

| Other overheads | Machine hrs. | 9,00,000 | 1,00,000 | 2,00,000 | 4,00,000 | 1,00,000 | 1,00,000 |
| | | 16,50,000 | 2,70,000 | 3,70,000 | 6,00,000 | 4,75,000 | 5,35,000 |

(ii)   Redistribution of Service Department's expenses

	A (Rs.)	B (Rs.)	C (Rs.)	X (Rs.)	Y (Rs.)
Total overheads	2,70,000	3,70,000	6,00,000	4,75,000	5,35,000
Dept. X overhead apportioned in the ratio (45:15:30: —:10)	2,13,750	71,250	1,42,500	(4,75,000)	47,500
Dept. Y overhead apportioned in the ratio (60:35: —:5: —)	3,49,500	2,03,875	–	29,125	(5,82,500)
Dept. X overhead apportioned in the ratio (45:15:30: —:10)	13,106	4,369	8,738	(29,125)	2,912
Dept. Y overhead apportioned in the ratio (60:35: —:5: —)	1,747	1,019	–	146	(2,912)
Dept. X overhead apportioned in the ratio (45:15:30: —:10)	65	22	44	(146)	15
Dept. Y overhead apportioned in the ratio (60:35: —:5: —)	9	6	-	-	(15)
	8,48,177	6,50,541	7,51,282	–	–

(iii)   Machine hour rate:

		A	B	C
A	Total overheads (Rs.)	8,48,177	6,50,541	7,51,282
B	Machine hours	1,000	2,000	4,000
C	**Machine hour rate(Rs) [A ÷ B]**	**848.18**	**325.27**	**187.82**

Concept – Methods of absorbing overheads to various products or Jobs

Overhead absorption Rate:- Following are the methods of charging overheads cost to products using overhead

a) Overhead charging Rate a % of direct material cost = $\frac{\text{Amount of overheads}}{\text{Direct material cost}}$ x 100

b) Overhead charging Rate as a % of direct labour cost = $\frac{\text{Amount of overheads}}{\text{Direct labour cost}}$ x 100

c) Overhead charging Rate as a % of prime cost = $\frac{\text{Amount of overheads}}{\text{Prime cost}}$ x 100

d) Overhead charging Rate Based on Direct labour hours = $\frac{\text{Amount of overheads}}{\text{Direct labour hours}}$

e) Overhead charging Rate Based on Machine hour = $\frac{\text{Amount of overheads}}{\text{Machine hours}}$

f) Overhead charging Rate Based on Units = $\frac{\text{Amount of overheads}}{\text{Number of Units}}$

Concept – Types of overhead Rates

a) Normal OH Rate (Based on Actual amount of Overheads) = $\frac{\text{Actual Amount of overheads}}{\text{Actual Base}}$

b) Pre-Determined OH Rate (Based on Budgeted amt of OH) = $\frac{\text{Budgeted Amount of overheads}}{\text{Budgeted Base}}$

c) Blanket Overhead Rate (**computation of one single overhead rate for the whole factory)**
= $\frac{\text{Total overheads for Factory}}{\text{Total Number of units of base for the factory}}$

d) Departmental Overhead Rate = $\frac{\text{Overheads of Department}}{\text{Corresponding Base}}$

Concept – Machine Hour Rate

Machine hour rate:- while calculating machine hour rate,

Machine hour rate = $\frac{\text{Amount of production overheads}}{\text{Effective Machine hours}}$

- All expenses related to **operating of machine** are divided into fixed/standing charges and running / machine expenses.
- Comprehensive machine hour rate = Simple machine hour rate +**direct wages per machine hour**$(\frac{Total\ Direct\ wages)}{Total\ machine\ hours})$

STATEMENT SHOWING THE COMPUTATION OF MACHINE HOUR RATE

Particulars	Amount (Rs.)
A. Fixed/Standing Charges:	
(a) Rent & Rates	XXX
(b) Heating & lighting cost	XXX
(c) Supervision cost	XXX
(d) Insurance cost	XXX
(e) Department & general overheads	XXX
(f) Sundry Shop Supplies	XXX
(g) Depreciation of factory – building	
Total Fixed/Standing Charges	**XXX**
B. Machine Expenses per hour:	
(a) Depreciation $= \dfrac{\text{Original Cost } + \text{ Installation Exp.} - \text{ Scrap Value}}{\text{Effective useful life (in hours)}}$	
(b) Powerconsumed cost / Electricity	
(c) Repair & Maintenance	
(d) Lubricating oil & Consumable stores	
(e) Other running expenses	
C. **Machine Hour Rate**	

Note:- Calculation of Effective machine hours

Particulars	Hours
Maximum Capacity (365 days x 8 hours in a day)	XXX
Less:- Hours spent on holidays, festivals, Sundays, repair & maintenance	(XXX)
Practical capacity (In hours)	XXX
Less:- Set up time (If **unproductive**)	(XXX)
Effective machine hours	XXX

Note:- if set-up time is considered productive then it shall not be reduced.

Note:-Depreciation of machine shall be fixed exp. if life of machine is based on Time OR Depreciation of machine shall be variable exp. if life of machine is based on machine hours. Depreciation of factory building shall always be fixed.

ILLUSTRATION 6 – Page 34

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

SOLUTION

Total number of hours per annum- 4,380 Hours

Total number of hours per month- 365 Hours

Computation of Machine Hour Rate

	Per Month (Rs.)	Per Hour (Rs.)
Fixed costs (Standing Charges)		
Depreciation (Refer working note-1)	75,833	
Rent (Rs.30,000 × ¼)	7,500	
Lighting charges {(Rs.8,000 × 2 points) ÷ 10 points}	1,600	
Foreman's salary (Rs.19,200 × 1/6)	3,200	
Sundry expenses (oil etc.)	900	
Insurance {(1% of Rs. 1,00,00,000) ÷ 12 months}	8,333	
	97,366	97,366 / 365 Hours = 266.76
Variable costs:		
Repairs [$\dfrac{\text{Rs.18,00000}}{\text{12 months X 10 Years X 365 Hours}}$]		41.10

Electricity (15 units × Rs. 5)		75.00
Machine Hour rate		**382.86**

(1) Depreciation per month = $\dfrac{\text{Cost of Machine} - \text{Scrap Value}}{\text{Life of Machine}}$ = $\dfrac{\text{Rs.1,00,00,000} - \text{Rs.9,00,000}}{\text{10 Years X 12 Month}}$ = Rs. 75,833

ILLUSTRATION 7 –Page 36

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 fourty 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 the fourty eight hours. In additions they are paid a bonus of 10 per cent 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 rate includes the direct wages of the operator and also recoups the factory overheads allocated to the machines. The following details of factory overheads applicable to the cost centre are available:

- ❖ Depreciation 10% per annum on original cost of the machine. Original cost of the 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

Calculation of Effective machine hours

Particulars	Hours
Total Working hours (48 hours per week x 4 week)	192 Hours
Less Unproductive hours SET UP TIME (4 hours per week x 4 week)	(16 Hours)
Effective Working Hours	**176 hours**

Statement showing cost of running for one machine for a four-week period

Particulars	Amount (Rs.)
Fixed Charges	
Rent ($\frac{Rs.5400\ x\ 4\ weeks}{52\ weeks\ x\ 3\ machines}$)	138.46
Heat & Light ($\frac{Rs.9720\ x\ 4\ weeks}{52\ weeks\ x\ 3\ machines}$)	249.23
Forman's Salary ($\frac{Rs.12960\ x\ 4\ weeks}{52\ weeks\ x\ 3\ machines}$)	332.30
wages (48 hours x 4 weeks x 3 operators for 1 machine x Rs. 20)	11520
Bonus 10% of (44 hours x 4 weeks x 3 operators for 1 machine x Rs.20)	1056
Misc. Expenses ($\frac{Rs.18000\ x\ 4\ weeks}{52\ weeks\ x\ 3\ machines}$)	461
Total Fixed Charges	**13757**
Running Charges	
Depreciation ($\frac{Rs.52,000\ x\ 10\%\ x\ \ 4\ weeks}{52\ weeks}$)	400
Repairs & maintenance (Rs. 60 x 4 weeks)	240
Consumable Stores (Rs. 75 x 4 weeks)	300
Power (176 hours x 20 units x Rs. 0.80)	2816
Total variable Charges	**3756**
Total Cost of Machine	**17513**

Machine hour rate = $\dfrac{\text{Rs.17513}}{176\ \text{hrs}}$ = Rs. 99.51

Concept - Treatment of under/over absorption (Recovery) of overheads:-

Meaning of unabsorbed OH:-

Example:- A company started to produce a product named as "B". The company provided following information to you.

Factory Rent (Annual) = Rs. 10,00,000
No. of units expected to be produced in a year = 10,000 units
Actually produced units = 9,000 units
Calculate amount of under absorbed Overhead?

Answer:- Overhead Recovery Rate = $\dfrac{\text{Rs.10,00,000}}{10,000\ \text{units}}$ = Rs. 100 per unit

Actually absorbed Overhead amount = Rs. 100 per unit x 9000 units = Rs.9,00,000
Under absorption OH (Rs.) = Rs. 10,00,000 – Rs. 9,00,000 = Rs.1,00,000

Under absorption of OH means that amount of OH absorbed over products is less than the amount of actual OH incurred.

Over absorption of OH means that amount of OH absorbed over products is more than the amount of actual OH incurred.

Accounting Treatment:- Under or over absorbed overheads are disposed off by any of following methods:-

a. One method suggest that the **under or over absorbed overheads should be charged to costing profit & loss account as loss or profit**.

b. Second method suggest that **unabsorbed / over-absorbed overheads should be charged to WIP, Finished goods- stock and units sold**

- By using supplementary rate   **OR**
- In the ratio of their value in case units are not given in question.

Note 1:- supplementary rate =

$$\frac{unabsorbed\ or\ over\ absorbed\ OH}{Total\ production\ in\ units\ including\ equivalent\ units\ of\ WIP}$$

Absorbed OH = absorption OH = Recovered OH = Applied OH

Note 2:- The **under absorbed overhead** relating to **inefficiency or defective planning or defective production policy** is abnormal loss hence it is charged to profit and loss account as loss.

Note 3:- For calculation of unabsorbed / over absorption OH, **Actual overhead incurred** should not include non-recurring expenses
- amount paid to worker as per court order
- previous years' expenses booked to current year
- wages paid in strike period
- Obsolete stores written off.

Illustration 8 – Page 41
The total overhead expenses of a factory are 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. 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 on account of increase in the cost of indirect materials and indirect labour and the remaining 50% was due to factory inefficiency. Also give the profit implication of the method suggested.

SOLUTION

	(Rs)
Actual factory overhead expenses incurred	4,46,380
Less: Overheads recovered from production (*2,93,104 hours* × Rs*1.25*)	3,66,380
Unabsorbed overheads	80,000

Reasons for unabsorbed overheads

(i)   50% of the unabsorbed overhead was on account of increased in the cost of indirect materials and indirect labour = Rs. 40,000

(ii)   50% of the unabsorbed overhead was due to factory inefficiency = Rs. 40, 000

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 produced by using a supplementary rate.

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

Equivalent Units	Rs.
Cost of sales (*7,000 units* ×Rs*5*)	35,000
Finished goods (*800 units* ×Rs*5*)	4,000
Work-in progress (*200 units* ×Rs*5*)	1,000
Total	**40,000**

The cost of sales figure would reduce the profit for the period by Rs. 35,000. The value of stock of finished goods and work-in-progress will increase by Rs 4,000 and Rs1,000 respectively.

2.   The balance amount of unabsorbed overheads viz. of Rs. 40,000 due to factory inefficiency should be charged to Costing Profit & Loss Account, as this is an abnormal loss.

ILLUSTRATION 9 – Page 45
(Reverse Calculation   of Factory Overhead and Administrative overheads)

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 FIX the selling price of job 103. The additional data being:

Direct materials	**Rs.** 24,000
Direct wages	**Rs.** 20,000
Profit percentage on selling price	12-½%

SOLUTION

(i) Let factory overhead recovery rate as percentage of direct wages be X and administrative overheads recovery rate as percentage of factory cost be Y.

Particulars	Job 101	Job 102
Direct material	54,000	37,500
Direct Wages	42,000	30,000
Prime Cost	**96,000**	**67,500**
Add: Factory Overhead (X% of direct wages)	$42{,}000 \times \dfrac{X}{100} = 420X$	$30{,}000 \times \dfrac{X}{100} = 300X$
Factory Cost	**96,000 + 420X**	**67,500 + 300X**
Add:- Admin Overhead (Y% of Factory Cost)	$(96{,}000+420X) \times \dfrac{Y}{100}$	$(67{,}500+300X) \times \dfrac{Y}{100}$
Total Cost	$(96{,}000+420X) \times (1+\dfrac{Y}{100})$	$(67{,}500+300X) \times (1+\dfrac{Y}{100})$
Add:- Profit	$15{,}150\ (166650 \times \dfrac{10}{110})$	$21{,}375\ (128250 \times \dfrac{20}{120})$
Sales	**1,66,650**	**1,28,250**

Eq. 1 $(96{,}000+420X) \times (1+\dfrac{Y}{100}) = 151500$

Eq. 2 $(67{,}500+300X) \times (1+\dfrac{Y}{100}) = 106875$

On dividing Eq 1 by Eq 2 and after solving it, we get X = 60 and Y = 25

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

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

(iii) Selling price of Job 103

Particulars	
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 ($\frac{\text{Total cost}}{87.5\%}$)	0

Concept – Profit & Loss Statement

ILLUSTRATION 10 – Page 51

A company which sells four products, some of them unprofitable, proposes discontinuing the sale of one of them. The following information is available regarding income, costs and activity for the year ended 31st March, 20X9.

	Products			
	A	**B**	**C**	**D**
Sales (Rs.)	30,00,000	50,00,000	25,00,000	45,00,000

Cost of sales (Rs.)	20,00,000	45,00,000	21,00,000	22,50,000
Area of storage (Sq.ft.)	50,000	40,000	80,000	30,000
Number of parcels sent	1,00,000	1,50,000	75,000	1,75,000
Number of invoices sent	80,000	1,40,000	60,000	1,20,000

Selling and Distribution overheads and the basis of allocation are:

	(Rs.)	Basis of allocation to products
Fixed Costs		
Rent & Insurance	3,00,000	Square feet
Depreciation	1,00,000	Parcel
Salesmen's salaries & expenses	6,00,000	Sales Volume
Administrative wages and salaries	5,00,000	No. of invoices
Variable Costs:		
Packing wages & materials	Rs. 2 per parcel	
Commission	4% of sales	
Stationery	Rs. 1 per invoice	

You are required to PREPARE Costing Profit & Loss Statement, showing the percentage of profit or loss to sales for each product.

SOLUTION

Statement of Profit or Loss on Various Products during the year ended March 31, 20X9.

	Total (Rs.)	Products			
		A (Rs.)	B (Rs.)	C (Rs.)	D (Rs.)
Sales	1,50,00,000	30,00,000	50,00,000	25,00,000	45,00,000
Variable costs:					
Cost of sales	1,08,50,000	20,00,000	45,00,000	21,00,000	22,50,000
Commissions 4% of sales	6,00,000	1,20,000	2,00,000	1,00,000	1,80,000
Packing wages & materials @ Rs. 2 per parcel	10,00,000	2,00,000	3,00,000	1,50,000	3,50,000

Stationery @ Rs.1 per invoice	4,00,000	80,000	1,40,000	60,000	1,20,000
Total variable costs	1,28,50,000	24,00,000	51,40,000	24,10,000	29,00,000
Contribution (Sales – VC)	21,50,000	6,00,000	(1,40,000)	90,000	16,00,000
Fixed Costs:					
Rent & Insurance (5:4:8:3)	3,00,000	75,000	60,000	1,20,000	45,000
Depreciation (4:6:3:7)	1,00,000	20,000	30,000	15,000	35,000
Salesmen's salaries & expenses (6:10:5:9)	6,00,000	1,20,000	2,00,000	1,00,000	1,80,000
Administrative wages & salaries (4:7:3:6)	5,00,000	1,00,000	1,75,000	75,000	1,50,000
Total Fixed costs	15,00,000	3,15,000	4,65,000	3,10,000	4,10,000
Profit or Loss (Cont.-FC)	6,50,000	2,85,000	(6,05,000)	(2,20,000)	11,90,000
Percentage of profit or Loss on sales (%)	**4.33%**	**9.50%**	**(12.10%)**	**(8.80%)**	**26.4%**

ACTIVITY BASED COSTING

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Concept – Overhead charging under absorption and Activity Based Costing

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Overhead absorption Rate under absorption Costing / traditional / conventional method – 6 Methods

1. Overhead charging Rate a % of direct material cost = $\frac{\text{Amount of overheads}}{\text{Direct material cost}}$ x 100

2. Overhead charging Rate as a % of direct labour cost = $\frac{\text{Amount of overheads}}{\text{Direct labour cost}}$ x 100

3. Overhead charging Rate as a % of prime cost = $\frac{\text{Amount of overheads}}{\text{Prime cost}}$ x 100

4. Overhead charging Rate Based on Direct labour hours = $\frac{\text{Amount of overheads}}{\text{Direct labour hours}}$

5. Overhead charging Rate Based on Machine hour = $\frac{\text{Amount of overheads}}{\text{Machine hours}}$

6. Overhead charging Rate Based on Units = $\frac{\text{Amount of overheads}}{\text{Number of Units}}$

Under ABC Costing, Overhead costs (Indirect Costs) is apportioned as follow -

1. **Overhead which is activity oriented** i.e. overhead which increases or decreases on increase or decrease in number of activities i.e. set-up cost is indirect cost (OH) which will increase if number of set-ups on machine increases and vice-versa.
   Overhead is charged on the basis of number of activities (Related Cost Driver)

2. **Overhead which is not activity oriented** e.g. factory rent, depreciation on machine. Here we use any of 6 Methods of absorption Costing.

Examples of Related Cost Driver – Page 4 & 11

ILLUSTRATION 1 – Page 11

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

	A	B	C
Production quantity (Units)	4,000	3,000	1,600
Resources per Unit:			
- Direct Materials (Kg.)	4	6	3
- Direct Labour (Minutes)	30	45	60

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

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

1. **Budgeted overheads were analysed into the following:**

	(Rs.)
Material handling	29,100
Storage costs	31,200
Electricity	39,150

2. **The cost drivers identified were as follows:**

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

3. **Data on Cost Drivers was as follows:**

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

You are requested to:

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

2. PREPARE a statement for management showing the product costs of each product using the ABC approach.

3. STATE what are the reasons for the different product costs under the two approaches?

 SOLUTION

1. Traditional Absorption Costing

	A	B	C	Total
(a) Quantity (units)	4,000	3,000	1,600	8,600
(b) Direct labour (minutes)	30	45	60	-
(c) Direct labour hours (a × b)/60 minutes	2,000	2,250	1,600	5,850

Overhead rate per direct labour hour:

= Budgeted overheads ÷ Budgeted labour hours

= Rs. 99,450 ÷ 5,850 hours

= Rs. 17 per direct labour hour

Unit Costs:

	A (Rs.)	B (Rs.)	C (Rs.)
Direct Costs:			
- Direct Labour	5.00	7.50	10.00
- Direct Material	8.00	12.00	6.00
Production Overhead:	8.50	12.75	17.00
	$\left(\frac{17 \times 30}{60}\right)$	$\left(\frac{17 \times 45}{60}\right)$	$\left(\frac{17 \times 60}{60}\right)$
Total unit costs	21.50	32.25	33.00
Number of units	4,000	3,000	1,600
Total costs	86,000	96,750	52,800

2. Activity Based Costing

Calc. of different Level of Activities

Particulars	A	B	C
Weight of Material Handled	4000 units X 4 Kg = 16,000 Kg	3000 units X 6 Kg = 18,000 Kg	1600 units X 3 Kg = 4800 Kg
No. of Batches of Material **(For Complete Production)**	10	5	15

No. of Machine Operations	4000 units X 6 = 24,000	3000 units X 3 Kg = 9,000	1600 units X 2 = 3200

Statement showing Total Cost & Unit Cost

Particulars	A	B	C
DMC	4000 units X Rs.5 = Rs.20,000	3000 units X Rs.7.50 = Rs.22500	1600 units X Rs.10 = Rs.16000
DLC	4000 units X Rs.8 = Rs.32,000	3000 units X Rs.12 = Rs.36000	1600 units X Rs.6 = Rs.9600
Overheads			
Material Handling (160:180:48)	12000	13500	3600
Storage Costs (10:5:15)	10400	5200	15600
Electricity (240:90:32)	25956	9733	3461
Total Costs	**100356**	**86933**	**48261**
Total Units	4000	3000	1600
Cost Per unit	**25.09**	**28.97**	**30.16**

3. **Comments:** The difference in the total costs under the two systems is due to the differences in the overheads borne by each of the products. The Activity Based Costs appear to be more precise.

Concept – Cost of Unused Capacity

ILLUSTRATION 2 – Page 19

MST Limited has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity.

Activity	Cost Driver	Capacity	Cost
Power	Kilowatt hours	50,000 kilowatt hours	Rs.2,00,000
Quality Inspections	Number of Inspections	10,000 Inspections	Rs. 3,00,000

The company makes three products M, S and T. For the year ended March 31, the following consumption of cost drivers was reported:

Product	Kilowatt hours	Quality Inspections
M	10,000	3,500
S	20,000	2,500
T	15,000	3,000

Required:

(i) COMPUTE the costs allocated to each product from each activity.

(ii) CALCULATE the cost of unused capacity for each activity.

(iii) DISCUSS the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate.

SOLUTION

(i) Statement of cost allocation to each product from each activity

	Product			
	M (Rs.)	S (Rs.)	T (Rs.)	Total (Rs.)
Power (Refer to working note)	40,000 (10,000 kWh × Rs.4)	80,000 (20,000 kWh ×Rs.4)	60,000 (15,000 kWh ×Rs.4)	1,80,000
Quality Inspections (Refer to working note)	1,05,000 (3,500 inspections × Rs.30)	75,000 (2,500 inspections × Rs. 30)	90,000 (3,000 inspections × Rs. 30)	2,70,000

Working note

Rate per unit of cost driver:

Power	(Rs. 2,00,000 / 50,000 kWh)	Rs. 4/kWh
Quality Inspection	(Rs. 3,00,000 / 10,000 inspections)	Rs. 30 per inspection

(ii) Computation of cost of unused capacity for each activity:

	(Rs.)
Power (5000 Kilowatt Hour X Rs.4)	20,000
Quality Inspections (1000 Inspection X Rs.30)	30,000
Total cost of unused capacity	50,000

(iii)   Factors management consider in choosing a capacity level to

compute the budgeted fixed overhead cost rate:

- Effect on product costing & capacity management

- Effect on pricing decisions.

- Effect on performance evaluation

- Effect on financial statements

- Regulatory requirements.

- Difficulties in forecasting chosen capacity level concepts.

Illustration 4 – Page 23

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

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

The following information is made available to formulate the budget:

	Activity	Present Cost (Rs)	Estimation for the Budget Period
(i)	ATM Service		
	(a) Machine Maintenance	4,00,000	(all fixed, no change)
	(b) Rents	2,00,000	(fully fixed, no change)
	(c) Currency Replenishment Cost	1,00,000	(expected to double during budget period)
		7,00,000	(This activity is driven by no. of ATM transaction)
(ii)	Computer Processing	5,00,000	(Half this amount is fixed and no change is expected) (The variable portion is expected to increase to three times the current level) This activity is driven by the number of Computer transactions.
	Issuing Statement	18,00,000	Presently 3 lacs statement are

			made. In the budget period, 5 lac statements are expected. For every increase of one lac statement, one lacs rupees is the budget increase (this activity is driven by the number of statements).
	Customer Inquiries	2,00,000	Estimated to increase by 80% during the budget period. (This activity is driven by telephone minutes).

The activity drivers and their budgeted quantifies are given below:

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

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

Required:
- (i) Calculate the budgeted rate for each activity.
- (ii) Prepare the budgeted cost statement activity wise.
- (iii) Find the budgeted product cost per account for each product using (i) and (ii) above.

Solution Working Note 1: Calculation of Activity cost in budgeted period:

ATM Service:

Particulars	Rs.
Machine maintenance	400000
Rent	200000
Currency cost (Rs. 100000 x 2)	200000
Total	**800000**

Computer processing:-

Particulars	Rs.
Fixed	250000

Variable (Rs. 250000 x 3)	750000
Total	**1000000**

Issuing statement

Particulars	Rs.
3 Lac statements	1800000
1 Lac statements	100000
1 Lac statements	100000
Total	**2000000**

Computer enquiries = 200000 x 1.80 = Rs. 360000

Statement of cost Pool (Activity Based Costing)

Overhead	Amount	Basis	No. of Activity	Cost per Activity (Rs)
ATM Service	800000	No. of ATM services	200000	4.00
Computer processing	1000000	No. of computer processing	2000000	0.50
Issuing statements	2000000	No. of statements	500000	4.00
Customers enquiries	360000	Telephone minutes	720000	0.50

Statement of cost (Activity Based Costing)

Particulars	Deposit A/cs	Loan A/cs	Credit A/cs
ATM Service (150000 : 0 : 50000)	600000	--	200000
Computer processing (15 lac : 2 lac : 3 lac)	750000	100000	150000
Issuing statements (350000 : 50000 : 100000)	1400000	200000	400000
Customers enquiries (360000 : 180000 : 180000)	180000	90000	90000
Total Cost	**2930000**	**390000**	**840000**
Units	58600	13000	14000
Cost per unit	50	30	60

COST SHEET

Concept – Format of Cost Sheet – Page No. 7

Particulars	Amt (Rs.)	Total units
Opening stock of raw material		
Add:- Purchase of raw material including carriage inwards		
Less:- Closing stock of raw material		
Direct material consumed / DMC		Units produced
Add:- Direct Labour Cost		Units produced
Add:- Direct Expenses / Chargeable Expenses		Units produced
Prime Cost/Direct Cost		Units produced
Add:- Factory/works/Manufacturing/Production overhead		
Add:- Opening stock of WIP		
Less:- Closing stock of WIP		
Factory Cost		Units produced
Add:- Quality Control Cost		
Add:- Research & Development Cost (Process Related)		
Add:- Adm. Overheads (Related to Production Activity)		
Less:- Credit for Recoveries / Scrap / By –Products / Misc. Income		
Add:- Primary Packing Cost		
Cost of Production (For FG Produced)		**Units Produce**
Add:- Opening stock of finished goods		
Less:- Closing stock of finished goods		
Cost of goods Sold (For FG Sold)		**Units Sold**
Add:- Selling and distribution overhead		Units Sold
Add:- General Admin Overheads		Units Sold
Total cost / Cost of sales		**Units Sold**

Note 1:- Total Cost + Total Profit = Total Sale

Note 2:- Formula to Calculate unit cost of closing stock of finished goods

$$\text{Unit Cost of Closing FG (per unit)} = \frac{Cost\ of\ Production}{No.of\ units\ produced}$$

Note 3:- Opening Stock (units) + produced (units) = No. of units Sold + closing Stock (units)

Concept – Treatment of Special Items – Page 9

1) **Abnormal costs-** Any abnormal cost, where it is material and quantifiable, **shall not form part of cost of production** or acquisition or supply of goods or provision of service. Examples of abnormal costs are:

    (a) Cost pertaining to or arising **out of a pandemic** e.g. COVID-19

    (b) Cost associated with employees due to **sudden lockdown**.

2) **Subsidy/ Grant/ Incentives**- Any such type of payment received/ receivable **shall be reduced from the cost** objects to which such amount pertains.

3) **Penalty, fine, damages, and demurrage** - These types of expenses **shall not form part of cost.**

4) **Interest and other finance costs**- Interest, including any payment in the nature of interest for use of non- equity funds and incidental cost that an entity incurs in arranging those funds. **Interest and finance charges are not included in cost of production**.

Illustration 3 – Page 12

Arnav Inspat Udyog Ltd. has the following expenditures for the year ended 31st March, 20X8:

Sl. No.		Amount (Rs.)	Amount (Rs.)	Cost Head
(i)	Raw materials purchased		100000000	**DMC**
(ii)	GST paid on the above purchases @18% (Eligible for input tax credit)		18000000	**Ignore**
(iii)	Freight inward		1120600	**DMC**
(iv)	Wages paid to factory workers		2920000	**DLC**
(v)	Contribution made towards employees' PF & ESIS		360000	**DLC**
(vi)	Production bonus paid to factory workers		290000	**DLC**
(vii)	Royalty paid for production		172600	**Direct Exp.**

(viii)	Amount paid for power & fuel		462000	**Direct Exp.**
(ix)	Amount paid for purchase of moulds and patterns (life is equivalent to two years production)		896000	**Direct Exp.**
(x)	Job charges paid to job workers		812000	**Direct Exp.**
(xi)	Stores and spares consumed		112000	**F.OH**
(xii)	Depreciation on:			
	- Factory building	84000		**F.OH**
	- Office building	56000		**Adm. OH**
	- Plant & Machinery	126000		**F.OH**
	- Delivery vehicles	86000	352000	**DIST. OH**
(xiii)	Salary paid to supervisors		126000	**F.OH**
(xiv)	Repairs & Maintenance paid for:			
	- Plant & Machinery	48,000		**F.OH**
	- Sales office building	18000		**SELL. OH**
	- Vehicles used by directors	19600	85600	**ADM.OH**
(xv)	Insurance premium paid for:			
	- Plant & Machinery	31200		**F.OH**
	- Factory building	18100		**F.OH**
	- Stock of raw materials & WIP	36000	85300	**F.OH**
(xvi)	Expenses paid for quality control check activities		19600	**Quality Cost**
(xvii)	Salary paid to quality control staffs		96200	**Quality Cost**
(xviii)	Research & development cost paid for improvement in production process		18200	**R&D COST**
(xix)	Expenses paid for pollution control and engineering & maintenance		26600	**F.OH**
(xx)	Expenses paid for administration of factory work		118600	**ADM. OH Related to Pro**
(xxi)	Salary paid to functional mangers:			
	- Production control	960000		**ADM. OH Related to Pro**
	- Finance & Accounts	918000		**ADM.OH –GEN**
	- Sales & Marketing	1012000	2890000	**Selling OH**
(xxii)	Salary paid to General Manager		1256000	**ADM.OH –GEN**
(xxiii)	Packing cost paid for:			
	- Primary packing necessary to maintain quality	96000		**Primary Packing Cost**
	- For re-distribution of finished goods	112000	208000	**Dist. OH**
(xxiv)	Wages of employees engaged in distribution of goods		720000	**Dist. OH**
(xxv)	Fee paid to auditors		180000	**ADM.OH –GEN**

(xxvi)	Fee paid to legal advisors		120000	**ADM.OH –GEN**
(xxvii)	Fee paid to independent directors		220000	**ADM.OH –GEN**
(xxviii)	Performance bonus paid to sales staffs		180000	**Selling OH**
(xxix)	Value of stock as on 1st April, 20X7:			
	- Raw materials	1800000		
	- Work-in-process	920000		
	- Finished goods	1100000	3820000	
(xxx)	Value of stock as on 31st March, 20X8:			
	- Raw materials	960000		
	- Work-in-process	870000		
	- Finished goods	1820000	3650000	

Amount realized by **selling of scrap and waste** generated during manufacturing process– Rs.86,000

From the above data you are requested to PREPARE Statement of cost for Arnav Ispat Udyog Ltd.
for the year ended 31st March, 20X8, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production,
(iv) Cost of goods sold and (v) Cost of sales.

Answer: Statement of Cost of Arnav Ispat Udyog Ltd. for the year ended 31st March, 20X8:

Sl. No.	Particulars	Amount (Rs.)	Amount (Rs.)
(i)	Material Consumed:		
	- Raw materials purchased	100000000	
	- Freight inward	1120600	
	Add: Opening stock of raw materials	1800000	
	Less: Closing stock of raw materials	(960000)	101960600
(ii)	Direct employee (labour) cost:		
	- Wages paid to factory workers	2920000	
	- Contribution made towards employees' PF & ESIS	360000	
	- Production bonus paid to factory workers	290000	3570000
(iii)	Direct expenses:		
	- Royalty paid for production	172600	
	- Amount paid for power & fuel	462000	
	- Amortised cost of moulds and patterns	448000	
	- Job charges paid to job workers	812000	1894600
	Prime Cost		107425200
(iv)	Works/ Factory overheads:		
	- Stores and spares consumed	112000	
	- Depreciation on factory building	84000	

	- Depreciation on plant & machinery	126000	
	- Salary paid to supervisors	126000	
	- Repairs & Maintenance paid for plant & machinery	48000	
	- Insurance premium paid for plant & machinery	31200	
	- Insurance premium paid for factory building	18100	
	- Insurance premium paid for stock of raw materials & wip	36000	
	- Expenses paid for pollution control and engineering & maintenance	26600	607900
	Gross factory cost		108033100
	Add: Opening value of W-I-P		920000
	Less: Closing value of W-I-P		(870000)
	Factory Cost		108083100
(v)	Quality control cost:		
	- Expenses paid for quality control check activities	19600	
	- Salary paid to quality control staffs	96200	115800
(vi)	Research & development cost paid improvement in production process		18200
(vii)	Administration cost related with production:		
	- Expenses paid for administration of factory work	118600	
	- Salary paid to Production control manager	960000	1078600
(viii)	Less: Realisable value on sale of scrap and waste		(86000)
(ix)	Add: Primary packing cost		96000
	Cost of Production		109305700
	Add: Opening stock of finished goods		1100000
	Less: Closing stock of finished goods		(1800000)
	Cost of Goods Sold		108605700
(x)	Administrative overheads:		
	- Depreciation on office building	56000	
	- Repairs & Maintenance paid for vehicles used by directors	19600	
	- Salary paid to Manager- Finance & Accounts	918000	
	- Salary paid to General Manager	1256000	
	- Fee paid to auditors	180000	
	- Fee paid to legal advisors	120000	
	- Fee paid to independent directors	220000	27,69,600
(xi)	Selling overheads:		
	- Repairs & Maintenance paid for sales office building	18000	
	- Salary paid to Manager- Sales & Marketing	1012000	
	- Performance bonus paid to sales staffs	180000	1210000
(xii)	Distribution overheads:		
	- Depreciation on delivery vehicles	86000	
(xiii)	- Packing cost paid for re-distribution of finished goods	112000	

	- Wages of employees engaged in distribution of Overheads	720000	918000
	Cost of Sales		113503300

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

COST ACCOUNTING SYSTEM

This Chapter includes 2 chapters

1. Integrated & Non-Integrated Accounts
2. Reconciliation of profit of Cost & Financial Accounts.

Integrated & Non-Integrated Accounts

1) **Under non-integrated accounts** - 2 sets of books are maintained. Cost records are maintained separate while financial records are maintained separate. Most accounts are added with word "Control Account".
   Under Non-integrated Accounts, **We will make entries only for cost records** (Not for financial records).
2) **Under integrated accounts**, only 1 set of book is maintained & **entries are made both for cost and financial records** e.g. Financial entries like cash paid to creditor and cash received from debtors shall also be passed.

3 golden rules of accounting

1. Debit the receiver and credit the giver
2. Debit what comes in and credit what goes out
3. Debit all exp. & losses and credit all revenues & income

Name Changed as follows:-

1. Raw Material / Stores – Stores Ledger Control Account.
2. Wages – Wages Control Account.
3. Factory – WIP Ledger Control Account.
4. Warehouse – Finished goods Ledger control Account.
5. Shop – Cost of Sales Account

Particulars	Accounting Entries
On Transferring Direct Raw Material from store to Factory	WIP Ledger Control A/c Dr. To Stores Ledger Control A/c
On Transferring Finished Goods from factory to Warehouse	FG Ledger control A/c Dr. To WIP Ledger control A/c
On Transferring FG from Warehouse to Showroom	Cost of Sales A/c Dr. To Finished Goods Ledger control A/c
On transferring Actual cost of Sales to Costing P&L A/c	Costing P&L A/c Dr. To Cost of Sales A/c
GLA Accounts / Cost Ledger Control Account - **GLA account shall be used in place of account not opened while preparing cost sheet e.g. Cash, Debtors, Creditors etc.**	
On Purchase of raw material	Stores Ledger Control A/c Dr. To GLA A/c (In place of Cash /Creditors A/c)

Journal Entries relating to Material

	Transaction Entry – Material purchased on credit / cash	Transfer Entry - Issued

Direct Material to factory	Stores ledger Control A/c Dr.
	   To GLA A/c
		WIP Ledger Control A/c Dr.
		   To Stores ledger Control A/c

Indirect material at Factory / Admin. Office / Selling Office	Stores ledger Control A/c Dr.
	   To GLA A/c
		Factory OH Control A/c Dr.
		Office & Admin OH Control A/c Dr.
		Selling OH Control A/c Dr.
		   To Stores ledger Control A/c

Journal Entries relating to wages

	Transaction Entry – Wages Paid	Transfer Entry

Direct Wages to factory	Wages Control A/c Dr.
	   To GLA A/c
		WIP Ledger Control A/c Dr.
		   To Wages Control A/c
		(Wages incurred for production)

Indirect Wages at Factory / Admin. Office / Selling Office	Wages Control A/c Dr.
	   To GLA A/c
		Factory OH Control A/c Dr.
		Office & Admin OH Control A/c Dr.
		Selling OH Control A/c Dr.
		   To Wages Control A/c

Journal Entries relating to direct expenses

	Transaction Entry – Direct Exp. Paid	Transfer Entry

Direct Expenses for factory	Direct Exp. Control A/c Dr.
	      To GLA A/c
		WIP Ledger Control A/c Dr.
		      To Direct exp. control A/c

Journal Entries relating to Overheads

Particulars	Transaction Entry – Overheads Incurred	Transfer Entry – Overheads charged / Recovered

Factory Overheads	Factory OH Control A/c Dr.
	      To GLA A/c
		WIP Ledger Control A/c Dr.
		      To Factory OH Control A/c

Office &Admin Overheads	Office &Admin OH Control A/c Dr.
	      To GLA A/c
		FG Ledger Control A/c Dr.
		      To Admin OH Control A/c

Selling & dist. Overheads	Selling& dist. OH Control A/c Dr.
	      To GLA A/c
		Cost of Sales A/c Dr.
		      To Selling OH Control A/c

Following Important control accounts maintained

1. Stores Ledger control A/c
2. Wages control A/c
3. Factory OH control A/c
4. WIP Ledger control A/c
5. Admin OH control A/c
6. FG ledger control A/c
7. Selling OH control A/c
8. Cost of Sales A/c
9. Costing P&L A/c
10. GLA A/c

(a) **Opening balances** of raw material, WIP & Finished goods shall be shown on **debit side** of A/c and **closing balances** shall be shown on **credit side** of A/c.

(b) **Opening balance** of GLA A/c shall be shown on **credit side** and **closing balance** shall be shown on **debit side**.

Treatment of under and over recovery of overheads:-

Option 1 of Treatment:- Carry Forward Next Year & Adjust against Next Year
- **No Accounting Entry** is made for this.

Option 2 of Treatment:- Charge in Current Year
- Journal Entry for Under – Recovery (Loss)

  Costing P&L A/c   Dr.   XXX

       To Factory OH / Admin OH / Selling & Dist. OH A/c   XXX

Note 1:- Just reverse entry for over-recovery.

Note 2:- If in question, **opening balances of overheads** are given, it means option 1 is followed by company.

Shortage in raw material
- When raw material balance on physical checking is found to be less than raw material balance as per books then difference is called shortage.
- Treatment as follows:-

If shortage is due to normal loss	Factory OH A/c Dr. To Stores Ledger Control A/c
If shortage is due to abnormal loss	Costing P&L A/c Dr. To Stores Ledger Control A/c
If shortage is due to non-recording of actual consumption	WIP Ledger control A/c Dr. To Stores Ledger Control A/c

  Note:- In case of surplus, just reverse the entries.

ILLUSTRATION 1 – Page 9
As of 31st March, the following balances existed in a Firm's Cost Ledger:

Account Head	Debit Rs.	Credit Rs.
Stores Ledger Control A/c	3,01,435	-
Work-in-Progress 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
Total	**6,75,745**	**6,75,745**

During the next three month the following items arose -

Transaction	Rs.	Transaction	Rs.
Finished Product (at Cost)	2,10,835	Cost of Sales	1,85,890
Manufacturing OH Incurred	91,510	Materials issued to Production	1,27,315

Raw Material Purchased	1,23,000	Sales Returned (at Cost)	5,380
Factory Wages	50,530	Materials returned to Suppliers	2,900
Indirect Labour	21,665	Manufacturing OH 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.

Solution:-

	Rs.		**Debit**	**Credit**
Stores Ledger Control A/c	3,01,435		Opening bal. shown on debit side	
Work-in-Progress Control A/c	1,22,365		Opening bal. shown on debit side	
Finished Stock Ledger Control A/c	2,51,945		Opening bal. shown on debit side	
Manufacturing Overhead Control A/c	10,525			Opening Bal. shown on credit side Since credit balance
Cost Ledger Control A/c **(CLC / GLA)**	6,65,220			Opening bal. shown on Credit side
Finished Product (at Cost)	2,10,835		FG ledger control A/c	WIP Ledger control A/c
Manufacturing OH Incurred	91,510		Factory OH Control A/c	GLA A/c
Raw Material Purchased	1,23,000		Stores ledger control A/c	GLA A/c
Factory Wages	50,530	6 -- Paid	Wages control A/c	GLA A/c
		6 – Allocated	WIP Ledger control A/c	Wages Control A/c
Indirect Labour	21,665	6 – Paid	Wages control A/c	GLA A/c
		6 – Allocated	Factory OH control A/c	Wages Control A/c
Cost of Sales	1,85,890		Cost of Sales A/c	FG Ledger control A/c
Materials issued to Production	1,27,315		WIP Ledger control A/c	Stores ledger control A/c

Sales Returned (at Cost)	5,380	(Reversal of return of Cost of Sales)	FG Ledger control A/c	Cost of Sales A/c
Materials returned to Suppliers	2,900	(Reversal of Material Purchased)	GLA A/c	Stores ledger control A/c
Manufacturing OH Charged to Production	77,200		WIP Ledger control A/c	Factory OH control A/c

Stores ledger control A/c

Particulars	Amt	Particulars	Amt
To bal. b/d	3,01,435	By WIP Ledger control A/c	1,27,315
To GLA A/c	1,23,000	By GLA A/c	2,900
		By bal. c/d **(DOB)**	2,94,220
	4,24,435		**4,24,435**

Note:- DOB Rs. 2,94,220 as closing balance of Raw Material.

Wages control A/c

Particulars	Amt	Particulars	Amt
To GLA A/c	50530	By WIP Ledger control A/c	50,530
To GLA A/c	21665	By manufacturing OH control A/c	21,665
	72,195		**72,195**

Note:- No DOB

Manufacturing OH control A/c

Particulars	Amt	Particulars	Amt
To GLA A/c	91,510	By bal. b/d	10,525
To wages control A/c	21,665	By WIP Ledger control A/c	77,200
		By bal. c/d**(DOB)**	25,450
	1,13,175		**1,13,175**

Note:- DOB as Rs. 25,450 to be transferred to next year hence will be shown in Trail Balance.

WIP Ledger control A/c

Particulars	Amt	Particulars	Amt
To bal. b/d	1,22,365	By FG ledger control A/c	2,10,835
To wages control A/c	50,530	By bal. c/d **(DOB)**	1,66,575
To manufacturing OH control A/c	77,200		
To stores ledger control A/c	1,27,315		
	3,77,410		**3,77,410**

Note:- DOB Rs.1,66,575 as closing balance of WIP.

FG Ledger control A/c

Particulars	Amt	Particulars	Amt
To bal. b/d	2,51,945	By cost of sales A/c	1,85,890
To WIP Ledger control A/c	2,10,835	By bal. c/d**(DOB)**	2,82,270
To cost of sales A/c	5,380		
	4,68,610		**4,68,610**

Note:- DOB Rs.2,82,270 as closing balance of FG.

Cost of Sales A/c

Particulars	Amt	Particulars	Amt
To FG Ledger control A/c	1,85,890	By FG ledger control A/c	5,380
		By bal. c/d**(DOB)**	1,80,510
	1,85,890		**1,85,890**

Note:- DOB as Rs.1,80,510 as closing balance of Cost of Sales.

GLA A/c

Particulars	Amt	Particulars	Amt
To stores ledger control A/c	2,900	By bal. b/d	6,65,220
To bal. c/d**(DOB)**	9,49,025	By manufacturing OH control A/c	91,510
		By stores ledger control A/c	1,23,000
		By wages control A/c	72,195
	9,51,925		**9,51,925**

Note:- DOB of Rs.9,49,025as closing balance of GLA A/c.

Trial balance

Particulars	Dr.	Cr.
Stores ledger control A/c	2,94,220	
WIP Ledger control A/c	1,66,575	
FG Ledger control A/c	2,82,270	
GLA A/c		9,49,025
Manufacturing OH control A/c	25,450	
Cost of Sales A/c	1,80,510	
	9,49,025	**9,49,025**

ILLUSTRATION 3 – Page 20 – Integrated Accounts

JOURNALISE the following transactions assuming that cost and financial transactions are integrated:

	(Rs.)

Raw materials purchased	2,00,000
Direct materials issued to production	1,50,000
Wages paid (30% indirect)	1,20,000
Wages charged to production	84,000
Manufacturing expenses incurred	84,000
Manufacturing overhead charged to production	92,000
Selling and distribution costs	20,000
Finished products (at cost)	2,00,000
Sales	2,90,000
Closing stock	Nil
Receipts from debtors	69,000
Payments to creditors	1,10,000

SOLUTION

Transaction	Rs.	Debit	Credit
Raw Material Purchased	2,00,000	Store Ledger Control A/c	To Cash / Creditors A/c
Direct materials issued to production	1,50,000	WIP Control A/c	To Store Ledger Control A/c
Wages paid (30% indirect)	1,20,000	Wages Control A/c	To Bank A/c
Wages charged to production			
• Direct Wages 70%	84,000	WIP Control A/c	To Wages Control A/c
• Indirect Wages 30%	36,000	Factory OH Control A/c	To Wages Control A/c
Manufacturing expenses incurred	84,000	Factory OH Control A/c	To Bank A/c
Manufacturing overhead charged to production	92,000	WIP Control A/c	To Factory OH Control A/c
Selling and distribution costs	20,000	Selling & Dist. OH Control A/c	To Bank A/c
Finished products (at cost) – **TF from Factory to Warehouse – Cost of Goods Produced**	2,00,000	FG Ledger Control A/c	To WIP Control A/c

Special Entry -

Cost of Sales A/c Dr.   2,20,000

        To Finished Goods Control A/c   2,00,000

        To Selling & Dist. OH Control A/c   20,000

(**Being** Cost of Sales = Cost of Goods Sold + Selling & Dist. OH)

Sales	2,90,000	Bank A/c	To Sales A/c
Receipts from debtors	69,000	Bank A/c	To Debtors A/c
Payments to creditors	1,10,000	Creditors A/c	To Bank A/c

RECONCILIATION OF PROFIT UNDER COST & FINANCIAL ACCOUNTS

Reasons why profit under cost records & financial records are different

1) **Different basis of Overheads**
   - In Costing – Overheads absorbed are shown
   - In Trading – Actual Overheads incurred are shown.

2) **Closing stock valuation**
   - In Costing – Cl. Shock at cost
   - In Trading – Cost or Market Price whichever is lower

3) **Depreciation on machine**
   - In Costing – based on life of machine or machine hours
   - In Trading – SLM Or WDV

4) **Some Financial Items only in financial** e.g. Interest income, Dividend Income, Rental Income

How Calculate Profit

- Under Costing -- Just make Cost Sheet and Reduce total cost from Total Sales
- Under Financial – Make Trading and Profit & loss Account

A **Reconciliation statement** shall be prepared in following manner:-

Particulars	Plus Items	Minus Items
Profit / Loss as per cost Records		
Add:- Items demanding addition should be added here in plus items heading		
Less:- Items demanding deletion should be deducted here in minus items heading		
Total (Make Total of both the columns i.e. "Plus items and Minus Items"		
Profit/Loss as per financial records (Rs. XXX – Rs. XXX) = Rs. XXX		

Memorandum Reconciliation Account
- All Plus Column Items ----- Credit Side of MRA
- All Minus Column Items ---- Debit Side of MRA
- Difference shall be profit / loss as per financial records.

Special Approach – DCP approach covered in classes

Example to Decide Addition/Deletion
Expense Side

	Amount (Rs.)	Implication **(Other Items Assumed Constant)**
An Exp. Charged in Cost	50,000	Profit as per costing will be less by Rs.10000
Same Exp. Charged in Trading	40,000	Profit as per financial will be more by Rs.10000
Difference	10,000	

Treatment
- If we use costing profit as starting point then we need to **Add Rs.10000**
- If we use trading profit as starting point then we need to **Reduce Rs.10000**

Revenue Side

	Amount (Rs.)	Implication **(Other Items Assumed Constant)**
An Revenue Item in Cost	Zero	Profit as per costing will be less by Rs.10000
Same Revenue Item in Finan.	10,000	Profit as per financial will be more by Rs.10000
Difference	10,000	

Treatment

- If we use costing profit as starting point then we need to **Add Rs.10000**
- If we use trading profit as starting point then we need to **Reduce Rs.10000**

ILLUSTRATION 8 – Page 36

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 Overhead	16,00,000
General Administration 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

TRADING AND PROFIT & LOSS ACCOUNT *(AS PER FINANCIAL RECORDS)*

Particulars	Rs.	Particulars	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 Stocks:	
To Factory Overheads	16,00,000	WIP	2,40,000
To Administration Overheads	7,00,000	Finished Goods (4,000 units)	3,20,000
To Selling and Distribution 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		
	1,26,80,000		1,26,80,000

STATEMENT OF COST AND PROFIT *(AS PER COST RECORDS)*

Particulars	Rs.
Direct Material	56,00,000
Direct Wages	30,00,000
Prime Cost	**86,00,000**
Factory Overheads (20% of prime cost)	17,20,000
Less : Closing Stock (WIP) – Assumed Same	(2,40,000)
Works Cost (124000 units)	**1,00,80,000**
Cost of Goods produced (1,24,000 units)	**1,00,80,000**
Less : Finished Goods (4,000 units @ Rs. $\frac{10080000}{124000\ units}$)	(3,25,160)
Cost of goods sold (1,20,000 units)	**97,54,840**
General Admin. Overheads (120000 units x Rs.6)	7,20,000
Selling and Distribution Overheads @ Rs. 8 on 1,20,000 units	9,60,000
Cost of Sales	**1,14,34,840**
Net Profit *(Balancing figure)*	5,65,160
Sales Revenue	**1,20,00,000**

RECONCILIATION STATEMENT

Particulars	Plus Items	Minus Items
Profit as per Cost Records	5,65,160	
Add: Excess of Material Consumption	6,00,000	
Over-recovery of Factory Overhead	1,20,000	
Over-recovery of Administration Overhead	20,000	
Dividend Received excluded from Cost Accounts	1,00,000	
Interest Received excluded from Cost Accounts	20,000	
Less : Bad debts excluded from Cost Accounts		80,000
Preliminary Expenses written off excluded from Cost A/cs		40,000
Legal Charges excluded from Cost Accounts		10,000
Overvaluation of Closing Stock in Cost Accounts		
(Rs. 3,25,160 – Rs. 3,20,000)		5,160
Total	**14,25,160**	**1,35,160**
Profit as per financial records (Rs. 14,25,160 – Rs. 1,35,160) i.e. Rs. 12,90,000		

Question 6 – Page 49

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. 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:

(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.

Particulars	Amount	Particulars	Amount
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 Dep. overcharged in costs	10,000
To Income-tax not provided in costs	1,20,000	By Interest on invest-ments 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

UNIT & BATCH COSTING

Concept – Unit costing

Unit costing is that method of costing where the output produced is identical and each unit of output requires identical cost.

Cost Per unit = $\frac{\text{Total Cost}}{\text{Total No.of Units Produced}}$

ILLUSTRATION 1 – Page 5

The following data relate to the manufacture of a standard product during the 4- week ended 28th February:

Raw Materials Consumed	Rs. 4,00,000
Direct Wages	Rs. 2,40,000
Machine Hours Worked	3,200 hours
Machine Hour Rate	Rs. 40
Office Overheads	10% of works cost
Selling Overheads	Rs. 20 per unit
Units produced and sold	10,000 at Rs. 120 each

You are required to FIND OUT the cost per unit and profit for the 4- week ended 28th February.

SOLUTION Statement of Cost per Unit (No. of units produced: 10,000 units)

Particulars	Cost per unit (Rs.)	Amount (Rs.)
Raw Materials Consumed	40.00	4,00,000
Direct Wages	24.00	2,40,000
Prime cost	64.00	6,40,000
Add: Manufacturing Overheads (3,200 hours × Rs. 40)	12.80	1,28,000
Works cost	76.80	7,68,000
Add: Office Overheads (10% of Works Cost)	7.68	76,800
Cost of goods sold	84.48	8,44,800
Add: Selling Overheads (10,000 units × Rs. 20)	20.00	2,00,000
Cost of sales / Total cost	104.48	10,44,800
Add: Profit (Bal Figure)	15.52	1,55,200
Sales	120.00	12,00,000

Concept – Batch costing

Batch Costing is a type of specific order costing where articles are manufactured in predetermined lots, known as batch.

Cost Per Batch = $\frac{\text{Total cost}}{\text{Total No.of Batches}}$

ILLUSTRATION 3 – Page 8

Arnav Confectioners (AC) owns a bakery which is used to make bakery items like pastries, cakes and muffins. AC use to bake atleast 50 units of any item at a time. A customer has given an order for 600 muffins. To process a batch of 50 muffins, the following cost would be incurred:

Direct materials-   Rs. 500
Direct wages-   Rs. 50

Oven set- up cost   Rs. 150

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

AC requires a profit margin of 25% of sales value. DETERMINE the selling price for 600 muffins.

SOLUTION   **Statement of cost per batch and per order**

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

Particulars	Cost per batch (Rs.)	Total Cost (Rs.)
Direct Material Cost	500	6,000
Direct Wages	50	600
Oven set-up cost	150	1,800
Add: Production Overheads (20% of Direct wages)	10	120
Total Production cost	710	8,520
Add: S&D and Administration overheads (10% of Total production cost)	71	852
Total Cost	781	9,372
Add: Profit (1/3rd of total cost)	260.33	3,124
Selling price	1,041.33	12,496

Concept – Economic Batch Quantity (EBQ)

Economic batch quantity is the size of a batch where total cost of set-up and holding costs are at minimum.

$$E.B.Q = \sqrt{\frac{2 \times \text{Annual Demand} \times \text{Set up cost per batch}}{\text{Cost of carrying per unit of production per annum}}}$$

ILLUSTRATION 5 – Page 12

Monthly demand for a product	500 units
Setting-up cost per batch	Rs. 60
Cost of manufacturing per unit	Rs. 20
Rate of interest	10% p.a.

DETERMINE **economic batch quantity**.

SOLUTION

$$\text{EBQ} = \sqrt{\frac{2 \times \text{Annual Demand} \times \text{Set up cost per batch}}{\text{Cost of carrying per unit of production per annum}}} = \sqrt{\frac{2 \times 500 \text{ units} \times 12 \text{ months} \times \text{Rs.}60}{\text{Rs.}20 \times 10\%}} = \textbf{600 units}$$

ILLUSTRATION 6 – Page 12

M/s. KBC Bearings Ltd. is committed to supply 48,000 bearings per annum to M/s. KMR Fans on a steady daily basis. It is estimated that it costs Rs. 1 as inventory holding cost per bearing per month and that the set up cost per run of bearing manufacture is Rs. 3,200.

(i) DETERMINE the optimum run size of bearing manufacture?
(ii) STATE what would be the interval between two consecutive optimum runs?
(iii) FIND OUT the minimum inventory cost?

SOLUTION

(i) Optimum batch size or Economic Batch Quantity (EBQ):

$$E.B.Q = \sqrt{\frac{2 \times \text{Annual Demand} \times \text{Set up cost per batch}}{\text{Cost of carrying per unit of production per annum}}}$$

$$E.B.Q = \sqrt{\frac{2 \times 48,000 \text{ units} \times \text{Rs.}3200}{\text{Rs.}12}} = 5060 \text{ units}$$

(ii) Number of Optimum runs = 48,000 ÷ 5,060 = 9.49 or 10 run

Interval between 2 runs (in days) = 365 days ÷ 10 Run = 36.5 days

(iii) Minimum Inventory Holding Costs (Carrying Cost) = Average Inventory × Inventory Carrying Cost per unit per annum

Average Inventory (EBQ/2) = 5,060 units ÷ 2 = 2,530 units

Carrying Cost per unit per annum= Rs. 1 × 12 months = Rs. 12

Minimum Inventory Holding Costs = 2,530 units × Rs. 12 = Rs. 30,360

JOB AND CONTRACT COSTING

Concept – Job Costing

Accounting Entries – Page 8 & 9 – [Covered in Chapter "Cost Accounting System"]

ILLUSTRATION 2 – Page 10

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

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

Analysis of the Profit/Loss Account (for the Current financial year)

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

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 current year 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 (Rs.)
Direct materials	70
Direct wages:	
Deptt. X Rs. 2.50 × 8 hrs. = Rs. 20.00	
Deptt. Y Rs. 2.50 × 6 hrs. = Rs. 15.00	
Deptt. Z Rs. 2.50 × 4 hrs. = Rs. 10.00	45
Chargeable expenses	5
Prime cost	**120**
Overheads:	
Deptt. X = $\frac{Rs.5,000}{Rs.10,000} \times 100$ = 50% of Rs. 20 = Rs. 10.00	
Deptt. Y = $\frac{Rs.9,000}{Rs.12,000} \times 100$ = 75% of Rs. 15 = Rs. 11.25	
Deptt. Z = $\frac{Rs.2,000}{Rs.8,000} \times 100$ = 25% of Rs. 10 = Rs. 2.50	23.75
Works cost	**143.75**
Selling expenses = $\frac{20000}{2,00,000} \times 100$ = 10% of Works Cost	14.38
Total cost	158.13
Profit (20% of total cost)	31.63
Selling price	**189.76**

Concept – Contract Costing
- There are 2 parties in a contract i.e. A **contractor** and A **contractee**. Contractor is the person who **undertakes** the contract and contractee is the person who **gives** the contract.
- **Value of work certified**:- It is expressed as a % of the contract price.
  Example:- If contract price is Rs. 10 Lakh & work certified is 60% then value of work certified shall be 6 lakh (contract price x work certified as %)

- **Retention money**:- it is that portion of value of work certified which has not been paid by contractee and kept as security money for future defective work.

  Retention money = Value of work certified – Cash received by contractor
  Example:- suppose in above example, if Rs. 5 Lakh has been paid by contractee to contractor then retention money shall be 1 lakh.

- **Cost of work uncertified** = Total cost incurred till date – Cost of work certified
- **Estimated Total Profit** = Total Contract Price – Estimated Total Cost
- **Estimated Total Cost** = Cost of Contract upto date + Costs to be incurred

Treatment of notional loss and estimated total loss
- **Notional loss** shall arise when cost of work certified is more than value of work certified.
- **Estimated total loss** shall arise when total estimated cost of contract is more than total contract price.
- Excess of estimated total loss over and above notional loss is called **anticipated loss**.
- The whole amount of **notional loss and anticipated loss** shall be recognized **as loss** & TF to costing P&L A/c.

Escalation clause:- under this clause of a contract, rise in price of material and labour beyond standard price fixed is paid by contractee as extra amount along with contract price. Formula to Calculate escalation:-
  For Material:- Standard quantity x (Actual Price – Std. Price)
  For Labour:- Standard labour hours x (Actual Price – Standard Price)

Contract A/c

Particulars	Rs.	Particulars	Rs.
To Materials Issued to site	XXX	By Materials at site (Closing Stock)	XXX
To Wages incurred (Paid + O/s – Prepaid)	XXX	By Materials returned from site i.e. returned to stores	XXX
To Direct Expenses (Paid + O/s – Prepaid)	XXX	By Bank A/c (Sale of Materials)	XXX
To Depreciation on Plant &Equipments	XXX	By Costing P&L A/c (Loss on sale)	XXX
To Office & Adm. Exp. Incurred(Paid + O/s – Prepaid)	XXX	By Work-in-progress	
To Costing Profit & Loss A/c	XXX	— Value of Work certified (**Like Sale**)	XXX
		— Cost of Work Uncertified (**Like closing stock)**	XXX
	XXX		**XXX**

Balance Sheet (Extract)

Liabilities	Rs.	Assets	Rs.
Capital	XXX	Land & Building (*Less:* Depreciation)	**XXX**
Profit & Loss A/c	XXX	Plant & Equipment (*Less:* Depreciation):	**XXX**
Outstanding Expenses	XXX	**Materials** : ———	
Contractee Cr. Balance	XXX	At Stores	**XXX**
		At Site	**XXX**
		Work-in-progress :	
		Value of work certified .... **XXX**	
		Cost of work uncertified .... **XXX**	**XXX**
		Cash & Bank Balance	**XXX**
		Prepaid Expenses	**XXX**

Illustration 4 – Page 20

The following expenses were incurred on a contract :

	(Rs.)
Material purchased	6,00,000
Material drawn from stores	1,00,000
Wages	2,25,000
Plant issued	75,000
Chargeable expenses	75,000
Apportioned indirect expenses	25,000

The contract was for Rs. 20,00,000 and it commenced on April 1, 2020. The value of the work completed and certified upto 28th February, 2021was Rs. 13,00,000 of which Rs. 10,40,000 was received in cash, the balance being held back as retention money by the contractee. The value of work completed subsequent to the architect's certificate but before 31st March, 2021 was Rs.60,000. There were also lying on the site materials of the value of Rs.40,000. It was estimated that the value of plant as at 31st March, 2021 was Rs. 30,000.

You are required to compute value of work certified, cost of work not certified and notional profit on the contract till the year ended 31st March 2021.

SOLUTION   **Contract Account**

Particulars	Amt (Rs.)	Particulars	Amt (Rs.)
To Material purchased	6,00,000	By Work-in-progress :	
To Stores issued	1,00,000	Work certified	13,00,000
To Wages	2,25,000	Work uncertified	60,000
To Plant	75,000	Material unused	40,000
To Chargeable expenses	75,000	Plant less depreciation	30,000
To Indirect expenses	25,000		
To Notional Profit (Costing P&L Account)	330000		
	14,30,000		**14,30,000**

Illustration 5 – Page 21

A contractor prepares his accounts for the year ending 31st March each year. He commenced a contract on 1st July, 2020.

The following information relates to the contract as on 31st March, 2021:

	(Rs.)
Material issued	2,51,000
Labour charges	5,65,600
Salary to Foreman	81,300

A machine costing Rs. 2,60,000 has been on the site for 146 days, its working life is estimated at 7 years and its final scrap value at Rs. 15,000.

A supervisor, who is paid Rs. 8,000 p.m. has devoted one-half of his time to this contract.

All other expenses and administration charges amount to Rs. 1,36,500.

Material in hand at site costs Rs. 35,400 on 31st March, 2021.

The contract price is Rs. 20,00,000. On 31st March, 2021 two-third of the contract was completed. The architect issued certificates covering 50% of the contract price, and the contractor had been paid Rs. 7,50,000 on account.

Prepare Contract A/c and show how much profit or loss should be included in financial accounts to 31st March, 2021.

Solution   **Contract Account**

Particulars	Amt (Rs.)	Particulars	Amt (Rs.)
To material issued	251000	By material in hand	35400
To labour	565600	By work certified	10,00,000
To foreman salary	81300	By work uncertified	2,62,250
To dep. On machine	14000		
To supervisor salary (Rs. 8000 x 9 x 50%)	36000		
To Adm. Changes	136500		
To Notional Profit (Costing P&L A/c)	213250		
	12,97,650		**12,97,650**

Working Notes :

1. Dep. On Machine : [(Rs. 2,60,000 –Rs 15,000)÷7] x $\frac{146}{365}$ = Rs.14,000

2. 2/3rd contract completed hence cost incurred to complete 2/3rd contract = Rs. 10,49,000

   Estimated total cost for full contract = $\frac{1049000}{2/3}$ = 15,73,500
   Cost of 50% certified contract = 1573500 x 50% = Rs. 786750
   Balance 50% uncertified cost = 1049000 – 786750 = Rs. 2,62,250

PROCESS & OPERATION COSTING

Basic Concept – Process Costing

Following A/cs are prepared in process costing:-
1. Process A/c
2. Finished goods A/c
3. Normal loss A/c
4. Abnormal loss A/c
5. Abnormal gain A/c
6. P&L Account
7. Any other A/c as required in question.

Process Account

Particulars	Units	Amount	Particulars	Units	Amount
To material input	XX	XX	By normal loss A/c	XX	= Scrap value
To All Expenses incurred		XX	By abnormal loss A/c	XX	= Cost of good units
To Rectification cost of normal loss units		XX	By Next process A/c (units TF to next process)	XX	= Cost of good units
To Abnormal gain A/c	XX	= Cost of good units	By finished goods A/c (units held as stock + units sold in mkt)	XX	= Cost of good units
	XXX	**XXX**		**XXX**	**XXX**

Finished goods A/c / Finished stock A/c

Particulars	Units	Amount	Particulars	Units	Amount
To process A/c (TF from process A/c)	XX	= Cost of good units	By Sales	XX	= Sale value
To P&L A/c		Profit on sale	By balance C/d	XX	= Cost of good units
	XXX	**XXX**		**XXX**	**XXX**

Normal loss A/c

Particulars	Units	Amount	Particulars	Units	Amount
To process A/c (TF from process A/c)	XX	=scrap value	By Bank A/c (Note 1)	XX - abnormal gain units	=scrap value
			By abnormal gain A/c	XX	= Bal. Fig.
	XXX	**XXX**		**XXX**	**XXX**

Note 1:- Sale of normal loss units cannot exceed actual loss units.

Abnormal loss A/c

Particulars	Units	Amount	Particulars	Units	Amount
To process A/c (TF from process A/c)	XX	= cost of good units	By Bank A/c	XX	=scrap value
			By P&L A/c		= Bal. Fig.
	XXX	**XXX**		**XXX**	**XXX**

Abnormal gain A/c

Particulars	Units	Amount	Particulars	Units	Amount
To normal loss A/c (TF from normal loss A/c)	XX	XX	By process A/c (TF from process A/c)	XX	= cost of good units
To P&L A/c		= Bal. Fig.			
	XXX	**XXX**		**XXX**	**XXX**

Types of Losses: - 2 types of losses arise in process costing:-

1. **Normal loss**:- loss which arise generally. Suppose 10,000 units are introduced in process & 2% is normal loss then 200 units will be normal loss units.
2. **Abnormal loss**:- if Actual loss is above normal loss. If in above example, 300 units are lost in processing then 100 units are abnormal loss.

Sometimes actual loss is less than normal loss. If in above example, only 150 units are lost in processing then 50 units are treated as **abnormal gain**.

ILLUSTRATION 2 – Page 11

A product passes through three processes. The output of each process is treated as the raw material of the next process to which it is transferred and output of the third process is transferred to finished stock.

	Process-I (Rs.)	Process-II (Rs.)	Process-III (Rs.)
Materials issued	40,000	20,000	10,000
Labour	6,000	4,000	1,000
Manufacturing overhead	10,000	10,000	15,000

10,000 units have been issued to the Process-I and after processing, the output of each process is as under:

Process	Output	Normal Loss
Process-I	9,750 units	2%
Process-II	9,400 units	5%
Process-III	8,000 units	10%

No stock of materials or of work-in-process was left at the end. CALCULATE the cost of the finished articles.

SOLUTION Statement showing normal loss, abnormal loss and abnormal gain (units)

Particulars	Process 1	Process 2	Process 3
Actual output (units) (A)	9750	9400	8000
Actual Input (inputs)	10000	9750	9400
Less Normal loss	(200)	(488)	(940)
	(2%)	(5%)	(10%)
Normal output (units) (B)	**9800**	**9262**	**8460**
Normal loss (units)	(200)	(488)	(940)
Abnormal loss/gain (units) (A-B)	(50)	138	(460)
Actual loss (units)	**(250)**	**(350)**	**(1400)**
Input cost (Input x cost p.u.)	40000	55714 (9750 units x Rs. 5.7142)	91051 (9400 units x Rs.9.6861)
Add Other direct cost	6000+10000 = 16000	20000+4000+10000 =34000	10000+1000+15000 =26000
Less scrap value of normal loss (units x scrap value p.u.)	NIL	NIL	NIL
Net Cost	**56000**	**89714**	**117051**
Cost per good unit (A/B)	**5.7142**	**9.6861**	**13.8356**

1st Process Account

Particulars	Units	Total (Rs.)	Particulars	Units	Total (Rs.)
To Material	10,000	40,000	By Normal Loss A/c	200	-
To Labour	--	6,000	By Abnormal Loss	50	286
To Mfd OH	-	10,000	By 2nd Process A/c	9,750	55,714
	10,000	**56,000**		**10,000**	**56,000**

2nd Process Account.

Particulars	Units	Total (Rs.)	Particulars	Units	Total (Rs.)
To 1st Process A/c	9,750	55,714	By Normal Loss A/c	488	-
To Material	--	20,000	By 3rd Process A/c	9,400	91,051
To Labour	--	4,000			
To Mfd OH	--	10,000			
To Abnormal Gain	138	1,337			
	9,888	**91,051**		**9,888**	**91,051**

3rd Process Account

Particulars	Units	Total (Rs.)	Particulars	Units	Total (Rs.)
To 2nd Process A/c	9,400	91,051	By Normal Loss A/c	940	-
To Material	--	10,000	By Abnormal Loss	460	6,364

To Labour	--	1,000	By Finished Stock A/c	8,000	1,10,687
To Mfd OH	--	15,000			
	9,400	1,17,051		9,400	1,17,051

Concept - Prepare process A/c when Opening & closing WIP (not 100% complete) is given cost item wise.

We need to prepare **additional 3 statements** as follows:-

Statement 1: Prepare Statement of Equivalent Production
Statement 2: Prepare Statement of Cost per Equivalent Unit
Statement 3: Prepare Statement of Evaluation

St. of equivalent production

Equivalent production units (EPU) = No. of units x degree (%) of completion **performed in current period**
EPU is calculated separately for each element of cost e.g. material, labour &OH because % of completion with regard to each element of cost is different.

Example: Suppose 900 units are incomplete at end of year (Closing WIP) & degree of completion is:
Material 80%, Labour 70%, Overheads 30% then EPU of closing WIP shall be
- ✓ EPU for material cost = 900 units x 80% = 720 units
- ✓ EPU for labour cost = 900 units x 70% = 630 units
- ✓ EPU for OH Cost = 900 units x 30% = 270 units

Explanation:-

- ✓ Material cost of 900 incomplete units = material cost of 720 completed units.
- ✓ Labour cost of 900 incomplete units = labour cost of 630 completed units.
- ✓ OH cost of 900 incomplete units = overheads of 270 completed units.

Input	Units	Output	Case 1 – Units	Case 2 – Units
Opening WIP	2000	Opening WIP Now Completed	2000	2000
Units introduced in current Year	10000	Units introduced in current period & completed	8000	8000
		Closing WIP	1000	1500
		Normal loss 8% of current period input	800	800
		Abnormal loss	200 (Bal. F.)	
		Abnormal Gain		(300) (Bal.)
Total	**12000**	**Total**	**12000**	**12000**

Degree (%) of completion performed in current period shall be
- ▪ (100% - degree of completion **performed in previous period**) for Opening WIP.
- ▪ 100% for units introduced in current period and completed
- ▪ As given in question for closing WIP
- ▪ Always ZERO for normal loss units

- As given in question for abnormal loss units. (100% if not given in question)
- Always 100% for abnormal gain units

Calculation of Normal loss Units

In exam Normal loss may be given as a % of Current Input, Total Input, Production or Units Processed.

Opening WIP	XXX	
Add:- Units Introduced	XXX	- Also Called Current Input
Total input units	XXX	
Less:- Closing Stock	(XXX)	
Units Processed / Production	XXX	

St. of cost per equivalent production

Material cost per equivalent unit, labour cost per equivalent unit and overhead cost per equivalent unit is calculated

Formula = $\dfrac{Total\ cost}{Total\ equivalent\ units}$

St. of evaluation

Cost of units completed, closing WIP, abnormal loss units and abnormal gain units is calculated
Formula = No. of equivalent units x cost per equivalent unit.

Method 1 FIFO METHOD

FIFO means units transferred as 100% complete shall comprise all opening WIP and balance from units introduced in current period. Units Transferred = Opening WIP + Units Introduced and completed

Total Cost of units Transferred to next process = Cost incurred in previous period on opening WIP + Cost incurred in current period on Opening WIP + Cost incurred in current period on units introduced & completed

Statement 1 -> Statement of Equivalent Production:-

Input		Output		Material		Labour		Overheads	
Particulars	Units	Particulars	Units	% Completion	Units	% Completion	Units	% Completion	Units
Opening WIP	XXX	Opening WIP completed	XXX	XXX *	XXX - 1	XXX *	XXX - 2	XXX *	XXX - 3
Units introduced	XXX	Units introduced and completed [Units Transferred – Op.WIP]	XXX	100%	XXX - 4	100%	XXX - 5	100%	XXX - 6
		Closing **WIP**	XXX	XXX	XXX - 7	XXX	XXX - 8	XXX	XXX - 9
		Normal loss	XXX	---	----	----	----	----	----

		Abnormal Loss	XXX	XXX	XXX - 10	XXX	XXX - 11	XXX	XXX - 12
		Abnormal Gain	(XXX)	100%	(XXX) - 13	100%	(XXX) – 14	100%	(XXX) - 15
Total	**XXX**	**Total**	**XXX**		**XXX –16**		**XXX –17**		**XXX - 18**

*100% – Degree of Completion of Opening WIP in previous period

Statement 2 Statement of Cost per Equivalent unit

Particulars	Net Material cost (Rs) *	Labour Cost (Rs.)	Overheads (Rs.)
Cost (Rs.) (A)	XXX	XXX	XXX
Equivalent units (B)	XXX - 16	XXX --- 17	XXX --- 18
Cost per equivalent unit (A/B)	XXX - 19	XXX --- 20	XXX --- 21

* Net Material Cost = Material Cost – Scrap Value of Normal Loss

Statement3 Statement of Evaluation:

Particulars	Cost Elements	Equivalent Units A	Cost per Equivalent UnitRs. B	Cost of Equivalent UnitsRs (A x B)	TotalRs. (A X B)
Opening WIP					
Cost incurred inprevious period				XXX	
Cost incurred in current period :	Material	XXX - 1	XXX –19	XXX	
	Labour	XXX - 2	XXX –20	XXX	
	Overhead	XXX - 3	XXX - 21	XXX	
Units introduced & completed	Material	XXX - 4	XXX – 19	XXX	
	Labour	XXX - 5	XXX – 20	XXX	
	Overhead	XXX - 6	XXX - 21	XXX	
Total Cost of Units t/f to next process:					XXX - 22
Closing WIP	Material	XXX - 7	XXX – 19	XXX	
	Labour	XXX - 8	XXX – 20	XXX	
	Overhead	XXX - 9	XXX - 21	XXX	XXX - 23
Abnormal Loss	Material	XXX - 10	XXX – 19	XXX	
	Labour	XXX - 11	XXX – 20	XXX	
	Overhead	XXX – 12	XXX - 21	XXX	XXX - 24
Abnormal gain	Material	XXX – 13	XXX – 19	XXX	
	Labour	XXX – 14	XXX – 20	XXX	
	Overhead	XXX – 15	XXX - 21	XXX	XXX - 25

Process Account

Particulars	Units	Rs.	Particulars	Units	Rs.

To Opening WIP	XXX	XXX	By Normal Loss	XXX	Scrap Value
To Direct Material		XXX	By Abnormal Loss	XXX	XXX - 24
To Direct Labour		XXX	By Process II A/c (Transfer to next process)	XXX	XXX - 22
To Factory Overheads		XXX	By Closing WIP	XXX	XXX - 23
To abnormal gain	XXX	XXX - 25			
	XXX	**XXX**		**XXX**	**XXX**

Method 2 – Weighted Average Method

Average method is used when it is not possible to identify opening WIP units in units transferred to next process

Average cost per equivalent unit is calculated

$$= \frac{\text{Cost incurred in previous period on Opening WIP} + \text{Cost Incurred in current period} - \text{Scrap value of normal loss units}}{\text{Total Equivalent Units}}$$

Total Cost of units Transferred to next process = Equivalent Units x Average Cost per unit

Statement 1 -> Statement of Equivalent Production:-

Input		Output		Material		Labour		Overheads	
Particulars	Units	Particulars	Units	% Completion	Units	% Completion	Units	% Completion	Units
Opening WIP	XXX	Units transferred to next process	XXX	100%	XXX - 4	100%	XXX - 5	100%	XXX - 6
Units introduced	XXX	Closing WIP	XXX	XXX	XXX - 7	XXX	XXX - 8	XXX	XXX - 9
		Normal loss	XXX	---	----	----	----	----	----
		Abnormal Loss	XXX	XXX	XXX - 10	XXX	XXX - 11	XXX	XXX - 12
		Abnormal Gain	(XXX)	100%	(XXX) - 13	100%	(XXX) – 14	100%	(XXX) - 15
Total	**XXX**	**Total**	**XXX**		**XXX –16**		**XXX –17**		**XXX - 18**

Statement 2 Statement of Cost per Equivalent per unit

Particulars	Net Material Cost	Labour Cost	Overhead cost
Opening WIP – Cost (A)	XXX	XXX	XXX
Cost incurred in current period (B)	XXX	XXX	XXX
Less Scrap value of normal loss (C)	(XXX)	---	---
Total Cost (A+B-C)	**XXX**	**XXX**	**XXX**
Equivalent units	XXX -- 16	XXX - 17	XXX -- 18
Cost per equivalent unit	XXX -- 19	XXX - 20	XXX -- 21

Statement 3 -> Statement of Evaluation

Particulars	Elements	Equivalent Units A	Cost per Equivalent Unit Rs. B	Cost of Equivalent UnitsRs (A x B)	Total Rs.
Units transferred to next process	Material	XXX - 4	XXX – 19	XXX	
	Labour	XXX - 5	XXX – 20	XXX	
	Overhead	XXX - 6	XXX - 21	XXX	XXX - 22
Closing WIP	Material	XXX - 7	XXX – 19	XXX	
	Labour	XXX - 8	XXX – 20	XXX	
	Overhead	XXX - 9	XXX - 21	XXX	XXX - 23
Abnormal Loss	Material	XXX - 10	XXX – 19	XXX	
	Labour	XXX - 11	XXX – 20	XXX	
	Overhead	XXX – 12	XXX - 21	XXX	XXX - 24
Abnormal gain	Material	XXX – 13	XXX – 19	XXX	
	Labour	XXX – 14	XXX – 20	XXX	
	Overhead	XXX – 15	XXX - 21	XXX	XXX - 25

Process Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Opening WIP	XXX	XXX	By Normal Loss	XXX	Scrap Value
To Direct Material		XXX	By Abnormal Loss	XXX	XXX - 24
To Direct Labour		XXX	By Process II A/c (Transfer to next process)	XXX	XXX - 22
To Overheads		XXX	By Closing WIP	XXX	XXX - 23
To abnormal gain	XXX	XXX - 25			
	XXX	**XXX**		**XXX**	**XXX**

Special Note:- If question is silent about method of valuation (FIFO / Average Method), Use following guidelines:-

Case No.	Opening WIP Given	Degree of completion	Method to follow

		of Opening WIP Given	
1	Yes	Yes	FIFO
2	Yes	No.	Average
3	No	N.A. (Yes/No)	FIFO

Question 2 – Page 30

Hill manufacturing Ltd uses process costing to manufacture Water density sensors for hydro sector. The following information pertains to operations for the month of May.

Particulars	Units
Beginning WIP, May 1	16,000
Started in production during May	1,00,000
Completed production during May	92,000
Ending work in progress, May 31	24,000

The beginning work in progress was 60% complete for materials and 20% complete for conversion costs. The ending inventory was 90% complete for material and 40% complete for conversion costs.

Costs pertaining to the month of May are as follows:

Beginning inventory costs are material Rs.27,670, direct labour Rs.30,120 and factory overhead Rs. 12,720.

Cost incurred during May are material used, Rs. 4,79,000, direct labour Rs.1,82,880, factory overheads Rs. 3,91,160.

Calculate:

1) Using FIFO Method, the equivalent units of production for material.
2) Cost per equivalent unit for conversion cost

Solution   Statement of Equivalent production

Input		Output		Material		Conversion Cost	
Particulars	Units	Particulars	Units	% Completion	Units	% Completion	Units
Opening WIP	16000	Opening WIP Now Completed	16000	40%	6400	80%	12800
Units introduced	100000	Units Intro. & Complete	76000	100%	76000	100%	76000

		Closing **WIP**	24000	90%	21600	40%	9600
Total	**116000**	**Total**	**116000**		**104000**		**98400**

Statement of cost per equivalent unit

Particulars	Conversion Cost (Rs.)
Labour Cost	1,82,880
Factory Overheads	3,91,160
Total Conversion Cost (A)	**5,74,040**
Equivalent units (B)	98400
Cost per equivalent unit A/B)	5.83

Question 4 – Page 31

Following details are related to the work done in Process 'A' XYZ Company during the month of March:

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

Units finished and transferred to Process 'B' : 35,000 units
Normal Loss :

5% of total input including opening work-in-progress.
Scrapped units fetch Rs. 20 per piece.

You are required to prepare :

1. Statement of equivalent production
2. Statement of cost
3. Statement of distribution cost, and
4. Process 'A' Account, Normal Loss Account and Abnormal Loss Account.

SOLUTION   Statement of Equivalent production

Input		Output		Material		Labour		Overheads	
Particulars	Units	Particulars	Units	% Completion	Units	% Completion	Units	% Completion	Units
Opening WIP	2000	Units transferred to next process	35000	100%	35000	100%	35000	100%	35000
Units introduced	38000	Closing **WIP**	2000	100%	2000	80%	1600	80%	1600
		Normal loss (5% of 40000	2000	---	----	----	----	----	----
		Abnormal Loss (Bal.)	1000	100%	1000	80%	800	80%	800
Total	**40000**	**Total**	**40000**		**38000**		**37400**		**37400**

Statement of cost per equivalent unit

Particulars	Net Material Cost *	Labour Cost	Overhead cost
Opening WIP – Cost (A)	80000	15000	45000
Cost incurred in current period (B)	1480000	359000	1077000
Less scrap value of normal loss (2000 units x Rs.20) (C)	(40000)	----	----
Total Cost (A+B-C)	**1520000**	**374000**	**1122000**
Equivalent units	38000	37400	37400
Cost per equivalent unit	40	10	30

Statement of evaluation (St. of distribution of cost)

Particulars	Elements	Equivalent Units A	Cost per Equivalent Unit Rs. B	Cost of Equivalent Units Rs (A x B)	Total Rs.
Units transferred to next process	Material	35000	40	1400000	
	Labour	35000	10	350000	
	Overhead	35000	30	1050000	2800000
Closing WIP	Material	2000	40	80000	
	Labour	1600	10	16000	
	Overhead	1600	30	48000	144000
Abnormal Loss	Material	1000	40	40000	
	Labour	800	10	8000	
	Overhead	800	30	24000	72000

Process A A/c

Particulars	Units	Rs.	Particulars	Units	Rs.
To Opening WIP 80000+15000+45000	2000	140000	By Normal Loss	2000	40000
To Material introduced	38000	1480000	By Abnormal Loss	1000	72000
To Direct Labour		359000	By Process B A/c	35000	2800000
To Overheads		1077000	By Closing WIP	2000	144000

	40000	3056000		40000	3056000

Normal Loss A/c

Particulars	Units	(Rs.)	Particulars	Units	(Rs.)
To Process A A/c	2,000	40,000	By Bank 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 A A/c	1,000	72,000	By Bank A/c	1,000	20,000
			By Costing Profit & Loss A/c		52,000
	1,000	72,000		1,000	72,000

Concept – INTER-PROCESS PROFIT

When output of one process is transferred to next process not at cost but at transfer price.Transfer price means cost plus some profit.

Under cost column, all cost are shown as incurred by company.
Under profit column, profit included in opening stock, closing stock and transfer is shown
Under total column, total of both cost and profit is shown.

Transfer price is calculated as shown below for valuation of inventory at prime cost

Particulars	Cost (A)	Profit (B)	Transfer Price (A+B)
Opening stock	XXX	XXX	XXX
Add:-			
Direct Material cost	XXX		XXX
Direct Labour cost	XXX		XXX
Dierct Expenses	XXX		XXX
Cost from previous process	XXX		XXX
Prime Cost	XXX (D)	XXX	XXX (E)
Less closing stock	XXX (D X F / E)	XXX (Bal. Fig)	XXX (F)
Net Balance	XXX	XXX	XXX
Add:- Factory Overhead	XXX		XXX
Total Cost	XXX	XXX	XXX
Add: - costing P&L A/c (Profit)		XXX	XXX
Grand Total	XXX	XXX	XXX

Some Special Points
(a) No Selling & distribution OH, Adm. OH Since it is internal transfer of goods.

(b) Opening & closing stock in **process 1** shall not include any profit since it has not been transferred from any previous process.

(c) Profit included in **opening stock of process II and onwards** is normally given in question. Hence we need not to calculate it.

(d) Costing Profit and loss Account
   a. Shall be credited by **unrealized profit on opening stock**.
   b. Shall be debited by **unrealized profit on closing stock**.
   c. Shall be credited by **profit of process A/c & finished goods A/c**.
   d. Bal. Fig. shall be net profit / loss

Illustration 6 – Page 22

A Ltd. produces product 'AXE' which passes through two processes before it is completed and transferred to finished stock. The following data for the month of October:

	Process I (Rs.)	Process II (Rs.)	Finished Stock (Rs.)
Opening stock	7,500	9,000	22,500
Direct materials	15,000	15,750	--
Direct wages	11,200	11,250	--
Factory overheads	10,500	4,500	--
Closing stock	3,700	4,500	11,250
Inter-process profit included in opening stock	--	1,500	8,250

Output of Process I is transferred to Process II at 25% profit on the transfer Price. Output of Process II is transferred to finished stock at 20% profit on the transfer price. Stock in process is valued at prime cost. Finished stock is valued at the price at which it is received from process II. Sales during the period are Rs. 1,40,000.

Prepare Process cost accounts and finished goods account showing the profit element at each stage.

SOLUTION

Process I Account

Particulars	Cost (Rs)	Profit (Rs)	Total (Rs)	Particulars	Cost (Rs)	Profit (Rs)	Total (Rs)
To Opening stock	7,500	-	7,500	By Process II A/c	40,500	13,500	54,000
To Direct materials	15,000	-	15,000				
To Direct wages	11,200	-	11,200				
To **Prime cost**	**33,700**	-	**33,700**				
Less Closing Stock	(3,700)	-	(3,700)				
Balance	**30,000**	-	**30,000**				
To Overheads	10,500	-	10,500				
To **Process cost**	**40,500**	-	**40,500**				
To Profit (1/3rd of total cost)	-	13,500	13,500				
	40,500	**13,500**	**54000**		**40,500**	**13,500**	**54000**

Process II Account

Particulars	Cost	Profit	Total (Rs)	Particular	Cost (Rs)	Profit	Total (Rs)

	(Rs)	(Rs)				(Rs)	
To Opening stock (Given profit)	7,500	1,500	9,000	By Finished Stock A/c	75,750	36,750	1,12,500
To T/F from Process-I	40,500	13,500	54,000				
To Direct materials	15,750	--	15,750				
To Direct wages	11,250	--	11,250				
Prime cost	**75,000**	**15,000**	**90,000**				
Less Closing Stock (Cost = 4500 x $\frac{75000}{90000}$)	(3,750)	(750)	(4,500)				
Balance	**71250**	**14250**	**85500**				
To Overheads	4,500	-	4,500				
To Process cost	**75,750**	**14,250**	**90,000**				
Profit (25% of total cost)	--	22,500	22,500				
	75,750	**36,750**	**1,12,500**		**75,750**	**36,750**	**1,12,500**

Finished Stock Account

Particulars	Cost (Rs)	Profit (Rs)	Total (Rs)	Particulars	Cost (Rs)	Profit (Rs)	Total (Rs)
To Opening stock (Given pft)	14,250	8,250	22,500	By Sales	82,500	57,500	1,40,000
To T/F from Process-II	75,750	36,750	1,12,500				
To **Prime Cost**	**90,000**	**45,000**	**1,35,000**				
Less Closing Stock (Cost = 11250 x $\frac{90000}{135000}$)	(7,500)	(3,750)	(11,250)				
Balance	**82500**	**41250**	**123750**				
To Profit	--	16,250	16,250				
	82,500	**57,500**	**1,40,000**		**82,500**	**57,500**	**1,40,000**

JOINT PRODUCTS AND BYPRODUCT

Concept – Joint & By Product

Joint products represent "two or more products separated in the course of the same processing operation **usually requiring further processing, each product being in such proportion that no single product can be designated as a major product".**

By-Products defined as "products recovered from material discarded in a main process**, or from the production of some major products, where the material value is to be considered at the time of severance from the main product."**

Concept – Methods of apportionment of Joint Cost
Method No. 1
Physical unit method:- Joint cost is distributed in ratio of quantity manufactured.

ILLUSTRATION 1 – Page 4

A coke manufacturing company produces the following products by using 5,000 tons of coal @ Rs.1,100 per ton into a common process.

Coke	3,500	tons
Tar	1,200	tons
Sulphate of ammonia	52	tons
Benzol	48	tons

PREPARE a statement apportioning the joint cost amongst the products on the basis of the physical unit method.

SOLUTION

	Products					
	Coke	**Tar**	**Sulphate**	**Benzole**	**Wastage**	**Total**
Output (in ton)	3,500	1,200	52	48	200	5,000
Wastage (in ton) (in Output Ratio)	146	50	2	2	(200)	
Net weight (in ton)	3,646	1,250	54	50	-	5,000
Share of Joint Cost (Net Weight Ratio)	40,10,600	13,75,000	59,400	55,000	-	55,00,000

Note-1: Apportionment of wastage of 200 tons over the four products is asfollows:

Coke: $\frac{200}{4,800}$x 3,500 tons = 146 tons

Tar : $\frac{200}{4,800}$x 1,200 tons =50 tons

Sulphate of ammonia: $\frac{200}{4,800}$x 52 tons = 2 tons

Benzole : $\frac{200}{4,800}$x 48 tons = 2 tons

Method No. 2

Net realizable value (NRV) method:- Joint costs are apportioned in the ratio of net realizable values of joint products

NRV is calculated as follows:-

Sale value after further processing	XXX (No. of units manufactured x Selling price)
Less:- Further processing costs	(XXX)
NRV	XXX

This method is used when
C.1. Sale value at split off point is not known and
C.2. Product is sold after further processing.
Note:- No. of units manufactured = Sold units + closing stock

Example -1 Page 6

An entity incurs a joint cost of Rs. 64,500 in producing two products A (200 units) and B (200 units) and earns a sales revenue of Rs. 86,000 by selling @ Rs. 170 per unit of product A and product B @ Rs. 260 per unit. Further processing costs for products A and B are Rs. 4,000 and Rs. 32,000 respectively the Joint cost can be apportioned to products A and B as follows:

Solution

Particulars	Product A (Rs.)	Product B (Rs.)
Sales Value	34000 (200 units X Rs.170)	52000 (200 units X Rs.260)
Less Further Processing Cost	(4000)	(32000)
NRV	**30000**	**20000**
Apportionment of Joint Cost of Rs.64500 in NRV Ratio (3:2)	38700	25800

Method No. 3

Sale value at separation point method:- Joint cost is distributed in ratio of sales value at split off point.
Sale value at split off point = No. of units produced x selling price

This method is used when sale price per unit is known at split off point.

Special Note due to ICAI method of "Market Value after further processing":- In Case further processing cost is also given in question then Joint cost will be distributed in ratio of "sales value after further processing". Technically it is telling to use "NRV Ratio" which is method 2.

Example 2 - Page 7

An entity incurs a joint cost of Rs.64,500 in producing two products A (200 units) and B (200 units) and earns a sales revenue of Rs.86,000 by selling @ Rs.170 per unit of product A and product B @ Rs. 260 per unit.

Solution

Particulars	Product A (Rs.)	Product B (Rs.)
Sales Value	34000 (200 units X Rs.170)	52000 (200 units X Rs.260)
Apportionment of Joint Cost of Rs.64500 in NRV Ratio (34:52)	25500	39000

Method No. 4

Average unit cost method:- under this method, first average cost per unit is calculated using following
Formula:-

Average cost per unit = $\dfrac{\text{Total Joint Costs}}{\text{Total No.of units of jonts products}}$

Share of each product in joint cost = No. of units of each product X Average cost per unit

ILLUSTRATION 2 – Page 9

FIND OUT the cost of joint products A, B and C using average unit cost method from the following data:
(a) Pre-separation Joint Cost Rs. 60,000
(b) Production data:

Products	Units produced
A	500
B	200
C	300
	1,000

SOLUTION

Average cost per unit = $\dfrac{\text{total joint costs}}{\text{units produced}} = \dfrac{\text{Rs.60,000}}{\text{1,000 units}}$ = Rs. 60

The joint costs apportioned @ Rs. 60 are as follows:

Products	Units	Cost per unit (Rs.)	Value (Rs.)
A	500	60	30,000
B	200	60	12,000
C	300	60	18,000
			60,000

Method No. 5 Contribution margin method

- Under this method, joint costs are divided into variable cost and fixed cost.
- Variable cost portion of joint cost is divided among products on the basis of physical units (Quantity / Units Ratio).
- Fixed cost portion of joint cost is divided among products on the basis of contribution ratio.

Contribution = Sales – Total variable cost

Contribution Ratio = $\frac{\text{Contrinution of an individual product}}{\text{Total contribution of all products}}$ x 100

Illustration 3 – Page 10

Find out the cost of joint products A and B using contribution margin method from the following data :

Sales

A : 100 kg @ Rs. 60 per kg.
B : 120 kg @ Rs. 30 per kg.

Joint costs

Marginal cost Rs. 4,400
Fixed cost Rs. 3,900

Solution St. showing apportionment of marginal cost (Variable cost portion) in quantity ratio

Products	Quanitiy manufactured	Quantity Ratio	Joint Cost (Rs.)
A	100 kg	$\frac{100\,kg}{220\,kg}$ x 100 = 45.45%	4400 x 45.45% = 2000
B	120 kg	$\frac{120\,kg}{220\,kg}$ x 100 = 54.55%	4400 x 54.55% = 2400
Total	**220 kg**	**100%**	**4400**

St. showing apportionment of fixed cost portion in contribution margin ratio

Product	Sales Revenue (A)	Marginal Cost (B)	Contribution (A-B)	Contribution ratio	Joint Cost (Rs.)
A	6,000	2,000	4,000	76.92%	3900 x 76.92% = 3000
B	3,600	2,400	1,200	23.08%	3900 x 23.08% = 900
Total			**5200**	**100%**	**3900**

Total joint cost of product = share in variable cost + share in fixed cost
Product A = Rs.2000 + 3000 = Rs. 5000
Product B = Rs. 2400 + 900 = Rs. 3300

Concept - Decision as to go for further processing or not.

Yes process if incremental sales > incremental cost i.e. if Profit increases.

St. Showing incremental profit / loss

Particulars	Amount (Rs.)
Sales value after further processing (A)	XXX
Sales value at split off point (B)	XXX
Incremental Sales revenue (C)={(A)-(B)}	XXX
Further processing cost: (D)	XXX
Profit (Loss) arising due to further processing {(C) – (D)}	XXX

Decision:- Go for further processing if profit increase as a result of further processing otherwise don't go for further processing.

ILLUSTRATION 4 – Page 11

Inorganic Chemicals purchases salt and processes it into more refined products such as Caustic Soda, Chlorine and PVC. In the month of July, Inorganic Chemicals purchased Salt for Rs.40,000. Conversion ofRs.60,000 were incurred upto the split off point, at which time twosaleable products were produced. Chlorine can be further processed into PVC.

The July production and sales information is as follows:

	Production (tonne)	Sales quantity (tonne)	Selling price (per tonne)
Caustic Soda	1,200	1,200	Rs.50
Chlorine	800	—	—
PVC	500	500	Rs.200

All 800 tonnes of Chlorine were further processed, at an incremental cost of Rs. 20,000 to yield 500 tonnes of PVC. There was no beginning or ending inventories of Caustic Soda, Chlorine or PVC in July.

There is active market for Chlorine. Inorganic Chemicals could have sold all its July production of Chlorine at Rs. 75 per tonne.

Required :
1. To calculate how joint cost of Rs.1,00,000 would be apportioned between Caustic Soda and Chlorine under each of following methods :
   a. Sales value at split off,
   b. Physical measure (method), and
   c. Estimated net realisable value.
2. Lifetime Swimming Pool Products offers to purchase 800 tonnes of Chlorine in August at Rs.75 per tonne. This sale of Chlorine would mean that no PVC would be produced in August. How the acceptance of this offer for the month of August would affect operating income?

SOLUTION

1   (a) Sales value at split off method

Products	Sales in tonnes (a)	Selling price per tonne (b)	Sales value (Rs) (c)=(a) × (b)	Sale value ratio	Joint cost apportioned
Caustic Soda	1,200	50	60,000	50%	50,000
Chlorine	800	75	60,000	50%	50,000
			1,20,000	**100%**	**1,00,000**

(b) Physical Measure Method

Products	Production (in tonnes)	Quantity Rati	Joint cost apportioned
Caustic Soda	1,200	60%	60,000
Chlorine	800	40%	40,000
	2,000	**100%**	**1,00,000**

(c) Estimated net realisable value method

Particulars	Caustic Soda	Chlorine	Total
Sale value after further processing (No. of units manufactured x Selling price)	60,000 (1,200 tonnes X Rs. 50)	1,00,000 (500 tonnes of PVC X Rs. 200)	160000
Less:- Further processing costs	----	(20000)	(20000)
NRV	60000	800000	140000
NRV Ratio	42.857%	57.143%	100%
Joint cost	42857	57143	100000

2.Incremental revenue from further processing of Chlorine into PVC

Products	Chlorine (Rs)
Sales revenue after further processing: (A)	100000 (500 tonnes x Rs.200)
Sales revenue at the point of split off: (B)	60000 (800 Tonnes x Rs. 75)
Incremental sales revenue: (C)={(A)-(B)}	40000
Further processing cost: (D)	(20000)
Profit (Loss) arising due to further processing: {(C) – (D)}	20000

If company process chlorine into PVC then it would earn Rs.20000 extra but if company chooses to produce chlorine to Lifetime swimming pool products then it would be a loss of incremental income.

SERVICE COSTING

Concept – Service Cost Unit

In case of transport of goods services, we shall calculate cost per tonne-km.

Total Tonne-km = Total Tonne x Total Kms.

Tonne km are of 2 types:-

- ✓ Absolute (Weighted Average) Tonne Km = Weight in tonne x km run
- ✓ Commercial (Simple Avearge) Tonne – Km – Total Km x Avg. Tonne Km.

Note:- If nothing is specified in question then absolute tonne km shall be used to calculate cost per tonne-km.

ILLUSTRATION 1 – Page 14

A Lorry starts with a load of 20 MT of Goods from Station 'A'. It unloads 8 MT in Station 'B' and balance goods in Station 'C'. On return trip, it reaches Station 'A' with a load of 16 MT, loaded at Station 'C'. The distance between A to B, B to C and C to A are 80 Kms, 120 Kms and 160 Kms, respectively. COMPUTE "Absolute MT- Kilometer" and "Commercial MT – Kilometer".

(MT = Metric Ton or Ton).

SOLUTION:

Weighted Average or Absolute basis – MT – Kilometer:

= (20 MT × 80 Kms) + (12 MT × 120 Kms) + (16 MT × 160 Kms)

= 1,600 + 1,440 + 2,560 = 5,600 MT - Kilometer

Simple Average or Commercial basis – MT – Kilometer:

= [{(20+12+16) / 3} MT × {(80+120+160) Kms]

= 16 MT × 360 Kms = 5,760 MT – Kilometer

Concept - Equivalent Cost Unit / Equivalent service Unit:

To calculate cost or pricing of two more different grade of services which uses common resources, **each grade of service is assigned a weight and converted into equivalent units**. Converting services into equivalent units make different grade of services equivalent and comparable.

Example – Page 6

A hotel has three types of suites for its customers, viz., Standard, Deluxe and Luxurious
Following information is given:

Type of suite	Number of rooms	Room Tariff
Standard	100	--
Deluxe	50	2.5 times of the Standard suits
Luxurious	30	Twice of the Deluxe suits

The rent of Deluxe suite is to be fixed at 2.5 times of the Standard suite and that of Luxurious suite as twice of the Deluxe suite.

Since, the all three types of suits uses same amount of overheads but to attach qualitative weight, these rooms are required to be converted into equivalent units. This can be done in two ways

Solution

(i)   Making all suits equivalent to Standard suits:

Nature of suite	Occupancy (Room-days)	Equivalent single room suites (Room-days)
Standard	36,000 (100 rooms X 360 days)	36,000 (36,000 X 1)
Deluxe	18,000 (50 rooms X 360 days)	45,000 (18,000 X 2.5)
Luxurious	10,800 (30 rooms X 360 days)	54,000 (10,800 X 5)
		1,35,000

(ii)   Making all suits equivalent to Luxurious suits:

Nature of suite	Occupancy (Room-days)	Equivalent Luxurious suites (Room-days)
Standard	36,000 (100 rooms X 360 days)	7,200 (36,000 X 1/5)
Deluxe	18,000 (50 rooms X 360 days)	9,000 (18,000 X ½)
Luxurious	10,800 (30 rooms X 360 days)	10,800 (10,800 X 1)
		27,000

Concept – Statement of Costs for Service Sectors

Divide Cost sheet in 3 heads:
1. Fixed Costs / Standing Charges
2. Variable costs / Running / Operating Charges
3. Semi-Variable / Repair & Maintenance Charges

Special Note

1) In the absence of information about semi-variable costs, the costs would be shown under fixed and variable heads only.
2) Depreciation – Will be Fixed if on time basis OR Will be Variable if on Usage basis
3) Interest & Finance Charges – Fixed Cost

Cost Per Passenger-Km = $\frac{\text{Total Cost}}{\text{Total Passenger} - \text{Km}}$

Total Passengers – KM = Total Km X Total No. of Passengers

ILLUSTRATION 2 – PAGE 9

AXA Passenger Transport Company is running 5 buses between two towns, which are 40 kms apart. Seating capacity of each bus is 40 passengers. Following details are available from their books, for the month of April:

	Amount (Rs.)
Salary of Drivers, Cleaners and Conductors	24,000
Salary to Supervisor	10,000
Diesel and other Oil	40,000
Repairs and Maintenance	8,000
Tax and Insurance	16,000
Depreciation	26,000
Interest	20,000
	1,44,000

Actual passengers carried were 75% of the seating capacity. All the four buses run on all days for the month. Each bus made one round trip per day. CALCULATE cost per passenger – Kilometer.

SOLUTION:

Working Note:
Total Passenger Kilometres = Number of Buses × Distance × Seating Capacity × Used Capacity × Number of days in the month × Number of trips
= 5 Buses × 40 kms. × 40 Seats × 75% × 30 Days × 2 Single trips (1 Round Trip) = 3,60,000 Passenger-Kms.
Cost per Passenger-Km = Total costs ÷ Total Passenger Kilometers

Statement of Cost per Passenger – Km

Particulars	Cost Per Month	Cost per Passenger – Km
A. Standing Charges:		
Wages of Drivers, Cleaners and Conductors	24,000	
Salary to Supervisor	10,000	
Tax and Insurance	16,000	
Depreciation	26,000	
Interest	20,000	
Total Standing Charges	96,000	0.267
B. Running Charges		
Diesel and other Oil	40,000	0.111
C. Maintenance Charges		
Repairs and Maintenance	8,000	0.022
Total	1,44,000	0.400

Cost per Passenger-Km = Rs. 0.40

ILLUSTRATION 5 – PAGE 16

GTC has a lorry of 6-ton carrying capacity. It operates lorry service from city A to city B for a particular vendor. 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 extra charges are billed for unloading goods in-between destination city and no concession in rates is given for reduced load after unloading at intermediate city. Distance between the city 'A' to 'B' is 300 km and distance from city 'A' to 'C' is 140 km.

In the month of January, the truck made 12 journeys between city 'A' and 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 Rs. 6,00,000 and Rs. 1,20,000 respectively. Running charges spent during the month of January are Rs. 2,94,400 (includes Rs. 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.

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

   (Refer to working note-1)

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

   (Refer to working note-2)

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

Particulars	(Rs)	(Rs)
Truck hire charges received during the month:		
From Outward journey((10+2) trips×6 ton×Rs2,400)	1,72,800	
From return journey ((5 trips×8 ton×Rs2,200) + ((6+1) trips×6 ton×Rs2,200))	1,80,400	3,53,200
Less: Monthly running cost (as per (i) above)		(3,42,000)
Operation 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+1journey×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×160km.×6 ton)	960	23,760
Total Absolute Ton-km		**44**,720

Concept – SERVICE Costing for Lodge

A Lodge is like hotel which provides variety of rooms like deluxe room, semi-deluxe room and super deluxe room on rental basis. This rent is decided for a day (not monthly). Objective is to calculate cost per room day.

Cost per room – day = $\dfrac{\text{Total operating cost}}{\text{Total number of room days}}$

Total Room Days = No. of Rooms X Occupancy ratio x No. of Days

Illustration 6 – Page 19

A company runs a holiday home. For this purpose, it has hired a building at a rent of Rs. 10,000 per month alongwith 5% of total taking. It has three types of rooms for its customers, viz., single room, double rooms and triple rooms.

Following information is given:

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

The rent of double rooms is to be fixed at 2.5 times of the single room and that of triple rooms as twice of the double rooms. The other expenses for the year 2020-21 are as follows:

Particulars	Amount (Rs.)
Staff salaries	14,25,000
Room attendants' wages	4,50,000
Lighting, heating and power	2,15,000
Repairs and renovation	1,23,500
Laundry charges	80,500
Interior decoration	74,000
Sundries	1,53,000

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

Solution:-

Calculation of no. of rooms occupied on a single day basis:-

Type	No. total	Occupied	Rent per day
Single Room	100	100 X 100% = 100	Rs. x
Double Room	50	50 x 80%= 40	Rs. 2.5 x
Triple Room	30	30 X 60%= 18	Rs. 5x
		158	

Let us assume rent per day of single room is Rs.X
Then double Room rent per day shall be Rs. 2.5X
Triple room rent per day shall be Rs.5X (2.5x X 5)

Statement of Operating Cost (Annual)

Particulars	Amount
Staff Salaries	14,25,000
Room attendant wages	4,50,000
Lighting, heating & power	2,15,000
Repairs	1,23,500
Laundry charges	80,500
Interior Decoration	74,000
Sundries	1,53,000

Total	25,21,000
+ Building rent (10,000 X 12)	1,20,000
+ 5% of total taking	+ 5% of Total taking
+ profit	20% of total taking
Total taking (annual)	**26,41,000 + 25% of total taking**

Total taking for a **Year** on the basis of room rent per day =
= (100X + 40 x 2.5X + 18 X 5X) x 360 Days = 104400X
Hence, Total takings = 104400X =
$26,41,000 + \frac{25}{100} \times 1,04,400X = 104400X$
        x = 33.73
So, single room rent per day shall be Rs. 33.73
Double room rent per day shall be = Rs.33.73 X 2.5 = Rs. 84.325
Triple room rent per day shall be = Rs.33.73 X 5 = Rs. 168.65

Concept - SERVICE Costing for Hospital

1. Rent Per Patient Day = Total Operating Cost + Total Profit / Total Patient Days

2. Total Patient Days = No. of beds x Occupancy Ratio x No. of Days

3. Repair & Maintenance shall be assumed to be fixed in case of Hospital. In Transport service provider, it was assumed to be Variable.

$$\text{Rent per patient day} = \frac{Total\ operating\ cost + Desired\ profit}{Total\ No.of\ patient\ days}$$

Patient Days = No. of beds x No. of Days x Occupancy Rate

4. Break Even Points (In Number of patient Days) = TFC / (Selling Price – V.Cost) = TFC / Contribution Per unit

ILLUSTRATION 8 – Page 25
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 –

1) Calculate profit per Patient day, if the hospital recovers on an average Rs.2,000 per day from each patient

2) Find out Breakeven point for the hospital.

Solution

W.Note 1:- Number of patient Days

= 35 beds x 150 days + 25 beds x 80 days + 750 bed days (Extra) = 8000

Particulars	Amount (Rs.)
Fixed Costs:-	
Rent (Rs. 75000 x 12 months)	900000
Supervisor (Rs. 25000 x 12 months x 2 persons)	600000
Nurses (Rs. 20,000 x 12 months x 4 persons)	960000
Ward boys (Rs.5000 x 12 months x 4 persons)	240000
Repairs (Fixed)	81000
Other Fixed Exp.	1080000
Administration Expenses Allocated	1000000
Total Fixed Cost – A	**4861000**
Variable Costs	
Doctors Fees (Rs. 250000 x 12 months)	3000000
Food to patients	880000
Other services to patients	300000
Laundry charges	600000
Medicines	750000
Bed hire charges (Rs. 100 x 750 beds)	75000
Total Variable Cost – B	**5605000**
Total Cost (A+B)	
Profit (Differnce)	5534000
Revenue (8000 patient days x Rs. 2000)	16000000

1) Computation of contribution per patient day

$$= \frac{Total\ Contribution}{Total\ patient\ days} = \frac{Revenue - Variable\ Costs}{Total\ patient\ Days} = \frac{16000000 - 5605000}{8000\ patient\ days} = 1299.375$$

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

   = Rs. 48, 61,000 /Rs. 1,299.375 **=** 3,741 patient days

Concept – Cost of Information Technology (IT) & Information Technology Enabled Services (ITES)

Illustration 9 – Page 30

Following are the data pertaining to Infotech Pvt. Ltd, for the year 2020-21.

Particulars	Amount (Rs)
Salary to Software Engineers (5 persons)	15,00,000
Salary to Project Leaders (2 persons)	9,00,000
Salary to Project Manager	6,00,000
Repairs & maintenance	3,00,000
Administration overheads	12,00,000

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

Project duration – 6 months

One Project Leader and three Software Engineers were involved for the entire duration of the project, whereas Project Manager spends 2 months' efforts, during the execution of the project.

Travel expenses incurred for the project – Rs.1,87,500

Two Laptops were purchased at a cost of Rs. 50,000 each, for use in the project and the life of the same is estimated to be 2 years

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

SOLUTION
Working Notes:
(1) Calculation of Cost per month and Overhead absorption rate

Particulars	Total Per Annum	Per Person Per Annum	Per Person Per Month
Salary to Software Engineer (5 Person)	Rs.15,00,000	Rs.3,00,000	Rs.25,000
Salary to Project Leaders (2 Person)	Rs. 9, 00,000	Rs. 4, 50,000	Rs. 37,500
Salary to Project Manager	Rs.6,00,000	Rs.6,00,000	Rs.50,000
Total	**Rs.30,00,000**		**Rs.1,12,500**

(2) **Total Overhead** = Repairs & Maintenance + Administration overheads
= Rs. 3, 00,000 +Rs. 12, 00,000 = Rs.15,00,000

(3) Calculation of Overhead absorption rate

= Total Overhead / Total Salary = Rs.15,00,000 / Rs. 30,00,000 = 50%
Hence ORR is 50% of salary.

Project Cost Sheet

Particulars		Amount (Rs.)
Salary Cost:		
Salary of Software Engineers months	(Rs. 25,000 x 3 × 6 months)	4,50,000
Salary of Project Leader months	(Rs. 37,500 x 1 × 6 months)	2,25,000
Salary of Project Manager months	(Rs. 50,000 x 1 × 2 months)	1,00,000
Total Salary		**7,75,000**
Overheads	(50% of Salary)	3,87,500
Travel Expenses		1,87,500
Depreciation on Laptops months	(Rs.1,00,000 / 24months × 6 months)	25,000
Total Project Cost		**13,75,000**

Concept - SERVICE Costing for Toll Roads

Government gives contract to contractor for construction of Highway. In such case Contractor incurs 3 types of expenditure:-

- Capital cost = Huge amount incurred in beginning in construction of Road
- Operating Cost = salary of persons involved in collecting tolls
- Maintenance Cost = Cost incurred in maintain repairs every year.

Government allows contractor to collect tolls for vehicles passing through that highway for a certain period e.g. 10 years. Hence contractor desires to know cost incurred per vehicle so that he can add profit and calculate toll rate to be charged for each vehicle.

Price per vehicle = Toll Rate per vehicle =

Formula 1:- Cost per vehicle + profit per vehicle

Formul1 2:- $\dfrac{\text{Total Cost+Total Profit}}{\text{Total Number of chargeable Vehicles}}$

Cost per vehicle = $\dfrac{\text{Total of capital cost+operating cost+maintenance cost}}{\text{Total number of vehicles estimated to be passing through this highway}}$

Cost per Km - Constructed = $\dfrac{\text{Total of capital cost+operating cost+maintenance cost}}{\text{Total Length of Road (Total Km)}}$

Illustration 10 – Page 34

BHG Toll Plaza Ltd built a 60 km. long highway and now operates a toll plaza to collect tolls from passing vehicles using the highway. The company has estimated that a total of 12 crore vehicles (only single type of vehicle) will be using the highway during the 10 years toll collection tenure.

Toll Operating and Maintenance cost for the month of April are as follows:

(i) Salary to –
- o Collection Personnel (3 Shifts and 4 persons per shift) -Rs.550 per day per person
- o Supervisor (2 Shifts and 1 person per shift) -Rs. 750 per day per person
- o Security Personnel (3 Shifts and 6 persons per shift) -Rs.450 per day per person
- o Toll Booth Manager (2 Shifts and 1 person per shift) -Rs.900 per day per person

(ii) Electricity – Rs. 8,00,000

(iii) Telephone – Rs. 1,40,000

(iv) Maintenance cost – Rs. 30 Lacs

Monthly depreciation and amortisation expenses will be Rs.1.50 crore. Further, the company needs 25% profit over total cost to cover interest and other costs.

Required:

(i) Calculate cost per kilometer per month.

(ii) Calculate the toll rate per vehicle.

SOLUTION   **Statement of cost (Monthly)**

Particulars		(Rs)
Capital cost for a month	Monthly depreciation and amortization	1,50,00,000
Operating Cost		
Salary to Collection Personnel	(3 shifts X 4 persons per shift X 30 days X Rs. 550 per day)	1,98,000
Salary to Supervisor	(2 shifts X 1 persons per shift X 30 days X Rs. 750 per day)	45,000
Salary to Security Personnel	(3 shifts X 6 persons per shift X 30 days X Rs. 450 per day)	2,43,000
Salary to Toll Booth Manager	(2 shifts X 1 persons per shift X 30 days X Rs. 900 per day)	54,000
Electricity		8,00,000
Telephone		1,40,000
Maintenance cost		**30,00,000**
Total Cost		1,94,80,000

(i) **Calculation of Cost per Kilometer per month:** $= \dfrac{\text{Total Cost}}{\text{Total Km}}$

$$= \dfrac{\text{Rs.}1,94,80,000}{60 \text{ Km}} = \text{Rs.}3,24,667$$

(ii) Calculation of toll rate per vehicle:

$$= \dfrac{\text{Total Cost}+25\% \text{ Profit}}{\text{Vehicles per month}} = \dfrac{\text{Rs.}1,94,80,000+\text{Rs.}48,70,000}{10,00,000 \text{ Vehicles}} = \text{Rs.}24.35$$

Working:

No. of Vehicles using the highway per month $= \dfrac{\text{Total Estimated vehicles}}{10 \text{ years}} = \dfrac{12 \text{ crs}}{10 \text{ years}}$ X

$\dfrac{1 \text{ month}}{12 \text{ months}}$ = 10 lakhs

Concept – Costing of Educational Institutions

Educational institutions like schools, colleges, technical institutes for education and training, are run to impart education and training to students. The objective of running these institutions may be 'Not-for profit' or 'For profit'.

Income of the Educational Institutions

The source of income of an institute may be classified on the basis of recurrence as follows:

1) **One-time fees**: These are the fees which are collected once in a course period or for a definite period like Admission fee, Development fee, Annual fee etc.

2) **Recurring fees**: Tuition fee, laboratory, computer and internet fee, library fee, training fee, amenities fee, sports fee, extracurricular activities fee etc.

   The Government and other aided institutes may not be permitted to collect various fees like capitation fee and development fees etc. Further, unlike the trading and manufacturing organizations, these are not free to determine fees beyond a prescribed limit.

3) **Other incomes**: The indirect income like transport, hostel, mess and canteen for the students and staff are provided by the educational institutions normally on no profit no loss basis.

Illustration 11 – Page 37

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:

Particulars	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	1400 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

Requirement (a) – Question is asking cost per student per annum for all three streams.

Formula = $\dfrac{\text{Total Annual Cost of all three streams}}{\text{Total number of students of all three streams}}$

Please Note We shall not include cost of "Primary & Secondary".

Statement Showing Total Annual Cost of all three streams

Particulars	WN	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)
Teachers' salary	1	1596000	2245091	2458909
Principal's salary	2	124800	187200	288000
Lab attendants' salary	3	-	-	172800
Salary to library staff	4	43200	28800	57600
Salary to peons	5	31636	94909	47455
Salary to other staffs	6	38400	115200	57600
Examinations expenditure	7	86400	259200	129600
Office & Administration cost	8	121600	364800	182400
Annual day expenses	8	36000	108000	54000
Sports expenses	8	9600	28800	14400
Total Cost	**A**	**2087636**	**3432000**	**3462764**
Total No. of Students	B	120	360	180
Cost Per Student Per Annum	**A/B**	**17397**	**9533**	**19238**

Working Note – 1 – Calculation of Teacher's Salary for all three streams

Particulars		Arts	Commerce	Science
Total No. of Teachers	A	4	5	6
Salary Per Teacher Per Annum	B	Rs.35,000 X 12 Months = Rs.4,20,000	Rs.35,000 X 12 Months = Rs.4,20,000	Rs.35,000 X 12 Months = Rs.4,20,000
Total Salary of All Teachers	AXB	Rs.1680000	Rs.2100000	Rs.2520000
Adjustment	Note 1	(Rs.84000)	Rs.84000	
Adjustment	Note 2		Rs.61091	(Rs.61091)
Total		**Rs.1596000**	**Rs.2245091**	**Rs.2458909**

Note 1 – Given "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".

It means a teacher of "Arts" also teaches "Commerce" hence his yearly salary (equal to 208 classes) shall be added to "Commerce Head" and hence shall be deducted from "Arts Head".

Amount to be adjusted = $\frac{Rs.4,20,000}{1040\ Classes}$ x 208 Classes = Rs.84,000

Note 2 – 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.

It means a teacher of "Science" also teaches "Commerce" hence his yearly salary (equal to 160 classes) shall be added to "Commerce Head" and hence shall be deducted from "Science Head".

Amount to be adjusted = $\frac{Rs.4,20,000}{1100\ Classes}$ x 160 Classes = Rs.61091

Working Note – 2 – Calculation of Principal's Salary for all three streams
Principal's Salary of Rs.1440000 apportioned in ratio of "Time spent by principal for administration".

Particulars	Ratio	Arts	Commerce	Science	Primary & Secondary
Principal's Salary	208:312:480:1400	124800	187200	288000	840000

Working Note – 3 – Calculation of "Lab assistants' Salary" for all three streams
Lab assistants' Salary of Rs.360000 apportioned in ratio of "Lab classes in a year".

Particulars	Ratio	Arts	Commerce	Science	Primary & Secondary
Lab assistants' Salary	0:0:144:156	-	-	172800	187200

Working Note – 4 – Calculation of "Salary to library staff" for all three streams
Salary to library staff of Rs.144000 apportioned in ratio of "Time spent at library per student per year".

Particulars	Ratio	Arts	Commerce	Science	Primary & Secondary
Salary to library staff	180:120:240:60	43200	28800	57600	14400

Working Note – 5 – Calculation of "Salary to peons" for all three streams
First of all, We need to calculate "Salary to peons" for "higher Secondary"

Particulars	Amount (Rs.)
One Peon dedicated for higher secondary (1 Peon X Rs.10000 X 12 Month)	120000
15% of other 3 peons (3 Peon X Rs.10000 X 12 Month X 15%)	54000
Total	**174000**

Salary to peons of Rs.174000 apportioned in ratio of "No. of students ".

Particulars	Ratio	Arts	Commerce	Science
Salary to peons	120:360:180	31636	94909	47455

Working Note – 6 – Calculation of "Salary to other staffs" for all three streams
Salary to other staffs of Rs.480000 apportioned in ratio of "No. of students".

Particulars	Ratio	Arts	Commerce	Science	Primary & Secondary
Salary to other staffs	120:360:180:840	38400	115200	57600	268800

Working Note – 7 – Calculation of "Examinations expenditure" for all three streams
Examinations expenditure of Rs.1080000 apportioned in ratio of "No. of students".

Particulars	Ratio	Arts	Commerce	Science	Primary & Secondary
Examinations expenditure	120:360:180:840	86400	259200	129600	604800

Pl Note - Examinations expenditure may also be apportioned in ratio of "No. of examinations in a year"

Working Note – 8 – Calculation of "Following Exp." for all three streams
- Office & Administration cost of Rs.1520000
- Annual day expenses of Rs.450000
- Sports expenses of Rs.120000

Above Exp. shall be apportioned in ratio of "No. of students".

Particulars	Ratio	Arts	Commerce	Science	Primary & Secondary
Office & Administration cost	120:360:180:840	121600	364800	182400	851200
Annual day expenses	120:360:180:840	36000	108000	54000	252000
Sports expenses	120:360:180:840	9600	28800	14400	67200

Requirement (b) Calculation of Profitability

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Total Fees per annum	12000	12000	12000	
Cost per student per annum	17397	9533	19238	
Profit/ (Loss) per student per annum	(5,397)	2,467	(7,238)	
Total No. of Students	120	360	180	
Total Profit/ (Loss)	(647640)	888120	(1302840)	(1062360)

Requirement (C) Calculation of fees to be charged to earn 10% profit on cost

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)
Cost per student per annum	17397	9533	19238
Add: Profit @10%	1740	953	1924
Fees Per Annum	19137	10486	21162
Total No. of Months	12	12	12
Fees Per Month	1595	874	1764

Concept – Costing of Insurance Companies – Page 41 & 42

Illustration 12 – Page 43

Sanziet Lifecare Ltd. operates in life insurance business. Last year it launched a new term insurance policy for practicing professionals 'Professionals Protection Plus'. The company has incurred the following expenditures during the last year for the policy:

Policy development cost	Rs. 11,25,000
Cost of marketing of the policy	Rs. 45,20,000
Sales support expenses	Rs. 11,45,000
Policy issuance cost	Rs. 10,05,900
Policy servicing cost	Rs. 35,20,700
Claims management cost	Rs. 1,25,600
IT cost	Rs. 74,32,000
Postage and logistics	Rs. 10,25,000
Facilities cost	Rs. 15,24,000
Employees cost	Rs. 5,60,000
Office administration cost	Rs. 16,20,400

Number of policy sold- 528
Total insured value of policies- Rs.1,320 crore
Required:
i. CALCULATE total cost for Professionals Protection Plus' policy segregating the costs into four main activities namely (a) Marketing and Sales support, (b) Operations, (c) IT and (d) Support functions
ii. CALCULATE cost per policy.
iii. CALCULATE cost per rupee of insured value

Solution

(i)   Calculation of Total Cost for 'Professionals Protection Plus' policy

Particulars	Amount (Rs.)
Operations	
• Policy Issuance Cost	Rs. 10,05,900
• Policy Servicing Cost	Rs. 35,20,700
• Claims Management Cost	Rs. 1,25,600
Total (A)	**Rs.46,52,200**
Marketing & Sales Support	
• Policy Development Cost	Rs. 11,25,000
• Cost of Marketing	Rs. 45,20,000
• Sales Support Expenses	Rs. 11,45,000
Total (B)	**Rs.67,90,000**
IT Support Cost (C)	**Rs.74,32,000**
Support Functions	
• Postage and logistics	Rs. 10,25,000
• Facilities cost	Rs. 15,24,000
• Employees cost	Rs. 5,60,000
• Office administration cost	Rs. 16,20,400
Total (D)	**Rs.47,29,400**
Total Cost (A + B + C + D)	**Rs.2,36,03,600**

(ii)   Cost Per Policy $= \dfrac{\text{Total Cost}}{\text{Total No.of Policies}} = \dfrac{\text{Rs.2,36,03,600}}{\text{528 Policies}} = $ Rs.44703.78

(iii)   Cost Per Rupee of Insured Value $= \dfrac{\text{Total Cost}}{\text{Total Insured Value}} = \dfrac{\text{Rs.2.36 Crore}}{\text{Rs.1,320 Crore}} = $ Rs.0.0018

Concept – Costing of Financial Institutions – Page 44 - 46

Processing Cost per home loan application $= \dfrac{\text{Total Processing Cost in a year}}{\text{Total number of loan applications in a year}}$

Illustration 13 – Page 46

The loan department of a bank performs several functions in addition to home loan application processing task. It is estimated that 25% of the overhead costs of loan department are applicable to the processing of home-loan application. The following information is given concerning the processing of a loan application:

Direct professional labor:

	(Rs)
Loan processor monthly salary: (4 employees @ Rs. 60,000 each)	2,40,000
Loan department overhead costs (monthly):-	
Chief loan officer's salary	75,000
Telephone expenses	7,500
Depreciation Building	28,000
Legal advice	24,000
Advertising	40,000
Miscellaneous	6,500
Total overhead costs	**1,81,000**

You are required to compute the cost of processing home loan application on the assumption that five hundred home loan applications are processed each month.

SOLUTION

Statement showing processing cost per home loan application (Monthly)

Particulars	Amount (RS.)
Direct professional labour cost (4 employees @ Rs. 60,000 each)	2,40,000
Service overhead cost (25% of Rs. 1,81,000)	45,250
Total processing cost per month	**2,85,250**
No. of applications processed per month	500
Total processing cost per home loan application	**570.50**

Concept - SERVICE Costing for POWER HOUSE

Power house generate electricity and desires to know cost per unit of electricity generated so that they can find out amount to be charged from customer after including its profit per unit.

Cost per unit of electricity generated $= \dfrac{\text{Total Cost}}{\text{Total chargeable Units Generated}}$

Note:- Sale of ashes shall be reduced from total expenses to calculate total cost.

Illustration 14 – Page 48

PREPARE the cost statement of Ignus Thermal Power Station showing the cost of electricity generated per kWh, from the data provided below pertaining to the year 2020-21:.

Total units generated	20,00,000 kwh
	(Rs.)
Operating labour	30,00,000
Repairs & maintenance	10,00,000
Lubricants, spares and stores	8,00,000
Plant supervision	6,00,000
Administration overheads	40,00,000

5 kwh. of electricity generated per kg. of coal consumed @Rs. 4.25 per kg. Depreciation charges @ 5% on capital cost of Rs. 5,00,00,000.

Solution:- Cost of Electricity generated per kwh $= \dfrac{Total\ operating\ Cost}{Total\ Kwh}$

Statement of Operating cost

Particulars	Annual cost
Fixed Expense:-	
Plant Supervision	6,00,000
Overhead	40,00,000
Depreciation (5% of Rs.5,00,00,000)	25,00,000
Total (A)	**71,00,000**
Variable Expense:-	
Operating Labour	30,00,000
Repairs	10,00,000
Lubricants	8,00,000
Cost of coal consumed $(\dfrac{20,00,000\ kwh}{5\ kwh}$ x Rs.4.25)	17,00,000
Total (B)	**65,00,000**
Total Cost (A+B)	**1,36,00,000**

Cost of Electricity generated per kwh **=** $\dfrac{1,36,00,000}{20,00,000\ kwh}$ = Rs.6.80

STANDARD COSTING

Basic Concept
1) Difference between actual cost and standard cost is called variance
2) Variance may be Favourable or unfavourable (Adverse).
3) Favourable variance is denoted by "F" and adverse variance is denoted by "A".
   If actual cost is more than by standard cost then difference is called Adverse variance.
   If actual cost is less than by standard cost then difference is called favourable variance.
4) We will study 5 types of variance under this chapter
   1) Material variances
   2) Labour varianes
   3) Variable Overhead variances
   4) Fixed Overhead Variances

Concept – Direct Material Cost Variances - Page 14

SP x SQAO	SP x RSQ	SP x AQ	AP x AQ
M1	M2	M3	M4

Cost = M1 – M4
Usage = M1 – M3
Price = M3 – M4
Yield = M1 – M2
Mix = M2 – M3

SQAO = Actual O/P x budgeted input for 1 unit of output = Actual O/P x $\frac{\text{Total Budgeted Material Kg}}{\text{Total budgeted Output}}$

RSQ = Divide total actual input in standard quantity ratio.

Illustration 2 – Page 18
NXE Manufacturing Concern furnishes the following information:-

Standard:	Material for 70 kg finished products	100 kg.
	Price of material	Rs.1 per kg.
Actual:	Output	2,10,000 kg.
	Material used	2,80,000 kg.
	Cost of Materials	*Rs 2,52,000*

Calculate: -
  (a) Material Usage Variance
  (b) Material Price Variance
  (c) Material Cost Variance

Solution

SP X SQAO	SP X RSQ	SP X AQ	AP X AQ
Rs. 1 per Kg x 300000 kg = Rs. 3,00,000	Rs. 1 per kg	Rs. 1 per kg x 280000 kg = Rs. 280000	Rs. 0.90 per kg x 280000 kg = 252000
M1	M2	M3	M4

SQAO = Actual O/P x Std Quantity required for 1 unit of output

$= 210000 \text{ kg x } \dfrac{Total\ std\ Quantity\ required}{Total\ standard\ output} = 210000 \text{ kg x } \dfrac{100\ kg}{70\ kg} = 300000 \text{ Kg}$

Actual Price (AP) $= \dfrac{Actual\ cost\ of\ materials}{Actual\ material\ used} =$ (Rs.2, 52,000 ÷ 2, 80,000 kg) = Rs. 0.90 per kg.

Material Usage Variance	= M1 – M3 = Rs. 300000 – Rs. 280000 = Rs. 20000(F)
Material Price Variance	= M3 – M4 = Rs. 280000 – Rs. 252000 = 28000 (F)
Material Cost Variance	= M1- M4 = Rs. 300000 – Rs. 252000 = 48000 (F)

Illustration 3 – Page 19

The standard cost of a chemical mixture is as follows:

40% material A at Rs.20 per kg.

60% material B at Rs.30 per kg.

A standard loss of 10% of input is expected in production.The cost records for a period showed the following usage :90 kg material A at a cost of Rs.18 per kg.

110 kg material B at a cost of Rs.34 per kg.

The quantity produced was 182 kg. of good product.

Calculate all material variances.

Solution

Raw material	SP X SQAO	SP X RSQ	SP X AQ	AP X AQ
	M1	**M2**	**M3**	**M4**
A	Rs. 20 x 80.88 kg = 1617.78	Rs. 20 x 80 kg = 1600	Rs. 20 x 90 kg = Rs. 1800	Rs. 18 x 90 kg = Rs. 1620
B	Rs. 30 x 121.33 kg = 3640	Rs. 30 x 120 kg 3600	Rs. 30 x 110 kg = Rs. 3300	Rs. 34 x 110 kg = Rs. 3740
Total	**5257.78**	**5200**	**Rs. 5100**	**Rs. 5360**

Table to calculate Std. Output

Assumed input kg	100 Kg
Then A	40 Kg
Then B	60 Kg
Total	100 Kg
Less:- Standard Loss 10%	(10 kg)
Std. output	90 Kg

SQAO = Actual output x budgeted input for 1 unit of output

$$= \text{Actual output x} \frac{\text{Total Budgeted Material Kg}}{\text{Total budgeted Output}}$$

A (SQAO) = 182 kg x $\frac{40\,Kg}{90\,Kg}$ = 80.88 Kg

B (SQAO) = 182 kg x $\frac{60\,Kg}{90\,Kg}$ = 121.33 Kg

RSQ = Total Actual input in budgeted ratio = (90 kg + 110 Kg) in Ratio of 40% and 60%.
A (RSQ) = 200 kg x 40% = 80 Kg
B (RSQ) = 200 kg x 60% = 120 Kg

1. MATERIAL COST VARIANCES = M1 – M4 = 5257.78 – 5360 = 102.22 (A)
2. MATERIAL PRICE VARINACE = M3 –M4 = 5100 – 5360 = 260(A
3. MATERIAL USAGE VARIABCE = M1 – M3 = 5257.78 – 5100 = 157.78(F)
4. MATERIAL MIX VARIANCE = M2 – M3 = 5200 – 5100 = 100(F)
5. MATERIAL YIELD VARIANCE = M1 – M2 = 5257.78 – 5200 = 57.78(F)

Concept – Labour Variances With Abnormal Idle Time – Page 24

SR X SHAO	SR X RSH	SR X AHW	SR X AHP	AR X AHP
L1	L2	L3	L4	L5

Cost = L1 – L5
Efficiency = L1 – L3
Idle Time = L3 – L4 (Always Adverse)
Rate = L4 – L5
Yield (**Revised/Sub Efficiency**) = L1 – L2
Mix (**Gang**) = L2 – L3

SHAO = Actual O/P x budgeted input for 1 unit of O/P = Actual O/P x $\frac{\text{Total Budgeted labour hours}}{\text{Total budgeted output}}$

Abnormal Idle Time = Actual hours Paid (AHP) – Actual hours worked (AHW)

RSH = Divide Actual hours **worked** in standard labour mix ratio.

Illustration 7 – Page 29

NPX Ltd. uses standard costing system for manufacturing of its product X. Following is the budget data given in relation to labour hours for manufacture of 1 unit of Product X :

Labour	Hours	Rate (Rs.)
Skilled	2	6
Semi-Skilled	3	4
Un-Skilled	5	3
Total	10	

In the month of January, total 10,000 units were produced following are the details:

Labour	Hours	Rate (Rs.)	Amount (Rs.)
Skilled	18,000	7	1,26,000
Semi-Skilled	33,000	3.50	1,15,500
Un-Skilled	58,000	4	2,32,000
Total	1,09,000		4,73,500

Actual Idle hours (abnormal) during the month:

Skilled: 500

Semi- Skilled: 700

Unskilled: 800

Total 2,000

CALCULATE:

(a) Labour Variances.

(b) Also show the effect on Labour Rate Variance if 5,000 hours of Skilled Labour are paid @ Rs. 5.5 per hour and balance were paid @ Rs. 7 per hour.

Solution

	SR X SHAO	SR X RSH	SR X AHW	SR X AHP	AR X AHP
	L1	L2	L3	L4	L5
Skilled	Rs.6 X 20000 Hrs	Rs.6 X 21400 Hrs	Rs.6 X 17500 Hrs	Rs.6 X 18000 Hrs	Rs.7 X 18000 Hrs
Semi-Skilled	Rs.4 X 30000 Hrs	Rs.4 X 32100 Hrs	Rs.4 X 32300 Hrs	Rs.4 X 33000 Hrs	Rs.3.50 X 33000 Hrs
Un-Skilled	Rs.3 X 50000 Hrs	Rs.3 X 53500 Hrs	Rs.3 X 57200 Hrs	Rs.3 X 58000 Hrs	Rs.4 X 58000 Hrs
Total	**390000**	**417300**	**405800**	**414000**	**473500**

Cost = L1 – L5 = 83500(A)

Efficiency = L1 – L3 = 15800(A)

Idle Time = L3 – L4 (Always Adverse) = 8200(A)

Rate = L4 – L5 = 59500(A)

Yield (**Revised/Sub Efficiency**) = L1 – L2 = 27300(A)

Mix (**Gang**) = L2 – L3 = 11500(F)

Abnormal Idle Time = Actual hours Paid (AHP) – Actual hours worked (AHW)

	AHP	Abnormal Idle Time	AHW
Skilled	18000 Hrs	500 Hrs	17500 Hrs
Semi-Skilled	33000 Hrs	700 Hrs	32300 Hrs
Un-Skilled	58000 Hrs	800 Hrs	57200 Hrs
Total	**109000 Hrs**	**2000** Hrs	**107000** Hrs

SHAO = Actual O/P x budgeted input for 1 unit of O/P

	SHAO
Skilled	10000 units X 2 hour = 20000 hour
Semi-Skilled	10000 units X 3 hour = 30000 hour
Un-Skilled	10000 units X 5 hour = 50000 hour

RSH = Divide Actual hours **worked** in standard labour mix ratio i.e. 107000 hours in 2:3:5

	SHAO
Skilled	21400 hours
Semi-Skilled	32100 hours
Un-Skilled	53500 hours

(b) **Labour Rate Variance** = L4 – L5 = (SR – AR) X AHP

Skilled (6 – 5.5) ×5,000

(6 – 7) ×13,000 = Rs. 10,500 (A)

Semi- Skilled (4 – 3.5) ×33,000 = Rs. 16,500 (F)

Unskilled (3 – 4) × 58,000 = Rs. 58,000 (A)

Total Rs. 52,000 (A)

Basic Concept for Overheads

1. Output absorbed Overhead
   a. Formula 1:- = Actual O/P x Budgeted OH per unit
   b. Formula 2:- = Std Hrs for actual O/P x budgeted OH per Hr
2. Input absorbed Overhead
   a. Formula 1:- = Actual Hrs. x Budgeted OH per Hr
   b. Formula 2:- = Expected O/P in Actual Hrs x Budgeted OH p. unit

3. Possible OH
    a. Formula 1:- = Possible Output x Budgeted OH p.u
    b. Formula 2:- = Possible Hrs. x Budgeted OH per Hr
4. Budgeted OH
    a. Formula 1:- = Budgeted O/P x Budgeted OH p.u.
    b. Formula 2:- = Budgeted Hrs. x Budgeted OH per Hr
5. Actual OH
    a. Formula 1:- = Actual O/P x Actual OH p.u.
    b. Formula 2:- = Actual Hrs. x Actual OH per unit

Variable Overheads

Output absorbed Var. OH	Input absorbed Var. OH	Actual Var. OH
VO1	VO2	VO3

Cost = VO 1 – VO 3
Efficiency = VO 1 – VO 2
Expense = VO 2 – VO 3

ILLUSTRATION 9 – Page 36

From the following information of G Ltd., CALCULATE (i) Variable Overhead Cost Variance; (ii) Variable Overhead Expenditure Variance and (iii) Variable Overhead Efficiency Variance:

Budgeted production	6,000 units
Budgeted variable overhead	Rs. 1,20,000
Standard time for one unit of output	2 hours
Actual production	5,900 units
Actual overhead incurred	Rs. 1,22,000
Actual hours worked	11,600 hours

SOLUTION

Output absorbed Var. OH	Input absorbed Var. OH	Actual Var. OH
Formula 1:- = Actual O/P x Budgeted OH per unit = 5900 units X $\frac{Rs.1,20,000}{6000\ units}$ = Rs.118000	Formula 1:- = Actual Hrs. x Budgeted OH per Hr = 11600 hours X $\frac{Rs.1,20,000}{6000\ units\ X\ 2\ Hour}$ = Rs.116000	1. Rs.1,22,000 **(Given)**
VO1	VO2	VO3
Rs.118000	Rs.116000	Rs.122000

Cost = VO 1 – VO 3 = 4000(A)
Efficiency = VO 1 – VO 2 = 2000(A)
Expense = VO 2 – VO 3 = 6000(A)

Concept – Fixed Overheads Variance With Calender Variance – Chart on Page 39

Output absorbed Fixed OH	Input absorbed Fixed OH	Possible Fixed OH	Budgeted Fixed OH	Actual Fixed OH
FO1	FO2	FO3	FO4	FO5

Cost = FO 1 – FO 5
Volume = FO 1 – FO 4
Exp. = FO 4 – FO 5
Efficiency =FO 1 – FO 2
Capacity = FO 2 – FO 3
Calender =FO 3 – FO 4

Illustration 11 – Page 42

A company has a normal capacity of 120 machines, working 8 hours per day of 25 days in a month. The fixed overheads are budgeted at Rs.1, 44,000 per month. The standard time required to manufacture one unit of product is 4 hours.

In April 2021, the company worked 24 days of 840 machine hours per day and produced 5,305 units of output. The actual fixed overheads were Rs.1, 42,000.

COMPUTE the following Fixed Overhead variance:

1) Efficiency variance
2) Capacity variance
3) Calendar variance
4) Expenditure variance
5) Volume variance
6) Total Fixed overhead variance

Solution

Output absorbed OH	Input Absorbed OH	Possible OH	Budgeted OH	Actual OH
= Actual O/P x budgeted FOH p.u. = 5305 units x Rs 24 p.u. = 127320	Actual Hrs. x Budgeted OH per Hr = 24 Days X 840 hrs. X Rs.6 = 120960	Possible Output x Budgeted OH p.u = 5760 units X Rs.24 = 138240	144000 (Given)	142000 (Given)
FO1	FO2	FO3	FO4	FO5

Cost = FO 1 – FO 5 = 14680(A)
Volume = FO 1 – FO 4 = 16680(A)
Exp. = FO 4 – FO 5 = 2000(F)
Efficiency =FO 1 – FO 2 = 6360(F)
Capacity = FO 2 – FO 3 = 17280(A)
Calender =FO 3 – FO 4 = 5760(A)

Budgeted FOH p.u. = $\frac{\text{budgeted FOH}}{\text{budgeted units}}$ = $\frac{\text{Rs.144000}}{\text{6000 units}}$ = Rs. 24 per unit

Budgeted FOH p.u. = $\frac{\text{budgeted FOH}}{\text{budgeted units}}$ = $\frac{\text{Rs.24 per unit}}{\text{4 hours for 1 unit}}$ = Rs. 6 per hour

Budgeted units = $\frac{\text{budgeted hours}}{\text{budgeted hour for 1 unit of output}}$ = $\frac{\text{120 machines x 8 hours a day x 25 days}}{\text{4 hours for 1 unit}}$ = 6000 units

Possible Units (In Actual Days) = $\frac{\text{120 machines x 8 hours a day x 24 days}}{\text{4 hours for 1 unit}}$ = 5760 units

Concept – Production volume & Overhead Exp. Variance
1. Production Volume Variance = (Actual capacity – budgeted capacity) x Budgeted FOH p.u.
2. OH exp. Variance =
    Budgeted FOH x budgeted production capacity + budgeted VOH x actual production
    capacity – Actual OH

Illustration 12 – Page 44
The overhead expense budget for a factory producing to a capacity of 200 units per month is as follows:

Description of Overhead	Fixed Cost Per unit (in Rs.)	Variable Cost per unit (in Rs.)	Total Cost per unit (in Rs.)
Power and fuel	1,000	500	1,500
Repair and maintenance	500	250	750
Printing and stationary	500	250	750
Other overheads	1,000	500	1,500
	Rs. 3,000	Rs. 1,500	4,500

The factory has actually produced only 100 units in a particular month. Details of overheads actually incurred have been provided by the accounts department and are as follows:

Description of overhead	Actual cost
Power and fuel	Rs. 4,00,000
Repair and maintenance	Rs. 2,00,000
Printing and stationary	Rs. 1,75,000
Other overheads	Rs. 3,75,000

You are required to compute the production volume variance and the overhead expenses variance.

Solution

Production Capacity = 200 units,   Actual capacity = 100 units

Production volume variance= unutilised capacity (units) x standard fixed overhead per unit.

= (100 units – 200 units) x Rs. 3000 per unit

= Rs. 300000(A)

Overhead expenses variance= standard overhead cost - actual overhead cost

= (std. Fixed OH for production capacity + Std Variable OH for actual capacity) – Actual OH Cost

= (Rs. 3000 x 200 units + Rs. 1500 x 100 units) – (400000 + 200000 + 175000 + 375000)

= Rs.400000(A)

Concept – Reverse Calculation Question
Question 3 – Page 55

GAP Limited operates a system of standard costing in respect of one of its products which is manufactured within a single cost centre. Following are the details.

Budgeted data:

Material	Qty	Price (Rs.)	Amount (Rs.)
A	60	20	1200
B	40	30	1200
Inputs	100		2400
Normal loss	20		
Output	80		2400

Actual data:

Actual output - 80 units.

Material	Qty	Price (Rs.)	Amount (Rs.)
A	70	?	?
B	?	30	?

Material Price Variance (A)   Rs. 105A
Material cost variance   Rs. 275A

You are required to CALCULATE:
(i) Actual Price of material A
(ii) Actual Quantity of material B
(iii) Material Price Variance
(iv) Material Usage Variance
(v) Material Mix Variance
(vi) Material Sub Usage Variance

Solution

Particulars	SP X SQAO	SP X RSQ	SP X AQ	AP X AQ
A	Rs. 20 X 60 units	Rs. 20 X	Rs. **P** X 70 units	Rs. **P** X 70 units
B	Rs. 30 X 40 units	Rs. 30 X	Rs. 30 X **Q**	Rs. 30 X **Q**
Total	M1	M2	M3	M4
	2400			

DMCV = M1 – M4
DMUV = M1 – M3
DMPV = M3 – M4
DMYV = M1 – M2
DMMV = M2 – M3

(i) Actual Price of Material A
Let Actual Price of Material A be 'Rs. P'
Material Price Variance of Material A = Rs. 105 (A)
M3 – M4 = Rs. 105 (A)
SP X AQ – AP X AQ = (SP – AP) × AQ
(20 – P) × 70 = 105 (A)
1,400 – 70 P = -105
P = 1,505 ÷ 70 = 21.5
Therefore P (Actual Price) = Rs. 21.5

(ii) Actual Quantity of Material B
Let Actual Quantity of Material B be 'Q'
Material Cost Variance = M1 – M4
Material Cost Variance = 275 (A)
2400 – 21.5 X 70 – 30 x Q = 275 (A)
895 – 30 Q = - 275
Q = 1,170 ÷ 30 = 39 units

Particulars	SP X SQAO	SP X RSQ	SP X AQ	AP X AQ
A	Rs. 20 X 60 units	Rs. 20 X 65.40 units	Rs. **20** X 70 units	Rs. **21.50** X 70 units
B	Rs. 30 X 40 units	Rs. 30 X 43.60 units	Rs. 30 X **39 Units**	Rs. 30 X **39 Units**
Total	M1	M2	M3	M4
	2400	2616	2570	2675

To Calc. RSQ, We need to divide sum of AQ in Standard Units ratio.

Sum of AQ = 70 units + 39 units = 109 units
Standard Units Ratio = 60:40

RSQ of Material A = 65.40 units
RSQ of Material B = 43.60 units

(iii) Material Price Variance = M3 – M4
   Material A = Rs. 105 (A)
   Material B = Rs. 0
   Total = Rs. 105 (A)

(iv) Material Usage Variance = M1 – M3
   Material A = Rs. 200 (A)
   Material B = Rs. 30 (F)
   Total = Rs. 170 (A)

(v) Material Mix Variance = M2 – M3
   Material A = Rs. 92 (A)
   Material B = Rs. 138 (F)
   Total = Rs. 46 (F)

(vi) Material Yield Variance = M1 – M2
   Material A = Rs. 108 (A)
   Material A = Rs. 108 (A)
   Total   = Rs. 216 (A)

Following data is extracted from the books of XYZ Ltd. for the month of January, 2020:
  (i) Estimation-

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

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

  (ii) Actuals- 1480 kg of output produced.

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

  (iii) Other Information-
    Material Cost Variance = Rs. 3,625 (F)
    Material Price Variance = Rs. 175 (F)
    You are required to CALCULATE:
    i. Standard Price of Material-A;
    ii. Actual Quantity of Material-B;
    iii. Actual Price of Material-A;
    iv. Revised standard quantity of Material-A and Material-B; and
    v. Material Mix Variance.

Solution

Particulars	SP X SQAO	SP X RSQ	SP X AQ	AP X AQ
A	X 940 KG		X 900 KG	X 900 KG
B	Rs.30 X 705 Kg			Rs.32.50 X
Total	M1	M2	M3	M4
				59,825

  (i) Material Cost Variance (A + B) = M1 – M4
    SP of Material A X 940 Kg + Rs.30 X 705 Kg – Rs.59,825 = 3625 (F)
    Standard Price of Material-A = Rs. 45

    Working Note:
    SQ i.e. quantity of inputs to be used to produce actual output
            = $\frac{1,480kg}{90\%}$ = 1,645 kg

  SQAO $_A$ = $\frac{800kg}{(800+600)}$ ×1,645kg. = 940 KG

  SQAO $_B$ = $\frac{600kg}{(800+600)}$ ×1,645kg. = 705 kg

(ii) Material Price Variance (A + B) = M3 – M4
Rs.45 x 900 Kg + Rs.30 X AQ of Material B – Rs.59825 = Rs.175(F)
AQ of Material B = 650 kg.

(iii) (AQ × AP) = Rs. 59,825
AP of Material A X 900 Kg + 21125 = 59825
Actual Price of Material-A = Rs. 43

(iv) To Calc. RSQ we need to divide Sum of AQ in Standard Units Ratio

Sum of AQ = 900 kg + 650 kg = 1550 kg
Standard kg Ratio = 800:600
Revised SQ$_A$ = $\frac{800kg}{(800+600)}$ ×1,550kg . **= 886 kg**

Revised SQ$_B$= $\frac{600kg}{(800+600)}$ ×1,550kg . **= 664 kg**

(v) Material Mix Variance (A + B) = M3 – M4
Rs.45 x 886 Kg + Rs.30 x 664 Kg - Rs.45 x 900 Kg - Rs.30 x 650 Kg
= **Rs. 210 (A)**

MARGINAL COSTING

Meaning of Contribution

Formula 1:- Contribution per unit = Selling price per unit – Variable Cost per unit
Formula 2:- Total Contribution = Total Sales – Total Variable Costs
Formula 3:- Contribution = Fixed Cost + Profit **(Derivation covered in class)**
Formula 4:- Contribution = Fixed Cost – Loss **(Derivation covered in class)**
Formula 5:- Contribution = Sales x P/V Ratio

Marginal cost Equation

Sales	XXX
Less:- Variable Cost	(XXX)
Contribution	**XXX**
Less:- Fixed Cost	(XXX)
Profit	**XXX**

Contribution to Sales Ratio $= \frac{Contribution}{Sales} \times 100$ (Expressed in %)

- Called Profit-Volume Ratio (P/V Ratio)
- Fixed Cost is ignored in Decision Making

P/V ratio $= \frac{Sales - Variable\ Cost}{Sales} \times 100 = \frac{Fixed\ Cost + Profit}{Sales} \times 100 = \frac{Fixed\ cost - loss}{Sales} \times 100$

Break Even Point Sales

- BEP Sales means "No Loss Sales" OR "Survival Sales" **(Derivation covered in class)**

BEP (In units) $= \frac{Fixed\ Cost}{contribution\ per\ unit}$ (Formula 1)

BEP Sales in rupees $= \frac{Fixed\ Cost}{p/vraio}$ (Formula 2)

Calculating P/V Ratio when break-even sales given

P/V Ratio $= \frac{Fixed\ Cost}{Break\ Even\ Sales} \times 100$ (Formula)

Calculating P/V Ratio when profit and sales volume of 2 periods are given. (Derivation covered in class)

P/V Ratio $= \frac{difference\ in\ profit}{difference\ in\ sales}$

Margin of safety sales
- Sales generating profit
- MOS sales means excess of actual sales over break-even point sales

MOS Sales units = $\frac{profit}{contribution\ per\ unit}$ **(Derivation covered in class)**

MOS Sales in Rs. = $\frac{profit}{pv\ ratio}$ **(Derivation covered in class)**

Break Even Sales Ratio and MOS Sales Ratio **(Derivation covered in class)**

Break Even Sales ratio + MOS Sales Ratio = 100%

Variable cost to sales ratio = $\frac{variable\ cost}{sales}$ x100

If variable cost to sales ratio is 60% then it means that if sales is made for Rs. 100 the

variable cost of Rs. 60 is incurred

Relation between PV Ratio & Variable Cost to Sales Ratio

P/V Ratio + variable cost to sales ratio = 100% **(Derivation covered in class)**

Required sales level to earn desired profit

Desired level of Sales (In units) = $\frac{Fixed\ Cost+Profit}{Contribution\ per\ unit}$ (Sum of BEP Sales and MOS Sales
Formula)
Desired level of Sales (In Rs.) = $\frac{Fixed\ Cost+Profit}{PV\ Ratio}$ (Sum of BEP Sales and MOS Sales Formula)

Cash BEP
- Minimum level of sales at which company is able to recover out fixed cost incurred in cash.

Cash BEP in units= $\frac{Cash\ Fixed\ cost}{contribution\ per\ unti}$

Cash BEP in rupees = $\frac{cash\ Fixed\ cost}{PV\ ratio}$

Cash fixed cost = Total FC – Non-FC
Non-cash FC are those which do not involve cash outflow e.g. depreciation

BEP for multiple products – Together
- One Packet – Multiple Products
- Each Product – Different Selling Price
- BEP For Packets

Illustration 1 – Page 14

MNP Ltd sold 2,75,000 units of its product at Rs. 37.50 per unit. Variable costs are Rs. 17.50 per unit (manufacturing costs of Rs. 14 and selling cost Rs. 3.50 per unit). Fixed costs are incurred uniformly throughout the year and amount to Rs. 35,00,000 (including depreciation of Rs. 15,00,000). there are no beginning or ending inventories.

Required: Estimate breakeven sales level quantity and cash breakeven sales level quantity.

Solution:

Break Even Sales Quantity = $\dfrac{\text{Fixed Cost}}{\text{Contribution per unit}}$ = $\dfrac{35,00,000}{37.50-17.50}$ = 1,75,000 units

Cash Break Even Sales Quantity = $\dfrac{\text{Cash Fixed Cost}}{\text{Contribution per unit}}$ = $\dfrac{20,00,000}{37.50-17.50}$ = 1,00,000 units

Contribution per unit = Sales – Variable cost = Rs. 37.50 – Rs. 17.50 = Rs. 20

Example 4 – Page 14

Arnav Ltd sells two products, J and K. The sales mix is 4 units of J and 3 units of K. The contribution margins per unit are Rs. 40 for J and Rs. 20 for K. Fixed costs are Rs. 6,16,000 per month. Compute the break-even point.

Solution

BEP Units x = $\dfrac{\text{Fixed Cost}}{\text{Contribution}}$ = $\dfrac{6,16,000}{4X\,40+3X20}$ = 2800 units

BEP (Units) for Product J is 4x = 4 X 2800 = 11200 units

BEP (Units) for Product K is 3x = 3 X 2800 = 8400 units

Illustration 4 – Page 18

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

	2019-20	2020-21
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 2020-21 due to the restructuring process. The company could maintain its sales quantity level of 2019-20 in 2020-21by reducing selling price.

You are required to calculate the following:

(i)   Sales for 2020-21in Rupees,
(ii) Fixed cost for 2020-21,
(iii) Break-even sales for 2020-21in Rupees.

Solution

Working Note 1:- Marginal Cost Equation

	2019-20	2020-21
MOS Sales	3,20,000 (40% of sales)	1,40,000 (21.875%)
+ BEP Sales	4,80,000 (balancing figure)	5,00,000 (balancing figure)
Total Sales	8,00,000	6,40,000 (Note 2)(
(-) Variable cost	(4,00,000) (balancing figure)	(4,00,000) (same as 2013- Note 1)
Total contribution	4,00,000 (50% P/V Ratio)	2,40,000 (balancing figure)
(-) Fixed Cost	(2,40,000) (BEP X P/V Ratio)	(1,87,500) (BEP X P/V Ratio)
Profit	1,60,000 (MOS Sales X P/V Ratio)	52,500 (MOS Sales X P/V Ratio)

Note 1:- In 2020-21, total variable cost will be same since sales quantity level of 2019-20 & 2020-21is same.

Note 2:- If in 2020-21, P/V Ratio = 37.5%

Hence, Variable cost to sales = 100% =37.5% = 62.5%

$\frac{4,00,000}{\text{Total sales}}$ = 62.5%

Total sales = Rs. 6,40,000

(i) Sales (2020-21) = Rs. 6,40,000 (working note 1)

(ii) Fixed Cost (2020-21) = Rs. 1,87,500 (working note 1)

(iii) BEP (2020-21) = Rs. 5,00,000 (working note 1)

ILLUSTRATION 5 – Page 22

You are given the following data for the current financial year of Rio Co. Ltd:

Variable cost	60,000	60%
Fixed cost	30,000	30%
Net profit	10,000	10%
Sales	1,00,000	100%

FIND OUT (a) Break-even point, (b) P/V ratio, and (c) Margin of safety. Also DRAW   a break-even chart showing contribution and profit.

SOLUTION

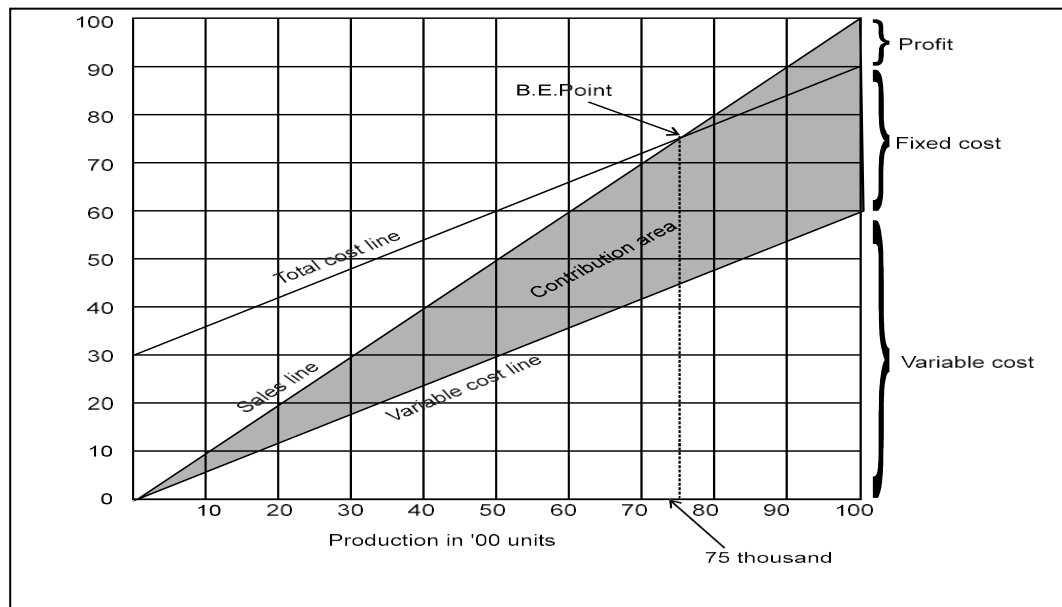P//V RATIO = $\frac{\text{Sales}-\text{variable cost}}{\text{sales}}$ = $\frac{1,00,000-60,000}{1,00,000}$ = 40%

Break even point = $\frac{\text{fixed cost}}{\text{p/v ratio}}$ = $\frac{30,000}{40\%}$ = **Rs. 75,000**

Margin of safety = Actual Sales – BE point = 1,00,000 – 75,000 = Rs. 25,000

Break even chart showing contribution is shown below:

Concept No:- Key factor / limiting factor

- Key factor limits the production capacity of an undertaking examples are shortage of raw material, shortage of labour, shortage of sales capacity, shortage of plant capacity

- Contribution per unit of limiting factor should be considered to decide the ranking of products to be produced and sold

$$\text{Contribution per unit of limiting factor} = \frac{contribution\ per\ unit}{key\ factor\ per\ unit}$$

- The product having largest contribution per unit of limiting factor should be ranked as first and so on.

- Following are various limiting factors and decision making rule

Various limiting factor	Decision making Rule
1.labour hours	Contribution per labour hour
2.machine hours	Contribution per machine hour
3.raw material in Qty (Kg.)	Contribution per kg of raw material
4.raw material cost	Contribution per rupee of material cost
5.labour cost	Contribution per rupee of labour cost
6.sales Qty	Contribution per unit sold
7.sales value in rupees	Contribution per rupee of sales / P/V Ratio

Steps to calculate best suitable mix of products

Step1:- Find out contribution per unit of each product

Step2:- Find out contribution per unit of limiting factor e.g. contribution per labour hour

Step3:- Allot ranking based on first rank to highest contribution per unit of limiting factor.

Step4:- Allocate the available resources to production of different units of products on the basis of ranking in step3.

Step5:- Find suitable best mix of all the products and find contribution for this mix.

Illustration 11 – Page 37

ABC Limited produces and sells two product- X and Y. The product is highly demanded in the market. Following information relating to both the products are given as under :

	Per unit (Rs.)	
	X	Y
Direct Materials	140	180
Direct Wages	60	100
Variable Overheads (Rs.5 per machine hour)	20	40
Selling Price	300	450

The company is facing scarcity of machine hours for working. The availability of machine hours are limited to 60,000 hrs in a month. At present, the monthly demand of product X and product Y is 8,000 units and 6,000 units respectively. The fixed expenses of the company are Rs. 2,25,000 per month.

You are required to:

DETERMINE the product mix that generates maximum profit to the company in the given situation and also CALCULATE the profit of the company.

Solution

Required Machine Hours = 8000 units X 4 hour + 6000 units X 8 hour = 80000 hours

Available machine hours = 60000 hours

Scarce Hours = 20000 hours Hence Limiting Factor

Statement showing rank between products

	X (₹)	Y (₹)
Selling price per unit	300	450
Less variable cost per unit	(220)	(320)
Contribution per unit	80	130
Machine hour per unit	4 hour	8 hour
Contribution per Machine hour	Rs. 20	Rs. 16.25
Rank	I	II

Allocation of available Machine hours to products

Product	Rank	Best Product Mix units	Machine Hr per unit	Available hours
X	I	8000	4 hour	32000
Y	II	3500 units	8 hour	28000 hours (Bal.)
			Total	**60,000 hours**

Total Profit = Total Contribution – Total Fixed Cost
= 8000 units X Rs.80 + 3500 units X Rs.130 – Rs.225000 = Rs.870000

Concept – Processing of Special Order

- When the resources for production are excess in supply, demand for the products becomes the limiting factor. Any additional demand for the product can earn an additional contribution to recover fixed costs. **(Capacity in Plenty)**
- Special orders are the orders which are **non-repetitive**. Offers for special orders are accepted even if the offered price covers the marginal cost (incremental cost) as it utilises the resources and can earn additional profit.
- **Some qualitative factors** like the effect of the decision on the existing customers or market, long term customer relationship, ethical and legal impact etc. shall also be given due consideration.
- **Only Variable cost increases due to Special order while Total Fixed cost does not increase.**

Illustration 12 – Page 38

PQR Ltd. manufactures medals for winners of athletic events and other contests. Its manufacturing plant has the capacity to produce 10,000 medals each month. The company has current production and sales level of 7,500 medals per month. The current domestic market price of the medal is Rs. 150.
The cost data for the month of August 2021 is as under:

	Rs.
Variable costs:	
▪ Direct Materials	2,62,500
▪ Direct Labour Cost	3,00,000
▪ Overhead	75,000
Fixed Manufacturing Costs	2,75,000
Fixed Marketing Costs	1,75,000Rs.
	10,87,500

PQR Ltd. has received a special one-time only order for 2,500 medals at Rs. 120 per medal. Required:

(i) Should PQR Ltd. accept the special order? Why? EXPLAIN briefly.

(ii) Suppose the plant capacity was 9,000 medals instead of 10,000 medals each month. The special order must be taken either in full or rejected totally. ANALYSE whether PQR Ltd. should accept the special order or not.

Solution

W. Note – Calc. of Existing Profit = Total Revenue – Total Cost

=7500 units X Rs.150 – Rs.1087500 = Rs.37500

(i) Since we have spare capacity to produce additional 2500 units. We need to incur only variable cost on this. Total Fixed Cost will remain same.

New Profit if special order is accepted = Total Revenue – Total Var. Cost - TFC

= 7500 units X Rs.150 + 2500 units X Rs.120 – 10000 units X Rs.85 – Rs.450000

= Rs.125000

Variable cost per unit = $\frac{Total\ Variable\ Cost}{Total\ units\ produced}$ = $\frac{Rs.637500}{7500\ units}$ = Rs.85

Advise:- Special order should be accepted since Profit increases by Rs.87500 (From Rs.37500 to Rs.125000)

(ii) Since we have spare capacity to produce additional 2500 units. We need to incur only variable cost on this. Total Fixed Cost will remain same.

New Profit if special order is accepted = Total Revenue – Total Var. Cost - TFC

= 6500 units X Rs.150 + 2500 units X Rs.120 – 9000 units X Rs.85 – Rs.450000

= Rs.60000

Variable cost per unit = $\frac{Total\ Variable\ Cost}{Total\ units\ produced}$ = $\frac{Rs.637500}{7500\ units}$ = Rs.85

Advise:- Special order should be accepted since Profit increases by Rs.22500 (From Rs.37500 to Rs.60000)

Concept – Make or Buy

- Make or Buy is a situation of decision making where it is to be decided whether the product should be made using the own production facility or to be produced outside by outsourcing or to buy from the market instead of making.

- This type of situation arises when Demand for the product is more than the supply of resources (material, men, machine etc.). The resource is limiting or key factor and decision is made keeping optimum utilization of the key resource and the maximization of profitability into consideration.

- However the qualitative factors shall also be kept into consideration.

Illustration 13 – Page 41

NN Ltd. manufactures automobiles accessories and parts. The following are the total cost of processing 2,00,000 units:

Direct materials cost	Rs. 375 per unit
Direct labour cost	Rs. 80 per unit
Variable factory overhead	Rs. 16 per unit
Fixed factory overhead	Rs. 500 lakhs

The purchase price of the component is Rs. 485. The fixed overhead would continue to be incurred even when the component is bought from outside.

REQUIRED:

(a) Should the part be made or bought from outside considering that the present facility when released following a buying decision would remain idle?

(b) In case the released capacity can be rented out to another manufacturer for Rs. 32,00,000 having good demand. What should be the decision?

Solution

(a) "present facility when released following a buying decision would remain idle" – It means TFC shall continue to incur even if component is purchased from outside. Hence Fixed Cost shall be ignored while deciding "Make or Buy".

Variable Cost to produce (Per unit) = Rs.375 + Rs.80 + Rs.16 = Rs.471

Purchase Price (Per unit) = Rs.485

Advise:- Company should produce component on its own since cheaper by Rs.14 per unit

(b) If by releasing the production facility the company can earn a rental income of Rs. 32,00,000, then the additional cost of buying from outside and the rental income from releasing the capacity shall be compared for making decision.

(i) Rental income	Rs. 32,00,000
(ii) Additional cost of buying (Rs. 14 × 2,00,000 units)	Rs. 28,00,000
Additional Income {(i)-(ii)}	Rs. 4,00,000

The component should be bought from outside as it would save the company Rs.4,00,000 in fixed cost.

Concept – Opportunity Cost

It means benefit forgone by rejecting the option.

Opportunity Cost means maximum possible loss of Contribution by not choosing alternative Opportunities.

Example:- Suppose You, after becoming CA, has 3 option to earn money.

Opportunity 1:- Join Job in an big Company & earn Rs.80,000 per month as salary.

Opportunity 2:- Start your own Practice & earn Rs. 60,000 Lakh per month.

Opportunity 3:- Start Teaching Full Time & Earn Rs.45,000 per month

If you choose Opportunity 1 then you will not earn earnings from Opportunity 2 & Opportunity 3. It means earnings from these Opportunities will be lost. This "lost earning" is called "Opportunity cost". Opportunity cost of choosing Opportunity 1 is maximum possible loss of benefits of opportunity 2 & opportunity 3. Hence opportunity cost of option 1 is Rs.60,000 per month (Maximum of Rs.60,000 & Rs.45,000)

Illustration 14 – Page 42

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)	3000	2000	1000
Production Capacity (unit)	2000	3000	900
Fixed Cost (Rs.)	30,000		

Required

COMPUTE the opportunity costs for each of the products.

Solution   **Statement showing Total Contribution**

Particulars	X	Y	Z
	Opportunity 1	Opportunity 2	Opportunity 3
Contribution per unit – (SPPU – VCPU)	Rs.4	Rs.3	Rs.5
Possible Sales – (Lower of Demand or Production Capacity)	2,000 units	2,000 units	900 units
Total Contribution (AxB)	Rs.8000	Rs.6000	Rs.4500
Opportunity Cost (Higher of contribution of rejected options)	Rs.6000	Rs.8000	Rs.8000

Concept – Income Statement under Absorption & Marginal costing

Income statement under Marginal costing approach

Particulars	Amount (Rs.)
Variable (Direct Material Cost)	XX
Variable (Direct Labour Cost)	XX
Variable (Direct Expenses)	XX
Variable Factory OH	XX
Variable manufacturing cost of Quantity Produced	**XX**
Add:- Opening FG	XX
Less:- Closing FG	(XX)
Variable manufacturing cost of Quantity Sold	**XX**
Add:- Variable Office & Admin OH	XX
Add:- Variable Selling & Distribution OH	XX
Variable Cost of Sales (A)	**XX**
Sales (B)	XX
Contribution (B – A)	XX
Less:- Fixed Factory OH	(XX)
Fixed Office and Admin OH	(XX)
Fixed Selling & Distribution OH	(XX)
Profit	**XX**

Income statement under Absorption costing approach

Particulars	Amount (Rs.)
Variable (Direct Material Cost)	XX
Variable (Direct Labour Cost)	XX
Variable (Direct Expenses)	XX
Variable Factory OH	XX
Fixed Factory OH **absorbed** units produced x standard rate per unit	XX
Total manufacturing cost of Quantity Produced	**XX**
Add:- Opening FG	XX
Less:- Closing FG	(XX)
Total manufacturing cost of Quantity Sold	**XX**
Add:- Variable Office & Admin OH	XX
Fixed Office and Admin OH	XX
Variable Selling & Distribution OH	XX
Fixed Selling & Distribution OH	XX
Add:- Under absorbed OH (Actual OH incurred – OH absorbed)	XX
Less:- Over absorbed OH (OH absorbed – Actual OH incurred)	(XX)
Total Cost of Sales (A)	**XX**
Sales (B)	XX
Profit (B – A)	**XX**

Reason for difference in profit

Particulars	Amount (Rs.)
Profit under marginal costing	**Xxx**
Add:- Opening stock Excess in marginal costing	Xxx
Closing stock Excess in absorption costing	Xxx
Less:- Opening stock Excess in absorption Costing	(xxx)
Closing stock Excess in Marginal costing	(xxx)
Profit under absorption costing	**Xxx**

Illustration 18 – Page 51

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. lakhs	Rs. lakhs
Sales	8.00	16.00
Production costs:		
Variable	3.20	6.40
Fixed	1.60	1.60
Selling and administration costs:		
Variable	1.60	3.20
Fixed	2.40	2.40

The normal level of activity for the year is 800 units. Fixed costs are incurred evenly throughout the year, and actual fixed costs are the same as budgeted. There were no stocks of ZEST at the beginning of the year.

In the first quarter, 220 units were produced and 160 units were sold.

Required

      (a) What would be the fixed production costs absorbed by ZEST if absorption costing is used?

      (b) What would be the under/over-recovery of overheads during the period?

      (c) What would be the profit using absorption costing?

      (d) What would be the profit using marginal costing?

Solution

Working Note 1:- <u>Calculation to closing stock units</u>

Particulars	Units
Opening stock	NIL
Add Produced	220 units
Less Sold	(160 units)
Closing Stock	**60 units**

Working Note 2:-

Variable production cost per unit	$\frac{Rs.3,20,000}{400\ units}$ = Rs. 800 per unit
Variable selling & Dist cost per unit	$\frac{Rs.160,000}{400\ units}$ = Rs. 400 per unit
Selling price per unit	$\frac{Rs.1600,000}{800\ units}$ = Rs. 2000 per unit
Fixed production cost per quarter	$\frac{Rs.160,000}{4\ Qtr}$ = Rs. 40,000
Fixed Selling &Dist OH per quarter	$\frac{Rs.240,000}{4\ Qtr}$ = Rs. 60,000
Fixed production OH per unit	$\frac{Rs.160,000}{800\ units}$ = Rs. 200 per unit

(d) Income statement under Marginal costing approach

Particulars	Amount (Rs.)
Variable (Direct Material Cost)	
Variable (Direct Labour Cost)	
Variable (Direct Expenses)	
Variable Factory OH	
Variable manufacturing cost of Quantity Produced 220 units x Rs.800	**176000**
Add:- Opening FG	NIL
Less:- Closing FG 60 units x Rs.800	(48,000)
Variable manufacturing cost of Quantity Sold	**1,28,000**
Add:- Variable Selling OH 160 units x Rs.400	64,000
Variable Cost of Sales (A)	**1,92,000**
Sales (B)	3,20,000
Contribution (B – A)	1,28,000
Less:- Fixed Factory OH	40000
Fixed Office and Admin OH	
Fixed Selling & Distribution OH	60000
Profit	**28000**

(c) Income statement under Absorption costing approach

Particulars	Amount (Rs.)
Variable (Direct Material Cost)	
Variable (Direct Labour Cost)	
Variable (Direct Expenses)	
Variable Factory OH	
Total **220 units x Rs.800**	**176000**
Fixed Factory OH **absorbed** 220 units x Rs.200	44,000
Total manufacturing cost of Quantity Produced	**2,20,000**
Add:- Opening FG	NIL
Less:- Closing FG 60 units	(60000)
Total manufacturing cost of Quantity Sold	**160000**
Add:- Variable Selling & Dist. OH 160 units x Rs.400	64,000
Fixed Selling and Dist. OH	60000
Add:- Under absorbed OH (Actual OH incurred – OH absorbed) Less:- Over absorbed OH (OH absorbed – Actual OH incurred) (40000 – 44000)	(4000)
Total Cost of Sales (A)	**2,80,000**
Sales (B)	**3,20,000**
Profit (B – A)	**40,000**

(a) Fixed production cost absorbed

   = Actual production in units x Fixed production overhead per unit

   = 220 units x Rs. 200 per unit = Rs. 44,000

(b) Fixed Production Overheads absorbed = Rs. 44,000

   Actual Fixed production overheads = Rs. 40,000

   Over absorbed Overheads = Rs. 44,000 – 40,000 = Rs. 4,000

BUDGETS & BUDGETARY CONTROL

Concept - Flexible Budget

This budget is prepared at different level of production. We divide all types of expenses into 3 categories while making this budget

- a. Variable expense = Feature (variable cost remain same at per unit at all levels)
- b. Fixed expenses = Feature (Fixed cost in totality remain same at all levels)
- c. Semi-variable expenses = Neither Variable Exp. Nor Fixed Exp.

Variable portion in semi-variable cost = $\dfrac{Difference\ in\ total\ semi-variable\ cost}{Difference\ in\ units}$

Fixed portion in semi variable cost = Total semi variable cost – Total variable portion in semi-variable cost.

ILLUSTRATION 1 – Page 19

A factory which expects to operate 7,000 hours i.e. at 70% level of activity, furnishes details of expenses as under:

Variable expenses	Rs.1,260
Semi-variable expenses	Rs.1,200
Fixed expenses	Rs.1,800

The semi-variable expenses go up by 10% between 85% and 95% activity and by 20% above 95% activity. PREPARE a flexible budget for 80, 90 and 100 per cent activities.

SOLUTION

Head of Account	Control basis	70%	80%	90%	100%
Budgeted hours		7,000	8,000	9,000	10,000
		(Rs.)	(Rs.)	(Rs.)	(Rs.)
Variable expenses	Var.	1,260	1,440	1,620	1,800
Semi-variable expenses	Semi. Var	1,200	1,200	1,320	1,440
Fixed expenses	Fixed	1,800	1,800	1,800	1,800
Total expenses		4,260	4,440	4,740	5,040
Recovery rate per hour		0.61	0.55	0.53	0.50

ILLUSTRATION 2 – Page 20

A department of Company X attains sale of Rs. 6,00,000 at 80 per cent of its normal capacity and its expenses are given below :

	(Rs.)
Administration costs:	
Office salaries	90,000
General expenses	2 per cent of sales

Depreciation	7,500
Rates & Taxes	8,750
Selling costs:	
Salaries	8 per cent of sales
Travelling expenses	2 per cent of sales
Sales office expenses	1 per cent of sales
General expenses	1 per cent of sales
Wages	15,000
Rent	1 per cent of sales
Other expenses	4 per cent of sales

Draw up flexible administration, selling and distribution costs budget, operating at 90 per cent, 100 per cent and 110 per cent of normal capacity.

SOLUTION   Flexible Budget of Department....of Company 'X'

	80% (Rs)	90% (Rs)	100% (Rs)	110% (Rs)
Sales	6,00,000	6,75,000	7,50,000	8,25,000
Administration Costs:				
Office Salaries (fixed)	90,000	90,000	90,000	90,000
General expenses (2% of Sales)	12,000	13,500	15,000	16,500
Depreciation (fixed)	7,500	7,500	7,500	7,500
Rent and rates (fixed)	8,750	8,750	8,750	8,750
(A) Total Adm. Costs	**1,18,250**	**1,19,750**	**1,21,250**	**1,22,750**
Selling Costs :				
Salaries (8% of sales)	48,000	54,000	60,000	66,000
Travelling expenses (2% of sales)	12,000	13,500	15,000	16,500
Sales office (1% of sales)	6,000	6,750	7,500	8,250
General expenses (1% of sales)	6,000	6,750	7,500	8,250
(B) Total Selling Costs	**72,000**	**81,000**	**90,000**	**99,000**
Distribution Costs :				
Wages (fixed)	15,000	15,000	15,000	15,000
Rent (1% of sales)	6,000	6,750	7,500	8,250
Other expenses (4% of sales)	24,000	27,000	30,000	33,000
(C) Total Distribution Costs	**45,000**	**48,750**	**52,500**	**56,250**
Total Costs (A + B + C)	**2,35,250**	**2,49,500**	**2,63,750**	**2,78,000**

Note: In the absence of information it has been assumed that office salaries, depreciation, ratesand taxes and wages remain the same at 110% level of activity also.

Concept – **Production Budget**
- Units to be produced
- Budgeted production = budgeted Sales + closing stock of finished goods – opening stock of finished goods

Raw Material Budget

- Raw material to be purchased = budgeted production x raw material requirement per unit

Production Cost Budget
- Cost which should have been incurred for the budgeted production level.
- Budgeted production cost is compared with actual production cost
- Analyse variance

Cash budget
- Estimated cash inflows and outflows during the budgeted period.
- Cash account is maintained for past cash inflows and cash outflows.
- Opening cash balances + estimated cash receipts – estimated cash payments = closing cash balance

Illustration 4 – Page 40
A single product company estimated its sales for the next year quarter-wise 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 (Rs.)	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 present 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 :

Total Annual Production (in units)

Sales in 4 quarters	1,53,750	units
Add : Closing balance	12,250	units
	1,66,000	units
Less : Opening balance	(6,000)	units
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

* Difference figure

(ii)
Raw material consumption budget in quantity

	Quarters				Total
	I	*II*	*III*	*IV*	
Units to be produced in each quarter: (A)	31,500	38,250	42,000	48,250	1,60,000
Raw material con-sumptionp.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) - Annually

Raw material to be Consumedin production (kg.)	3,20,000
Add : Closing stock of raw material (kg.)	5,000
Less : Opening stock (kg.)	(10,000)
Material to be purchased (kg.)	3,15,000

Raw materialpurchase budget (in value) - Annually

Quarters	% of annual require-ment (Qty.) for pur-chasing raw material (kg.)	Quantity of raw material to be purchased	Rate per kg. (Rs)	Amount (Rs)
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 RS.	Value RS.	Kg.	Rate RS.	Value RS.	Kg.	Rate RS.	Value RS.	Kg.	Rate RS.	Value RS.
Opening balance	10,000	2	20,000	41,500	2	83,000	1,22500	3	3,67,500	38,500	3	1,15500
(A)										63,000	4	2,52000
Purchases: (B)	94,500	2	1,89,000	1,57,500	3	4,72500	63,000	4	2,52000	-	-	-
Consumption: (C)			1,26000	41,500	2	83,000	84,000	3	2,52,000	38,500	3	1,15,500
	63,000	2		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			

Concept - Ratios

(i) Efficiency Ratio = $\frac{Standard\ Hours}{Actual\ Hours}$ x 100

e.g. how efficient the worker is? If worker is doing same task in less than "standard time" then he is efficient.

(ii) Activity Ratio = $\frac{Standard\ Hours}{Budgeted\ Hours}$ x 100

e.g. how hard-working the worker is? If worker is planning to work for more than standard time; it means he is hard worker.

(iii) Standard Capacity Usage Ratio = $\frac{Budgeted\ Hours}{Maximum\ possible\ hours\ in\ the\ budget\ period}$ x 100

(iv) Actual Capacity Usage Ratio = $\frac{Actual\ Hours\ Worked}{Max.Possible\ working\ hours\ in\ a\ period}$ x 100

(v) Actual Usage of Budgeted Capacity Ratio = $\frac{Actual\ Working\ Hours}{Budgeted\ Hours}$ x 100

(vi) Calendar Ratio = $\frac{Available\ working\ days}{Budgeted\ working\ days}$ x 100

Illustration 7 – Page 61

Following Data is available for XYZ Ltd.

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	6400 hours
Standard hours expected to be earned per four week	8000 hours
Actual hours worked in the four week period	6000 hours
Standard hours earned in the four week period	7000 hours

The related period of is 4 weeks. In this period, there was one special day holiday due to national event.

Calculate following ratios

1. Efficiency Ratio
2. Activity ratio
3. Standard Capacity Usage Ratio
4. Actual Capacity Usage Ratio
5. Actual Usage of Budgeted Capacity Ratio
6. Calendar Ratio

Solution Following Data is available for ABC

		Analysis	Tech. Term
Standard working Hours	8 hours per day of 5 days per week	A worker "should" work for 5 days in a week and 8 hours in a day.	
Maximum capacity	50 employees	Max. 50 workers can work in this Co.	
Actual Working	40 Employees	Actually 40 workers worked	
Actual hours expected to be worked per four week	6400 Hours	40 workers "should" work for 6400 hours in this month. 40 Workers x 4 week x 5 days x 8 hours = 6400 Hours	Budgeted Hours
Standard hours expected to be earned per four week	8000 Hours	If 50 workers work then those 50 workers "should" work for 8000 hours in this month. 50 Workers x 4 week x 5 days x 8 hours = 8000 Hours It is Maximum Hours	Maximum Hours
Actual Hours Worked in the four week Period	6000 Hours	40 workers "Actually" worked for 6000 hours in this month.	Actual Hours
Standard Hours earned in the four week period	7000 hours		Standard Hours

The period is of 4 weeks.

(i) Efficiency Ratio = $\frac{Standard\ Hours}{Actual\ Hours}$ x 100 = $\frac{7000\ Hours}{6000\ Hours}$ x 100 = 116.67%

(ii) Activity Ratio = $\frac{Standard\ Hours}{Budgeted\ Hours}$ x 100 = $\frac{7000\ Hours}{6400\ Hours}$ x 100 = 109.375%

(iii) Standard Capacity Usage Ratio =

$\frac{Budgeted\ Hours}{Maximum\ possible\ hours\ in\ the\ budget\ period}$ x 100 = $\frac{6400\ Hours}{8000\ Hours}$ x 100 = 80%

(iv) Actual Capacity Usage Ratio =

$$\frac{Actual\ Hours\ Worked}{Max.Possible\ working\ hours\ in\ a\ period} \times 100 = \frac{6000\ Hours}{8000\ Hours} \times 100 = 75\%$$

(v) Actual Usage of Budgeted Capacity Ratio

$$= \frac{Actual\ Working\ Hours}{Budgeted\ Hours} \times 100 = \frac{6000\ Hours}{6400\ Hours} \times 100 = 93.75\%$$

(vi) Calendar Ratio $= \frac{\text{Available working days}}{\text{Budgeted working days}} \times 100 =$ 19 days / 20 days = 95%