CA INTER

COST & MANAGEMENT ACCOUNTING

VOLUME I

SOLVED QUESTION BANK

ONE BOOK. EVERY SOLUTION. EXAM READY!

Crafted with Creativity, Designed for Success!

Covers 100% ICAI Study Material, Past Exam Papers, RTP & MTP (Case Study Based MCQs included)

CA GANESH BHARADWAJ

Solved Question Bank

Welcome to this **'One of a Kind'** Solved Question Bank on Cost & Management Accounting.

This book is your single source of Costing preparation as it is meticulously compiled to include all questions & Case Study Based MCQs with solutions from ICAI Study Material, Past Exam Papers (PEPs), Revision Test Papers (RTPs), and Mock Test Papers (MTPs)—ensuring you have everything you need in one place.

For the first time ever, similar questions are grouped together with unique numbering & a distinct colour background to make your revision structured and effortless. The best part is that I have personally improvised the presentation of solutions wherever required to enhance your learning experience, making them easy to follow and apply in your exams. This innovative approach will help you collate problem solving faster and practice efficiently.

Study smarter, stay ahead, and ace your exams with confidence.
Remember, a perfect 100/100 in Costing is soon a reality for you.

With Best Wishes,
CA Ganesh Bharadwaj

FOREWORD

In 1999-2000 my son and his group of ten friends who were pursuing the Chartered Accountancy course wanted me to coach them in Cost Accounting and Financial Management to which I agreed.

When they passed the Intermediate level of the course, they wanted me to teach Advanced Management Accounting and Strategic Financial Management for the Final level of the course. That was when my journey in coaching CA Intermediate and Final started.

Since then, I took more than 30 batches for Intermediate and Final students in small groups. To my satisfaction, I have a success rate of more than 90%.

I am satisfied that my students have been well placed in the industry. But to my surprise, I found that none of my students were interested in teaching. With this background, I got a call from Ganesh for an appointment. Ganesh was my student in CA Intermediate and Final level for the subjects Costing and Financial Management. He told me his desire to enter the teaching profession and wanted my views. Immediately I gave him the consent and gave some tips from my experience to start coaching students.

In Ganesh, I found an enterprising character and an urge to excel in whatever he does. As a student, he learned some finer points and asked pertinent questions. To his advantage, he has a command over technology and is tech-savvy. He keeps himself abreast of the latest technology and uses tech to his advantage.

Ganesh prepared this study material and wanted my views. A casual glance of this study material suggested the hard work and intelligence put in by him in preparing the study material. He has taken micro care in ensuring that this study material covers all the syllabus of the CA curriculum. The chapters are arranged in logical order and questions are arranged well from basic fundamental level to high professional level. Also, he has grouped all the similar questions together which will help students to revise similar questions in a short time span. This idea is definitely one of a kind!

With the well-prepared study material and well-motivated Ganesh, I am absolutely certain that the students will benefit from his coaching sessions. If followed sincerely there is no doubt that students can face the CA exams with courage and determination.

I pray to my Guru to shower his blessings to Ganesh and reward him and his students for the hard work.

Love you all.
V N Prabakar CA, CMA, CS

PREFACE

It gives me immense pleasure to present this Solved Question Bank on Financial Management designed specifically for students pursuing the **Intermediate level** of **Chartered Accountancy (CA)** course as per the New Syllabus.

As per the learning objectives prescribed on the subject by The **Institute of Chartered Accountants of India**, a student at the **Intermediate level** is expected to develop an **in-depth understanding** of basic concepts and applications to establish the **cost** associated with the production of **products** and provision of **services** and apply the same to determine **prices**, develop an understanding of **cost accounting statements** and acquire the ability to apply information for **cost ascertainment**, **planning, control, and decision making.**

This book is a classroom supplement and contains a **rich collection** of solved problems ranging from Easy to Difficult, that covers **100%** of the Illustrations, Exercise Problems & Case Study Based MCQs prescribed in **ICAI Study Material, Past Exam Papers (PEPs), Revision Test Papers (RTPs) & Mock Test Papers (MTPs).** An extensive and in-depth discussion on the concepts dealt with by these problems along with the tips on the presentation of answers in exams will be covered during the lectures.

I am forever grateful to my parents **(Shri Seetharaman & Smt Usha Seetharaman)** and my brother **Hari,** for their constant motivation and support in all walks of my life. Many thanks to my friends **Mohit** and **Srinivas** who have stood by me through thick and thin in various phases of my life no matter what. I sincerely thank & appreciate the efforts of my **student Bharathi**, who helped me in editing the contents of this book. Special thanks to **Habib and team** for their complete DTP support.

I dedicate this book to my Costing & FM guru **Shri CA V.N. Prabakar Sir** who not only inculcated me with interest in the subject but was also kind enough to write a foreword to this book.

Finally, none of this would have been a reality without the blessings of **Shri Kanchi Maha Periyava** and I bow down to the great lineage of gurus originating from **Shri Adi Shankaracharya.**

I wish the students the very best in all their future endeavors. As the famous verse from the Bhagavad Gita goes - **"Your right is for action alone, never for the results. Do not become the agent of the results of action. May you not have any inclination for inaction."**

So, give your best and leave the rest. Success will automatically follow.

"Work Hard in Silence. Let your success make all the noise."

With Best Wishes,
CA Ganesh Bharadwaj

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CHAPTER 01: BASIC CONCEPTS

PROBLEM – 1:

ABC Pistons Ltd. operates an automobile service facility that specializes in replacing pistons on compact cars. The following table shows the costs incurred during a month when 600 pistons were replaced.

Particulars	Piston Replacements		
	500	600	700
Fixed costs	a	₹ 42,000	b
Variable costs	c	₹ 30,000	d
Total costs	e	₹ 72,000	f
Cost per Piston Replacement:			
Fixed costs	g	h	i
Variable cost	j	k	l
Total cost per piston replacement	m	n	o

Required: Fill in the missing amounts, labelled a. through (o), in the table.

SOLUTION:

	Piston Replacements		
Particulars	**500 Units**	**600 Units**	**700 Units**
Fixed Cost	₹ 42,000	₹ 42,000	₹ 42,000
Variable Cost	₹ 25,000	₹ 30,000	₹ 35,000
Total Cost	**₹ 67,000**	**₹ 72,000**	**₹ 77,000**
Fixed Cost Per Unit	₹ 84	₹ 70	₹ 60
Variable Cost Per Unit	₹ 50	₹ 50	₹ 50
Total Cost Per Unit	**₹ 134**	**₹ 120**	**₹ 110**

W.N 1: Fixed Cost = ₹ 42000 (Given)

Variable Cost = ₹ 30000 ÷ 600 Units = ₹ 50 Per Unit

Observation:

1. Variable Cost Increases In Total As Volume Increases. However, Variable Cost Per Unit Remains Constant.
2. Fixed Cost Remains Constant In Total But Decreases On A Per-Unit Level As The Volume Increases.
3. Total Cost Increases As The Volume Increases Because Of Variable Cost.
4. Total Cost Per Unit Decreases As The Volume Increases Because Of Fixed Cost Per Unit.

PROBLEM – 2

A single-product manufacturing company gives the following budgetary details for a year when production is maintained at 80,000 units (80%).

Particulars	Cost per unit (₹)
Direct materials	40
Direct labour	25
Production overheads (60% fixed)	15
Administration overheads (100% fixed)	5
Selling and distribution overhead (60% variable)	10

Prepare the company's budgetary details per unit and in total when it works at 90% capacity.

SOLUTION:

Flexible Budget

	80,000 Units		90,000 Units	
Particulars	**Per Unit**	**Amount (₹)**	**Per Unit**	**Amount (₹)**
Direct Material	40	32,00,000	40	36,00,000
Direct Labour	25	20,00,000	25	22,50,000
Prime Cost	**65**	**52,00,000**	**65**	**58,50,000**
Production Overheads (Fixed) ₹ 15 x 60%	9	7,20,000	8	7,20,000
Production Overheads (Variable) ₹ 15 x 40%	6	4,80,000	6	5,40,000
Manufacturing Cost/Works/ (Factory Cost)	**80**	**64,00,000**	**79**	**71,10,000**
Administrative Overheads (Fixed)	5	4,00,000	4.44	4,00,000
Selling & Distribution (Fixed)	4	3,20,000	3.55	3,20,000
Selling & Distribution (Variable)	6	4,80,000	6	5,40,000
Total Cost	**95**	**76,00,000**	**92.995**	**83,70,000**

PROBLEM – 3

A newly established manufacturing company has an installed capacity to produce 1,00,000 units of a consumer product annually. However, its practical capacity is only 90%. The actual capacity utilization may be substantially lower, as the firm is new to the market and demand is uncertain.

The following budget has been prepared for 90% capacity utilization:

Particulars	Cost per unit (₹)
Direct materials	12
Direct labour	8
Direct expenses	5
Production overheads (40% variable)	10
Administration overheads (100% fixed)	5
Selling and distribution (50% variable)	6

You are required to prepare a budget at 60%, 70% and 80% levels of capacity utilization giving clearly the unit variable cost, the unit fixed cost and the total cost under various heads at all the above levels.

SOLUTION:

Flexible Budget

	90,000 Units (Given)	
Particulars	**Per Unit**	**Amount (₹)**
Direct Material	12	10,80,000
Direct Labour	8	7,20,000
Direct Expenses	5	4,50,000
Prime Cost	**25**	**22,50,000**
Production Overheads (Variable)	4	3,60,000
Production Overheads (Fixed)	6	5,40,000
Factory Cost	**35**	**31,50,000**
Administrative Overheads (Fixed)	5	4,50,000
Selling & Distribution (Variable)	3	2,70,000
Selling & Distribution (Fixed)	3	2,70,000
Total Cost	**46**	**41,40,000**

Flexible Budget

Particulars	Per Unit	60,000 units Value (₹)	Per Unit	70,000 units Value (₹)	Per Unit	80,000 units Value (₹)
Direct Material	12	720000	12	840000	12	9,60,000
Direct Labour	8	480000	8	560000	8	6,40,000
Direct Expenses	5	300000	5	350000	5	4,00,000

Prime Cost	**25**	**1500000**	**25**	**1750000**	**25**	**20,00,000**
Add: Variable @ 40% (Production Overhead)	4	240000	4	280000	4	3,20,000
Add: Fixed @ 60% (Production Overhead)	9	5,40,000	7.7	5,40,000	6.75	5,40,000
Gross Works Cost	**38**	**2280000**	**36.7**	**2570000**	**35.75**	**28,60,000**
Administration Overhead	7.5	4,50,000	6.42	4,50,000	5.62	4,50,000
Selling & Other Overheads Variable @50%	3	180000	3	210000	3	2,40,000
Fixed @50%	4.5	2,70,000	3.85	2,70,000	3.37	2,70,000
Total	**53**	**3180000**	**49.97**	**3500000**	**47.75**	**3820000**

PROBLEM – 4

Action plan manufacturers normally produce 8,000 units of their product in a month, in their Machine Shop. For the month of January, they had planned for a production of 10,000 units. Owing to a sudden cancellation of a contract in the middle of January, they could only produce 6,000 units in January.

Indirect manufacturing costs are carefully planned and monitored in the Machine Shop and the Forman of the Shop is paid 10% of the savings as a bonus when in any month the indirect manufacturing cost incurred is less than the budgeted provision.

The Forman has put out in a claim that he should be paid a bonus of ₹ 88.50 for the month of January. The Works Manager wonders how anyone can claim a bonus when the company has lost a sizeable contract. The relevant figures are as under:

Indirect Manufacturing Costs	Budgeted exp in (₹) for 8,000 units	Budgeted expenses in (₹) for 10,000 units	Actual cost in (₹)
Salary of foreman	1,000	1,000	1,000
Indirect labour	720	900	600
Indirect material	800	1,000	700
Repairs and maintenance	600	650	600
Power	800	875	740
Tools consumed	320	400	300
Rates and taxes	150	150	150
Depreciation	800	800	800

Insurance	100	100	100
Total	₹ 5,290	₹ 5,875	₹ 4,990

Do you agree with the works Manager? Is the Forman entitled to any bonus for the performance in January? Substantiate your answer with facts and figures.

SOLUTION:

Flexible Budget for 6000 Units:

Particulars	Nature of Cost	Computation	Amount (₹)
1. Forman Salary	Fixed	Given	1000
2. Indirect Labour	Variable @ 0.09 Per Unit	6000 units x ₹ 0.09	540
3. Indirect Material	Variable @ 0.10 Per Unit	6000 units x ₹ 0.10	600
4. Repairs & Maintenance (WN-1)	Variable @ 0.025 Per Unit + Fixed @ ₹ 400	(6000 units x ₹ 0.025) + ₹ 400	550
5. Power (WN-2)	Variable @ 0.0375 Per Unit + Fixed @ ₹ 500	(6000 units x ₹ 0.0375) + ₹ 500	725
6. Tools Consumed	Variable @ 0.04 Per Unit	6000 units x ₹ 0.04	240
7. Rates and Taxes	Fixed	Given	150
8. Depreciation	Fixed	Given	800
9. Insurance	Fixed	Given	100
Total			**4705**

WN1: Segregation Of Repairs & Maintenance Cost into Variable & Fixed

- **Variable Cost per unit** = ΔCost ÷ ΔUnits = (₹ 650 - ₹ 600) ÷ (10000 Units – 8000 Units)
  = ₹ 50 ÷ 2000 Units
  = ₹ 0.025 per unit
- **Fixed Cost** = Total Cost – Variable Cost
  = ₹ 650 - (10000 units x ₹ 0.025)
  = ₹ 650 - ₹ 250
  = ₹ 400

WN2: Segregation of Power Cost into Variable & Fixed

- **VC per unit** = ΔCost ÷ ΔUnits = (₹ 875 - ₹ 800) ÷ (10000 Units – 8000 Units)
  = ₹ 75 ÷ 2000 Units
  = ₹ 0.0375 per unit
- **Fixed Cost** = Total Cost – Variable Cost
  = ₹ 875 - (10000 units x ₹ 0.0375)
  = ₹ 875 - ₹ 375

= ₹ 500

The Foreman Claim Is Incorrect Since He Has Spent ₹ 4990 As Against Target Cost ₹ 4705. Hence, He Is Not Entitled To Bonus.

PROBLEM – 5

Several costs incurred by Marina Beach Golf Equipment, Ltd., are listed below. For each cost, indicate which of the following classification best describe the cost.

More than one classification may apply to the same cost item. For example, a cost may be both a variable cost and a product cost.

Cost Classifications:

1. **Variable**
2. **Fixed**
3. **Period**
4. **Product**
5. **Administrative**
6. **Selling**
7. **Manufacturing**
8. **Research and development**
9. **Direct material**
10. **Direct labour**
11. **Manufacturing overhead**

Cost Items:

1. **Metal used in golf clubs.**
2. **Salary of plant manager.**
3. **Cost of natural gas used to heat the factory.**
4. **Commissions paid to sales personnel.**
5. **Wages paid to employees who assemble golf bags.**
6. **Salary of an engineer who is working on a prototype of a new solar-powered golf cart.**
7. **Depreciation on the word processing equipment used by the company president's secretary.**

SOLUTION:

1. Variable, Product, Manufacturing, Direct Material
2. Fixed, Product, Manufacturing Overheads.
3. Variable, Product, Manufacturing, Manufacturing Overheads.
4. Variable, Period, Selling, NA

5. Variable, Product, Manufacturing, Direct Labour
6. Fixed Period, Research & Development, NA
7. Fixed, Period, Administrative, NA.

CHAPTER 02: COST SHEET

PROBLEM – 1:

Farewell Company is a metal and wood cutting manufacturer, selling products to the home construction market. Consider the following data for the year 20x1:

S No	Particulars	Amount (₹)
1	Sandpaper	₹ 2,000
2	Materials-handling costs	₹ 70,000
3	Lubricants and coolants	₹ 5,000
4	Miscellaneous indirect manufacturing Labour	₹ 40,000
5	Direct manufacturing labour	₹ 3,00,000
6	Direct materials, January 1, 20x1	₹ 40,000
7	Direct materials, December 31, 20x1	₹ 50,000
8	Finished goods, January 1, 20x1	₹ 1,00,000
9	Finished goods, December 31, 20x1	₹ 1,50,000
10	Work in process, January 1, 20x1	₹ 10,000
11	Work in process, December 31, 20x1	₹ 14,000
12	Plant-leasing costs	₹ 54,000
13	Depreciation – plant equipment	₹ 36,000
14	Property taxes on plant equipment	₹ 4,000
15	Fire insurance on plant equipment	₹ 3,000
16	Direct materials purchased	₹ 4,60,000
17	Revenues	₹ 13,60,000
18	Marketing promotions	₹ 60,000
19	Marketing salaries	₹ 1,00,000
20	Distribution costs	₹ 70,000
21	Customer-service costs	₹ 1,00,000

Required:

1. Prepare an income statement with a separate supporting schedule of cost of goods manufactured. For all manufacturing items, indicate by V or F whether each is basically a variable cost or a fixed cost (where the cost object is a product unit). If in doubt, decide on the basis of whether the total cost will change substantially over a wide range of units produced.
2. Suppose that both the direct materials and plant-leasing costs are tied to the production of 9,00,000 units. What is the unit cost for the direct materials assigned

to each unit produced? What is the unit cost of the plant- leasing costs? Assume that the plant-leasing costs are a fixed cost.

3. Repeat the computation in requirement 2 for direct materials and plant-leasing costs, assuming that the costs are being predicted for the manufacturing of 10,00,000 units next year. Assume that the implied cost-behavior patterns persist.
4. As a management consultant, explain concisely to the president why the unit costs for direct materials did not change in requirements 2 and 3 but the unit costs for plant-leasing costs did change.

SOLUTION:

Part – 1: Income Statement With Supporting Schedule of COGS:

Cost Sheet of Farewell Company

Particulars	**(₹)**	
1. Opening Stock of Raw Materials (Given)	40,000	
2. Purchases (Given)	4,60,000	
3. Closing Stock of Raw Materials (Given)	(50,000)	
4. Direct Materials Consumed (1 + 2 – 3)		**4,50,000**
5. Direct Labour		3,00,000
6. Prime Cost (4 + 5)		**7,50,000**
7. Production Overheads (W.N.1)		2,14,000
8. Gross Works Cost (6 + 7)		**9,64,000**
9. Opening W I P		10,000
10. Closing W I P		(14,000)
11. Net Works Cost (8 + 9 – 10)		**9,60,000**
12. Opening Finished Goods		1,00,000
13. Closing Finished Goods		(1,50,000)
14. Cost of Goods Sold (11 + 12 – 13)		**9,10,000**

Income Statement

Particulars	**(₹)**
Sales	13,60,000
(-) Cost Of Goods Sold (Statement 1)	(9,10,000)
Gross Profit	**4,50,000**
(-) Selling Overheads (W.N.2)	(3,30,000)
Operating Profit	**1,20,000**

W.N.1: Production Overheads

Particulars	**(₹)**	
Sandpaper	2,000	Variable Cost
Material Handling Costs	70,000	Variable Cost
Lubricants & Coolants	5,000	Fixed Cost
Misc. Indirect Labour	40,000	Fixed Cost
Plant Leasing	54,000	Fixed Cost
Depreciation On Plant	36,000	Fixed Cost
Fire Insurance On Plant	3000	Fixed Cost
Property Taxes	4,000	Fixed Cost
Total	**2,14,000**	

W.N.2: Selling Overheads

Particulars	**(₹)**
Marketing promotions	60,000
Salary	1,00,000
Distribution cost	70,000
Customer service costs	1,00,000
Total	**3,30,000**

Part – 2: Calculation of Direct Material & Plant Leasing Cost Per Unit When Production is 9,00,000 Units (Raw Materials Consumed)

a) Direct Material per unit = $\frac{₹\ 4,50,000}{9,00,000\ units}$ = ₹ 0.50 per unit

b) Plant Leasing cost per unit = $\frac{₹\ 54,000}{9,00,000\ units}$ = ₹ 0.06 per unit

Part - 3: Calculation Of Direct Materials & Plant Leasing Cost When Production Increases To 10,00,000 Units

a) Direct Material Per Unit = $\frac{₹\ 5,00,000}{10,00,000\ units}$ = ₹ 0.50 Per Unit

W.N.:

Consumed	Units
4,50,000	9,00,000 u
x	10,00,000 u

x = ₹ 5,00,000

b) Plant Leasing Cost Per Unit = $\frac{₹\ 54,000}{10,00,000\ units}$ = ₹ 0.054 Per Unit

Part - 4: Cost Behaviour Pattern

1. Direct Material Cost Per Unit Did Not Change in Requirement 2 And 3 Because It Is Variable Cost And Variable Cost Remains Constant Per Unit At All Volume Levels.
2. Plant Leasing Cost Per Unit Did Change in Requirements 2 And 3 Because It Is A Fixed Cost And Fixed Cost Remains Constant in Total But Varies Per Unit.

PROBLEM – 2:

The following data relates to the manufacture of a standard product during the month of April:

Particulars	
Raw materials	₹ 1,80,000
Direct wages	₹ 90,000
Machine hours worked (hours)	10,000
Machine hour rate (per hour)	₹ 8
Administration overheads (general)	₹ 35,000
Selling overheads (per unit)	₹ 5
Units produced	4,000
Units sold	3,600
Selling price per unit	₹ 125

You are required to PREPARE a cost sheet in respect of the above showing:

a. Cost per unit

b. Profit for the month

SOLUTION:

Cost Sheet Output: 4,000 units

Particulars	Total Cost (₹)	Cost per (unit) (₹)
Raw Materials	1,80,000	45.00
Direct Wages	90,000	22.50
Prime Cost	**2,70,000**	**67.50**
Add: Factory Overheads (10,000 Hours × ₹ 8 Per Hour)	80,000	20.00
Cost Of Production	**3,50,000**	**87.50**
Less: Closing Stock of Finished Goods (4,000 – 3,600 Units)	(35,000)	--
Cost Of Goods Sold	**3,15,000**	**87.50**
Add: Administration Overheads (General)	35,000	9.72
Add: Selling Overheads (3,600 Units × ₹ 5 Unit)	18,000	5.00
Cost Of Sales (Total Cost)	**3,68,000**	**102.22**

Statement of Profit

Particulars	Total Cost (₹)
Sales Revenue (3,600 Units @ ₹ 125)	4,50,000
Less: Cost of Sales	3,68,000
Profit	**82,000**

PROBLEM – 3:

Prepare a cost sheet and compute the income for the given period.

Opening stock of Raw materials	**10,000 kgs @ ₹ 20 per kg**
Purchases	**50,000 kgs @ ₹ 25 per kg**
Consumption during the period	**55,000 kgs**
Direct wages	**₹ 6,75,000**
Production overheads	**₹ 10,00,000**
Work in process	**Nil**
Opening finished goods	**1,000 units @ ₹ 550**
Production	**5,000 units**
Units sold	**4,500 units @ ₹ 750 per unit**
Administration expenses	**₹ 2,50,000**
Selling expenses	**₹ 3,00,000**

SOLUTION:

Part I - FIFO Method

Step – 1: Cost Sheet (Production: 5,000 Units)

Particulars	Per Unit	(₹)
1. Direct Materials Consumed (W.N.1)	265	13,25,000
2. Direct Labour	135	6,75,000
3. Prime Cost (1 + 2)	**400**	**20,00,000**
4. Production Overheads	200	10,00,000
5. GWC Or Cost Of Production	**600**	**30,00,000**
6. Opening Stock Of Finished Goods	110	5,50,000
7. Closing Stock Of Finished Goods (W.N.2)	(600)	(9,00,000)
8. Cost Of Goods Sold (W.N.2)	**588.55**	**26,50,000**

W.N.1: Direct Materials Consumed

Opening Stock of Raw Material 10,000 kgs @ ₹ 20 Per kg

Purchases 50,000 kgs @ ₹ 25 Per kg

RM Consumed = 55,000 kgs

10,000 kgs @ ₹ 20 Per kg
= ₹ 2,00,000

45,000 kgs @ ₹ 25 (Balancing Figure)
= ₹ 11,25,000

Total ₹ 13,25,000

W.N.2: Valuation of FG and COGS

Opening Stock of FG	=	1,000 @ ₹ 550
Production	=	5,000 @ ₹ 600
Total		6,000

COGS
=4,500

1,000
@ ₹ 550
= ₹ 5,50,000

3,500
@ ₹ 600
= ₹ 21,00,000

₹ 26,50,000

Closing stock – FG
1,500 (Balancing Figure)
= 1,500 @ ₹ 600
= ₹ 9,00,000

Step – 2: Income Statement (Sales – 4500 Units)

Particulars	**(₹)**
Sales	33,75,000
(-) COGS (Statement 1)	(26,50,000)
Gross profit	**7,25,000**
(-) Administrative Overheads	(2,50,000)
(-) Selling Overheads	(3,00,000)
Operating profit	**1,75,000**

II. Weighted Average Method:

Step – 1: Cost Sheet (Produced = 5,000 Units)

Particulars	Per Unit	(₹)
1. Direct Materials Consumed (W.N.3)	265.83	13,29,168
2. Direct Labour	135.00	6,75,000
3. Prime Cost	**400.83**	**20,04,168**
4. Production Overheads	200	10,00,000
5. GWC or Cost of Production	**600.83**	**30,04,168**
6. Opening Stock of Finished Goods	550	5,50,000
7. Closing Stock of Finished Goods (W.N.2)	(592.3613)	(8,88,542)
8. Cost of Goods Sold (W.N.4)	**592.3613**	**26,65,626**

W.N.3: Direct Materials Consumed

Opening Raw Material 10,000 kgs @ ₹ 20 Per kg = ₹ 2,00,000

Purchases 50,000 kgs @ ₹ 25 Per kg = ₹ 12,50,000

60,000 ₹ 14,50,000

Weighted Average price = $\frac{₹\ 14,50,000}{60,000\ kgs}$ = ₹ 24.167 Per Kg

60,000 kgs

Direct Material Consumed
55,000 kgs
= ₹ 13,29,168

Closing Raw Material
5,000 kgs
= ₹ 1,20,835

Total ₹ 13,25,000

W.N.4: Valuation of FG and COGS

Opening Stock of FG = 1,000 @ ₹ 550 = ₹ 5,50,000

Cost of Production = 5,000 @ ₹ 600.83 = ₹ 30,04,168

Cost of goods available 6,000 ₹ 35,54,168

₹ 35,54,168

COGS
4,500 units @ ₹ 592.3613
= ₹ 26,65,626

Closing stock – Finished Goods
= 1,500 units @ ₹ 592.3613
= ₹ 8,88,542

Step – 2: Income statement (Sold = 4,500 units)

Particulars	Per Unit	(₹)
Sales	750	33,75,000
(-) COGS	(592.3613)	(26,65,626)
Gross profit	**157.6386**	**7,09,374**
(-) Administrative Overheads	(55.55)	(2,50,000)
(-) Selling Overheads	(66.66)	(3,00,000)
Operating profit	**35.4164**	**1,59,374**

PROBLEM – 3A: (MTP 2 MAY 24)

Following information relate to a manufacturing concern for the year ended 31st March, 2023:

	(₹)
Raw Material (opening)	2,28,000
Raw Material (closing)	3,05,000
Purchases of Raw Material	43,50,000
Freight Inwards	1,20,000
Direct wages paid	12,56,000
Direct wages-outstanding at the end of the year	1,50,000
Factory Overheads	20% of prime cost
Work-in-progress (opening)	1,92,500
Work-in-progress (closing)	1,40,700
Administrative Overheads (related to production)	1,73,000
Distribution Expenses	₹ 16 per unit
Finished Stock (opening)- 1,320 Units	6,08,500
Sale of scrap of material	7,000

The firm produced 14,350 units of output during the year. The stock of finished goods at the end of the year is valued at cost of production. The firm sold 14,903 units at a price of ₹579 per unit during the year.

PREPARE cost sheet of the firm.

SOLUTION:

Cost sheet for the year ended 31st March, 2023

Units produced - 14,000 units Units sold - 14,153 units

Particulars	**Amount (₹)**
Raw materials purchased	43,50,000
Add: Freight Inward	1,20,000
Add: Opening value of raw materials	2,28,000
Less: Closing value of raw materials	(3,05,000)
	43,93,000
Less: Sale of scrap of material	(7,000)
Materials consumed	**43,86,000**
Direct Wages (12,56,000 + 1,50,000)	14,06,000
Prime Cost	**57,92,000**
Factory overheads (20% of Prime Cost)	11,58,400
Add: Opening value of W-I-P	1,92,500
Less: Closing value of W-I-P	(1,40,700)
Factory Cost	**70,02,200**
Add: Administrative overheads	1,73,000
Cost of Production	**71,75,200**
Add: Value of opening finished stock	6,08,500
Less: Value of closing finished stock [₹ 500(71,75,200/14,350) × 767] (1,320 + 14,350 – 14,903 = 767 units)	(3,83,500)
Cost of Goods Sold	**74,00,200**
Distribution expenses (₹16 × 14,903 units)	2,38,448
Cost of Sales	**76,38,648**
Profit (Balancing figure)	9,90,189
Sales (₹ 579 × 14,903 units)	**86,28,837**

PROBLEM – 4

Easy feet Shoe Co. manufactures two types of shoes A and B. production costs for the year ended 31st March 20X1 were:

Direct materials	**₹ 15,00,000**
Direct wages	**₹ 8,40,000**
Production overhead	**₹ 3,60,000**

There was no work in progress at the beginning or at the end of the year. It is given that

a. Direct material in type A shoes consists twice as much as that in type B shoes.
b. The direct wages for type B were 60% of those for type A shoes.
c. Production overhead was the same per pair of A and B types.
d. Administrative overhead for each type was 150% of direct wages.
e. Selling cost was ₹ 1.50 per pair.
f. Production during the year was:
   - Type A 40,000 pairs of which 36,000 were sold.
   - Type B 1,20,000 pairs of which 1,00,000 were sold.
g. The Selling price was ₹44 for type A and ₹28 per pair for type B.

Prepare a Statement showing Cost and Profit for each pair of each type.

SOLUTION:

Step – 1: Cost Sheet Of Easy Feet Shoe Company

Production A 40,000 units B 1,20,000 units

Particulars	Type – A		Type – B	
	Per Unit	₹	Per Unit	₹
1. Direct Materials (W.N.1)	15.00	6,00,000	7.50	9,00,000
2. Direct Wages (W.N.2)	7.50	3,00,000	4.50	5,40,000
3. Prime Cost	**22.50**	**9,00,000**	**12.00**	**14,40,000**
4. Production Overheads (W.N.3)	2.25	90,000	2.25	2,70,000
5. GWC Or Cost Of Production	**24.75**	**9,90,000**	**14.25**	**17,10,000**
6. Opening Finished Goods	-	-	-	-
7. Closing Finished Goods (W.N.4)	24.75	(99,000)	14.25	(2,85,000)
8. Cost Of Goods Sold	**24.75**	**8,91,000**	**14.25**	**14,25,000**

Step – 2: Income statement (units sold A 36,000 units B 1,00,000 units)

Particulars	Type – A		Type – B	
	Per Unit	₹	Per Unit	₹
Sales	44	15,84,000	28	28,00,000
(-) Cost Of Goods Sold	(24.75)	(8,91,000)	(14.25)	(14,25,000)
Gross Profit	**19.25**	**6,93,000**	**13.75**	**13,75,000**
(-) Administrative Overheads	(12.50)	(4,50,000)	(8.10)	(8,10,000)
(-) Selling Overheads	(1.50)	(54,000)	(1.50)	(1,50,000)

Operating Profit	**5.25**	**1,89,000**	**4.15**	**4,15,000**

W.N.1: Apportionment of Direct Material cost

Ratio	A	:	B
Consumption	2	:	1
Production	40,000	:	1,20,000
Weighted Ratio	80,000		1,20,000 = 2 : 3

Direct Material Consumed = ₹ 15,00,000

Type – A	(2 : 3)	Type – B
= ₹ 6,00,000		= ₹ 9,00,000

W.N.2: Apportionment of Direct Wages

Ratio	A	:	B
Consumption	100	:	60
Production	40,000	:	1,20,000
Weighted Ratio	40,00,000		72,00,000 = 5 : 9

Direct Wages = ₹ 8,40,000

A	(5:9)	B
= ₹ 3,00,000		= ₹ 5,40,000

W.N.3: Apportionment of Production Overheads

Ratio	A	:	B
Consumption	1	:	1
Production	40,000	:	1,20,000
Weighted Ratio	40,000		1,20,000 = 1 : 3

Production Overheads = ₹ 3,60,000

Type A	Type B
= ₹ 90,000	= ₹ 2,70,000

W.N.4: Apportionment of Administrative Overheads

A - ₹ 3,00,000 x 150% = ₹ 4,50,000

B - ₹ 5,40,000 x 150% = ₹ 8,10,000

W.N.5: Valuation of Closing Finished Goods

Particulars	A (₹)	B (₹)
Production	40,000	1,20,000
(-) Sales	(36,000)	(1,00,000)
Closing FG (in units)	**4,000**	**20,000**
Cost of Production Per Unit	24.75	14.25
Closing Finished (in ₹) (1 x 2)	**99,000**	**2,85,000**

PROBLEM 4A: **(RTP JAN 25)**

IC Ltd. manufactures two types of phone covers, one is 'plastic' phone cover and another is 'silicon' phone cover.

The cost data relating to the manufacturing of both the phone covers for the year ended 31st March is provided below:

Particulars	Amount (₹)
Direct Materials	1,00,00,000
Direct Wages	56,00,000
Production Overhead	32,00,000
Total	1,88,00,000

Other information relating to the production of the phone covers is as follows:

- **Direct material cost per unit of 'silicon' phone cover was twice than that of 'plastic' phone cover.**
- **Direct wages per unit for 'plastic' phone cover were 60% of those for 'silicon' phone cover.**
- **Production overhead per unit was at same rate for both the type of phone covers.**
- **Administration overhead being part of cost of production was 50% of Production overhead.**
- **Selling cost and Selling Price of 'silicon' phone cover were ₹ 8 and ₹ 140 per unit respectively.**

No. of units of 'silicon' phone covers sold- 90,000

No. of units of Production of

- **'silicon' phone cover: 1,00,000**
- **'plastic' phone cover: 3,00,000**

You are required to PREPARE a cost sheet for 'silicon' phone cover showing Cost and Profit (per unit and Total).

SOLUTION:

Preparation of Cost Sheet for 'silicon' phone covers

No. of units produced = 1,00,000 Units No. of Units sold = 90,000 units

Particulars	**Per unit (₹)**	**Total (₹)**
Direct Materials (Working note- (i))	40.00	40,00,000
Direct Wages (Working note- (ii))	20.00	20,00,000
Prime Cost	60.00	60,00,000
Production Overhead (Working note- (iii))	8.00	8,00,000
Factory Cost	68.00	68,00,000
Administration Overhead (50% of Production Overhead)	4.00	4,00,000
Cost of Production	72.00	72,00,000
Less: Closing stock (1,00,000 units – 90,000 units)	-	(7,20,000)
Cost of Goods Sold i.e. 90,000 units	72.00	64,80,000
Selling cost	8.00	7,20,000
Cost of Sales / Total Cost	**80.00**	**72,00,000**
Profit	**60.00**	**54,00,000**
Sales Value (₹ 140 × 90,000 units)	140.00	1,26,00,000

Working Notes:

(i) Direct material cost per unit of 'plastic' phone cover = M

Direct material cost per unit of 'silicon' phone cover = 2M

Total Direct Material Cost = 2M × 1,00,000 units + M × 3,00,000 units

Or, ₹ 1,00,00,000 = 2,00,000 M + 3,00,000 M

$$\text{Or, } M = \frac{₹\ 1,00,00,000}{5,00,000} = ₹\ 20$$

Therefore, Direct material Cost per unit of 'silicon' phone cover = 2 × ₹ 20 = ₹ 40

(ii) Direct wages per unit for 'silicon' phone cover = W Direct wages per unit for 'plastic' phone cover = 0.6W So,

(W x 100,000) + (0.6W x 3,00,000) = ₹ 56,00,000

Or, 1,00,000 W + 1,80,000 W = ₹ 56,00,000

$$\text{Or, } W = \frac{₹\ 56,00,000}{2,80,000} = ₹\ 20 \text{ per unit}$$

(iii) Therefore, Direct wages per unit of 'silicon' phone cover = ₹ 20

$$\text{Production overhead per unit} = \frac{₹\ 32,00,000}{(1,00,000 + 3,00,000)} = ₹\ 8$$

Production overhead for 'silicon' phone cover = ₹ 8 × 1,00,000 units = ₹ 8,00,000

PROBLEM 5:

The books of Adarsh Manufacturing Company present the following data for the month of April:

Direct Labour cost ₹ 17,500 being 175% of works overheads.

Cost of goods sold excluding administrative expenses ₹ 56,000.

Inventory accounts showed the following opening and closing balances:

	April 1 (₹)	April 30 (₹)
Raw materials	8,000	10,600
Work-in-progress	10,500	14,500
Finished goods	17,600	19,000

Other data are:

	(₹)
Selling expenses	3,500
General and administration expenses	2,500
Sales for the month	75,000

You are required to:

- **FIND out the value of materials purchased.**
- **PREPARE a cost statement showing the various elements of cost and also the profit earned**

SOLUTION:

Computation of the value of materials purchased

To find out the value of materials purchased, reverse calculations from the given data can be presented as below:

Particulars	(₹)
Cost Of Goods Sold	**56,000**
Add: Closing Stock Of Finished Goods	19,000
Less: Opening Stock Of Finished Goods	(17,600)
Cost Of Production	**57,400**
Add: Closing Stock Of Work-In-Progress	14,500
Less: Opening Stock Of Work-In-Progress	(10,500)
Works Cost	**61,400**
Less: Factory Overheads: $\left(\frac{₹\ 17,500 \times 100}{175}\right)$	(10,000)
Prime Cost	**51,400**
Less: Direct Labour	(17,500)

Raw Material Consumed	**33,900**
Add: Closing Stock Of Raw Materials	10,600
Raw Materials Available	44,500
Less: Opening Stock Of Raw Materials	(8,000)
Value Of Materials Purchased	**36,500**

Cost Statement

	(₹)
Raw Material Consumed [Refer to Statement (I) Above]	33,900
Add: Direct Labour Cost	17,500
Prime Cost	**51,400**
Add: Factory Overheads	10,000
Works Cost	**61,400**
Add: Opening Work-In-Progress	10,500
Less: Closing Work-In-Progress	(14,500)
Cost Of Production	**57,400**
Add: Opening Stock Of Finished Goods	17,600
Less: Closing Stock Of Finished Goods	(19,000)
Cost Of Goods Sold	**56,000**
Add: General And Administration Expenses	2,500
Add: Selling Expenses	3,500
Cost Of Sales	**62,000**
Profit (Balance Figure ₹ 75,000 – ₹ 62,000)	13,000
Sales	**75,000**

PROBLEM – 5A:

XYZ,a Manufacturing Firm, has revealed the following information for September:

Particulars	1st September	30th September
Raw Materials	₹ 2,42,000	₹ 2,92,000
Work-in-Progress	₹ 2,00,000	₹ 5,00,000

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

Particulars	Amount (₹)
Consumable Stores and Spares of Factory	₹ 3,50,000
Research and Development Cost for process improvements	₹ 2,50,000

Quality Control Cost	**₹ 2,00,000**
Packing Cost (secondary) per unit of goods sold	**₹ 2**
Lease Rent of Production Asset	**₹ 2,00,000**
Administrative Expenses (General)	**₹ 2,24,000**
Selling and Distribution Expenses	**₹ 4,13,000**
Finished Goods (Opening)	**Nil**
Finished Goods (Closing)	**5,000 units**

- **Defective Output which is 4% of targeted production, realizes 61 per unit.**
- **Closing Stock is valued at Cost of Production (excluding Administrative Expenses)**
- **Cost of Goods Sold, excluding Administrative Expenses amounts to ₹78,26,000.**
- **Direct Employees Cost is 1/2 of the Cost of Material Consumed.**
- **Selling Price of the Output is 110 per unit.**

Required:

1. Calculate the Value of Material Purchased.

2. Prepare Cost Sheet showing the Profit earned by the Firm.

SOLUTION:

Cost Sheet

Particulars	**(₹)**	**(₹)**
Opening Stock of Raw Material	2,42,000	
Add: Purchases (Balancing Figure)	52,50,000	
Less: Closing Stock of Raw Material	2,92,000	
Direct Materials Consumed (W N 1)		**52,00,000**
Add: Direct Labour (₹ 52 Lakhs x 50%)		26,00,000
Prime Cost		**78,00,000**
Add: Production Overheads (₹ 3,50,000 + ₹ 2,00,000)		5,50,000
Gross Works Cost		**83,50,000**
Add: Opening W I P (Given)		2,00,000
Less: Closing W I P (Given)		(5,00,000)
Net Works Cost		**80,50,000**
Add: Quality Control Cost (Given)		2,50,000
Add: Research & Distribution (Given)		2,00,000
Less: Sale of Scrap (1,00,000 X 4% x ₹ 61)		(2,44,000)
Cost of Production (96,000 x ₹ 86)		**82,56,000**
Add: Opening Finished Goods		-

Less: Closing Finished Goods (5,000 X ₹ 86)		(4,30,000)
Cost Of Goods Sold (Given)		**78,26,000**
Add: Administrative Overheads		2,24,000
Add: Selling Overheads (95,000 x ₹ 2 + 4,13,000)		6,03,000
Cost Of Sales		**86,53,000**
Profit (Balancing Figure)		13,57,000
Sales (91,000 x ₹ 110)		**1,00,10,000**

W N 1: Calculation of Direct Material Consumed

Direct Employee Cost = 50% of Direct Material Consumed

Prime Cost = Direct Material + Direct Employee Cost

78,00,000 = Direct Material + 50% of Direct Material

78,00,000 = Direct Material + (1 + 50%)

78,00,000 = Direct Material x 1.5

Direct Material = 52,00,000

W.N.2: Computation of Good Units Produced and Units Sold

Targeted Production Units	=	1,00,000
(-) Defective Output @ 4%	=	(4,000)
Good Units Produced	=	96000
(-) Closing Finished Goods	=	(5,000)
Units Sold	=	91,000

PROBLEM – 6:

From the following particulars, prepare a Cost Statement showing the component of Total Cost and the Profit for the year ended 31 December.

Particulars	ON 1st January	ON 31st December
Stock of Raw Materials	₹ 4,00,000	₹ 5,00,000
Stock of Finished Goods	₹ 60,000	₹ 1,50,000
Stock of Work-In-Progress	₹ 1,50,000	₹ 1,00,000

Particulars	Amount (₹)	Particulars	Amount (₹)
Raw Materials Purchased	₹ 47,50,000	Sales for the year	₹ 90,00,000
Carriage Inwards	₹ 1,25,000	Selling Expenses	₹ 92,500
Wages	₹ 17,50,000	General Expenses	₹ 3,20,000
Works Manager's Salary	₹ 3,00,000	Debenture Interest	₹ 50,000
Salary-Factory Employees	₹ 3,00,000	Dividend Paid	₹ 10,000

Salary-Office Staff	₹ 2,00,000	Income-Tax Provision	₹ 5,000
Salary-Salesmen	₹ 1,00,000	Goodwill written off	₹ 1,00,000
Factory Rent & Insurance	₹ 72,500	Goods and Services Tax Collected and Paid	₹ 1,60,000
Power Expenses	₹ 95,000	Transfer to Machinery Replacement Fund	₹ 1,00,000
Other Production Expenses	₹ 4,20,000	Interest on Loan	₹ 75,000
Bad Debts written off	₹ 15,000	Bank Charges	₹ 5,000
Loose Tools written off	₹ 10,000	Discount Allowed	₹ 27,000
Quality Control Cost	₹ 15,000	Research and Development Cost	₹ 15,000

SOLUTION:

Cost sheet for the Year Ended 31st December

Particulars	Amount (₹)
Opening stock of Raw Materials	4,00,000
Add: Purchases of Raw Materials + carriage inwards	48,75,000
Less: Closing stock of Raw Materials	(5,00,000)
Direct materials consumed	**47,75,000**
Add: Direct Labour	17,50,000
Prime cost	**65,25,000**
Add: Production Overheads (W N 1)	11,97,500
Gross Works Cost	**77,22,500**
Add: Opening WIP	1,50,000
Less: Closing WIP	(1,00,000)
Net Works Cost	**77,72,500**
Add: Quality Control Cost	15,000
Add: Research & Development Cost	15,000
Cost Of Production	**78,02,500**
Add: Opening Finished Goods	60,000
Less: Closing Finished Goods	(1,50,000)
Cost Of Goods Sold	**77,12,500**
Add: Administrative Overheads (W N 2)	5,25,000
Add: Selling Overheads (₹ 1,00,000 + ₹ 92,500)	1,92,500
Cost Of Sales	**84,30,000**

Add: Profit (Balancing Figure)	(5,70,000)
Sales (Given)	**90,000**

W.N.1: Production Overheads

Particulars	**₹**
1. Works Manager salary	3,00,000
2. Salary – Factory	3,00,000
3. Factory Rent and Insurance	72,500
4. Power Expenses	95,000
5. Other Production Expenses	4,20,000
6. Loose tools Written Off	10,000
Total	**11,97,500**

W.N.2: Administrative Overheads

Salary Office staff	₹ 2,00,000
General Expenses	₹ 3,20,000
Bank Charges	₹ 5,000
Total	**₹ 5,25,000**

Note: Exclusions from Cost Sheet

	Particulars	**(₹)**	**Reason**
1.	Bad Debts	15,000	Inefficiency In Collection (Non-Operating Item)
2.	Debenture Interest	50,000	Financial Item
3.	Dividend Paid	10,000	Appropriation Of Profits
4.	Income Tax Provision	5,000	Profit Based Outflow (Non – Operating Item)
5.	Goodwill Written Off	1,00,000	Amortization Of an Intangible Asset (Non – Operating Item)
6.	GST	1,60,000	Collection & Remittance On Behalf Of Government (Not A Revenue Or a Cost)
7.	Transfer To Machinery Replacement Fund	1,00,000	Appropriation Of Profits
8.	Interest On Loan	75,000	Financial Expenses
9.	Discount Allowed	27,000	It Is Policy-Based Transaction (Non-Operating Expenses)

PROBLEM 7: **(RTP MAY 24 / SEPT 24)**

P Ltd. has gathered cost information from ledgers and other sources for the year ended 31st December 2023. The information are tabulated below:

Sl. No.		Amount (₹)	Amount (₹)
(i)	Raw materials purchased		5,00,00,000
(ii)	Freight inward		9,20,600
(iii)	Wages paid to factory workers		25,20,000
(iv)	Royalty paid for production		1,80,000
(v)	Amount paid for power & fuel		3,50,000
(vi)	Job charges paid to job workers		3,10,000
(vii)	Stores and spares consumed		1,10,000
(viii)	Depreciation on office building		50,000
(ix)	Repairs & Maintenance paid for:		
	- Plant & Machinery	40,000	
	- Sales office building	20,000	60,000
(x)	Insurance premium paid for:		
	- Plant & Machinery	28,200	
	- Factory building	18,800	47,000
(xi)	Expensespaid for quality control check activities		18,000
(xii)	Research & development cost paid for improvement in production process		20,000
(xiii)	Expenses paid for pollution control and engineering & maintenance		36,000
(xiv)	Salary paid to Sales & Marketing managers		5,60,000
(xv)	Salary paid to General Manager		6,40,000
(xvi)	Packing cost paid for:		
	- Primary packing necessary to maintain quality	46,000	
	- For re-distribution of finished goods	80,000	1,26,000
(xvii)	Fee paid to independent directors		1,20,000
(xviii)	Performance bonus paid to sales staffs		1,20,000
(xix)	Value of stock as on 1st January, 2023:		
	- Raw materials	10,00,000	
	- Work-in-process	8,60,000	

	- Finished goods	12,00,000	30,60,000
(xx)	Value of stock as on 31st December, 2023:		
	- Raw materials	8,40,000	
	- Work-in-process	6,60,000	
	- Finished goods	10,50,000	25,50,000

Amount realized by selling of scrap and waste generated during manufacturing process – ₹ 48,000/-

The board meeting is scheduled to be held in next week and you being an associate to the chief cost controller of the company, has been asked to PREPARE a cost sheet.

SOLUTION:

Statement of Cost of P Ltd. for the year ended 31st December, 2023:

Sl. No.	Particulars	Amount (₹)	Amount (₹)
(i)	**Material Consumed:**		
	- Raw materials purchased	5,00,00,000	
	- Freight inward	9,20,600	
	Add: Opening stock of raw materials	10,00,000	
	Less: Closing stock of raw materials	(8,40,000)	**5,10,80,600**
(ii)	**Direct employee (labour) cost:**		
	- Wages paid to factory workers		**25,20,000**
(iii)	**Direct expenses:**		
	- Royalty paid for production	1,80,000	
	- Amount paid for power & fuel	3,50,000	
	- Job charges paid to job workers	3,10,000	**8,40,000**
	Prime Cost		**5,44,40,600**
(iv)	**Works/ Factory overheads:**		
	- Stores and spares consumed	1,10,000	
	- Repairs & Maintenance paid for plant & machinery	40,000	
	- Insurance premium paid for plant & machinery	28,200	
	- Insurance premium paid for factory building	18,800	
	- Expenses paid for pollution control and engineering & maintenance	36,000	**2,33,000**
	Gross Factory Cost		**5,46,73,600**
	Add: Opening value of W-I-P		8,60,000
	Less: Closing value of W-I-P		(6,60,000)

	Factory Cost		**5,48,73,600**
(v)	**Quality control cost:**		
	- Expenses paid for quality control check activities		18,000
(vi)	Research & development cost paid for improvement in production process		20,000
(vii)	Less: Realizable value on sale of scrap and waste		(48,000)
(viii)	Add: Primary packing cost		46,000
	Cost of Production		**5,49,09,600**
	Add: Opening stock of finished goods		12,00,000
	Less: Closing stock of finished goods		(10,50,000)
	Cost of Goods Sold		**5,50,59,600**
(ix)	**Administrative overheads:**		
	- Depreciation on office building	50,000	
	- Salary paid to General Manager	6,40,000	
	- Fee paid to independent directors	1,20,000	8,10,000
(x)	**Selling overheads:**		
	- Repairs & Maintenance paid for sales office building	20,000	
	- Salary paid to Manager- Sales & Marketing	5,60,000	
	- Performance bonus paid to sales staffs	1,20,000	7,00,000
(xi)	**Distribution overheads:**		
	- Packing cost paid for re-distribution of finished goods		80,000
	Cost of Sales		**5,66,49,600**

PROBLEM – 7A:

The following figures are extracted from the Trial Balance of G.K Co. on 31st March:

PARTICULARS	Dr.	Cr.
	₹	₹
Inventories:		
Finished Stock	**80,000**	
Raw Materials	**1,40,000**	
Work-in-Process	**2,00,000**	
Office Appliances	**17,400**	
Plant & Machinery	**4,60,500**	
Building	**2,00,000**	

Sales		7,68,000
Sales Return and Rebates	14,000	
Materials Purchased	3,20,000	
Freight incurred on Materials	16,000	
Purchase Returns		4,800
Direct employee cost	1,60,000	
Indirect employee cost	18,000	
Factory Supervision	10,000	
Repairs and factory up-keeping expenses	14,000	
Heat, Light and Power	65,000	
Rates and Taxes	6,300	
Miscellaneous Factory Expenses	18,700	
Sales Commission	33,600	
Sales Travelling	11,000	
Sales Promotion	22,500	
Distribution Dept.—Salaries and Expenses	18,000	
Office Salaries and Expenses	8,600	
Interest on Borrowed Funds	2,000	

Further details are available as follows:

i. Closing Inventories:	
Finished Goods	1,15,000
Raw Materials	1,80,000
Work-in-Process	1,92,000
ii. Outstanding expenses on:	
Direct employee cost	8,000
Indirect employee cost	1,200
Interest on Borrowed Funds	2,000
iii. Depreciation to be provided on:	
Office Appliances	5%
Plant and Machinery	10%
Buildings	4%
iv. Distribution of the following costs:	
Heat, Light and Power to Factory, Office and Distribution in the ratio 8: 1: 1.	
Rates and Taxes two-thirds to Factory and one-third to Office.	

Depreciation on Buildings to Factory, Office and Selling in the ratio 8: 1: 1.

With the help of the above information, you are required to PREPARE a condensed Profit and Loss Statement of G.K Co. for the year ended 31st March along with supporting schedules of:

a. Cost of Sales.

b. Selling and Distribution Expenses.

c. Administration Expenses

SOLUTION:

Profit and Loss Statement of G.K Co. for the year ended 31st March

	(₹)	(₹)
Gross Sales	7,68,000	
Less: Returns And Rebates	(14,000)	7,54,000
Less: Cost Of Sales (Excluding Interest on Borrowed Funds) [Refer To Schedule (I)]		(7,14,020)
Net Operating Profit		**39,980**
Less: Interest On Borrowed Funds (₹ 2,000 + ₹ 2,000)		(4,000)
Net Profit		**35,980**

(i) Schedule of Cost of Sales

	(₹)	(₹)
Raw Material (Inventory Opening Balance)		1,40,000
Add: Material Purchased	3,20,000	
Add: Freight On Material	16,000	
Less: Purchase Returns	(4,800)	3,31,200
		4,71,200
Less: Closing Raw Material Inventory		(1,80,000)
Materials Consumed in Production		**2,91,200**
Direct Employee Cost (₹ 1,60,000 + ₹ 8,000)		1,68,000
Prime Cost		**4,59,200**
Factory Overheads:		
Indirect Employee Cost (₹ 18,000 + ₹ 1,200)	19,200	
Factory Supervision	10,000	
Repairs And Factory Up-Keeping Expenses	14,000	
Heat, Light And Power (₹ 65,000 × 8/10)	52,000	
Rates And Taxes (₹ 6,300 × 2/3rd)	4,200	

Miscellaneous Factory Expenses	18,700	
Depreciation Of Plant (10% Of ₹ 4,60,500)	46,050	
Depreciation Of Buildings (4% Of ₹ 2,00,000 × 8/10)	6,400	1,70,550
Gross Works Cost		**6,29,750**
Add: Opening Work-In-Process Inventory		2,00,000
Less: Closing Work-In-Process Inventory		(1,92,000)
Cost Of Production		**6,37,750**
Add: Opening Finished Goods Inventory		80,000
Less: Closing Finished Goods Inventory		(1,15,000)
Cost Of Goods Sold		**6,02,750**
Add: Administration Expenses [See Schedule (iii)]		18,870
Add: Selling And Distribution Expenses [See Schedule (ii)]		92,400
Cost Of Sales		**7,14,020**

Alternatively Interest on Borrowed funds of ₹ 4000 (₹ 2000 + ₹ 2000) may be added to arrive at Cost of Sales.

(ii) Schedule of Selling and Distribution Expenses

	(₹)
Sales Commission	33,600
Sales Travelling	11,000
Sales Promotion	22,500
Distribution Department Salaries and Expenses	18,000
Heat, Light and Power	6,500
Depreciation of Buildings	800
Total	**92,400**

(iii) Schedule of Administration Expenses

	(₹)
Office Salaries and Expenses	8,600
Depreciation of Office Appliances	870
Depreciation of Buildings	800
Heat, Light and Power	6,500
Rates and Taxes	2,100
Total	**18,870**

PROBLEM 7B: **(MTP 1 SEP 24)**

From the following data of Meta Ltd., CALCULATE Cost of Production:

		Amount (₹)
(i)	Repair & maintenance paid for plant & machinery	9,80,500
(ii)	Insurance premium paid for inventories	26,000
(iii)	Insurance premium paid for plant & machinery	96,000
(iv)	Raw materials purchased	64,00,000
(v)	Opening stock of raw materials	2,88,000
(vi)	Closing stock of raw materials	4,46,000
(vii)	Wages paid	23,20,000
(viii)	Value of opening Work-in-process	4,06,000
(ix)	Value of closing Work-in-process	6,02,100
(x)	Quality control cost for the products in manufacturing process	86,000
(xi)	Research & development cost for improvement in production process	92,600
(xii)	Administrative cost for:	
	- Factory & production	9,00,000
	- Others	11,60,000
(xiii)	Amount realised by selling scrap generated during the manufacturing process	9,200
(xiv)	Packing cost necessary to preserve the goods for further processing	10,200
(xv)	Salary paid to Director (Technical)	8,90,000
(xvi)	Expenses paid for pollution control and engineering & maintenance	22,000

SOLUTION:

Calculation of Cost of Production of Meta Ltd for the period

Particulars	Amount (₹)
Raw materials purchased	64,00,000
Add: Opening stock	2,88,000
Less: Closing stock	(4,46,000)
Material consumed	**62,42,000**
Add: Wages paid	23,20,000
Prime cost	**85,62,000**
Add: Repair and maintenance cost of plant & machinery	9,80,500

Add: Insurance premium paid for inventories	26,000
Add: Insurance premium paid for plant & machinery	96,000
Gross Works Cost	**96,64,500**
Add: Opening value of W-I-P	4,06,000
Less: Closing value of W-I-P	(6,02,100)
Works Cost	**94,68,400**
Add: Quality Control Cost	86,000
Add: Research & development cost	92,600
Add: Administrative overheads related with factory and production	9,00,000
Add: Primary packing cost	10,200
Add: Expenses paid for pollution control and engineering & maintenance	22,000
Less: Amount Realised by selling scrap	(9,200)
Cost of Production	**1,05,70,000**

Notes:

- Other administrative overhead does not form part of cost of production.
- Salary paid to Director (Technical) is an administrative cost.

PROBLEM 7C: **(MTP 2 SEP 24)**

ABC Ltd is engaged in producing electronic equipment's. It has furnished following details related to its products produced during a month:

	Units	Amount (₹)
Opening stock	10,000	5,00,00,000
Purchases	4,90,000	25,20,00,000
Closing stock	17,500	85,00,000
Works-in-progress		
Opening	20,000	1,20,00,000
Closing	10,000	60,50,000
Direct employees' wages, allowances etc.		5,50,50,000
Primary packaging cost (per unit)		140
R&D expenses & Quality control expenses		1,90,00,000
Guards' salaries		20,00,000
Directors' salaries		60,00,000
Consumable stores, depreciation on plant related to factory overhead		3,42,00,000
Product inspection (before primary packaging)		22,00,000

Rearrangement design of factory machine		75,00,000
Administrative overheads related to production		3,45,00,000
Selling expenses		3,94,50,000
Royalty paid for production		3,10,50,000
Cost of web-site (for online sale) maintenance		60,75,000
Gifts & Snacks		30,50,000
GST (credit allowed)		5,50,00,000
AMC cost of CCTV		10,00,000
Hiring of cars for the transportation of employees and guests		25,00,000
Audit and Legal Fees		29,00,000
Secondary packaging cost (per unit)		20

Distribution of the following costs:

Guard's salaries to Factory, Office and Distribution in the ratio 7: 2:1.

Hiring of cars is only for selling and distribution

AMC of CCTV to Factory, Office and Selling in the ratio 6 : 2 : 2.

The company paid EPF of 12% over above basic pay. However, Guards will not receive any incentive or EPF.

It has lucky draws every month giving the first prize of ₹ 1,00,000; 2nd prize of ₹ 50,000, 3rd prize of ₹ 20,000 and three consolation prizes of ₹ 10,000 each to customers buying the product.

It also sponsors a television programme every week at a cost of ₹ 20,00,000 per month.

The hiring of cars attracts GST under RCM @5% without credit.

There was a normal scrap of 2,000 units of direct material which realized ₹ 350 per unit. The entire finished product was sold at a profit margin of 25% on sales.

You are required to PREPARE a cost sheet

SOLUTION:

Cost Sheet

Particulars	Units	Amount (₹)
Material		
Opening stock	10,000	5,00,00,000
Add: Purchases	4,90,000	25,20,00,000
Less: Closing stock	(17,500)	(85,00,000)
	4,82,500	**29,35,00,000**

Less: Normal wastage of materials realized @ ₹ 350 per unit	(2,000)	(7,00,000)
Material consumed		**29,28,00,000**
Add: Direct employee's wages and allowances		5,50,50,000
Add: Direct expenses- Royalty paid for production		3,10,50,000
Prime cost	4,80,500	**37,89,00,000**
Add: Factory overheads - Consumable stores, depreciation etc.		3,42,00,000
Add: Rearrangement design of factory machine		75,00,000
Gross Works Cost	4,80,500	**38,64,00,000**
Add: Opening WIP	20,000	1,20,00,000
Less: Closing WIP	(10,000)	(60,50,000)
Factory/Works Cost	4,90,500	**39,23,50,000**
Add: Administration Overheads related to production		3,45,00,000
Add: R&D expenses and Quality control cost		1,90,00,000
Add: AMC cost of CCTV installed at factory premises		6,00,000
Add: Guard Salaries for factory premises		14,00,000
Add: Product Inspection		22,00,000
Add: Primary packaging cost @ ₹ 140 per unit		6,86,70,000
Cost of production	4,90,500	**51,87,20,000**
Administration Overheads		
Add: Guard salaries for office		4,00,000
Add: Audit and legal fees		29,00,000
Add: Director's Salaries		60,00,000
Add: EPF Director's Salaries @12%		7,20,000
Add: AMC cost for CCTV installed at office.		2,00,000
Selling and Distribution Overheads		
Add: Cost of maintaining website for online sale		60,75,000
Add: Secondary packaging cost @ ₹ 20 per unit	4,90,500	98,10,000
Add: Gift and snacks		30,50,000
Add: Guard salaries for selling department		2,00,000
Add: AMC cost for CCTV installed at selling department		2,00,000
Add: Hiring charges of cars		25,00,000
Add: GST @5% on RCM basis		1,25,000
Add: Television programme sponsorship cost		20,00,000

Add: Customers' prize cost*		2,00,000
Add: Selling expenses		3,94,50,000
Cost of sales		**58,64,75,000**
Add: Profit @ 25% on sales or 33.333% of cost		19,54,89,712
Sales value		**78,19,64,712**

***Customers' prize cost:**

	Amount (₹)
1st Prize	1,00,000
2nd Prize	50,000
3rd Prize	20,000
Consolation Prizes (3 × ₹ 10,000)	30,000
Total	**2,00,000**

***Customers' prize cost:**

	Amount (₹)
1st Prize	1,00,000
2nd Prize	50,000
3rd Prize	20,000
Consolation Prizes (3 × ₹ 10,000)	30,000
Total	**2,00,000**

PROBLEM – 7D: **(MTP 1 JAN 25)**

Following information is available from the books of YSPP Ltd. for the current year ending 31st March:

S.No.	Particulars	Amount (₹)	Amount (₹)
(i)	Raw materials purchased		35,00,00,000
(ii)	Freight inwards		39,22,100
(iii)	Wages paid to factory workers		1,02,20,000
(iv)	Contribution made towards employees' PF & ESIS		12,60,000
(v)	Hire charges paid for hiring specific equipment		8,40,000
(vi)	Amount paid for power & fuel		16,17,000

(vii)	Amount paid for purchase of moulds and patterns (life is equivalent to four years production)		31,36,000
(viii)	Job charges paid to job workers		28,42,000
(ix)	Lease rent paid for production assets		3,92,000
(x)	Depreciation on:		
	Factory building	2,94,000	
	Office building	1,96,000	
	Plant & Machinery	4,41,000	
	Delivery vehicles	3,01,000	12,32,000
(xi)	Salary paid to supervisors		4,41,000
(xii)	Repairs & Maintenance paid for:		
	Plant & Machinery	1,68,000	
	Sales office building	63,000	2,31,000
(xiii)	Insurance premium paid for:		
	Plant & Machinery	1,09,200	
	Factory building	63,350	
	Stock of raw materials & WIP	1,26,000	2,98,550
(xiv)	Expenses paid for quality control check activities		68,600
(xv)	Salary paid to quality control staffs		3,36,700
(xvi)	Research & development cost paid for improvement in production process		63,700
(xvii)	Expenses paid for administration of factory work		4,15,100
(xviii)	Salary paid to functional mangers:		
	Production control	33,60,000	
	Finance & Accounts	32,13,000	
	Sales & Marketing	35,42,000	1,01,15,000
(xix)	Salary paid to General Manager		43,96,000
(xx)	Packing cost paid for:		
	Primary packing necessary to maintain quality	3,36,000	
	For re-distribution of finished goods	3,92,000	7,28,000

(xxi)	Fee paid to auditors		6,30,000
(xxii)	Fee paid to independent directors		7,70,000
(xxiii)	Value of stock as on 1st April (beginning):		
	Raw materials	63,00,000	
	Work-in-process	32,20,000	
	Finished goods	38,50,000	1,33,70,000
(xxiv)	Value of stock as on 31st March (ending):		
	Raw materials	33,60,000	
	Work-in-process	30,45,000	
	Finished goods	63,00,000	1,27,05,000

Due to delay in picking up cargo from the port, YSPP Ltd. had to pay ₹ 15,000 as demurrage in the month of March.

From the above data you are required to PREPARE Statement of cost for YSPP Ltd. for the year ended 31st March, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of sales.

SOLUTION:

Statement of Cost of YSPP Ltd for the year ended 31st March:

S.NO.	Particulars	Amount (₹)	Amount (₹)
(I)	**Material consumed:**		
	Raw materials purchased	35,00,00,000	
	Add: Freight inwards	39,22,100	
	Add: opening stock of raw materials	63,00,000	
	Less: closing stock of raw materials	(33,60,000)	**35,68,62,100**
(II)	**Direct employee (Labour) cost:**		
	Add: Wages paid to factory workers	1,02,20,000	
	Add: Contribution made towards employees' PF & ESIS	12,60,000	**1,14,80,000**
(III)	**Direct expenses:**		
	Add: Hire charges paid for hiring specific equipment	8,40,000	
	Add: Amount paid for power & fuel	16,17,000	
	Add: Amortised cost of Moulds and patterns	7,84,000	
	Add: Job charges paid to job workers	28,42,000	**60,83,000**
	Prime cost		**37,44,25,100**

(IV)	**Works/ factory overheads:**		
	Add: Lease rent paid for production assets	3,92,000	
	Add: Depreciation on factory building	2,94,000	
	Add: Depreciation on plant & machinery	4,41,000	
	Add: Repairs & maintenance paid for plant & machinery	1,68,000	
	Add: Insurance premium paid for plant & machinery	1,09,200	
	Add: Insurance premium paid for factory building	63,350	
	Add: Insurance premium paid for stock of raw materials & WIP	1,26,000	
	Add: Salary paid to supervisors	4,41,000	20,34,550
	Gross factory cost		**37,64,59,650**
	Add: opening value of W I P		32,20,000
	Less: closing value of W I P		(30,45,000)
	Factory cost		**37,66,34,650**
(V)	**Quality control cost:**		
	Add: Expenses paid for quality control check activities	68,600	
	Add: Salary paid to quality control staffs	3,36,700	4,05,300
(VI)	**Research & development cost paid for improvement in production process**		63,700
(VII)	**Administration cost related with production:**		
	Add: Expenses paid for administration of factory work	4,15,100	
	Add: Salary paid to production control manager	33,60,000	37,75,100
(VIII)	Add: primary packing cost		3,36,000
	Cost of production		**38,12,14,750**
	Add: opening stock of finished goods		38,50,000
	Less: closing stock of finished goods		(63,00,000)
	Cost of Goods Sold		**37,87,64,750**
(IX)	**Administrative overheads:**		
	Add: Depreciation on office building	1,96,000	
	Add: Salary paid to manager- finance & accounts	32,13,000	

	Add: Salary paid to general manager	43,96,000	
	Add: Fee paid to auditors	6,30,000	
	Add: Fee paid to independent directors	7,70,000	**92,05,000**
(X)	**Selling overheads:**		
	Add: Repairs & maintenance paid for sales office building	63,000	
	Add: Salary paid to manager- sales & marketing	35,42,000	**36,05,000**
(XI)	**Distribution overheads:**		
	Add: Depreciation on delivery vehicles	3,01,000	
(XII)	Add: Packing cost paid for re- distribution of finished goods	3,92,000	6,93,000
	Cost of sales		**39,22,67,750**

Note: Demurrage is a type of penalty, thus will not form part of cost.

PROBLEM 8: **(PYP SEP 24)**

MNP Limited have the capacity to produce 84,000 units of a product very month. Its prime cost per unit at various levels of production is as follows:

Level	Prime Cost per unit (₹)
10%	50
20%	48
30%	46
40%	44
50%	42
60%	40
70%	38
80%	36
90%	34
100%	32

Its prime cost consists of raw material consumed, direct wages and direct expenses in the ratio of 3 : 2 : 1. In the month of January 2024, the company worked at 40% capacity and raw material purchased amounting to ₹ 8,40,000. In the month of February 2024, the company worked at 100% capacity and raw material purchased for ₹ 16,46,400.

It is the policy of the company to maintain opening stock of raw material equal to 1/3 of closing stock of raw material. Factory overheads are recovered at 60% of direct wages

cost. Fixed administration expenses (as part of production cost) and fixed selling and distribution expenses are ₹ 2,01,600 and ₹ 1,68,000 per month respectively. During the month of January 2024 company sold 33,600 units @ ₹ 68.8 per unit. The variable distribution cost amounts to ₹ 1.5 per unit sold.

The management of the company chalks out a pl for the month of February 2024 to sell its whole output @ ₹ 61 per unit by incurring following further expenditure:

(i) Company sponsors a television programme on every Sunday at a cost of₹ 26,250 per week. There are 4 Sundays in February 2024.

(ii) Hi-tea programme every month for its potential customers at a cost of ₹ 1,05,000.

(iii)Special gift item costing ₹ 105 on sale of a dozen units.

(iv)Lucky draws scheme is introduced every month by giving the first prize of ₹ 1,00,000; second prize of ₹ 80,000; third prize of ₹ 40,000 and four consolation prizes of ₹ 8,000 each.

Note: (In the month of February 2024, there is a significant saving in material cost per unit due to entry of new suppliers in the market and saving in per unit cost of Direct wages and Direct expenses due to introduction of new· policy by the management.)

Prepare a cost sheet for the month of January 2024 and February 2024 showing prime cost (with different elements of prime cost), factory cost, cost of production, total cost and profit earned.

SOLUTION:

Cost Sheet

Particulars	January 2024	February 2024
	33,600 Units	**84,000 Units**
Opening Stock Of Raw Material	50,400	1,51,200
Add: Purchases	8,40,000	16,46,400
Less: Closing Stock Of Raw Material	(1,51,200)	(4,53,600)
Direct Materials Consumed:	**7,39,200**	**13,44,000**
Add: Direct Wages	4,92,800	8,96,000
Add: Direct Expenses	2,46,400	4,48,000
Prime Cost	**14,78,400**	**26,88,000**
Add: Factory Overheads (60% Of Direct Wages)	2,95,680	5,37,600
Factory / Works Cost	**17,74,080**	**32,25,600**
Add: Administration Overhead (Production)	2,01,600	2,01,600
Cost Of Production / Cost Of Goods Sold	**19,75,680**	**34,27,200**

Add: Fixed Selling And Distribution Overhead	1,68,000	1,68,000
Add: Variable Distribution Overheads (₹ 1.5 Per Unit)	50,400	1,26,000
➢ Sponsorship Cost	-	1,05,000
➢ Hi Tea Programme	-	1,05,000
➢ Special Gifts (84,000 X 1/12 X 105)	-	7,35,000
➢ Lucky Draw Prize *	-	2,52,000
Cost Of Sales / Total Cost	**21,94,080**	**49,18,200**
Add: Profit (Balancing Figure)	1,17,600	2,05,800
Sales Revenue	**23,11,680**	**51,24,000**

***Lucky draw prize:**

	Amount (₹)
1st Prize	1,00,000
2nd Prize	80,000
3rd Prize	40,000
Consolation Prizes (4 × ₹ 8,000)	32,000
Total	**2,52,000**

Working note:

Calculation of opening and costing stock of Raw Material

January

Units Manufactured = 84,000 x 40% = 33,600 units

Prime Cost = 33,600 units x ₹ 44 = ₹ 14,78,400

Raw Material consumed = ₹ 14,78,400 X 3 ÷ 6 = ₹ 7,39,200

Raw Material purchase (given) = ₹ 8,40,000

Let closing stock of Raw Material be x

Opening stock of Raw Material be 1 ÷ 3x

Opening Stock + Purchase – closing stock = Raw Material consumed

1 ÷ 3x + ₹ 8,40,000 – x = ₹ 7,39,200

(1 ÷ 3x) – x = ₹ 7,39,200 – ₹ 8,40,000

2 ÷ 3x = ₹ 1,00,800

x = ₹ 1,51,200 (closing stock)

Opening stock = ₹ 1,51,200 x 1 ÷ 3 = ₹ 50,400

February

Prime Cost = 84,000 x 32 = ₹ 26,88,000

Raw Material consumed = ₹ 26,88,000 x 3 ÷ 6 = ₹ 13,44,000

Raw Material purchased (given) = ₹ 16,46,400

Opening Stock + Purchase – closing stock = Raw Material consumed

₹ 1,51,200 + ₹ 16,46,400 – closing stock = ₹ 13,44,000

Closing stock = ₹ 4,53,600

PROBLEM – 8A:

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

LEVEL (%)	WORK COST PER UNIT (₹)
10%	400
20%	390
30%	380
40%	370
50%	360
60%	350
70%	340
80%	330
90%	320
100%	310

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

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

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

It can market 30% of its output at ₹ 550 per unit without incurring any of the expenses referred to in 1 to 4 above.

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

SOLUTION:

Cost sheet

Level of Capacity	30% 30,000 units		100% 1,00,000 units	
	Per Unit	₹	Per Unit	₹
Works Cost	380	114,00,000	310	310,00,000
Add: Fixed Administrative Expenses	5.00	1,50,000	1.50	1,50,000
Add: Fixed Marketing Expenses	8.33	2,50,000	2.50	2,50,000
Variable Distribution Cost	30.00	9,00,000	30.00	30,00,000
Add: Special Cost				
- Gift Item Costs			30.00	30,00,000
- Customer Prizes			1.00	1,00,000
- Refreshments			1.00	1,00,000
- Television Programme Sponsorship Cost			20.00	20,00,000
Cost of sales	**423.33**	**1,27,00,000**	**396.00**	**3,96,00,000**
Add: Profit (Balancing Figure)	126.67	38,00,000	104.00	104,00,000
Sales Revenue	**550**	**165,00,000**	**500**	**5,00,00,000**

Customers Prize Cost

	Amount (₹)
1st Prize	50,000
2nd Prize	25,000
3rd Prize	10,000
Consolidated Prizes (3 x 5000)	15000
Total	**1,00,000**

PROBLEM – 9:

ML Auto Ltd is a manufacturer of auto components and the details of its expenses for the previous year are given below:

Particulars	AMOUNT
Opening Stock of Material	₹ 1,50,000

Closing Stock of Material	₹ 2,00,000
Purchase of Material	₹ 18,50,000
Direct Labour	₹ 9,50,000
Factory Overhead	₹ 3,80,000
Administrative Overhead related to Production Activity	₹ 2,50,400

During next year, the Company has received an order from a Car Manufacturer where it estimates that the Cost of Material and Labour will be ₹ 8,00,000 and ₹ 4,50,000 respectively. ML Auto Ltd charges Factory OH as a Percentage of Direct Labour and Administrative OH related to Production, as a Percentage of Factory Cost based on previous year's cost. The cost of delivery of the components at the Customer's Premises is estimated at ₹45,000.

You are required to -

a. Calculate the Overhead Recovery Rates based on Actual Costs for the previous year.
b. Prepare a detailed Cost Statement for the order received in the next year, and the price to be quoted if the Company wants to earn a profit of 10% on Sales.

SOLUTION:

Step 1: Calculation of Overheads Recovery Rates

Particulars	Last Year Actuals ₹	Computation
Opening Stock Of Raw Materials	1,50,000	Given
Add: Purchases	18,50,000	Given
Less: Closing Stock Of Raw Materials	(2,00,000)	Given
Direct Materials Consumed	**18,00,000**	
Add: Direct Labour	9,50,000	Given
Prime Cost	**27,50,000**	
Add: Factory Overheads	3,80,000	Given (3,80,000 ÷ 9,50,000) x 100 = 40%
Gross Works Cost / Net Works Cost	**31,30,000**	
Add: Admin Overheads Related to Production	2,50,400	(2,50,400 ÷ 31,30,000) x 100 = 8%
Cost Of Production	**33,80,400**	

Step 2: Cost Statement & Price to be Quoted for the Order Received Next Year

Particulars	Last year actuals ₹	Computation ₹
Direct Materials	8,00,000	Given
Add: Direct Labour	4,50,000	Given
Prime cost	**12,50,000**	
Add: Factory Overheads	1,80,000	40% x 4,50,000
Gross Works Cost or Net Works Cost	**14,30,000**	
Add: Admin Overheads Related to Production	1,14,400	8% x 14,30,000
Cost of Production	**15,44,400**	
Add: Selling Overheads	45,000	Given
Cost of sales	**15,89,400**	
Add: Profit @ 10% on sales	1,76,600	
1 ÷ 10 on sales 1 ÷ 9 on cost		(15,89,400 ÷ 90) x 10
Sales	**17,66,000**	

PROBLEM – 10:

A Company produces a Machine and sells it for ₹ 3,000. There is an increase of 20% in the Cost of Material, 10% in Labour, and 10% in Overhead Cost. The only figures available are that Material Cost is 50% of Cost of Sales, Labour Cost is 30% of Cost of Sales and Overhead Cost is 20% of Cost of Sales.

The anticipated increased cost in relation to the present Sales Price would cause a 30% decrease in the amount of the present Gross Profit.

What would be the Selling Price of the machine to give the same percentage of Gross Profit as before?

SOLUTION:

Part 1: Computation of Total Cost

Let the present cost be ₹ C and the profit be ₹ P the breakup of Materials, Labour and Overheads are as follows:

Particulars	Existing		Proposed	
	Workings	₹	Workings	₹
Direct Materials	0.5 C	1000	0.5 C x 120%	1200
+ Direct Wages	0.3 C	600	0.3 C x 110%	660
+ Overheads	0.2 C	400	0.2 C x 110%	440

Total cost of sales	***C***	**2000**	**1.15 *C***	**2300**
+ Profit	P	1000	0.7 P	700
Selling price	**3000**	**3,000**	**3000**	**3000**

Existing: $C + P = ₹\ 3000$ Equation – 1

Proposed: $1.15\ C + 0.7\ P = ₹\ 3000$ Equation – 2

$0.7\ C + 0.7\ P = ₹\ 2100$

$\underline{1.5\ C + 0.7\ P = ₹\ 3000}$

$-\ 0.45C = -\ ₹\ 900$

$C = ₹\ 2000$

$C + P = ₹\ 3000$

$₹\ 2000 + P = ₹\ 3000$

$P = ₹\ 1000$

Part – 2: Computation of New Selling Price

Present GP to Cost $= \frac{₹\ 1000}{₹\ 2000} \times 100 = 50\%$ on cost

New selling price (₹) = New Cost + GP Margin

= ₹ 2300 + 50% (₹ 2300)

= ₹ 2300 + ₹ 1150 = ₹ 3450

CHAPTER 03: OVERHEADS – ABSORPTION COSTING METHOD

PROBLEM – 1:

The following figures are extracted from the accounts of a manufacturing concern for the month of September, 20x1 –

Particulars		Amount (₹)
Indirect materials:		
- Production Dept.	P1	₹ 950
- Production Dept.	P2	₹ 1,200
- Production Dept.	P3	₹ 200
- Maintenance Dept.	S1	₹ 1,500
- Stores Dept.	S2	₹ 400
Indirect wages:		
- Production Dept.	P1	₹ 900
- Production Dept.	P2	₹ 1,100
- Production Dept.	P3	₹ 300
- Maintenance Dept.	S1	₹ 1,000
- Stores Dept.	S2	₹ 650
Power and light		₹ 6,000
Insurance on assets		₹ 1,000
Rent and rates		₹ 2,800
Meal charges		₹ 3,000

Depreciation on capital value of assets is 6% per annum. From the above information prepare a primary distribution summary with the following departmental data:

Particulars	Production Cost Centres			Service Cost Centres	
	P1	P2	P3	S1	S2
Area (sq. m.)	4,000	4,000	3,000	2,000	1,000
Capital value of assets (000)	100	120	80	60	40
Kilowatt hours	4,000	4,400	1,600	1,500	500
Number of employees	90	120	30	40	20

SOLUTION:

Statement Of Primary Distribution Summary

Particulars	Total (₹)	Basis	P_1 (₹)	P_2 (₹)	P_3 (₹)	S_1 (₹)	S_2 (₹)
Indirect Material	4,250	Direct Allocation	950	1200	200	1500	400
Indirect Wages	3,950	Direct Allocation	900	1100	300	1000	650
Power & Light	6,000	Kilowatt Hours (40 : 44 : 16 : 15 : 5)	2000	2200	800	750	250
Insurance On Assets	1,000	Capital Value (10 : 12 : 8 : 6 : 4)	250	300	200	150	100
Rents & Rates	2,800	Area (4 : 4 : 3 : 2 : 1)	800	800	600	400	200
Meal Charges	3,000	Employees (90 : 120 : 30 : 40 : 20)	900	1200	300	400	200
Depreciation On Capital Assets (Capital Value x 6%) x 1 Month ÷ 12 Months	2000	Capital Value (10 : 12 : 8 : 6 : 4)	500	600	400	300	200
Primary Distribution Summary	**23,000**		**6,300**	**7,400**	**2,800**	**4,500**	**2,000**

PROBLEM – 2:

A Ltd. manufactures a number of products. It has two production departments P1 and P2 and service departments S1 and S2. The estimated overhead costs for 20x1 and interdepartmental relationship matrix are as follows:

SERVICE PROVIDED BY	SERVICE PROVIDED TO			
	P1	P2	S1	S2
S1	40%	50%	-	10%
S2	50%	30%	20%	-
Estimated overhead (₹)	₹ 7,000	₹ 6,000	₹ 18,000	₹ 8,000

You are required to calculate overhead costs for P1 and P2 using –

1. **Direct apportionment method;**
2. **Step method of apportionment –**
   - **Apportioning S1 costs first, and**

- Apportioning S2 costs first;

3. Reciprocal method of apportionment –
4. Repeated distribution method,
5. Simultaneous equations method, and
6. Trial & Error Method.

SOLUTION:

1. Direct Re-Distribution Method:

Particulars	P_1 (₹)	P_2 (₹)	S_1 (₹)	S_2 (₹)
Primary Distribution Summary	7,000	6,000	18,000	8,000
S_1 (4 : 5)	8,000	10,000	(18,000)	-
S_2 (5 : 3)	5,000	3,000	-	(8,000)
Secondary Distribution Summary	**20,000**	**19,000**	**-**	**-**

2. Step – Ladder Method:

a) Apportioning S_1 Cost First

Particulars	P_1 (₹)	P_2 (₹)	S_1 (₹)	S_2 (₹)
Primary Distribution Summary	7,000	6,000	18,000	8,000
S_1 (4 : 5 : 1)	7,200	9,000	(18,000)	1,800
S_2 (5 : 3)	6,125	3,675	-	(9,800)
Secondary Distribution Summary	**20,325**	**18,675**	**-**	**-**

b) Apportioning S_2 cost first

Particulars	P_1 (₹)	P_2 (₹)	S_1 (₹)	S_2 (₹)
Primary Distribution Summary	7,000	6,000	18,000	8,000
S_1 (5 : 3 : 2)	4,000	2,400	1,600	(8,000)
S_2 (4 : 5)	8,711	10,889	(19,600)	-
Secondary Distribution Summary	**19,711**	**19,289**	**-**	**-**

3. Repeated Distribution Method:

Particulars	P_1 (₹)	P_2 (₹)	S_1 (₹)	S_2 (₹)
Primary Distribution Summary	7,000	6,000	18,000	8,000
S_1 (4 : 5 : 1)	7,200	9,000	(18,000)	1,800
S_2 (5 : 3 : 2)	4,900	2,940	1,960	(9800)

S_1 (4 : 5 : 1)	784	980	(1,960)	196
S_2 (5 : 3 : 2)	98	59	39	(196)
S_1 (4 : 5 : 1)	16	19	(39)	4
S_2	2	2	-	(4)
Secondary Distribution Summary	**20,000**	**19,000**	**-**	**-**

4. Simultaneous Equation Method

Step 1: Forming Equations

Let Overheads of S_1 be x

S_2 be y

Step 2: X = ₹ 18,000 + 0.20 y

Y = ₹ 8,000 + 0.10 X

Substituting – 1 in 2

⇒ y = ₹ 8,000 + 0.10(₹ 18,000 + 0.20Y)

⇒ y = ₹ 8,000 + ₹ 1800 + 0.02Y

⇒ 0.98Y = ₹ 9800

⇒ y = ₹ 10,000

⇒ x = ₹ 18,000 + 0.20 (y)

⇒ x = ₹ 18,000 + 0.20 (₹ 10,000)

⇒ x = ₹ 20,000

Step 3: Apportionment

Particulars	**P_1 (₹)**	**P_2 (₹)**	**S_1 (₹)**	**S_2 (₹)**
Primary Distribution Summary	7,000	6,000	18,000	8,000
S_1 (4:5:1)	8,000	10,000	(20,000)	2,000
S_2 (5:3:2)	5,000	3,000	2,000	(10,000)
Secondary Distribution Summary	**20,000**	**19,000**	**-**	**-**

5. Trial & Error Method:

Step 1:

Particulars	**S_1 (₹)**	**S_2 (₹)**
Primary Distribution Summary	18,000	8,000
$S_1 \rightarrow S_2$ (10% x ₹ 18000)		1,800
$S_2 \rightarrow S_1$ (20% x ₹ 9800)	1,960	
$S_1 \rightarrow S_2$ (10% x ₹ 1960)		196

$S_2 \rightarrow S_1$ (20% x ₹ 196)	39.2	
$S_1 \rightarrow S_2$ (10% x ₹ 39.2)		3.92
$S_2 \rightarrow S_1$ (rounded off)	0.8	0.08
	20,000	**10,000**

Step 2: Apportionment

Particulars	**P_1 (₹)**	**P_2 (₹)**
Primary Distribution Summary	7,000	6000
S_1 (90% x ₹ 20,000) (4 : 5)	8,000	10,000
S_2 (80% x ₹ 10,000) (5 : 3)	5,000	3,000
Secondary Distribution Summary	**20,000**	**19,000**

PROBLEM – 3:

A factory is having three production departments A, B and C, and two service departments Boiler- house and pump room. The boiler-house has to depend upon the pump - room for supply of water and pump room in its turn is dependent on the boiler-house for the supply of steam power for driving the pump. The expenses incurred by the production departments during a period are

A – ₹ 8,00,000; B – ₹ 7,00,000; and C – ₹ 5,00,000.

The expenses for the boiler-house are ₹ 2,34,000 and the pump - room – ₹ 3,00,000.

The expenses of the boiler-house and pump- room are apportioned to the production departments on the following basis

PARTICULARS	A	B	C	B.H	P.R
Expenses of boiler-house	20%	40%	30%	-	10%
Expenses of pump-room	40%	20%	20%	20%	-

Show clearly as to how the expenses of boiler- house and pump-room would be apportioned to A, B and C departments. Use algebraically equation.

SOLUTION:

Step 1: Forming equation

Let B.H Overheads be x

P.R Overheads be y

X = ₹ 234000 + 0.20 y $\rightarrow$ 1

Y = ₹ 3,00,000 + 0.10 x $\rightarrow$ 2

Substituting $\rightarrow$ 1 in $\rightarrow$ 2

Y = ₹ 300000 + 0.10 (₹ 234000 + 0.20y)

Y = ₹ 300000 + ₹ 23400 + 0.02

0.98y = ₹ 3,23,400

Y = ₹ 3,30,000

Substituting y in → 1

X = ₹ 2,34,000 + 0.20 (₹ 3,30,000)

X = ₹ 2,34,000 + ₹ 66,000

X = ₹ 3,00,000

Step 2: Apportionment

Particulars	**A (₹)**	**B (₹)**	**C (₹)**	**BH (₹)**	**PR (₹)**
Primary Distribution Summary	8,00,000	7,00,000	5,00,000	2,34,000	3,00,000
S_1 (2 : 4 : 3 : 1)	60,000	1,20,000	90,000	(3,00,000)	30,000
S_2 (4 : 2 : 2 : 2)	1,32,000	66,000	66,000	66,000	(3,30,000)
Secondary Distribution Summary	**9,92,000**	**8,86,000**	**6,56,000**	**-**	**-**

PROBLEM – 4:

A manufacturing company has two production departments P1 and P2, and three service departments, time-keeping, stores and maintenance. The departmental distribution summary showed the following expenses for December, 20x1:

PARTICULARS	**AMOUNT (₹)**
Production department P1	**₹ 24,000**
Production department P2	**₹ 16,000**
Service Dept.-Stores	**₹ 5,000**
Service Dept.-Time keeping	**₹ 4,000**
Service Dept.-Maintenance	**₹ 3,000**
Total	**₹ 52,000**

Additional information:

Particulars	Production Department		Service Department		
	P1	P2	STORES	TIME KEEPING	MAINTENANCE
No. of employees	20	15	10	8	5
No. of requisitions	12	10	-	-	3
Machine hours	2400	600	-	-	-

Apportion the service department expenses to production cost centres P1 and P2.

SOLUTION:

Step – Ladder Method:

Particulars	P_1 (₹)	P_2 (₹)	Maintenance (₹)	Stores (₹)	Time Keeping (₹)
Primary Distribution Summary	24,000	16,000	3,000	5,000	4,000
Time Keeping (20: 15: 5: 10)	1600	1200	400	800	(4,000)
Stores (12: 10: 3)	2,784	2,320	696	(5800)	-
Maintenance (24: 6)	3,277	819	(4096)	-	-
Secondary Distribution Summary	**31,661**	**20,339**	**-**	**-**	**-**

Notes:

1. It Can Be Observed That There Are No Reciprocal Services Among Service Department. Hence We Can Use Step Ladder Method.
2. While Distributing Overheads, Distribute Overheads Of That Department Which Provides Services To Maximum No Of Other Service Departments And Go In Descending Order.

PROBLEM – 4A:

Deccan Manufacturing Ltd., have three departments which are regarded as production departments. Service departments' costs are distributed to these production departments using the "Step Ladder Method" of distribution. Estimates of factory overhead costs to be incurred by each department in the forthcoming year are as follows. Data required for distribution is also shown against each department:

Department	Factory overhead (₹)	Direct Labour hours	No. of employees	Area in Square Meter
Production:				
X	₹ 1,93,000	4,000	100	3,000
Y	₹ 64,000	3,000	125	1,500
Z	₹ 83,000	4,000	85	1,500
Service:				
P	₹ 45,000	1,000	10	500
Q	₹ 75,000	5,000	50	1,500
R	₹ 1,05,000	6,000	40	1,000
S	₹ 30,000	3,000	50	1,000

The overhead costs of the four service departments are distributed in the same order, viz. P, Q, R and S respectively on the following basis.

Department Basis

P Number of employees

Q Direct Labour hours

R Area in Square Metres

S Direct Labour Hours

You are required to:

a. PREPARE a schedule showing the distribution of overhead costs of the four service departments to the three production departments; and

b. CALCULATE the overhead recovery rate per direct labour hour for each of the three production departments.

SOLUTION:

a) Deccan Manufacturing Limited

Schedule Showing The Distribution Of Overhead Costs Among Departments

	Production			Service			
	X (₹)	Y (₹)	Z (₹)	P (₹)	Q (₹)	R (₹)	S (₹)
Overhead Cost	1,93,000	64,000	83,000	45,000	75,000	1,05,000	30,000
Distribution of Department P (100 : 125 : 85 : - : 50 : 40 : 50)	10,000	12,500	8,500	-45,000	5,000	4,000	5,000
Distribution of Department Q (4 : 3 : 4 : - : - : 6 : 3)	16,000	12,000	16,000	-	-80,000	24,000	12,000
Distribution of Department R (6 : 3 : 3 : - : - : - : - : 2)	57,000	28,500	28,500	-	-	-1,33,000	19,000

Distribution of Department S (4 : 3 : 4 : - : - : - : -)	24,000	18,000	24,000	-	-	-	-66,000
Total	**3,00,000**	**1,35,000**	**1,60,000**				

b) Calculation of Overhead Recovery Rate

	Dept-X	Dept-Y	Dept-Z
Total Apportioned Overheads	₹ 3,00,000	₹ 1,35,000	₹ 1,60,000
Direct Labour Hours	4,000	3,000	4,000
Overhead Recovery Rate per Labour Hour	**₹ 75**	**₹ 45**	**₹ 40**

PROBLEM – 5:

Super class Co. Ltd. has three production departments X, Y and Z and two service departments A and B.

The following estimated figures for a certain period have been made available: -

Particulars	Amount (₹)
Rent and Rates	₹ 10,000
Lighting and Electricity	₹ 1,200
Indirect Wages	₹ 3,000
Power	₹ 3,000
Depreciation of Machinery	₹ 20,000
Other Expenses and Sundries	₹ 20,000

Following are further details which are also available: -

Particulars	Total	X	Y	Z	A	B
Floor Space (Sq. mts)	10,000	2,000	2,500	3,000	2,000	500
Light Points (Nos.)	120	20	30	40	20	10
Direct wages	₹ 20,000	₹ 6,000	₹ 4,000	₹ 6,000	₹ 3,000	₹ 1,000
Horsepower of machine	300	120	60	100	20	-
Cost of Machinery (₹)	₹ 1,00,000	₹ 24,000	₹ 32,000	₹ 40,000	₹ 2,000	₹ 2,000
Working hours		4,670	3,020	3,050	-	-

The expenses of the service departments A and B are to be allocated as follows: -

Particulars	X	Y	Z	A	B
A	20%	30%	40%	-	10%
B	40%	20%	30%	10%	-

You are required to calculate the overhead absorption rate per hour in respect of the three production departments.

What will be the total cost of an article with a material cost of 80 and direct Labour cost of 40 which passes through X, Y and Z for 2, 3 and 4 hours respectively?

SOLUTION:

Step 1: Primary Distribution of Overheads

Particulars	Production Department				Service Department	
	Basis	X ₹	Y ₹	Z ₹	A ₹	B ₹
Rent & Rates (2 : 2.5 : 3 : 2 : 0.5)	Floor Space	2000	2500	3000	2000	500
Lighting & Electricity (2 : 3 : 4 : 2 : 1)	Light Points	200	300	400	200	100
Indirect Wages (6 : 4 : 6 : 3 : 1)	Direct Wages	900	600	900	450	150
Power (12 : 6 : 10 : 2)	Horse Power of Machine	1200	600	1000	200	-
Depreciation (24 : 32 : 40 : 2 : 2)	Cost of Machine	4800	6400	8000	400	400
Other expenses (6 : 4 : 6 : 3 : 1)	Direct Wages	6,000	4,000	6,000	3,000	1,000
Direct Wages of Service Department	Direct Allocation	-	-	-	3000	1000
Primary Distribution Summary		**15,100**	**14,400**	**19,300**	**9,250**	**3,150**

Step 2: Secondary Distribution Simultaneous Equation Method:

a. Equation:

Let Overheads of Department A be A

Let Overheads of Department B be B

$\Rightarrow A = ₹\ 9{,}250 + 0.10\ B \rightarrow 1$

$\Rightarrow B = ₹\ 3{,}150 + 0.10\ A \rightarrow 2$

b. Solving Equation:

Substituting 2 in 1

$\Rightarrow A = ₹\ 9{,}250 + 0.10\ (₹\ 3150 + 0.10A)$

$\Rightarrow A = ₹\ 9250 + ₹\ 315 + 0.01\ A$

$\Rightarrow 0.99\ A = ₹\ 9565$

⇒ A = ₹ 9662

⇒ B = ₹ 3150 + 0.10 A

⇒ B = ₹ 3150 + 0.10 (₹ 9662)

⇒ B = ₹ 4116

c. Apportionment

Particulars	**X (₹)**	**Y (₹)**	**Z (₹)**	**A (₹)**	**B (₹)**
Primary Distribution Summary	15100	14400	19300	9250	3150
A (2 : 3 : 4 : 1)	1932	2899	3865	(9662)	966
B (4 : 2 : 3 : 1)	1646	823	1235	412	(4116)
Secondary Distribution Summary	**18678**	**18122**	**24400**	-	-

Step 3: Absorption of Overheads

a. Calculation of Absorption Rate:

Particulars	**X (₹)**	**Y (₹)**	**Z (₹)**
1. Secondary Distribution Summary	18678	18122	24400
2. Labour Hours	4670 Hours	3020 Hours	3050 Hours
3. Absorption Rate (1 ÷ 2)	₹ 4 Per hour	₹ 6 Per hour	₹ 8 Per hour

b. Charging of Overheads to the Products

Overheads = Absorption Rate x Base Quantity Consumed

Dept. X = ₹ 4 x 2 Hours = ₹ 8

Dept. Y = ₹ 6 x 3 Hours = ₹ 18

Dept. Z = ₹ 8 x 4 Hours = ₹ 32

Overheads Cost ₹ 58

Step 4: Total Cost Per Unit

Particulars	**₹**
Direct Materials	80
Direct Wages	40
Prime Cost	**120**
Add: Overheads	58
Total Cost Per Unit	**178**

PROBLEM – 5A:

The ABC Company has the following account balances and distribution of direct charges on 31st March.

	Total	Production Depts		Service Depts	
		Machine shop	Packing	General Plant	Store & Maintenance
	(₹)	(₹)	(₹)	(₹)	(₹)
Allocated Overheads:					
Indirect labour	₹ 14,650	₹ 4,000	₹ 3,000	₹ 2,000	₹ 5,650
Maintenance material	₹ 5,020	₹ 1,800	₹ 700	₹ 1,020	₹ 1,500
Misc. supplies	₹ 1,750	₹ 400	₹ 1,000	₹ 150	₹ 200
Superintendent's salary	₹ 4,000	-	-	₹ 4,000	-
Cost & payroll salary	₹ 10,000	-	-	₹ 10,000	-
Overheads to be apportioned:					
Power	₹ 8,000				
Rent	₹ 12,000				
Fuel and heat	₹ 6,000				
Insurance	₹ 1,000				
Trade License fees	₹ 2,000				
Depreciation	₹ 1,00,000				
	₹ 1,64,420	₹ 6,200	₹ 4,700	₹ 17,170	₹ 7,350

The following data were compiled by means of the factory survey made in the previous year:

	Floor Space (Sq ft)	Radiator Sections	No. of Employees	Investment (₹)	H.P hours
Machine Shop	2,000	45	20	6,40,000	3,500
Packing	800	90	10	2,00,000	500
General Plant	400	30	3	10,000	-
Store & Maintenance	1,600	60	5	1,50,000	1,000
	4,800	225	38	10,00,000	5,000

Expenses charged to the stores and maintenance departments are to be distributed to the other departments by the following percentages:

Machine shop 50%; Packing 20%; General Plant 30%; General Plant overheads is distributed on the basis of number of employees

Prepare

i. An overhead distribution statements.

ii. Distribution of the service departments' expense to production departments.

SOLUTION:

(a) Overhead Distribution Statement

Particulars	Production Department		Service Department	
	Machine	Packing	General Plant	Stores & Maintenance
Allocated Expenses:				
Indirect Labour	4,000	3,000	2,000	5,650
Maintenance material	1,800	700	1,020	1,500
Superintendent's salary	-	-	4,000	-
Misc. supplies	400	1,000	150	200
Cost & payroll salaries	-	-	10,000	-
Total Allocated Overheads	**6,200**	**4,700**	**17,170**	**7,350**
Apportioned expenses (as per schedule below)	77,720	25,800	2,830	22,650
Total Overheads	**83,920**	**30,500**	**20,000**	**30,000**

Schedule of Apportioned Expenses

Item	Basis	Total Amount	Production Department		Service Department	
			Machine shop	Packing	General Plant	Store & Maintenance
		(₹)	(₹)	(₹)	(₹)	(₹)
Power (7 : 1 : - : 2)	HP Hours	8,000	5,600	800	-	1,600
Rent (5 : 2 : 1 : 4)	Floor Space	12,000	5,000	2,000	1,000	4,000
Fuel and heat (3 : 6 : 2 : 4)	Radiator Sectors	6,000	1,200	2,400	800	1,600
Insurance (64 : 20 : 1 : 15)	Investment	1,000	640	200	10	150
Trade License Fees (64 : 20 : 1 : 15)	Investment	2,000	1,280	400	20	300

Depreciation (64 : 20 : 1 : 15)	Investment	1,00,000	64,000	20,000	1,000	15,000
Total		**1,29,000**	**77,720**	**25,800**	**2,830**	**22,650**

Distribution of Service Department Expenses

	Production Department		Service Department	
	Machine shop	Packing	General Plant	Store & Maintenance
	(₹)	(₹)	(₹)	(₹)
Total Expense [as per (a)]	83,920	30,500	20,000	30,000
Distribution of Store & Maintenance (5:2:3)	15,000	6,000	9,000	- 30,000
Distribution of General plant (4:2:1)	16,571	8,286	-29,000	4,143
Distribution of Store & Maintenance (5:2:3)	2,072	829	1,242	-4,143
Distribution of General plant (4:2:1)	710	355	-1,242	177
Distribution of Store & Maintenance (5:2:3)	89	35	53	-177
Distribution of General plant (4:2:1)	35	18	-53	0
Total	**1,18,397**	**46,023**		

PROBLEM – 5B: (MTP 1 JAN 25)

Baba Ltd. belongs to an automotive industry, manufacturing hybrid bicycles. The production of bicycles passes through three departments, viz. X1, Y2, Z3. The bicycles being equipped with gears needs quality check from time to time. Thus, the company also operates two service departments, namely quality control (QC) and maintenance (M), for its bicycle.

Following information is extracted from the accounting books regarding expenses as incurred/ charged:

Particulars	(₹)
Rent and Rates	40,00,000
General Lighting	4,80,000
Indirect Wages	15,51,200
Power	12,00,000
Depreciation on Machines	80,00,000
Sundries	77,56,000

Additional information:

	Production Departments			Service Departments	
	X1	Y2	Z3	QC	M
Direct wages (₹)	24,00,000	16,00,000	24,00,000	12,00,000	1,56,000
Working hours	6,140	8,950	4,838	-	-
Value of machines (₹)	4,80,00,000	6,40,00,000	8,00,00,000	40,00,000	40,00,000
H.P. of machines	120	60	100	20	-
Light points	20	30	40	20	10
Floor space (sq. ft.)	4,000	5,000	6,000	4,000	1,000

A technical assessment unveiled the following basis for the apportionment of expenses of service departments:

	X1	Y2	Z3	QC	M
QC	20%	30%	40%	-	10%
M	40%	20%	30%	10%	-

You are required to DETERMINE the following:

(i) Overheads distributed to all the departments, viz. X1, Y2, Z3, QC and M.

(ii) Overheads total and rate per hour under all the Production Departments after redistribution of Service Department's Overhead.

(iii) Total cost of a bicycle, considering the Direct Material and labour Cost of ₹ 20,000 and ₹ 12,000 respectively, which is being processed for manufacturing in Departments X1, Y2 and Z3 for 4, 5 and 3 hours respectively.

SOLUTION:

(i) Statement Showing Distribution of Overheads of Baba Ltd.

Particulars	Basis	Total	Production Departments			Service Departments	
			X1	Y2	Z3	QC	M
		(₹)	(₹)	(₹)	(₹)	(₹)	(₹)
Direct wages	Actual	13,56,000	-	-	-	12,00,000	1,56,000
Rent & rates	Area	40,00,000	8,00,000	10,00,000	12,00,000	8,00,000	2,00,000
General Lighting	Light points	4,80,000	80,000	1,20,000	1,60,000	80,000	40,000
Indirect Wages	Direct wages	15,51,200	4,80,000	3,20,000	4,80,000	2,40,000	31,200
Power	H.P.	12,00,000	4,80,000	2,40,000	4,00,000	80,000	-

Depreciation of Machines	Value of Machines	80,00,000	19,20,000	25,60,000	32,00,000	1,60,000	1,60,000
Sundries	Direct Wages	77,56,000	24,00,000	16,00,000	24,00,000	12,00,000	1,56,000
		2,43,43,200	**61,60,000**	**58,40,000**	**78,40,000**	**37,60,000**	**7,43,200**

(ii) Redistribution Of Service Department's Expenses Over Production Departments

	X1 (₹)	Y2 (₹)	Z3 (₹)	QC (₹)	M (₹)
Total overhead distributed as above	61,60,000	58,40,000	78,40,000	37,60,000	7,43,200
Dept. QC Overheads apportioned (20 : 30 : 40 : — : 10)	7,52,000	11,28,000	15,04,000	-37,60,000	3,76,000
Dept. M overheads apportioned (40 : 20 : 30 : 10 : —)	4,47,680	2,23,840	3,35,760	1,11,920	- 11,19,200
Dept. QC Overheads apportioned (20 : 30 : 40 : — : 10)	22,384	33,576	44,768	-1,11,920	11,192
Dept. M overheads apportioned (40 : 20 : 30 : 10 : —)	4,477	2,238	3,358	1,119	-11,192
Dept. QC Overheads apportioned (20 : 30 : 40 : — : 10)	224	336	448	-1,119	112
Dept. M overheads apportioned (40 : 20 : 30 : 10 : —)	45	22	34	11	-112
Dept. QC Overheads apportioned (20 : 30 : 40 : — : 10)	2	3	5	-11	-
Total	**73,86,812**	**72,28,015**	**97,28,373**		
Working hours	6,140	8,950	4,838		
Rate per hour	**1,203**	**808**	**2,011**		

(iii)Determination of Total Cost of a Bicycle:

Particulars	**(₹)**
Direct material cost	20,000
Direct labour cost	12,000

Overhead cost (See working note)	14,885
	46,885

Working Note:

Overhead cost

= (₹ 1,203 × 4 Hours) + (₹ 808 × 5 Hours) + (₹ 2,011 × 3 Hours)

= ₹ 4,812 + ₹ 4,040 + ₹ 6,033 = ₹ 14,885

PROBLEM – 6:

AC Limited is a small company that undertakes a variety of jobs for its customers Budgeted profit and loss statement for the year ending 31 December 20x1.

PARTICULARS	AMOUNT (₹)	AMOUNT (₹)
Sales		₹ 7,50,000
Cost:		
Direct materials	₹ 1,00,000	
Direct wages	₹ 50,000	
Prime cost	₹ 1,50,000	
Fixed production overhead	₹ 3,00,000	
Production cost	₹ 4,50,000	
Selling, Distribution and Administration cost	₹ 1,60,000	₹ 6,10,000
Profit		₹ 1,40,000
Budgeted data:		
Labour hours for the year	25,000	
Machine hours for the year	15,000	
Number of jobs for the year	300	

An enquiry has been received, and the production department has produced estimates of the prime cost involved and of the hours required to complete job A57.

Particulars	Amount (₹)
Direct materials	₹ 250
Direct wages	₹ 200
Prime cost	₹ 450
Labour hours required	80
Machine hours required	50

You are required to:

A. Calculate by different methods six overhead absorption rates;

B. Calculate cost estimates for job A57 using in turn each of the six overhead absorption rates calculated in a..

SOLUTION:

Step 1: Calculation of absorption rate (all six types)

S. No	Formula	Calculation	Absorption rate (₹)
1.	Labour Hour Rate = $\frac{\text{Overheads}}{\text{Labour Hours}}$	$\frac{3,00,000}{25,000 \text{ Hours}}$	₹ 12 Per Labour Hour
2.	Machine Hour Rate = $\frac{\text{Overheads}}{\text{Machine Hours}}$	$\frac{3,00,000}{15,000 \text{ Hours}}$	₹ 20 Per Machine Hour
3.	Material Cost Rate = $\frac{\text{Overheads}}{\text{Material Cost}} \times 100$	$\frac{₹\ 3,00,000}{₹\ 1,00,000} \times 100$	300% of Direct Material Cost
4.	Labour Cost Rate = $\frac{\text{Overheads}}{\text{Labour Cost}} \times 100$	$\frac{₹\ 3,00,000}{₹\ 50,000} \times 100$	600% of Direct Labour Cost
5.	Prime Cost = $\frac{\text{Overheads}}{\text{Prime cost}} \times 100$	$\frac{₹\ 3,00,000}{₹\ 1,50,000} \times 100$	200% of Prime Cost
6.	Production Unit Rate = $\frac{\text{Overheads}}{\text{No. of Jobs}}$	$\frac{₹\ 3,00,000}{300 \text{ jobs}}$	₹ 1000 Per job

Step 2: Charging Overheads to Job A57 and Calculating Total Cost of Job A57

Method	Direct Material (₹) (1)	Direct Labour (₹) (2)	Prime Cost (₹) (1 + 2) = (3)	Production Overheads (₹) (4)	Total Cost (₹) (5) = (3 + 4)
Labour Hour Ratio	250	200	450	80 Hours x ₹ 12 Per Hour	1410
Machine Hour Ratio	250	200	450	50 Hours x ₹ 20 Per Hour	1450
Material Cost Rate	250	200	450	250 x 300 % = ₹ 750	1200
Labour Cost Rate	250	200	450	200 x 600 % = ₹ 1200	1650
Prime Cost Rate	250	200	450	450 x 200 % = ₹ 900	1350
Production Units Cost	250	200	450	1000 x 1 = ₹ 1000	1450

PROBLEM – 7:

ABC Ltd manufactures a single product and absorbs production overheads at a predetermined rate of ₹ 10 per machine hour.

At the end of the financial year, it has been found that actual production overheads incurred were ₹6,00,000. It included ₹ 45,000 on account of written off obsolete stores and ₹ 30,000 being the wages paid for the strike period under an award.

The production and sales data for the year are as under:

Finished goods produced: 20000 units

WIP [50% complete in all aspects]: 8,000 units

Goods sold: 18,000 units.

The actual machine hours worked during the year was 48,000 hours. It has been found that one-third of the under absorption was due to lack of production planning and the rest were attributable to a normal increase in costs.

You are required to:

i. Calculate the amount of under absorption of production overheads during the year.

ii. Show the accounting treatment of under absorption of production overheads.

SOLUTION:

Step 1: Calculation of Under or Over Absorption during the Year:

			(₹)
	A. Total Production Overheads Actually Incurred	=	6,00,000
(-)	**B.** Written Off Absolute Stores	=	(45,000)
	Wages Paid For Strike Period	=	(30,000)
	C. Net Production Overheads Actually Incurred (Note – 1)	=	5,25,000
	D. Absorbed POH (Absorption Rate x Machine Hours) (₹ 10 x 48,000 Hours)	=	4,80,000
	E. Under Absorption (C – D)	=	**45,000**

Note 1: (b) – Are Excluded From Actual OH Incurred As They Are Directly Chargeable To Costing Profit and Loss A/c as Period Costs.

Step 2: Classification of under absorption into product or period cost:

₹ 45,000

Period cost	Product cost
↓	↓
1/3 due to inefficiency	₹ 30,000
= ₹ 15,000	(Balancing Figure)
	(Price Level Changes)

Step 3: Apportionment of product cost between the products using supplementary rate

Particulars	Units	Computation	₹
a. FG sold	18,000 (Given)	18,000 x ₹ 1.25	22,500
b. FG unsold (Closing Stock)	2000 (20,000 – 18,000)	2,000 x ₹ 1.25	2,500
c. WIP (8000 Units x 50%)	4,000	4,000 x ₹ 1.25	5,000
	24,000		**30,000**

$$\text{Supplementary Rate} = \frac{\text{Under Absorption*}}{\text{Total Equivalent Units Produced}}$$

$$\text{*Only To Extent Of Product Cost Per Unit} = \frac{₹\ 30,000\ *}{24,000\ \text{Units}} = ₹\ 1.25\ \text{Per Unit}$$

Date	Particulars		Debit (₹)	Credit (₹)
	Cost of sales A/c	Dr	22,500	
	FG A/c	Dr	2,500	
	WIP A/c	Dr	5,000	
	Costing P & L A/c	Dr	15,000	
	To POH A/c			45,000
	(Being Under Absorption Accounted For)			

Note 2: Due To The Above Adjustment Current Year Profit Comes Down By ₹ 37,500 (₹ 22,500 + ₹ 15,000) & Stock Increases By ₹ 7,500 (₹ 2500 + ₹ 5000)

PROBLEM – 7A:

In a manufacturing unit, Overhead was recovered at a pre-determined rate of ₹ 20 per labour hour. The total Factory OH paid and the labour-hours actually worked were ₹ 45,00,000 and 2,00,000 labour - hours respectively. During this period 30,000 units were sold. At the end of the period, 5,000 units were held in stock while there was no Opening Stock of Finished Goods. Similarly, though there was no stock of uncompleted units at the beginning of the period, at the end of the period there were 10,000 uncompleted units, which may be reckoned at 50% complete.

The cost accountant was able to obtain the following other information:

1. **Actual factory OH included the following items:**
   a. **₹ 1,25,000 paid to workers for a strike period under an award of the labour court.**
   b. **₹ 25,000 being a penalty paid for contravention of Central Excise Rules.**
   c. **₹ 40,000 being obsolete stores now written off.**
   d. **₹ 10,000 paid towards Consumables, relating to prior periods, now paid after settlement of a dispute.**
2. **₹ 2,00,000 of Factory OH for the period was still payable and not yet accounted in the books.**

On analysing the reasons, it was found that 60% of the unabsorbed OH were due to defective planning and the rest were attributable to an increase in OH costs. How would Unabsorbed OH be treated in cost accounts?

SOLUTION:

Step 1: Calculation Of Under Or Over Absorption:

	Particulars		**₹**
a.	Total Production Overheads Actually Incurred		45,00,000
b.	Factory Overheads Incurred For The Period But Not Accounted		2,00,000
c.	**Production Overheads Actually Incurred**		**47,00,000**
d.	Strike Wages	1,25,000	
	Penalty – Central Excise	25,000	
	Obsolete Stores	40,000	
	Prior Period Settlement	10,000	(2,00,000)
e.	**Net Production Overheads Actually Incurred**		**45,00,000**
f.	Absorbed Overheads (₹ 20 X 2,00,000)		40,00,000
g.	**Under Absorbed Overheads (E – F)**		**5,00,000**

Step 2: Classification Of Under Absorption Into Product & Period Cost

₹ 5,00,000

Period cost	Product Cost
(60%)	(Balancing Figure)
₹ 3,00,000	₹ 2,00,000
(Inefficiency)	(Price Level Changes)

Step 3: Apportionment Of Under Absorption To Output Using Supplementary Rate

	Particulars	Value	Computation	(₹)
a.	Units sold Finished Goods	30,000	30,000 x ₹ 5	1,50,000
b.	Units unsold Finished Goods	5,000	5,000 x ₹ 5	25,000
c.	Closing WIP (10,000 x 50%)	5,000	5,000 x ₹ 5	25,000
		40,000		**2,00,000**

$$\text{Supplementary rate} = \frac{\text{Product cost}}{\text{Units Produced}} = \frac{₹\ 2,00,000}{40,000\ \text{units}} = ₹\ 5\ \text{Per Unit}$$

Particulars		Debit (₹)	Credit (₹)
Cost of sales A/c	Dr	1,50,000	
FG A/c	Dr	25,000	
WIP A/c	Dr	25,000	
Costing P & L A/c	Dr	3,00,000	
To Production Overheads			5,00,000
(Being Treatment Of Under Absorption)			

Note: Due To Above Adjustment, Profit Comes Down By ₹ 4,50,000 & Stock Value Increases By ₹ 50,000 (₹ 25,000 & ₹ 25,000)

PROBLEM – 7B:

Your company uses an integrated accounting system and applies overheads on the basis of "pre-determined" rates. The following figures are extracted from the Trial balance as at 31st March.

PARTICULARS	AMOUNT (₹)	PARTICULARS	AMOUNT (₹)
Manufacture Overhead	₹ 4,26,544 Dr.	Work-in- Progress	₹ 1,41,480 Dr.
Manufacture Overhead applied	₹ 3,65,904 Dr.	FG stock	₹ 2,30,732 Dr.
		Cost of goods sold	₹ 8,40,588 Dr.

You are required to show the profit implications of treating under-absorption under the following methods:

A. Write off to Profit and Loss Account;

B. Adjustment to cost of sales and inventories of WIP and Finished goods.

SOLUTION:

Step 1: Calculation Of Under Or Over Absorption

	Particulars	**(₹)**
a.	Total Production Overheads Actually Incurred	4,26,544
b.	Absorbed Overheads (Note)	3,65,904
c.	**Under Absorption (A – B)**	**60,640**

Step 2:

A) Under Absorption – ₹ 60,640 Treated As Period Cost It Will Be Written Off To Costing Profit and Loss A/c

Costing Profit and Loss A/c Dr. 60,640

To Production Overheads 60,640

Due To This Adjustment, The Profit Reduces By ₹ 60,640

B) Under Absorption – ₹ 60,640 Treated As Product Cost It Will Be Distributed Between FG Sold, FG Unsold, And WIP Units In Supplementary Rate.

	Particulars	**Units**	**Computation**	**(₹)**
a.	WIP	1,41,480	1,41,480 x 5%	7074
b.	FG stock	2,30,732	2,30,732 x 5%	11537
c.	FG Sold	8,40,588	8,40,588 x 5%	42029
		12,12,800		**₹ 60,640**

$$\text{Supplementary Rate} = \frac{\text{Under Absorption}}{\text{Cost Of Production}} = \frac{₹\ 60,640}{₹\ 12,12,800}$$

Note: Since Value Is Given, Supplementary Rate Is Calculated As A %

Cost of sales A/c Dr. ₹ 42029

FG A/c Dr. ₹ 11534

WIP A/c Dr. ₹ 7077

To Production Overheads ₹ 60,640

PROBLEM – 7C: **(MTP 2 JAN 25)**

Shanu Ltd has calculated a predetermined overhead rate of ₹ 22 per machine hour for its Quality Check (QC) department. This rate has been calculated for the budgeted level of activity and is considered as appropriate for absorbing overheads. The following overhead expenditures at various activity levels had been estimated.

Total overheads	Number of machine hours
₹ 3,38,875	14,500
₹ 3,47,625	15,500
₹ 3,56,375	16,500

You are required to:

(i) CALCULATE the variable overhead absorption rate per machine hour.

(ii) CALCULATE the estimated total fixed overheads.

(iii) CALCULATE the budgeted level of activity in machine hours

(iv) CALCULATE the amount of under/over absorption of overheads if the actual machine hours were 14,970 and actual overheads were ₹ 3,22,000.

(v) STATE the arguments for and against using departmental absorption rates as opposed to a single or blanket factory wide rate.

SOLUTION:

(i) Variable Overhead Absorption Rate: $= \frac{\text{Difference In Total Overheads}}{\text{Difference In Levels In Terms Of Machine Hours}}$

$= \frac{₹\ 3,47,625 - ₹\ 3,38,875}{15,500\ \text{Hours} - 14,500\ \text{Hours}} = ₹\ 8.75$ Per Machine Hour

(ii) Calculation of Total fixed overheads:

	Amount (₹)
Total Overheads At 14,500 Hours	3,38,875
Variable Overheads = ₹ 8.75 × 14,500 Hours	1,26,875
Total Fixed Overheads	**2,12,000**

(iii) Calculation Of Budgeted Level Of Activity In Machine Hours:

Let Budgeted Level Of Activity = X

Then, $\frac{(₹\ 8.75\ X + ₹\ 2,12,000)}{X} = ₹\ 22$

$8.75X + ₹\ 2,12,000 = 22\ X$

$13.25X = ₹\ 2,12,000$

$X = 16,000$

Thus, Budgeted Level Of Activity = 16,000 Machine Hours

(iv) Calculation of Under or Over absorption of overheads:

	Amount (₹)
Actual Overheads	3,22,000
Absorbed Overheads = 14,970 Hours × ₹ 22 Per Hour	3,29,340
Over-Absorption (₹ 3,29,340 – ₹ 3,22,000)	**7,340**

(v) Departmental absorption rates provide costs which are more precise than those provided by the use of blanket absorption rates. Departmental absorption rates facilitate variance analysis and cost control. The application of these rates makes the task of stock and work-in-process (WIP) valuation easier and more precise. However, the setting up and monitoring of these rates can be time-consuming and expensive.

PROBLEM – 8:

The Pipe Company manufacture two products, A and B during the first year of its operations. For purposes of product costing, an overhead rate of application of ₹ 1.70 per direct-labour hour was used, based on budgeted factory overhead of ₹ 3,40,000 and budgeted direct-labour hours of 2,00,000 as follows.

	Budgeted overhead	Budgeted hours
Department 1	₹ 2,40,000	1,00,000
Department 2	₹ 1,00,000	1,00,000
Total	₹ 3,40,000	2,00,000

The number of labour hours required to manufacture each of these products was:

	Product A	Product B
In Dept. 1	4	1
In Dept. 2	1	4
Total	5	5

At the end of the year, there was no work in process. There were, however, 2,000 and 6,000. Finished Units, respectively, of products A and B on hand. Assume that budgeted activity was attained.

i. **What was the effect on the Company's income of using a plant wise overhead rate instead of departmental overhead rates?**

ii. **Assume that material and labour costs per unit of Product A were ₹ 10/- and that the selling price was established by adding 40 per cent to cover profit, what selling price results from the use of departmental against plant wise overhead rates?**

iii. Explain why departmental overhead rates were generally preferable to plant wise rates.

SOLUTION:

Part – A: Effect On Company's Income Due To Use Of Plant-Wise Rate Instead Of Departmental Rate

Step 1: Overhead Cost Charged To Products Using Plant Wise Rate (Blanket Rate)

$$\text{Absorption rate} = \frac{\text{Budgeted Total Overheads}}{\text{Budgeted Total Labour Hours}}$$

$$= \frac{₹\ 3,40,000}{2,00,000\ \text{Hours}} = ₹\ 1.70\ \text{Per Hour}$$

Prod. A = 5 Hours x ₹ 1.70 = ₹ 8.50 Per Unit

Prod. B = 5 Hours x ₹ 1.70 = ₹ 8.50 Per Unit

Step 2: Overhead Cost Charged To Products Using Departmental Rate

	Particulars	Department 1	Department 2
a.	Budgeted Overheads	₹ 2,40,000	₹ 1,00,000
b.	Labour Hours	1,00,000	1,00,000
c.	**Absorption rate (a ÷ b)**	**₹ 2.40 Per Hour**	**₹ 1.00 Per Hour**

Product A = (4 Hours x ₹ 2.4) + (1 Hour x ₹ 1) = ₹ 10.60 Per Unit

Product B = (1 Hour x ₹ 2.4) + (4 Hours x ₹ 1) = ₹ 6.40 Per Unit

Step 3: Impact on profit

Particulars	A	B
Blanket Rate (₹) Departmental Rate (₹)	8.50 Per Unit 10.60 Per Unit	8.50 Per Unit 6.40 Per Unit
Difference (₹)	**2.10 Per Unit (Under Costed)**	**2.10 Per Unit (Over Costed)**
Stock (units)	2000 Units	6000 Units
Difference in Stock Value	₹ 4200 (Under Valued)	₹ 12,600 (Over Valued)
Net	**₹ 8400 (Overvalued)**	

Due To Over Valuation Of Closing Stock On Account Of Using Blanket Rate The Profit Stands Overstated By ₹ 8,400

Part –B: Computation Of Selling Price Per Unit Of Product A Using Plant Wise Rate & Departmental Rate:

Particulars	Plant Wise Rate (₹)	Departmental Wise Rate (₹)
Material + Labour	10.00	10.00
Add: Overheads	8.50	10.60
Total cost	**18.50**	**20.60**
Add: Profit @ 40%	7.40	8.24
Selling price	**25.90**	**28.84**

Due To Use By Blanket Rate, Product A Has Been Under – Priced By ₹ 2.94 (₹ 28.84 - ₹ 25.90)

PROBLEM – 9:

A machine shop has 8 identical Drilling Machines manned by 6 operators. The machines cannot be worked without an operator wholly engaged on it. The original cost of all these 8 machines works out to ₹ 8 lakhs. These particulars are furnished for a six month period:

Normal available hours per month	208
Absenteeism (without pay) - hours	18
Leave (with pay) – hours	20
Normal idle time unavoidable – hours	10
Average rate of wages per day of 8 hours	₹ 20
Production Bonus estimated on Wages	15%
Value of Power consumed	₹ 8,050
Supervision and Indirect Labour	₹ 3,300
Lighting and Electricity	₹ 1,200

The following particulars are for a year:

- **Repairs and maintenance including consumables 3% on the value of machines.**
- **Insurance ₹ 40,000.**
- **Depreciation 10% on original cost.**
- **Other Sundry works expenses ₹ 12,000.**
- **General Management expenses allocated ₹ 54,530.**

You are required to work out a comprehensive machine hour rate for the Machine Shop.

SOLUTION:

W.N.1: Calculation of Paid Hours and Effective Working Hours.

Particulars	6 operators And 6 months
A. Normal Available Hours (208 Hours x 6 Months x 6 Operators)	7,488
B. Absenteeism Without Pay (18 Hours x 6 Operators)	(108)
C. Paid Hours (A – B)	**7,380**
D. Leave With Pay (20 Hours x 6 Operators)	(120)
E. Normal Idle Time (10 Hours x 6 Operators)	(60)
F. Effective Working Hours (C – D – E)	**7,200**

Note:

As The Machine Cannot Be Worked Without An Operator Wholly Engaged On Them. Therefore The Effective Working Hours Of 6 Operators For 6 Months Are The Hours For Which The Machines Can Be Used.

Hence 7200 Hours Represent Hours Of Machine Operation.

W.N.2: Computation Of Operators Wages

Average Rate Of Wages = $\frac{₹\ 20}{8\ \text{Hours}}$ = ₹ 2.5 Per Hour

∴ Total Wages Paid To 6 Operators For 6 Months = 7380 Hours x ₹ 2.5 Per Hour = ₹ 18450

Computation Of Comprehensive Machine Hour Rate Of Machine Shop:

	Particulars	(₹)
1.	Operator's wages (W.N.2)	18450
2.	Production Bonus (15% x ₹ 18450)	2768
3.	Power consumed	8050
4.	Supervision	3300
5.	Lighting & Electricity	1200
6.	Repairs (3% x ₹ 8,00,000 x 6 Months ÷ 12 Months)	12,000
7.	Insurance (₹ 40,000 x 6 Months ÷ 12 Months)	20,000
8.	Depreciation (₹ 8,00,000 x 10% x 6 Months ÷ 12 Months)	40,000
9.	Sundry Expenses (₹ 12,000 x 6 Months ÷ 12 Months)	6,000
10.	General Management Expenses (₹ 54,530 x 6 Months ÷ 12 Months)	27,265
	Total Overheads	**139033**

$$\text{Comprehensive Machine Hr Rate} = \frac{\text{Total Overheads}}{\text{Total Machine Hours (W.N.1)}}$$

$$= \frac{₹\,1,39,033}{7200 \text{ Hours}}$$

$$= ₹\,19.31 \text{ Per Machine Hour}$$

PROBLEM 9A:

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 ₹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:

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

Required:

i. Calculate the cost of running one machine for a four-week period.

SOLUTION:

Effective Machine Hour For Four-Week Period

= Total Working Hours – Unproductive Set-Up Time

= {(48 hours × 4 weeks) – {(4 hours × 4 weeks)}

= (192 – 16 Hours) = 176 Hours.

(i) Computation Of Cost Of Running One Machine For A Four Week Period

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

(ii) Machine hour rate $= \frac{₹\ 17,513.54}{176\ \text{Hours}} = ₹\ 99.51$

PROBLEM -9B:

A machine costing ₹ 1,00,00,000 is expected to run for 10 years. At the end of this period its scrap value is likely to be ₹ 9,00,000. Repairs during the whole life of the machine are expected to be ₹ 18,00,000 and the machine is expected to run 4,380 hours per year on the average.

Its electricity consumption is 15 units per hour, the rate per unit being ₹ 5. The machine occupies one-fourth of the area of the department and has two points out of a total of ten for lighting.

The foreman has to devote about one sixth of his time to the machine. The monthly

rent of the department is ₹ 30,000 and the lighting charges amount to ₹ 8,000 per month. The foreman is paid a monthly salary of ₹ 19,200. FIND OUT the machine hour rate, assuming insurance is @ 1% p.a. and the expenses on oil, etc., are ₹ 900 per month

SOLUTION:

Total Number Of Hours Per Annum- 4,380

Total Number Of Hours Per Month- 365

Computation of Machine Hour Rate

	Per Month (₹)	Per Hour (₹)
Fixed Costs (Standing Charges)		
Depreciation (Refer Working Note-1)	75,833	
Rent (₹30,000 × $\frac{1}{4}$)	7,500	
Lighting Charges {(₹ 8,000 × 2 Points) ÷ 10 Points}	1,600	
Foreman's Salary (₹ 19,200 × 1/6)	3,200	
Sundry Expenses (Oil Etc.)	900	
Insurance {(1% Of ₹ 1,00,00,000) ÷ 12 Months}	8,333	
	97,366	**266.76**
Variable Costs:		
Repairs (Refer Working Note -2)		41.10
Electricity (15 Units × ₹ 5)		75.00
Machine Hour Rate		**382.86**

Working Notes:

$$\text{Depreciation Per Month} = \frac{\text{Cost Of Machine - Scrap Value}}{\text{Life The Machine}}$$

$$= \frac{₹\,1,00,00,000 - ₹\,9,00,000}{(10\text{ years} \times 12\text{ months})^*} = ₹\,75,833$$

*In the question the life of the machine is given as 10 years and it is also mentioned the machine will run for 4,380 hours per annum. The depreciation can be calculated either on the basis of time i.e. 10 years or on the basis of activity of 43,800 hours (4,380 hours p.a.)

Repairs for the whole life is ₹ 18,00,000, which can be linked to activity level of 43,800 Hours.

Thus, Repairs cost per hour = ₹ 18,00,000 ÷ 43,800 Hours = ₹ 41.10

PROBLEM – 9C: **(RTP SEP 24)**

From the details furnished below you are required to compute a comprehensive machine-hour rate:

Original purchase price of the machine (subject to depreciation at 10% per annum on original cost)	₹12,96,000
Normal working hours for the month (The machine works for only 75% of normal capacity)	200 hours
Wages to Machine-man	₹800 per day (of 8 hours)
Wages to Helper (machine attendant)	₹500 per day (of 8 hours)
Power cost for the month for the time worked	₹1,30,000
Supervision charges apportioned for the machine centre for the month	₹18,000
Electricity & Lighting (fixed in nature) for the month	₹9,500
Repairs & maintenance (machine) including consumable stores per month	₹17,500
Insurance of Plant & Building (apportioned) for the year	₹18,000
Other general expense per annum	₹18,000

The workers are paid a fixed dearness allowance of ₹4,500 per month. Production bonus payable to workers in terms of an award is equal to 10% of basic wages and dearness allowance. Add 10% of the basic wage and dearness allowance against leave wages and holidays with pay to arrive at a comprehensive labour-wage for debit to production.

SOLUTION:

Effective Machine Hours = 200 Hours × 75% = 150 Hours

Computation Of Comprehensive Machine Hour Rate

	Per Month (₹)	Per Hour (₹)
Fixed Cost		
Supervision Charges	18,000.00	
Electricity And Lighting	9,500.00	
Insurance Of Plant And Building (₹ 18,000 ÷ 12 Months)	1,500.00	
Other General Expenses (₹ 18,000 ÷ 12 Months)	1,500.00	
Depreciation (₹ 1,29,600 ÷ 12 Months)	10,800.00	

	41,300.00	**275.33**
Direct Cost		
Repairs And Maintenance	17,500.00	116.67
Power	1,30,000.00	866.67
Wages Of Machine Man		196.00
Wages Of Helper		136.00
Machine Hour Rate (Comprehensive)		**1,590.67**

Wages Per Machine Hour

	Machine Man	**Helper**
Wages For 200 Hours		
Machine-Man (₹ 800 × 25)	₹ 20,000.00	---
Helper (₹ 500 × 25)	---	₹ 12,500.00
Dearness Allowance (Da)	₹ 4,500.00	₹ 4,500.00
	₹ 24,500.00	**₹ 17,000.00**
Production Bonus (10% Of Basic And DA)	₹ 2,450.00	₹ 1,700.00
Leave Wages (10% Of Basic And DA)	₹ 2,450.00	₹ 1,700.00
	₹ 29,400.00	**₹ 20,400.00**
Effective Wage Rate Per Machine Hour	**₹ 196.00**	**₹ 136.00**

PROBLEM – 9D: (MTP 1 SEP 24)

The following particulars refer to process used in the treatment of material subsequently, incorporated in a component forming part of an electrical appliance:

(i) The original cost of the machine used (Purchased in June 2023) was ₹ 10,000. Its estimated life is 10 years, the estimated scrap value at the end of its life is ₹ 1,000, and the estimated working time per year (50 weeks of 44 hours) is 2,200 hours of which machine maintenance etc., is estimated to take up 200 hours.

No other loss of working time expected. Setting up time, estimated at 100 hours, is regarded as productive time. (Holiday to be ignored).

(ii) Electricity used by the machine during production is 16 units per hour at cost of a 9 paisa per unit. No current is taken during maintenance or setting up.

(iii) The machine required a chemical solution which is replaced at the end of week at a cost of ₹ 20 each time.

(iv) The estimated cost of maintenance per year is ₹ 1,800.

(v) Two attendants control the operation of machine together with five other identical machines. Their combined weekly wages, insurance and the employer's contribution to

holiday pay amount ₹ 120.

(vi) Departmental and general works overhead allocated to this machine for the current year amount to ₹ 3,000.

You are required to CALCULATE the machine hour rate of operating the machine.

SOLUTION:

Working Notes:

i) Total Productive Hours = Estimated Working Hours – Machine Maintenance Hours

= 2,200 Hours – 200 Hours = 2,000 Hours

ii) Depreciation Per Annum = $\frac{₹\,10,000 - ₹\,1,000}{10 \text{ years}}$ = ₹ 900

iii) Chemical Solution Cost Per Annum = ₹ 20 × 50 Weeks = ₹ 1,000

iv) Wages Of Attendants (Per Annum) = $\frac{₹\,120 \times 50 \text{ weeks}}{6 \text{ machines}}$ = ₹ 1,000

Calculation Of Machine Hour Rate

Particulars	Amount ₹ (per annum)	Amount (per hour)
A. Standing Charge		
(i) Wages of attendants	1,000	
(ii) Departmental and general works overheads	3,000	
Total Standing Charge	**4,000**	
Standing Charges per hour = $\left[\frac{₹\,4,000}{2,000 \text{ Hours}}\right]$		2.0
B. Machine Expense		
(iii) Depreciation	900	0.45
(iv) Electricity (₹ 0.09 x 16 units x 1900 Hours ÷ 2000 Hours)	-	1.37
(v) Chemical solution	1,000	0.50
(vi) Maintenance cost	1,800	0.90
Machine Operating Cost Per Hour (A + B)		**5.22**

PROBLEM – 9E: (PYP SEP 24)

This data pertains to the three machines operating in the manufacturing division of PQR Corp for the financial year 2023-2024:

Particulars	Estimated Expenses			
	TOTAL (₹)	Machines		
		X (₹)	Y (₹)	Z (₹)
Direct Labour Expenses (per quarter)	2,50,000			
Oil Expenses (per quarter)	1,03,125	37,500	37,500	28,125
Machine Insurance Expenses (per quarter)	60,000			
Depreciation (per annum)	6,00,000	1,00,000	2,00,000	3,00,000
Building Maintenance Expenses (per quarter)	1,00,000			
Wages of Operator (per quarter)	2,25,000			
Electricity Expenses (per quarter)	3,00,000			
Rent and Rates (per month)	80,000			
Salary of Technician (per month)	62,500			

(The Technician works only on machines X and Y and the Operator controls all three machines and both spend equal time on each of the machines worked upon by them.)

There are 14 holidays besides Sundays in the year, of which six are on Saturdays. There was a Strike of workers for 5 working days (including one Saturday). The manufacturing department operates for 8 hours per day on regular week days, while on Saturdays, the operating hours are reduced by 2 hours per day. All machines operate at 80% capacity throughout the year. Assume 366 days in a year.

The following additional information is also available:

(i) A 20% hike in the price of oil.

(ii) A 10% rise in Oil consumption for machines 'X' and 'Y' only. (iii)

Particulars	Machines		
	X	Y	Z
No. of Workers	5	3	2
Ratio of K.W. Rating	3	3	4
Ratio of Floor space utilized	1	2	1

Required:

Prepare a Statement detailing the allocation of expenses to each machine on an annual basis and thereafter, compute the comprehensive machine hour rate for each of the specified machine.

SOLUTION:

Computation Of Comprehensive Machine Hour Rate

Particulars	Basis of Apportionment	Total (₹)	Machines		
			X (₹)	Y (₹)	Z (₹)
Standing Charges (Per Annum)					
Direct Labour Expenses	No. of Workers (5:3:2)	10,00,000	5,00,000	3,00,000	2,00,000
Wages of Operator	Equal	9,00,000	3,00,000	3,00,000	3,00,000
Machine Insurance Expenses	Depreciation (1:2:3)	2,40,000	40,000	80,000	1,20,000
Building Maintenance Expenses	Floor Space (1:2:1)	4,00,000	1,00,000	2,00,000	1,00,000
Rent and Rates	Floor Space (1:2:1)	9,60,000	2,40,000	4,80,000	2,40,000
Salary of Technician	(1:1:0)	7,50,000	3,75,000	3,75,000	-
Total Standing Charges		42,50,000	15,55,000	17,35,000	9,60,000
Hourly Rate (A)			856.28	955.40	528.63
Machine Expenses (Per Annum)					
Oil Expenses	Direct (W.N.1)	5,31,000	1,98,000	1,98,000	1,35,000
Depreciation	Direct	6,00,000	1,00,000	2,00,000	3,00,000
Electricity Expenses	K. W. Rating (3:3:4)	12,00,000	3,60,000	3,60,000	4,80,000
Total Machine Expenses		23,31,000	6,58,000	7,58,000	9,15,000
Hourly Rate (B)			362.33	417.40	503.85
Total Expenses		65,81,000	22,13,000	24,93,000	18,75,000
(A) + (B)			**1,218.61**	**1,372.80**	**1,032.49**

Calculation of Effective Working Hours

	Per Machine Per Annum
Full Day Working Hours (250 days x 8 hours)	2,000
6 hours per day Working Hours (45 days x 6 hours)	270
Total Hours	**2,270**
Capacity Utilization	80%
Effective working hours	**1,816**
No. of Shutdown Days	
Sundays	52
Holidays	14
Strike Period	5
	71
No. of 6 Hours Working Days	
Saturdays	52
Less: Holidays	(6)
Less: Strike Period	(1)
	45

No. of Full Working Days

Total No of Days in a year	366
Less: No of Shutdown Days	(71)
Less: No. of 6 Hours Working Days	(45)
	250

Working Notes

1. Calculation of Oil Expenses.

Particulars	Machines		
	X (₹)	Y (₹)	Z (₹)
Oil Expenses	1,50,000	1,50,000	1,12,500
Add: Increase in Price @20%	30,000	30,000	22,500
	1,80,000	1,80,000	1,35,000
Add: Increase in Consumption @10%	18,000	18,000	-
Total	**1,98,000**	**1,98,000**	**1,35,000**

PROBLEM – 10:

Gemini Enterprises undertakes three different jobs A, B and C. All of them require the use of a special machine and also the use of a computer. The computer is hired and the hire charges work out to ₹ 4,20,000 per annum. The expenses regarding the machine are estimated as follows:

	(₹)
Rent for a quarter	17,500
Depreciation per annum	2,00,000
Indirect charges per annum	1,50,000

During the first month of operation the following details were taken from the job register:

Number of hours the machine was used:	Job		
	A	B	C
a. Without the use of the computer	600	900	-
b. With the use of the computer	400	600	1000

You are required to COMPUTE the machine hour rate

i. **For the firm as a whole for the month when the computer was used and when the computer was not used**

ii. **For the individual Jobs A, B and C**

SOLUTION:

Step 1: Calculation Of Machine Hours With & Without Use Of Computers

Total Machine Hours = 3,500 Hours

(600 + 900 + 400 + 600 + 1000)

Machine Hours without use of Computers	Machine Hours with use of Computers
= 600 + 900	= 400 + 600 + 1000
= 1500 Hours	= 2000 Hours

Step 2: Calculation Of Total Overheads Of The Machine & Computer Per Month:

1. Total Overheads Of Machine Per Month:

Rent (₹ 17,500 x 1 Month ÷ 3 Months)	₹ 5,833
Depreciation (₹ 2,00,000 x 1 Month ÷ 12 Months)	₹ 16,667
Indirect charges (₹ 1,50,000 x 1 Month ÷ 12 Months)	₹ 12,500
Total	**₹ 35,000**

2. Computer Hire Charges (₹ 4,20,000 x 1 Month ÷ 12 Months) ₹ 35,000

Step 3: Calculation Of Total Overheads With & Without Use Of Computer

1. Overheads For Using Machine Without Computers $\left(\frac{₹\ 35,000}{3500\ Hours} \times 1500\ Hours\right) = ₹\ 15,000$
2. Overheads For Using Machine With Computers

$\left(\frac{₹\ 35,000}{3500\ Hours} \times 2000\ Hours\right) + ₹\ 35000 = ₹\ 55,000$

Step 4: Calculation Of Machine Hour Rate

1. With Computer = $\frac{₹\ 55,000}{2000\ Hours} = ₹\ 27.5$ Per Machine Hour
2. Without Computer = $\frac{₹\ 15,000}{1500\ Hours} = ₹\ 10$ Per Machine Hour

Step 5: Computation Of Machine Hour Rate For Individual Jobs

Particulars	Rate Per Hour	A		B		C	
		Hours	₹	Hours	₹	Hours	₹
Overheads							
Without Computer	10	600	6,000	900	9,000	-	-
With Computer	27.5	400	11,000	600	16,500	1,000	27,500
Total		**1,000**	**17,000**	**1500**	**25,500**	**1000**	**27,500**
Machine Hour Rate $\left(\frac{\text{Total Overheads}}{\text{Total Hours}}\right)$		₹ 17 Per Hour		₹ 17 Per Hour		₹ 27.5 Per Hour	

PROBLEM – 11:

In an engineering company, the factory overheads are recovered on a fixed percentage basis on direct wages and the administrative overheads arse 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:

PARTICULARS	Job 101 (₹)	Job 102 (₹)
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:

- **COMPUTATION of percentage recovery rates of factory overheads and administrative overheads.**

- **CALCULATION of the amount of factory overheads, administrative overheads and profit for each of the two jobs.**
- **Using the above recovery rates DETERMINE the selling price of job 103. The additional data being:**

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

SOLUTION:

Let The Factory Overheads as a % of Direct Wages be = F

Let The Admin Overheads as a % of Factory Cost be = A

Particulars	**Job 101**		**Job 102**	
	Workings	**₹**	**Workings**	**₹**
Direct Materials	54,000	54,000	37,500	37,500
Direct Wages	42,000	42,000	30,000	30,000
Prime cost	**96,000**	**96,000**	**67,500**	**67,500**
+ Factory Overheads	42,000F	25,200	30,000F	18,000
Factory Cost	**96,000 + 42,000F**	**1,21,200**	**67,500 + 30,000 F**	**85,500**
+ Administrative Overheads	(96,000 + 42000F)A	30,300	(67,500 + 30,000F)A	21,375
Total cost	**96,000 + 42,000F +96000A + 42000FA**	**1,51,500**	**67,400 + 30,000 F + 67500A + 30000FA**	**1,06,875**
+ Profit	(Total Cost x 10%)	15,150	(Total Cost x 20%)	21,375
Selling Price		**1,66,650**		**1,28,250**

Factory Cost + Admin Overheads = Total cost

1. Job 101: (96,000 + 42,000F) + [(96,000 + 42,000F)A] = ₹ 1,51,500

2. Job 102: (67,500 + 30,000 F) + [(67,500 + 30,000F)A] = ₹ 1,06,875

(or)

$$\frac{₹\,96,000 + 42,000F}{₹\,67,500 + 30,000F} = 1.4175$$

₹ 96000 + ₹ 42000F = ₹ 95681 + ₹ 42525F

₹ 319 = ₹ 525F

0.6076 = F or F = 60%

Substituting in → 1

= ₹ 96,000 + (₹ 42,000 x 0.6) + [(₹ 96,000 + (₹ 42,000 x 0.6) A] = ₹ 1,51,500

= ₹ 1,21,200 + 1,21,200A = ₹ 1,51,500

= 1,21,200A = ₹ 30,300

= B = 0.25 or 25%

∴ % of Recovery Rate:

Factory Overheads = 60% of Direct Wages

Admin Overheads = 25% of Factory Cost

Statement Of Jobs, Showing Amount Of Factory Overheads, Administrative Overheads And Profit:

	Job 101	Job 102
	(₹)	(₹)
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 (10% & 20% Respectively)	15,150	21,375
Selling Price	**1,66,650**	**1,28,250**

Computation Of Selling Price Of Job 103:

Particulars	**₹**
Direct Materials	24,000
Direct Wages	20,000
Prime Cost	**44,000**
+ Factory Overheads (60% x ₹ 20,000)	12,000
Factory Cost	**56,000**
+ Admin Overheads (25% x ₹ 56,000)	14,000
Total Cost	**70,000**
+ Profit (12.5% On Selling Price)	10,000
Selling Price	**80,000**

PROBLEM – 12:

Job No. 198 was commenced on October 10, 20x1 and completed on November 1, 20x1. Materials used were 6,000 and labour charged directly to the job was 4,000. Other information is as follows:

Machine No. 215 used for 40 hours, the machine hour rate being ₹ 35.

Machine No. 160 used for 30 hours, the machine hour rate being ₹ 40. Six welders worked on the job for five days of 8 hours each. The Direct labour hour per welder is ₹ 20.

General expenses related to production not included for calculating either the machine hour or direct labour hour rate totalled ₹ 20,000, total direct wages for the period being ₹ 2,00,000. COMPUTE the works costs for Job No. 198.

SOLUTION:

Computation Of Works Cost For Job 198:

Particulars		**₹**
Materials		6,000
Direct Labour		4,000
Prime Cost		**10,000**
Add: Factory Overheads		
Machine 215: (40 Hours x ₹35)	1,400	
Machine 160: (30 Hours x ₹40)	1,200	
Welders Labour Cost (6 Welders x 5 Days x 8 Hours Per Day x ₹20 Per Hour)	4,800	
General Expenses (10% x Wages)	400	7,800
Total Works Cost for Job 198		**17,800**

W.N.1: Absorption for General expenses $= \frac{\text{Total General Expenses}}{\text{Total Direct Wages}} \times 100$

$= \frac{₹\ 20,000}{₹\ 2,00,000} \times 100 = 10\%$ of Direct Wages

PROBLEM – 13:

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

DEPARTMENT	DIRECT MATERIAL (₹)	DIRECT WAGES (₹)	FACTORY OVERHEADS (₹)	DIRECT LABOUR HOURS	MACHINE HOURS
Budget:					
Machining	6,50,000	80,000	3,60,000	20,000	80,000
Assembly	1,70,000	3,50,000	1,40,000	1,00,000	10,000
Packing	1,00,000	70,000	1,25,000	50,000	-
Actual:					
Machining	7,80,000	96,000	3,90,000	24,000	96,000
Assembly	1,36,000	2,70,000	84,000	90,000	11,000
Packing	1,20,000	90,000	1,35,000	60,000	-

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

Department	Direct material (₹)	Direct wages (₹)	Direct labour hours	Machine hours
Machining	1,200	240	60	180
Assembly	600	360	120	30
Packing	300	60	40	-

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

Required:

1. COMPUTE the overhead absorption rate as per the current policy of the company and determine the selling price of Job No. CW 7083.
2. Suggest any suitable alternative method(s) of absorption of the factory overheads and CALCULATE the overhead recovery rates based on the method(s) so recommended by you.
3. DETERMINE the selling price of Job CW 7083 based on the overhead application rates calculated in (2) above.
4. CALCULATE the department-wise and total under or over recovery of overheads based on the company's current policy and the method(s) recommended by you.

SOLUTION:

Part A:

Step 1: Calculation of overhead absorption rate as per current policy of the Company:

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

$$\text{Overheads Absorption rate} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Direct Wages}} \times 100$$

$$= \frac{₹\,6,25,000}{₹\,5,00,000} \times 100 = 125\% \text{ of Direct wages}$$

Step 2: Calculation of selling price of Job CW 7083:

Particulars	₹
Direct Materials (₹ 1200 + ₹ 600 + ₹ 300)	2,100
Direct Wages (₹ 240 + ₹ 360 + ₹ 60)	660
Prime Cost	**2,760**
+ Factory Overheads (125% x ₹ 660)	825
Factory Cost	**3,585**
Profit Mark Up @ 30% on ₹ 3585	1,075.50
Selling Price Per Unit	**4660.50**

Part B: Methods Available For Absorbing Factory Overheads And Their Overhead Absorption Rate In Different Departments

1. **Machinery Department**

   Note: In The Machining Department The Use Of Machine Time Is Predominant Factor Of Production. Hence Machine Hour Rate Should Be Used To Recover Overheads Is This Department

$$\text{Machine Hour Rate} = \frac{\text{Budgeted Factory Overheads}}{\text{Budgeted Machine Hours}}$$

$$= \frac{₹\,3,60,000}{80,000 \text{ Hours}} = ₹\,4.50 \text{ Per Hour}$$

2. **Assembly Department**

   Note: In This Department Direct Labour Hours Is Main Factor Of Production. Hence Direct Labour Rate Should Be Used To Recover Overheads.

$$\text{Direct Labour Hour Rate} = \frac{\text{Budgeted Factory OH}}{\text{Budgeted Direct Labour Hours}}$$

$$= \frac{₹\,1,40,000}{1,00,000\ \text{Hours}} = ₹\,1.40\ \text{Per Hour}$$

3. Packing Department

Note: In This Department Labour Is Important Factor Of Production. Hence Direct Labour Hour Rate Should Be Used To Recover Overheads Is This Department.

$$\text{Direct Labour Rate} = \frac{\text{Budgeted Factory Overheads}}{\text{Budgeted labour Hours}}$$

$$= \frac{₹\,1,25,000}{50,000\ \text{Hours}} = ₹\,2.50\ \text{Per Hour}$$

Part C: Calculation Of Selling Price Using Recovery Rate As In Part B:

Particulars	**(₹)**
Direct Materials	2,100
Direct Wages	660
Prime Cost	**2,760**
+ Factory Overheads (W.N.1)	1,078
Factory Cost	**3838.00**
+ 30% Mark Up	1,151.40
Selling Price	**4,989.40**

W.N.1: Overhead Summary Statement:

	Particulars	**Basis**	**Hours**	**Rate**	**(₹)**
1.	Machining	Machine Hours	180	₹ 4.50	810
2.	Assembly	Labour Hours	120	₹ 1.40	168
3.	Packing	Labour Hours	40	₹ 2.50	100
	Total				**1078**

Part D: Department Wise Statement Of Under Or Over Absorption Of Overheads

a) Current Policy

Particulars	**Machining (₹)**	**Assembly (₹)**	**Packing (₹)**	**Total (₹)**
Direct Wages (Actual)	96,000	2,70,000	90,000	
a. Absorbed Overheads (125% on Direct Wages)	1,20,000	3,37,500	1,12,500	5,70,000
b. Actual Overheads	3,90,000	84,000	1,35,000	6,09,000

c. Under or Over Recovery of Overheads (a-b)	**(2,70,000)**	**2,53,500**	**(22,500)**	**(39,000)**

b) Proposed Policy:

Particulars	Machining (₹)	Assembly (₹)	Packing (₹)	Total (₹)
Hours worked (actual)	96,000 (Machine Hours)	90,000 (Labour Hours)	60,000 (labour Hours)	
Rate per Hour	₹ 4.5	₹1.4	₹2.5	
a. Absorbed Overheads (Hours x rate)	₹ 4,32,000	₹1,26,000	₹1,58,000	₹7,08,000
b. Actual Overheads	₹ 3,90,000	₹ 84,000	₹1,35,000	₹6,09,000
c. Under or Over Recovery of Overheads (a-b)	₹42,000	₹42,000	₹15,000	₹99,000

PROBLEM -14:

A light engineering factory fabricates machine parts for customers. The factory commenced fabrication of 12 nos. Machine parts as per customers' specifications, the expenditure incurred on the job for the week ending 21st August, 20x1 is as tabulated below:

Particulars	Amount (₹)	Amount (₹)
Direct materials (all items)		780
Direct labour (Manual) 20 hours @ ₹ 15 per hour		300
Machine facilities:		
Machine No. I: [4 hours @ ₹ 45]	180	
Machine No. II: [6 hours @ ₹ 65]	390	570
Total		1,650
Overheads @ ₹ 8 per hour on 20 manual hours		160
Total cost		₹ 1,810

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

After the close of each week, the factory levies a supplementary rate for the recovery of full overhead expenses on the basis of actual hours worked during the week. During

the week ending 21st August, 20x1, the total labour hours worked was 2,400 and Machine Nos. I and II had worked for 30 hours and 32.5 hours respectively.

PREPARE a Cost Sheet for the job for the fabrication of 12 nos. Machine parts duly levying the supplementary rates.

SOLUTION:

Cost Sheet For The Week Ending August 21st

Particulars		₹
Direct Materials (all items)		780
Direct Labour (20 Hours @ 15 Per Hour)		300
Prime Cost		**1080**
Machine Facilities:		
Machine 1: (4 Hours @ ₹ 45 Per Hour)	180	
Machine 2: (6 Hours @ ₹ 65 Per Hour)	390	570
Total		**1650**
+ Overheads (₹ 8 Per Hour x 20 Manual Hours)		160
Total Cost		**1,810**
+ Supplementary Rates		
Overheads (₹ 2 Per Hour x 20 Hours) (W.N.1)	40	
Machine Facilities (W.N.2)		
- Machine 1 (₹ 15 x 4 Hours)	60	
- Machine 2 (₹ 15 x 6 Hours)	90	190
Cost		**2,000**

W.N.1: Overheads:

Note: Budgeted OH (3000 Hours x ₹ 8) = ₹ 24,000

In The Absence Of Information, It Is Assumed That Budgeted OH Is Same As Actual OH.

∴ Actual OH = ₹ 24,000

⇒ Actual Man Hours = 2400 Hours

⇒ Actual Rate Per Hour = ₹ 24,000 ÷ 2400 Hours = ₹ 10 Per Hour

Supplementary rate = ₹ 2 (₹ 10 – ₹ 8) Per Hour

W.N.2: Machine Facilities:

Particulars	M1	M2
1. Budgeted	₹ 1,800 (40 Hours x ₹45)	₹ 2,600 (40 Hours x ₹65)
2. Actual Number of Hours	30	32.50

3. Actual Rate Per Hour (1 ÷ 2)	₹60 Per Hour	₹80 Per Hour
4. Predetermined rate	₹45 Per Hour	₹65 Per Hour
5. Supplementary rate (AR – PR)	₹15 Per Hour	₹15 Per Hour

PROBLEM – 15:

A Ltd. manufactures two products A and B. The manufacturing division consists of two production departments P_1 and P_2 and two service departments S_1 and S_2. Budgeted overhead rates are used in the production departments to absorb factory overheads to the products. The rate of Department P_1 is based on direct machine-hours, while the rate of Department P_2 is based on direct labour hours. In applying overheads, the pre-determined rates are multiplied by actual hours.

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

i. Cost of Department S_1 to Department P_1 and P_2 equally, and

ii. Cost of Department S_2 to Department P_1 and P2 in the ratio of 2:1 respectively.

The following budgeted and actual data are available:

Annual profit plan data:

Factory overheads budgeted for the year:

Production departments		Service departments	
P_1	P_2	S_1	S_2
₹ 25,50,000	₹ 21,75,000	₹ 6,00,000	₹ 4,50,000

Budgeted output in units:

Product A - 50,000; B - 30,000.

Budgeted raw-material cost per unit:

Product A - 120; Product B - 150.

Budgeted time required for production per unit:

Department P_1	Product A: 1.5 machine hours
	Product B: 1.0 machine hour
Department P_2	Product A: 2 Direct labour hours
	Product B: 2.5 Direct labour hours

Average wage rates budgeted in Department P_2 are:

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

All materials are used in Department P_1 only.

Actual data: (for the month of July, 20x1)

Units actually produced: Product A: 4,000 units

Product B: 3,000 units

Actual direct machine hours worked in Department P_1:

On product A - 6,100 hours; Product B - 4,150 hours.

Actual direct labour hours worked in Department P_2:

On product A - 8,200 hours; Product B - 7,400 hours.

Costs actually incurred:	Product A	Product B
Raw materials	₹ 4,89,000	₹ 4,56,000
Wages	₹ 5,91,900	₹ 5,52,000
Overheads:		
Department P_1	₹ 2,31,000	
Department P2	₹ 2,04,000	
Department S_1	₹ 60,000	
Department S_2	₹ 48,000	

You are required to:

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

ii. PREPARE a performance report for July 2020 that will reflect the budgeted costs and actual costs.

SOLUTION:

Part A: Calculation Of Pre-Determined Rate For Each Production Department Using Budgeted Data:

Particulars	P1 (₹)	P2 (₹)	S1 (₹)	S2 (₹)
Budgeted Factory Overheads (₹)	25,50,000	21,75,000	6,00,000	4,50,000
S1 (1 : 1)	3,00,000	3,00,000	(6,00,000)	-
S2 (2 : 1)	3,00,000	1,50,000	-	(4,50,000)
Total Overheads (₹)	**31,50,000**	**26,25,000**	**-**	**-**

Budgeted Hours

(W.N.1)	Budgeted Machine Hours	1,05,000	-
(W.N.2)	Budgeted Labour Hours	-	1,75,000
	Pre Determined Rate	**₹ 30 Per Hour**	**₹ 15 Per Hour**

W.N.1: Budgeted machine Hours and Labour Hours

Particulars	A	B	Total
Budgeted Output (U)	50,000 Units	30,000 Units	-
Budgeted Machine Hours (P1)	75,000 (50,000,x ₹ 1.5)	30,000 (30,000 x ₹ 1)	**1,05,000**
Budgeted Labour Hours (P2)	1,00,000 (50,000 x ₹ 2)	75,000 (300,000 x ₹ 2.5)	**1,75,000**

Part B: Performance Report For July 2020

	Budgeted (Standard)	Actuals
Raw Materials (Exclusively In P1)		
Product A (4000 X ₹ 120)	4,80,000	4,89,000
Product B (3000 X ₹ 150)	4,50,000	4,56,000
Wages (Exclusively In P2)		
Prod. A (4000 X 2 Hours X ₹ 72)	5,76,000	5,91,900
Prod. B (3000 X 2.5 Hours X ₹ 75)	5,62,500	5,52,000
Overheads Absorbed On Machine Hour Basis (P1)		
A (4000 x 1.5 Hours x ₹ 30)	1,80,000	1,74,371*
B (3000 x 1 Hour x ₹ 30)	90,000	1,18,629*
Overheads Absorbed on Labour Hour Basis (P2)		
A (4000 x 2 Hours x ₹ 15)	1,20,000	1,31,410*
B (3000 x 2.5 Hours x ₹ 15)	1,12,500	1,18,590*
Total	**25,71,000**	**26,31,900**

W.N 2: Calculation Of Actual Machine Hours & Actual Labour Hours.

Particulars	A	B	Total
Actual output (Units)	4,000	3,000	-
Actual Machine Hours (P1)	6,100	4,150	10,250
Actual Labour Hours (P2)	8,200	7,400	15,600

W.N.3: Calculation of Actual Absorption Rate

Particulars	P1 (₹)	P2 (₹)	S1 (₹)	S2 (₹)
Actual Factory Overheads	2,31,000	2,04,000	60,000	48,000
S1 (1 : 1)	30,000	30,000	(60,000)	-
S2 (2 : 1)	32,000	16,000	-	(48,000)
Total	**2,93,000**	**2,50,000**	**-**	**-**

Part C: Computation of Actual Overheads Rate:

Particulars	P1 (₹)	P2 (₹)
Actual Overheads	₹ 293000	₹ 250000
Actual Machine Hours (P1)	10250 Hours	
Actual Labour Hours (P2)		15600 Hours
Actual Rate	₹ 28.59 Per Hour	₹16.02 Per Hour

Part D: Actual Overheads Absorbed

1. **Based on Machine Hours (P1)**

   A = (6100 x ₹ 28.59 Per Hour) = ₹ 1,74,371

   B = (4150 x ₹ 28.59 Per Hour) = ₹ 1,18,629

2. **Based on Labour Hours (P2)**

   A = (8200 x ₹ 16.02 Per Hour) = ₹ 1,31,410

   B = (7400 x ₹ 16.02 Per Hour) = ₹ 1,18,590

PROBLEM – 16:

A company which sells four products, some of these are unprofitable. Company proposes to discontinue to sale one of these products. The following information is available regarding income, costs and activity for the year ended 31st March.

	Products			
	A	B	C	D
Sales (₹)	30,00,000	50,00,000	25,00,000	45,00,000
Cost of goods sold (₹)	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:

	Amount (₹)	Basis of allocation to products
Fixed Costs		
Rent & Insurance	3,00,000	Area of storage (Sq. ft.)
Depreciation	1,00,000	No. of Parcels sent
Salesmen's salaries & expenses	6,00,000	Sales Volume

Administrative wages and salaries	5,00,000	No. of invoices sent
Variable Costs:		
Packing wages & materials	₹ 2 per parcel	
Commission	4% of sales	
Stationery	₹ 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 31st

	Total (₹)	Products			
		A (₹)	B (₹)	C (₹)	D (₹)
Sales	**1,50,00,000**	**30,00,000**	**50,00,000**	**25,00,000**	**45,00,000**
Variable costs:					
Cost of goods sold	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 @ ₹ 2 per parcel	10,00,000	2,00,000	3,00,000	1,50,000	3,50,000
Stationery @ ₹ 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 – variable cost)	**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	6,00,000	1,20,000	2,00,000	1,00,000	1,80,000

(6:10:5:9)					
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 (Contribution–fixed Costs)	**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

CHAPTER 04: ACTIVITY BASED COSTING

PROBLEM – 1:

Indirect expenses expended by a Machine shop in a factory during a period amounted to ₹ 1,00,000. The machine running time for the period is 10,000 hours. The details of the utilization of the machine time are as follows:

PRODUCT	PRODUCTION	MACHINE TIMES
A	200 units	5000 hours
B	100 units	5000 hours

Trace the overhead cost per unit to the two products using the Traditional overhead absorption system.

The company collected more details relating to the activities performed by its Machine shop to enable tracing indirect costs using the ABC system.

ACTIVITY	COST POOL	COST DRIVER	COST DRIVER CONSUMPTION	
			Product A	Product B
Machine running	₹ 60,000	Machine hours	5000 Hours	5000 Hours
Set up	₹ 15,000	Setup time	3000 Hours	2000 Hours
Inspection	₹ 25,000	Inspection time	1500 Hours	3500 Hours
Total	₹ 1,00,000			

Trace the overhead cost per unit to the two products using the ABC system.

SOLUTION:

Part – 1: Calculation Of Overheads Cost Per Unit Using Tradition At Overheads Absorption System

Calculation Of Absorption Rate:

$$\text{Machine Hour Rate} = \frac{₹\ 1,00,000}{10,000\ \text{Hours}} = ₹\ 10\ \text{Per Machine Hour}$$

Charging Overheads to the Products

₹ 1,00,000

Product A	Product B
↓	↓
5000 Hours x ₹ 10	5000 Hours x ₹ 10
↓	↓
₹ 50,000	₹ 50,000
Overheads Cost per unit	Overheads Cost per unit

$= \frac{₹\,50,000}{200} = ₹\,250$ Per Unit $= \frac{₹\,50,000}{100} = ₹\,500$ Per Unit

Part 2: Activity Based Costing:

Step 1: Calculation Of Cost Driver Rate:

Activity (1)	Cost Pool (2)	Cost Driver (3)	Cost Driver Quantity (4)	Cost Driver Rate (5) = (2 ÷ 4)
Machine	60,000	Machine Hours	10,000 Hours	₹ 6 Per Machine Hour
Setup	15000	Setup time	5000 Hours	₹ 3 Per Setup
Inspection	25000	Inspection	5000 Hours	₹ 5 Per Inspection

Step 2: Appropriation of Overheads:

	Product P1		Product P2	
	Cost Driver Quantity	₹	Cost Driver Quantity	₹
Machine	5000	30,000	5000	30,000
Setup	3000	9000	2000	6,000
Inspection	1500	7500	3500	17,500
Total		**46,500**		**53,500**
Product		200 units		100 units
Overheads Per Unit		**232.50**		**535**

Since ABC System Uses Appropriate Cost Drivers to Apportion Cost it is More Accurate Than Traditional Costing System.

PROBLEM 1A: **(MTP 1 MAY 24)**

The following budgeted information relates to Pinku Ltd. for the year 2024:

	Products		
	A	B	C
Production and Sales (units)	1,00,000 (₹)	80,000 (₹)	60,000 (₹)

Selling price per unit	90	180	140
Direct cost per unit	50	90	95
	Hours	Hours	Hours
Machine department (machine hours per unit)	3	4	5
Assembly department (direct labour hours per unit)	6	4	3

The estimated overhead expenses for the year 2024 will be as below:

Machine Department ₹ 73,60,000

Assembly Department ₹ 55,00,000

Overhead expenses are apportioned to the products on the following basis:

Machine Department On the basis of machine hours

Assembly Department On the basis of Labour hours

After a detailed study of the activities the following cost pools and their respective cost drivers are found:

Cost Pool	Amount (₹)	Cost Driver	Quantity
Machining services	64,40,000	Machine hours	9,20,000 hours
Assembly services	44,00,000	Direct labour hours	11,00,000 hours
Set-up costs	9,00,000	Machine set-ups	9,000 set-ups
Order processing	7,20,000	Customer orders	7,200 orders
Purchasing	4,00,000	Purchase orders	800 orders

As per an estimate the activities will be used by the three products:

	Products		
	A	B	C
Machine set-ups	4,500	3,000	1,500
Customer orders	2,200	2,400	2,600
Purchase orders	300	350	150

Prepare a product-wise profit statement using Activity-based method.

SOLUTION:

Profit Statement Using Activity Based Costing (ABC) Method:

	Particulars	Product			Total (₹)
		A	B	C	
A.	Sales Quantity	1,00,000	80,000	60,000	
B.	Selling price per unit (₹)	90	180	140	
C.	**Sales Value (₹) [A × B]**	**90,00,000**	**1,44,00,000**	**84,00,000**	**3,18,00,000**
D.	Direct cost per unit (₹)	50	90	95	

E.	**Direct Cost (₹) [A × D]**	**50,00,000**	**72,00,000**	**57,00,000**	**1,79,00,000**
F.	Overheads:				
	(Refer working note-3)				
(i)	Machining services (₹)	21,00,000	22,40,000	21,00,000	64,40,000
(ii)	Assembly services (₹)	24,00,000	12,80,000	7,20,000	44,00,000
(iii)	Set-up costs (₹)	4,50,000	3,00,000	1,50,000	9,00,000
(iv)	Order processing (₹)	2,20,000	2,40,000	2,60,000	7,20,000
(v)	Purchasing (₹)	1,50,000	1,75,000	75,000	4,00,000
G.	**Total Cost (₹) [E + F]**	**1,03,20,000**	**1,14,35,000**	**90,05,000**	**3,07,60,000**
H.	**Profit (₹) (C - G)**	**(13,20,000)**	**29,65,000**	**(6,05,000)**	**10,40,000**

1. W.N: 1.

		Products			
		A	**B**	**C**	**Total**
A.	Production (Units)	1,00,000	80,000	60,000	
B.	Machine Hours Per Unit	3	4	5	
C.	Total Machine Hours [A×B]	3,00,000	3,20,000	3,00,000	9,20,000
D.	Rate Per Hour (₹)	8	8	8	
E.	**Machine Department Cost [C×D]**	**24,00,000**	**25,60,000**	**24,00,000**	**73,60,000**
F.	Labour Hours Per Unit	6	4	3	
G.	Total Labour Hours [A×F]	6,00,000	3,20,000	1,80,000	11,00,000
H.	Rate Per Hour (₹)	5	5	5	
I.	**Assembly Department Cost [G×H]**	**30,00,000**	**16,00,000**	**9,00,000**	**55,00,000**

$$\text{Machine hour rate} = \frac{₹\ 73,60,000}{9,20,000\ \text{Hours}} = ₹\ 8$$

$$\text{Labour hour rate} = \frac{₹\ 55,00,000}{11,00,000\ \text{Hours}} = ₹\ 5$$

2. Calculation Of Cost Driver Rate

Cost Pool (1)	**Amount (2) (₹)**	**Cost Driver (3)**	**Quantity (4)**	**Driver Rate (₹) (5 = 2 ÷ 4)**
Machining Services	64,40,000	Machine Hours	9,20,000 hours	7.00
Assembly Services	44,00,000	Direct Labour Hours	11,00,000 hours	4.00

Set-Up Costs	9,00,000	Machine Set-Ups	9,000 set-ups	100.00
Order Processing	7,20,000	Customer Orders	7,200 orders	100.00
Purchasing	4,00,000	Purchase Orders	800 orders	500.00

3. Calculation Of Activity-Wise Cost

		Products			Total
		A	B	C	
A.	Machining hours (Refer Working note-1)	3,00,000	3,20,000	3,00,000	9,20,000
B.	Machine hour rate (₹) (Refer Working note-2)	7	7	7	
C.	**Machining services cost (₹) [A × B]**	**21,00,000**	**22,40,000**	**21,00,000**	**64,40,000**
D.	Labour hours (Refer Working note-1)	6,00,000	3,20,000	1,80,000	11,00,000
E.	Labour hour rate (₹) (Refer Working note-2)	4	4	4	
F.	**Assembly services cost (₹) [D × E]**	**24,00,000**	**12,80,000**	**7,20,000**	**44,00,000**
G.	Machine set-ups	4,500	3,000	1,500	9,000
H.	Rate per set-up (₹) (Refer Working note-2)	100	100	100	
I.	**Set-up cost (₹) [G × H]**	**4,50,000**	**3,00,000**	**1,50,000**	**9,00,000**
J.	Customer orders	2,200	2,400	2,600	7,200
K.	Rate per order (₹) (Refer Working note-2)	100	100	100	
L.	**Order processing cost (₹) [J × K]**	**2,20,000**	**2,40,000**	**2,60,000**	**7,20,000**
M.	Purchase orders	300	350	150	800
N.	Rate per order (₹) (Refer Working note-2)	500	500	500	
O.	**Purchasing cost (₹) [M × N]**	**1,50,000**	**1,75,000**	**75,000**	**4,00,000**

PROBLEM – 2:

ABC Ltd. Manufactures two types of machinery equipment Y and Z and applies/absorbs Overheads on the basis of direct-labour hour. The budgeted Overheads and direct-labour hours for the month of December, 20x1 are ₹ 12,42,500 and 20,000 hours respectively. The information about Company's products is as follows:

PARTICULARS	EQUIPMENT Y	EQUIPMENT Z
Budgeted Production volume	2,500 units	3,125 units
Direct Material cost	300 per unit	450 per unit
Direct labour cost		
Y : 3 hours @ 150 per hour; Z : 4 hours @ 150 per hour	450	600

ABC Ltd.'s Overheads of ₹ 12,42,500 can be identified with three major activities: Order Processing (₹ 2,10,000), machine processing (₹ 8,75,000), and product inspection (₹ 1,57,500).

These activities are driven by the number of orders processed, machine hours worked, and inspection hours, respectively. The data relevant to these activities is as follows:

	ORDERS PROCESSED	MACHINE HOURS WORKED	INSPECTION WORKS
Y	350	23,000	4,000
Z	250	27,000	11,000
Total	600	50,000	15,000

Required:

1. Assuming use of direct-labour hours to absorb/apply Overheads to production, compute the unit manufacturing cost of the equipment Y and Z, if the budgeted manufacturing volume is attained.
2. Assuming use of activity-based costing, compute the unit manufacturing costs of the equipment Y and Z, if the budgeted manufacturing volume is achieved.
3. ABC Ltd.'s selling prices are based heavily on cost. By using direct-labour hours as an application base, calculate the amount of cost distortion (under-costed or over-costed) for each equipment.

SOLUTION:

Part I: Calculation Of Unit Manual Cost Of Equipment Using Traditional Costing System

Particulars	Equipment Y (₹)	Equipment Z (₹)
Direct Materials Cost	300	450
Direct Labour Cost	450	600
Prime Cost	**750**	**1050**

(+) Production Overheads (W.N.1)	186.375 (62.125 x 3)	248.50 (62.125 x 4)
Total Manufacturing Cost	**936.375**	**1298.50**

W.N.1: Calculation Of Labour Hour Rate

$$\text{Labour Hour Rate} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Labour Hour}} = \frac{₹\ 12,42,500}{20,000} = ₹\ 62.125 \text{ Per Hour}$$

Part II: Calculation Of Total Equipment Cost Per Unit Using ABC System

Step 1: Calculation Of Cost Driver Rate

Activity (1)	**Cost Pool (2)**	**Cost Driver (3)**	**Cost Quantity (4)**	**Cost Rate (5) = 2 ÷ 4**
Order	₹ 2,10,000	Order Processed	600	₹ 350 Per Order
Machine	₹ 8,75,000	Machine Hours	50,000	₹ 17.5 Per Machine
Product	₹ 1,57,500	Inspection Hours	15,000	₹ 10.5 Inspection Cost

Step 2: Apportionment

Particulars (Activity)	**Equipment Y (₹)**		**Equipment Z (₹)**	
	CDQ	**₹**	**CDQ**	**₹**
Order	350	1,22,500	250	87,500
Machines	23,000	4,02,500	27000	4,72,500
Inspection	4,000	42,000	11,000	1,15,500
Total		**5,67,000**		**6,75,500**
Units		2500 Units		3125 Units
Production Overheads Per Unit		**226.8**		**216.16**

Step 3: Total Cost Under ABC

Particulars	**Equipment Y (₹)**	**Equipment Z (₹)**
Direct Materials	300	450
Direct Labour	450	600
Prime Cost	**750**	**1050**
Add: Production Overheads	226.8	216.16
Total Cost	**976.80**	**1266.16**

Part III: Calculation Of Cost Distortion:

Particulars	Equipment Y (₹)	Equipment Z (₹)
Traditional System	936.375	1298.50
ABC	976.8	1266.16
Cost Distortion	**40.425**	**32.34**
	(Under Costed)	(Over costed)

PROBLEM – 2A:

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

Budgeted Overheads were analysed into the following:

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

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

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 operations	**6**	**3**	**2**

You are requested to:

1. **PREPARE a statement for management showing the unit costs and total costs of each product using the absorption costing method.**
2. **PREPARE a statement for management showing the product costs of each product using the ABC approach.**
3. **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

= ₹ 99,450 ÷ 5,850 hours

= ₹ 17 Per Direct Labour Hour

Unit Costs:

	A (₹)	B (₹)	C (₹)
Direct Costs:			
- Direct Labour	5.00	7.50	10.00
- Direct Material	8.00	12.00	6.00
Production Overhead:	8.50 $\left(\frac{₹17 \times 30}{60}\right)$	12.75 $\left(\frac{₹17 \times 45}{60}\right)$	17.00 $\left(\frac{₹17 \times 60}{60}\right)$
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**

Activity Based Costing

	A	B	C	Total
Quantity (Units)	4,000	3,000	1,600	-
Material Weight Per Unit (Kg.)	4	6	3	-
Total Material Weight	**16,000**	**18,000**	**4,800**	**38,800**
Machine Operations Per Unit	6	3	2	-
Total Operations	**24,000**	**9,000**	**3,200**	**36,200**
Total Batches Of Material	10	5	15	30

Material Handling Rate Per Kg. = ₹ 29,100 ÷ 38,800 Kg.
= ₹ 0.75 Per Kg.

Electricity Rate Per Machine Operations = ₹ 39,150 ÷ 36,200
= ₹ 1.081 Per Machine Operations

Storage Rate Per Batch = ₹ 31,200 ÷ 30 Batches
= ₹ 1,040 Per Batch

Unit Costs:

	A (₹)	B (₹)	C (₹)
Direct Costs:			
Direct Labour	5.00	7.50	10.00
Direct Material	8.00	12.00	6.00
Production Overheads:			
Material Handling	3.00 (₹ 0.75 x 4)	4.50 (₹ 0.75 x 6)	2.25 (₹ 0.75 x 3)
Electricity	6.49 (₹ 1.081 x 6)	3.24 (₹ 1.081 x 3)	2.16 (₹ 1.081 x 2)
Storage	2.60 $\left(₹ 10 \times \frac{₹ 1040}{4,000}\right)$	1.73 $\left(₹ 5 \times \frac{₹ 1,040}{3,000}\right)$	9.75 $\left(₹ 15 \times \frac{₹ 1040}{1,060}\right)$
Total Unit Costs	**25.09**	**28.97**	**30.16**
Number Of Units	4,000	3,000	1,600
Total Costs	**₹ 1,00,360**	**₹ 86,910**	**₹ 48,256**

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.

PROBLEM 2B: (MTP 1 JAN 25)

Xtyle Ltd. is a leading manufacturer in the textile industry, renowned for its commitment to quality and innovation. With decades of experience, the company specializes in producing a diverse range of textile products, including high-quality towels, designed to meet the varying needs of its

Customers. The company offers mainly three types of towel, viz. Hand towels, Kitchen towels and Gym towels, catering to both everyday use and specialized applications. Below are the key production data for a recent period:

Particulars	Hand towels	Kitchen towels	Gym towels
Production (units)	9,000	15,000	60,000
Machine hours per unit	10	18	14
Direct Labour hours per unit	4	12	8
Direct Material per unit (₹)	450	400	600

Currently, the company utilizes a traditional costing method, which assigns all production overhead costs based on the number of machine hours used. The overhead cost is calculated at a rate of ₹ 30 per machine hour. Additionally, the direct labor cost is charged at ₹ 100 per hour.

Now, the company plans to implement an Activity-Based Costing (ABC) system to enhance cost accuracy and provide a clearer understanding of the costs associated with each product.

The activity analysis is provided as under:

Particulars	Hand towels	Kitchen towels	Gym towels
Batch size (units)	450	1,500	3,000
Number of purchase orders per batch	3	10	8
Store delivery	45	80	125
Number of inspections per batch	5	4	3

Further, the total production Overheads can be divided into several key categories. Machine setup costs account for 20% of the total, while inspection costs make up 35%. Material procurement-related costs represent 10%, and store delivery costs also constitute 10%. Finally, machine operation costs contribute 25% to the overall Overheads. This breakdown provides insight into how resources are allocated across various activities within the production process.

You are required to CALCULATE the cost per unit of each product using -

(i) traditional method.

(ii) activity based costing principles.

SOLUTION:

i) Statement Showing "Cost per unit - Traditional Method"

Particulars of Costs	Hand Towels (₹)	Kitchen Towels (₹)	Gym Towels (₹)
Direct Materials	450	400	600
Direct Labour [(4, 12, 8 hours) x ₹ 100]	400	1,200	800
Production Overheads [(10, 18, 14 hours) x ₹ 30]	300	540	420
Cost Per Unit	**1,150**	**2,140**	**1,820**

ii) Statement Showing "Cost per unit - Activity Based Costing"

Products	Hand Towels	Kitchen Towels	Gym Towels
Production (units)	9,000	15,000	60,000
	(₹)	(₹)	(₹)
Direct Materials	40,50,000 (9,000 units x ₹ 450)	60,00,000 (15,000 units x ₹ 400)	3,60,00,000 (60,000 units x ₹ 600)
Direct Labour (refer Part (i) above)	36,00,000 (9,000 units x ₹ 400)	1,80,00,000 (15,000 units x ₹ 1,200)	4,80,00,000 (60,000 units x ₹ 800)
Setup Costs @ ₹ 1,44,000 per setup	28,80,000 (20 setups x ₹ 1,44,000)	14,40,000 (10 setups x ₹ 1,44,000)	28,80,000 (20 setups x ₹ 1,44,000)
Inspection Costs @ ₹ 63,000 per inspection	63,00,000 (100 inspections x ₹ 63,000)	25,20,000 (40 inspections x ₹ 63,000)	37,80,000 (60 inspections x ₹ 63,000)
Purchase Related Costs @ ₹ 11,250 per purchase order	6,75,000 (60 purchase orders x ₹ 11,250)	11,25,000 (100 purchase orders x ₹ 11,250)	18,00,000 (160 purchase orders x ₹ 11,250)
Store delivery costs @ ₹ 14,400 per store delivery	6,48,000 (45 store delivery x ₹ 14,400)	11,52,000 (80 store delivery x ₹ 14,400)	18,00,000 (125 store delivery x ₹ 14,400)
Machine Related Costs @ ₹ 7.5 per hour	6,75,000 (90,000 hours x ₹ 7.5)	20,25,000 (2,70,000 hours x ₹ 7.5)	63,00,000 (8,40,000 hours x ₹ 7.5)

Total Costs	**1,88,28,000**	**3,22,62,000**	**10,05,60,000**
Cost Per Unit (Total Cost ÷ No. Of Units)	**2,092**	**2,151**	**1,676**

Working Notes:

A. Number of Batches, Purchase Orders, Inspections and Store Deliveries-

	Particulars	Hand Towels	Kitchen Towels	Gym Towels	Total
A.	Production (units)	9,000	15,000	60,000	
B.	Batch Size (units)	450	1,500	3,000	
C.	Number of Batches (A ÷ B)	20	10	20	50
D.	Number Of Purchase Order Per Batch	3	10	8	
E.	Total Purchase Orders [C x D]	60	100	160	320
F.	Number Of Inspections Per Batch	5	4	3	
G.	Total Inspections [C x F]	100	40	60	200
H.	Total Store Deliveries	45	80	125	250

B. Total Machine Hours:

	Particulars	Hand Towels	Kitchen Towels	Gym Towels
A.	Machine Hours per unit	10	18	14
B.	Production (units)	9,000	15,000	60,000
C.	**Total Machine Hours [A x B]**	**90,000**	**2,70,000**	**8,40,000**

Total Machine Hours = 12,00,000

Total Production Overheads = 12,00,000 Hours x ₹ 30 = ₹ 3,60,00,000

C. Cost Driver Rates-

Cost Pool	%	Overheads (₹)	Cost Driver Basis	Cost Driver (Units)	Cost Driver Rate (₹)
Setup	20%	72,00,000	Number of batches	50	1,44,000 per Setup
Inspection	35%	1,26,00,000	Number of inspections	200	63,000 per Inspection
Purchases	10%	36,00,000	Number of purchase order	320	11,250 per Purchase order
Store delivery	10%	36,00,000	Number of store deliveries	250	14,400 per store delivery

Machine Operation	25%	90,00,000	Machine Hours	12,00,000	7.5 per Machine Hour

PROBLEM – 3: **(PYP SEP 24)**

GST Limited is a multi-product company. The production and cost details of its two products P and Q are given as follows:

Particulars	Product	
	P	Q
Quantity produced (No.)	9,000	7,200
Direct material cost (₹)	72,000	50,000
Direct labour hours	800	600
Purchase requisition (No.)	180	144
Production runs (No.)	144	108
Quality inspections (No.)	27	18

Direct wages rate is ₹ 14.50 per hour. Presently the company uses a single overhead recovery rate based on direct labour hours Overhead incurred by the company during the year 2023-24 are as follows:

Technical staff salary	₹ 45,000
Machine operation expenses	₹ 1,62,000
Machine maintenance expenses	₹ 27,000
Wages and salary of stores staff	₹ 36,000

During this period direct labour hours worked 72,000.

Now the Company wants to adopt Activity Based Costing. For this purpose, following activities are identified:

- **Quality control**
- **Setup of machine for production runs**
- **Store receiving**

It is also decided that salary of technical staff should be distributed among machine maintenance, setup and quality control in the ratio of 1 : 2 : 2. Machine maintenance expenses and machine operation expenses should be distributed in the ratio of 2 : 3 in between stores and production setup activities.

During this period cost drivers for these activities are identified as under:

- **Requisition raised 5,760**
- **Production setup 7,200**
- **No. of quality test 720**

You are required to compute:

(i) The cost of products P and Q based on traditional absorption costing system.

(ii) The cost of products P and Q based on ABC Costing system. (8 Marks)

SOLUTION:

(i) Statement Showing "Total Cost - Traditional Method"

Particulars of Costs	**P**	**Q**
	(₹)	**(₹)**
Direct Materials	72,000	50,000
Direct Labour [(800,600 hours) x ₹ 14.5]	11,600	8,700
Production Overheads [(800,600 hours) x ₹ 3.75] (WN1)	3,000	2,250
Total Cost	**86,600**	**60,950**
Cost per unit (9,000, 7,200)	9.62	8.47

WN1: Calculation of Production Overhead:

	(₹)
Technical Staff Salary	45,000
Machine Operation Expenses	1,62,000
Machine Maintenance Expenses	27,000
Wages And Salary Of Stores Staff	36,000
Total Production Overhead	2,70,000
Total Direct Labour Hours Worked	72,000 hours
Production Overhead Rate Per Hour	3.75

(ii) Statement Showing "Total Cost - Activity Based Costing"

Products	**P**	**Q**
Production (units)	9,000	7,200
	(₹)	**(₹)**
Direct Materials	72,000	50,000
Direct Labour [(800,600 hours) x ₹ 14.5]	11,600	8,700
Requisition Related Costs @ ₹ 20 per requisition raised (180,144) (WN2)	3,600	2,880
Production Setup Costs @ ₹ 19 per production runs (144,108) (WN2)	2,736	2,052
Quality Inspection Costs @ ₹ 25 per quality test (27,18) (WN2)	675	450
Total Costs	**90,611**	**64,082**

Cost per unit (9,000, 7,200)	**10.07**	**8.90**

WN2: Statement Showing Distribution of Expenses

	Machine Maintenance Expenses	Total Stores	Production Setup	Quality Control
Technical staff salary of ₹ 45,000 (1:2:2)	9,000	-	18,000	18,000
Machine operation expenses of ₹ 1,62,000 (2:3)	-	64,800	97,200	-
Machine maintenance expenses of ₹ 36,000 (2:3)	(9,000)	14,400	21,600	-
Wages and salary of stores staff	-	36,000	-	-
Total	**-**	**1,15,200**	**1,36,800**	**18,000**

WN3: Cost for each activity cost driver:

Activity (1)	Total cost (₹) (2)	Cost allocation base (3)	Cost driver rate (4) = [(2) ÷ (3)]
Stores Receiving	1,15,200	5,760 Requisitions Raised	**₹ 20 per requisition raised**
Production Setup	1,36,800	7,200 Production Setup	**₹ 19 per production setup**
Quality Control	18,000	720 Quality Test	**₹ 25 per quality test**

PROBLEM – 4:

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

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

Family store also provides the following information for the current year:

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

Required:

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

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

SOLUTION:

Working Notes:

1. **Total Support Cost:**

	(₹)
Bottles Returns	60,000
Ordering	7,80,000
Delivery	12,60,000
Shelf Stocking	8,64,000
Customer Support	15,36,000
Total Support Cost	**45,00,000**

2. **Percentage Of Support Cost To Cost Of Goods Sold (COGS):**

$$= \frac{\text{Total Support Cost}}{\text{Total Cost Of Goods Sold}} \times 100$$

$$= \frac{₹\,45,00,000}{₹\,1,50,00,000} \times 100$$

= 30% of COGS

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

(i) Statement Of Operating Income And Operating Income As A Percentage Of Revenues For Each Product Line

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

	Soft Drinks (₹)	Fresh Produce (₹)	Packaged Foods (₹)	Total (₹)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost of Goods sold (COGS): (B)	30,00,000	75,00,000	45,00,000	1,50,00,000
Support cost (30% of COGS): (C) (Refer working notes)	9,00,000	22,50,000	13,50,000	45,00,000
Total cost: (D) = {(B) + (C)}	39,00,000	97,50,000	58,50,000	1,95,00,000
Operating income: E= {(A)-(D)}	67,500	7,53,000	1,99,500	10,20,000
Operating income as a percentage of revenues: (E ÷ A) × 100)	**1.70%**	**7.17%**	**3.30%**	**4.97%**

(ii) Statement Of Operating Income And Operating Income As A Percentage Of Revenues For Each Product Line

(When support costs are allocated to product lines using an activity- based costing system)

	Soft drinks (₹)	Fresh Produce (₹)	Packaged Food (₹)	Total (₹)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost & Goods Sold	30,00,000	75,00,000	45,00,000	1,50,00,000
Bottle Return Costs	60,000	0	0	60,000
Ordering Cost* (360:840:360)	1,80,000	4,20,000	1,80,000	7,80,000
Delivery Cost* (300:2190:660)	1,20,000	8,76,000	2,64,000	12,60,000
Shelf Stocking Cost* (540 : 5400 : 2700)	54,000	5,40,000	2,70,000	8,64,000
Customer Support Cost* (1,26,000:11,04,000:3,06,000)	1,26,000	11,04,000	3,06,000	15,36,000
Total Cost: (B)	35,40,000	1,04,40,000	55,20,000	1,95,00,000
Operating Income C:{(A)- (B)}	4,27,500	63,000	5,29,500	10,20,000
Operating Income As A % Of Revenues	**10.78%**	**0.60%**	**8.75%**	**4.97%**

* Refer to working note 3

PROBLEM – 4A:

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

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

Its five activities and their cost drivers are:

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

Required:

1. COMPUTE the customer-level operating income of each of five retail customers now being examined (A, B, C, D and E). Comment on the results.
2. STATE what insights are gained by reporting both the list selling price and the actual selling price for each customer.

SOLUTION:

Working note:

Computation Of Revenues (At Listed Price), Discount, Cost Of Goods Sold And Customer Level Operating Activities Costs:

	Customers				
	A (₹)	**B (₹)**	**C (₹)**	**D (₹)**	**E (₹)**
Cases sold: (a)	4,680	19,688	1,36,800	71,550	8,775
Revenues (at listed price) (₹): (b) {(a) × ₹108)}	5,05,440	21,26,304	1,47,74,400	77,27,400	9,47,700
Discount (₹): (c) {(a) × Discount per case}	-	35,438 (19,688 cases × ₹ 1.80)	12,31,200 (1,36,800 cases × ₹ 9)	2,57,580 (71,550 cases × ₹ 3.60)	94,770 (8,775 cases × ₹ 10.80)
Cost Of Goods Sold (₹): (D) {(A) × ₹ 90}	**4,21,200**	**17,71,920**	**1,23,12,000**	**64,39,500**	**7,89,750**

Customer Level Operating Activities Costs

Order taking costs (₹): (No. of purchase × ₹750)	11,250	18,750	22,500	18,750	22,500
Customer visits costs (₹) (No. of customer visits ×	1,200	1,800	3,600	1,200	1,800

₹ 600)					
Delivery vehicles travel costs (₹) (₹ 5.75 per km) (Kms travelled by delivery vehicles × ₹ 5.75 per km.)	1,150 (5.75 x 10x20)	1,035 (5.75 x 30 x 6)	1,725 (5.75 x 60x 5)	2,300 (5.75 x 40 x 10)	3,450 (5.75 x 20 x 30)
Product handling costs (₹) {(a) ×₹ 3.75}	17,550	73,830	5,13,000	2,68,313	32,906
Cost of expediting deliveries (₹) {No. of expedited deliveries × ₹ 2,250}	-	-	-	-	2,250
Total cost of customer level operating activities (₹)	**31,150**	**95,415**	**5,40,825**	**2,90,563**	**62,906**

Computation Of Customer Level Operating Income

	Customers				
	A (₹)	**B (₹)**	**C (₹)**	**D (₹)**	**E (₹)**
Revenues (At List Price) (Refer To Working Note)	5,05,440	21,26,304	1,47,74,400	77,27,400	9,47,700
Less: Discount (Refer To Working Note)	-	35,438	12,31,200	2,57,580	94,770
Revenue (At Actual Price)	**5,05,440**	**20,90,866**	**1,35,43,200**	**74,69,820**	**8,52,930**
Less: Cost Of Goods Sold (Refer To Working Note)	4,21,200	17,71,920	1,23,12,000	64,39,500	7,89,750
Gross Margin	**84,240**	**3,18,946**	**12,31,200**	**10,30,320**	**63,180**
Less: Customer Level Operating Activities Costs (Refer To Working Note)	31,150	95,415	5,40,825	2,90,563	62,906
Customer Level Operating Income	**53,090**	**2,23,531**	**6,90,375**	**7,39,757**	**274**

Comment on the results:

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

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

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

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

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

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

PROBLEM – 4B: (MTP 1 SEP 24)

Icecold a FMCG Company manufactures and sells three flavors of ice cream: Dark chocolate, Chocolate, and Butterscotch. The batch size for the ice cream is limited to 1,000 ice cream based on the size of the fridge and ice cream molds owned by the company. Based on budgetary projections, the information listed below is available:

	Dark chocolate	Chocolate	Butterscotch
Projected sales in units	500,000	800,000	600,000
PER UNIT data:			
Selling price	₹ 80	₹ 75	₹ 60
Direct materials	₹ 20	₹ 15	₹ 14
Direct labor	₹ 4	₹ 2	₹ 2
Hours per 1000-unit batch:			
Direct labor hours	20	10	10
Fridge hours	1	1	1
Packaging hours	0.5	0.5	0.5

Total overhead costs and activity levels for the year are estimated as follo

Activity	Overhead costs	Activity levels
Direct labor		2,400 hours
Fridge	₹ 2,10,00,000	1,900 fridge hours
Packaging	₹ 1,50,00,000	950 packaging hours
	₹ 3,60,00,000	

Required:

a. With the help of ABC system, for the Chocolate ice cream:
   1. Compute the activity-cost-driver rate
   2. Compute the estimated overhead costs per thousand ice cream.
   3. Compute the estimated operating profit per thousand ice cream.

b. With the help of traditional system (with direct labor hours as the overhead allocation base), for the Chocolate ice cream, compute the estimated operating profit per thousand ice cream.

SOLUTION:

a.

1. Estimation Of Cost-Driver Rate

Activity (1)	Overhead cost (₹) (2)	Cost driver (3)	Cost driver rate (₹) (4) = 2 ÷ 3
Packaging	1,50,00,000	950 Packaging Hours	15,789.47
Fridge	2,10,00,000	1,900 Fridge Hours	11,052.63

2. Overhead Cost For Chocolate Ice Cream

Activity	Overhead for a 1,000-ice cream batch	Amount (₹)
Packaging	1 x ₹ 11,052.63	11,052.63
Fridge	0.5 x ₹ 15,789.47	7,894.74
Total		**18,947.37**

3. **Operating Profit For Chocolate Ice Cream**

Particulars	Amount (₹)
Revenue (1,000 x ₹ 75)	75,000.00
Less: Direct Material (1,000 x ₹ 15)	15,000.00
Less: Direct Labour (10,000 x ₹ 2)	20,000.00
Less: Overhead	18,947.37
Operating Profit	**21,052.63**

b. Overhead Per Direct Hour

= Total Overhead ÷ Total Direct Labour Hours

= ₹ 3,60,00,000 ÷ 24,000 hours

= ₹ 1,500 per direct labour hour

Since It Takes 10 Direct Labour Hour Per 1,000 Chocolate Ice Cream, The Overhead Is ₹ 15,000

Particulars	Amount (₹)
Revenue (1,000 x ₹ 75)	75,000.00
Less: Direct Material (1,000 x ₹ 15)	15,000.00
Less: Direct Labour (10,000 x ₹ 2)	20,000.00
Less: Overhead	15,000
Operating Profit	**25,000**

PROBLEM – 5:

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

I. General Supermarket Chains

II. Drugstore Chains

III. Chemist Shops

The following data for the month of April, 20x1 in respect of RST Limited has been reported:

PARTICULARS	GENERAL SUPERMARKET CHAINS	DRUGSTORE CHAINS	CHEMIST SHOPS
Average revenue per delivery	₹ 84,975	₹ 28,875	₹ 5,445
Average cost of goods sold per delivery	₹ 82,500	₹ 27,500	₹ 4,950
Number of deliveries	330	825	2,750

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

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

The Activity analysis of RST Limited is as under:

ACTIVITY AREA	COST DRIVER
Customer purchase order processing	Purchase orders by customers
Line-items ordering	Line-items per purchase order
Store delivery	Store deliveries
Cartons dispatched to a stores	Cartons dispatched to a store per delivery
Shelf-stocking at customers store	Hours of shelf-stocking

The April, 20x1 operating costs (other than cost of goods sold) of RST Limited are ₹ 8,27,970. These operating costs are assigned to five activity areas. The cost in each area and the quantity of the cost allocation basis used in that area for April, 20x1 are as follows:

Activity Area	Total costs in April, 20x1	Total Units of Cost Allocation Base used in April, 20x1
Customer purchase order processing	₹ 2,20,000	5,500 orders
Line-item ordering	₹ 1,75,560	58,520 line items
Store delivery	₹ 1,95,250	3,905 store deliveries
Cartons dispatched to stores	₹ 2,09,000	2,09,000 cartons
Shelf-stocking at customer store	₹ 28,160	1,760 hours

Other data for April, 20x1 include the following:

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

Required:

i. **COMPUTE for April, 20x1 gross-margin percentage each of its three distribution channels and compute RST Limited's operating income.**

ii. **COMPUTE the April, 20x1 rate per unit of the cost-allocation base for each of the five activity areas.**

iii. **COMPUTE the operating income of each distribution channel in April, 20x1 using the activity-based costing information. Comment on the results. What new insights are available with the activity-based cost information?**

iv. **DESCRIBE four challenges one would face in assigning the total April, 20x1 operating costs of ₹ 8,27,970 to five activity areas**

SOLUTION:

Part I: Statement of Operating Income and Gross Margin Percentage for Each of its Three Distribution Channel:

Particulars	General Super Market (₹)	Drug Store (₹)	Chemist Shop (₹)	Total (₹)
Revenue	2,80,41,750 (330 x ₹ 84,975)	2,38,21,875 (825 x ₹ 28,875)	1,49,73,750 (2750 x ₹ 5,445)	6,68,37,375
(-) COGS	(2,72,25,000) (330 x ₹ 82,500)	(2,26,87,500) (825 x ₹ 27,500)	(1,36,12,500) (2750 x ₹ 4,950)	6,35,25,000
Gross Profit	**8,16,750**	**11,34,375**	**13,61,250**	**33,12,375**
Less (-) Operating Cost				(8,27,970)
Operating Income				**24,84,405**
Gross Margin	2.91%	4.76%	9.09%	4.96
Operating Income %				**3.72%**

Part – II: ABC System Cost Allocation Base Of Fine Activity Areas

Activity (1)	Cost Pool ₹ (2)	Cost Driver (3)	Cost Driver Quantity (4)	Cost Driver Rate ₹ (5) = (2 ÷ 4)
Purchase order	2,20,000	Orders	5500	₹ 40 Per Order
Line items	1,75,500	Line Item	58,520	₹ 3 Per Line Item

Stores	1,95,250	Store Deliver	3905	₹ 50 Per Deliver
Cartons	2,09,000	Cartons	2,09,000	₹ 1 Per Cartons
Shelf	28,160	Hours	1760	₹ 16 Per Hour

Activity	General		Drug		Chemist	
	CDQ	₹	CDQ	₹	CDQ	₹
Orders	385	15400	990	39600	4125	165000
Line item	5390	16170	11880	35640	41250	123750
Store Deliver	330	16500	825	41250	2750	137500
Cartons	99000	99000	66000	66000	44000	44000
Hours	990	15840	495	7920	275	4400
Total		**162910**		**190410**		**474650**

Apportionment Under ABC

Particulars	General (₹)	Drug (₹)	Chemist (₹)
Revenue	2,80,41,750	2,38,21,875	1,49,73,750
(+) COGS	(2,72,25,000)	(2,26,87,500)	(1,36,12,500)
Gross Profit	**8,16,750**	**11,34,375**	**13,61,250**
(-) Production Overheads	1,62,910	1,90,410	4,74,650
Operating Income	6,53,840	9,43,965	8,86,600
Operating Income %	2.33	3.96	5.92
Production Overheads %	**0.58%**	**0.80%**	**3.17%**

PROBLEM – 6:

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

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

The following information is made available to formulate the budget:

Activity	Present Cost ₹	Estimation for the budget period
ATM Services: a. Machine Maintenance b. Rents c. Currency Replenishment Cos	 4,00,000 2,00,000 1,00,000	 All fixed, no change. Fully fixed, no change. Expected to double during budget period
	7,00,000	(This activity is driven by no. of ATM transactions)
Computer Processing	5,00,000	Half this amount is fixed and no change is expected. The variable portion is expected to increase to three times the current level. (This activity is driven by the number of computer transactions)
Issuing Statements	18,00,000	Presently, 3 lakh statements are made. In the budget period, 5 lakh statements are expected. For every increase of one lakh statement, one lakh rupees is the budgeted increase. (This activity is driven by the number of statements)
Computer Inquiries	2,00,000	Estimated to increase by 80% during the budget period. (This activity is driven by telephone minutes)

The activity drivers and their budgeted quantifies are given below:

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

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

Required:

- **CALCULATE the budgeted rate for each activity.**
- **PREPARE the budgeted cost statement activity wise.**
- **COMPUTE the budgeted product cost per account for each product using (i) and (ii) above.**

SOLUTION:

Statement Showing "Budgeted Cost Per Unit Of The Product"

Activity	Activity Cost (Budgeted) (₹)	Activity Driver	No. of Units of Activity Driver (Budget)	Activity Rate (₹)	Deposits (₹)	Loans (₹)	Credit Cards (₹)
ATM Services	8,00,000	No. of ATM Transaction	2,00,000	4.00	6,00,000	---	2,00,000
Computer Processing	10,00,000	No. of Computer processing Transaction	20,00,000	0.50	7,50,000	1,00,000	1,50,000
Issuing Statements	20,00,000	No. of Statements	5,00,000	4.00	14,00,000	2,00,000	4,00,000
Customer Inquiries	3,60,000	Telephone Minutes	7,20,000	0.50	1,80,000	90,000	90,000
Budgeted Cost	41,60,000				29,30,000	3,90,000	8,40,000
Units of Product (as estimated in the budget period)					**58,600**	**13,000**	**14,000**
Budgeted Cost per unit of the product					(₹) 50	(₹) 30	(₹) 60

Working Note

Activity	Budgeted Cost (₹)	Remark
ATM Services:		
(a) Machine Maintenance	4,00,000	- All fixed, no change.
(b) Rents	2,00,000	- Fully fixed, no change.
(c) Currency Replenishment Cost	2,00,000	- Doubled during budget period.
Total	8,00,000	
	2,50,000	

Computer Processing	7,50,000	- ₹ 2,50,000 (half of ₹ 5,00,000) is fixed and no change is expected. - ₹ 2,50,000 (variable portion) is expected to increase to three times the current level.
Total	10,00,000	
Issuing Statements	18,00,000	- Existing.
	2,00,000	- 2 lakh statements are expected to be increased in budgeted Period. For every increase of one lakh statement, one lakh Rupees is the budgeted increase.
Total	20,00,000	
Computer Inquiries	3,60,000	- Estimated to increase by 80% during the budget period. (₹ 2,00,000 x 180%)
Total	3,60,000	

PROBLEM – 6A: (MTP 2 JAN 25)

XYZ Constructions is a leading engineering and construction company providing a range of infrastructure and industrial services. Recently, they have been asked to quote for residential building construction (RBC) and industrial plant construction (IPC) projects. However, they are winning fewer RBC contracts than expected.

XYZ Constructions has a policy to price all jobs at budgeted total cost plus 50%. Overheads are currently absorbed on a labour-hour basis. The company believes that switching to activity-based costing (ABC)

to absorb overheads would reduce the costs associated with RBC and make them more competitive.

You are provided with the following data:

Overhead category	Annual Overhead (₹ Lakhs)	Activity driver	Total number of activities per year
Supervisors	₹120	Site visits	600
Project Planners	₹ 80	Planning documents	300
Property related	₹400	Labour hours	50,000
Total	₹600		

For a typical RBC: Material cost: ₹ 5 lakhs, Labour hours: 1,200 hours, Site visits: 2 visits, Planning documents: 2 documents For a typical IPC: Material cost: ₹ 12 lakhs, Labour hours: 2,500 hours, Site visits: 10 visits, Planning documents: 8 documents Labour is paid at ₹ 100 per hour. Required:

(a) CALCULATE the cost and quoted price of an RBC and an IPC using labour hours to absorb the overheads.

(b) CALCULATE the cost and quoted price of an RBC and an IPC using ABC to absorb the overheads.

(c) Assuming that the cost of an RBC falls by nearly 7% and the price of an IPC rises by about 2% as a result of the change to ABC, SUGGEST possible pricing strategies for the two services offered by XYZ Constructions. Additionally, suggest two reasons other than high prices for the current poor sales of RBC.

SOLUTION:

(a) Cost and Quoted Price Using Labour Hours to Absorb Overheads

		RBC (₹ in lakhs)	IPC (₹ in lakhs)
Materials		5.00	12.00
Labour	1200 x ₹ 100; 2500 x ₹ 100	1.20	2.50
Overheads	1200 x ₹ 1200; 2500 x ₹ 1200	14.40	30.00
Total cost		20.60	44.50
Add: Profit	50% of Total Cost	10.30	22.25
Quoted Price		**30.90**	**66.75**

b) Cost and Quoted Price Using ABC

Step 1: Calculate Overhead Rates for Each Activity

Overhead Category	Total Overhead (₹ Lakhs)	Activity Driver	Activity Rate
Site Engineers	₹120	Site Visits	₹ 120 ÷ 600 = ₹ 20,000 per site visit
Project Planners	₹80	Planning Documents	₹ 80 ÷ 300 = ₹ 26,667 per planning document
Equipment Depreciation	₹400	Labour Hours	₹ 400 ÷ 50,000 = ₹ 800 per Labour Hour

Step 2: Allocate Overheads Using ABC

		RBC (in lakhs)	IPC (in lakhs)
Materials		5.00	12.00
Labour	1200 x ₹100; 2500 x ₹100	1.20	2.50

Overheads			
Site Engineers	2 x ₹ 20,000; 10 x ₹ 20,000	0.40	2.00
Project Planners	2 x ₹ 26,667; 8 x ₹ 26,667	0.53	2.13
Equipment Depreciation	1200 x ₹ 800; 2500 x ₹ 800	9.60	20.00
Total cost		16.73	38.63
Add: Profit	50% of Total Cost	8.37	19.32
Quoted Price		**25.10**	**57.95**

c) Possible pricing strategies for the two services offered by XYZ Constructions

- ✓ The pricing policy is a matter for XYZ Constructions to decide. They could elect to maintain the current 50% mark-up on cost and if they did the price of the RBC would fall by around 7% in line with the costs. This should make them more competitive in the market.
- ✓ They could also reduce the prices by a little less than 7% (say 5%) in order to increase internal margins a little.

Reasons other than high prices for the current poor sales of RBC:

- ✓ If the quality of work or the reputation and reliability of the builder are questionable, lowering prices is unlikely to boost sales.
- ✓ While it is possible that XYZ Constructions has a strong reputation for IPC but not for RBC, it is more likely that a poor reputation would impact all their products. Poor service or inflexibility in meeting customer needs may also hurt sales and can't be fixed by lowering prices.
- ✓ Poor marketing strategies also discourage customers from selecting XYZ Constructions.
- ✓ XYZ Constructions faces competition and may need to adopt a more competitive pricing strategy, such as 'going rate pricing,' instead of simply adding a markup to costs.
- ✓ XYZ Constructions could enter the market by pricing some projects competitively to establish a foothold. Completed projects could then be leveraged to attract new customers.

PROBLEM – 7:

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

	BABYSOFT Gold		BABYSOFT Pearl		BABYSOFT Diamond	
Production of soaps (Units)	4,000		3,000		2,000	
Resources per Unit:	Qty	Rate ₹	Qty	Rate ₹	Qty	Rate ₹
Essential Oils	60 ml	200 / 100ml	55 ml	300 / 100 ml	65 ml	300 / 100 ml
Cocoa Butter	20 g	200 / 100 g	20 g	200 / 100 g	20 g	200 / 100 g
Filtered Water	30 ml	15 / 100ml	30 ml	15 / 100 ml	30 ml	15 / 100 ml
Chemicals	10 g	30 / 100g	12 g	50 / 100 g	15 g	60 / 100 g
Direct Labour	30 minutes	10 / hour	40 minutes	10 / hour	60 minutes	10 / hour

Bio-organic Ltd. followed an Absorption Costing System and absorbed its production Overheads, to its products using direct labour hour rate, which were budgeted at ₹ 1,98,000.

Now, Bio-organic Ltd. is considering adopting an Activity Based Costing system.

For this, additional information regarding budgeted Overheads and their cost drivers is provided below:

Particulars	₹	Cost drivers
Forklifting cost	58,000	Weight of material lifted
Supervising cost	60,000	Direct labour hours
Utilities	80,000	Number of Machine operations

The number of machine operations per unit of production are 5, 5, and 6 for BABYSOFT-Gold, BABYSOFT- Pearl, and BABYSOFT- Diamond respectively.

(Consider (i) Mass of 1 litre of Essential Oils and Filtered Water equivalent to 0.8 kg and 1 kg respectively (ii) Mass of output produced is equivalent to the mass of input materials taken together.)

You are requested to:

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

SOLUTION:

Traditional Absorption Costing

	BABYSOFT-Gold	BABYSOFT-Pearl	BABYSOFT-Diamond	Total
(a) Production of soaps (Units)	4,000	3,000	2,000	9,000
(b) Direct labour (minutes)	30	40	60	-
(c) Direct labour hours (a × b) ÷ 60 minutes	2,000	2,000	2,000	6,000

Overhead rate per direct labour hour:

= Budgeted Overheads ÷ Budgeted labour hours

= ₹ 1,98,000 ÷ 6,000 hours

= ₹ 33 per direct labour hour

Unit Costs:

	BABYSOFT-Gold (₹)	BABYSOFT-Pearl (₹)	BABYSOFT-Diamond (₹)
Direct Costs:			
- Direct Labour	5.00 $\left(\frac{10 \times 30}{60}\right)$	6.67 $\left(\frac{10 \times 40}{60}\right)$	10.00 $\left(\frac{10 \times 60}{60}\right)$
- Direct Material (Refer working note1)	167.50	215.50	248.50
Production Overhead	16.50 $\left(\frac{33 \times 30}{60}\right)$	22.00 $\left(\frac{33 \times 40}{60}\right)$	33.00 $\left(\frac{33 \times 60}{60}\right)$
Total unit costs	189.00	244.17	291.50
Number of units	4,000	3,000	2,000
Total costs	**7,56,000**	**7,32,510**	**5,83,000**

Working Note-1

Calculation of Direct material cost

	BABYSOFT-Gold (₹)	BABYSOFT-Pearl (₹)	BABYSOFT-Diamond (₹)
Essential oils	120.00 $\left(\frac{200 \times 60}{100}\right)$	165.00 $\left(\frac{300 \times 55}{100}\right)$	195.00 $\left(\frac{300 \times 65}{100}\right)$
Cocoa Butter	40.00	40.00	40.00

	$\left(\frac{200 \times 20}{100}\right)$	$\left(\frac{200 \times 20}{100}\right)$	$\left(\frac{200 \times 20}{100}\right)$
Filtered water	4.50 $\left(\frac{15 \times 30}{100}\right)$	4.50 $\left(\frac{15 \times 30}{100}\right)$	4.50 $\left(\frac{15 \times 30}{100}\right)$
Chemicals	3.00 $\left(\frac{30 \times 10}{100}\right)$	6.00 $\left(\frac{50 \times 12}{100}\right)$	9.00 $\left(\frac{60 \times 15}{100}\right)$
Total costs	**167.50**	**215.50**	**248.50**

Activity Based Costing

	BABYSOFT-Gold	**BABYSOFT-Pearl**	**BABYSOFT-Diamond**	**Total**
Quantity (Units)	4,000	3,000	2,000	-
Weight Per Unit (Grams)	108 {(60 × 0.8) + 20 + 30 + 10}	106 {(55 × 0.8)+20 + 30 + 12}	117 {(65 × 0.8) + 20 + 30 + 15}	-
Total Weight (Grams)	**4,32,000**	**3,18,000**	**2,34,000**	**9,84,000**
Direct Labour (Minutes)	30	40	60	-
Direct Labour Hours	**2,000** $\left(\frac{4000 \times 30}{60}\right)$	**2,000** $\left(\frac{3000 \times 40}{60}\right)$	**2,000** $\left(\frac{2000 \times 60}{60}\right)$	**6,000**
Machine Operations Per Unit	5	5	6	-
Total Operations	**20,000**	**15,000**	**12,000**	**47,000**

Forklifting rate per gram = ₹ 58,000 ÷ 9,84,000 grams

= ₹ 0.06 per gram

Supervising rate per direct labour hour = ₹ 60,000 ÷ 6,000 hours

= ₹ 10 per labour hour

Utilities rate per machine Operations = ₹ 80,000 ÷ 47,000 machine operations

= ₹ 1.70 per machine operations

Unit Costs under ABC:

	BABYSOFT-Gold (₹)	BABYSOFT-Pearl (₹)	BABYSOFT-Diamond (₹)
Direct Costs:			
- Direct Labour	5.00	6.67	10.00
- Direct material	167.50	215.50	248.50
Production Overheads:			
- Forklifting cost	6.48 (0.06 x 108)	6.36 (0.06 x 106)	7.02 (0.06 x 117)
- Supervising cost	5.00 $\left(\frac{10 \times 30}{60}\right)$	6.67 $\left(\frac{10 \times 40}{60}\right)$	10.00 $\left(\frac{10 \times 60}{60}\right)$
Utilities	8.50 (1.70 x 5)	8.50 (1.70 x 5)	10.20 (1.70 x 6)
Total unit costs	192.48	243.70	285.72
Number of units	4,000	3,000	2,000
Total costs	**7,69,920**	**7,31,100**	**5,71,440**

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

PROBLEM – 8:

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

ACTIVITY	COST DRIVER	KILOWATT HOURS	COST
Power	Kilowatt hours	50,000 kilowatt hours	₹ 2,00,000
Quality inspections	Number of inspections	10,000 inspections	₹ 3,00,000

The company makes three products M, S and T. For the year ended March 31, 20x1, 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:

Part I: Computation Of Cost Allocate From Each Quantity:

Step 1: Calculation Of Cost Drive Rate:

Activity (1)	**Cost Pool (2)**	**Cost Driver (3)**	**Cost Driver Quantity (4)**	**Cost Driver Rate (5) = (2 ÷ 4)**
Power	2,00,000	Kilowatt	50000	₹ 4 Per Kilowatt
Quality	3,00,000	Quality inspection	10000	₹ 30 Per Quality Inspection

Step 2: Apportionment

Particulars	**M**		**S**		**T**		**Total**
	CDQ	**₹**	**CDQ**	**₹**	**CDQ**	**₹**	**₹**
Power	10000	40000	20000	80000	15000	60000	180000
Quality	3500	105000	2500	75000	3000	90000	270000

Part II: Cost Of Unused Capacity For Each Quantity

Particulars	**₹**
Power (5000 kilowatt x ₹ 4)	20,000
Inspection (1000 Inspection x ₹ 30)	30,000
Total cost of unused capacity	**50,000**

Part III: Factors To Be Considered In Choosing A Capacity Level:

1. Effect On Product Costing And Capacity Management
2. Effect On Pricing Decisions.
3. Effect On Performance Evaluation
4. Effect On Financial Statements.

CHAPTER 05: COST ACCOUNTING SYSTEM

PROBLEM – 1:

During the month of January the following transactions took place in A Co. Ltd:

PARTICULARS	AMOUNT
1. Material purchased:	
a. Credit purchases	₹ 9,000
b. Credit purchases for special job	₹ 400
c. Cash purchases	₹ 1,000
2. Returns to suppliers	₹ 500
3. Direct materials issued to production	₹ 6,000
4. Indirect materials issued	₹ 600
5. Materials return from production to stores	₹ 100
6. Materials transferred from Job No. 10 to Job No. 11	₹ 200

You are required to enter the transactions in the cost books.

SOLUTION:

Journal entries

S No	Particulars		Debit (₹)	Credit (₹)
1.a.	Stores Ledger Control A/c	Dr	9000	
	To General Ledger Adjustment A/c			9000
	(Being Purchases made)			
b.	WIP A/c	Dr	400	
	To General Ledger Adjustment A/c			400
	(Being Credit Purchase Made for Special Job)			
c.	Stores Ledger Control A/c	Dr	1000	
	To General Ledger Adjustment A/c			1000
	(Cash purchase)			
2.	General Ledger Adjustment A/c	Dr	500	
	To Stores Ledger Control A/c			500
	(Being Return made to Supplier)			
3.	WIP A/c	Dr	6000	
	To Stores Ledger Control A/c			6000
	(Being Direct Material Issued for Production)			
4.	Production Overheads A/c	Dr	600	
	To Stores Ledger Control A/c			600

	(Indirect Material Issued)			
5.	Stores Ledger Control A/c To WIP A/c (Being Returned to Stores Ledger Control)	Dr	100	 100
6.	Job No 11 To Job No 10 (Material Transferred from Job 10 to Job 11)	Dr	200	 200

PROBLEM – 2:

Enter the following transactions in cost books:

Particulars	Amount (₹)	Amount (₹)
Gross wages		₹ 10,000
Less: Deductions -		
Employees' State insurance	₹ 230	
Employees' provident fund	₹ 800	
Income-tax	₹ 200	₹ 1,230
Net cash		₹ 8,770

Provide employer's contribution to E.S.I. ₹ 250 and provident fund ₹ 800

The following particulars are obtained from the wages analysis book:

Particulars	Amount (₹)
Wages paid to direct Labour	₹ 8,000
Salaries paid to production staff	₹ 1,050
Salaries paid to administration staff	₹ 800
Salaries paid to selling and distribution staff	₹ 1,200

SOLUTION:

Transaction	Entry		Debit (₹)	Credit (₹)
Incurrence of Wages	Wages Control A/c	Dr	11050	
	To General Ledger Adjustment A/c			11050
	(₹ 1,00,000 + ₹ 250 + ₹ 800)			
Utilization of wages	WIP A/c	Dr	8000	
	Production Overhead A/c	Dr	1050	
	Administrative Overhead A/c	Dr	800	
	Selling Overhead A/c	Dr	1200	
	To Wages Control A/c			11050

PROBLEM – 3:

The following information is obtained from X Co., Ltd., during April, 20x1 –

PARTICULARS	AMOUNT (₹)
1. Overhead is incurred as under –	
a. Service supplied by creditors	5,000
b. Petty cash expenditure for miscellaneous expenses	200
Analysis of service reveals –	
Production overhead	2,000
Administration overhead	1,000
Selling and distribution overhead	2,000
Analysis of petty cash reveals –	
Production overhead	120
Administration overhead	10
Selling and distribution overhead	70
2. Overhead is absorbed as under –	
a. Production overhead	1,900
b. Administration overhead	1,050
c. Selling and distribution overhead	2,000

Enter the above transactions in the cost books.

SOLUTION:

S. No	Transaction	Journal entries		(₹)	(₹)
1 a)	Production Overhead Incurred	Production Overhead A/c To General Ledger Adjustment A/c	Dr	2120	2120
1 b)	Administrative Overhead Incurred	Administrative Overhead A/c To General Ledger Adjustment A/c	Dr	1010	1010
1 c)	Selling Overhead Incurred	Selling Overhead A/c To General Ledger Adjustment A/c	Dr	2070	2070
2 a)	Absorption of Production Overhead	WIP A/c To Production Overhead A/c	Dr	1900	1900

2 b)	Absorption of Administrative Overhead	Cost of Sales A/c To Administrative Overhead A/c	Dr	1050	1050
2 c)	Absorption of Selling Overhead	Cost of Sales A/c To Selling Overhead A/c	Dr	2000	2000
3 a)	Under Absorption	Costing Profit and Loss A/c To Production Overhead A/c	Dr	220	220
3 b)	Over Absorption	Administrative Overhead A/c To Costing Profit and Loss A/c	Dr	40	40
3 c)	Under Absorption	Costing Profit and Loss A/c To Selling Overhead A/c	Dr	70	70

PROBLEM – 4:

The following balances are obtained from the books of XYZ Co., Ltd., on 1.1.20x1:

Particulars	Dr. (₹)	Cr. (₹)
Stores ledger control account	₹ 5,000	
Work-in-progress ledger control account	₹ 2,000	
Finished goods ledger control account	₹ 1,000	
General ledger adjustment account		₹ 8,000
TOTAL	₹ 8,000	₹ 8,000

The following information is received at the end of the year –

Particulars	AMOUNT	AMOUNT
Purchase for stores		₹ 29,500
Purchase for special jobs		₹ 1,800
Returned to suppliers from stores		₹ 200
Direct wages	₹ 20,500	
Indirect factory wages	₹ 4,500	
Salaries to administration staff	₹ 3,400	
Salaries to selling and distribution staff	₹ 2,400	
Abnormal idle time	₹ 300	₹ 31,100
Direct expense		₹ 2,200
Production expenses		₹ 5,100

Administration expenses		₹ 4,100
Selling and distribution expenses		₹ 2,600
Stores and issued to production		₹ 30,500
Materials lost from stores by theft		₹ 400
Stores issued to maintenance account		₹ 1,300
Production overhead applied to production		20% on prime cost
Administration overhead applied to finished goods		₹ 7,200
Selling and distribution overhead applied to cost of sales		6% on sales value
Finished goods produced during the year		₹ 66,000
Goods sold during the period – at sales value		₹ 80,000
Goods sold during the period – at cost		₹ 69,500

You are required to record the entries in the cost ledger for the year and prepare a trial balance.

SOLUTION:

Dr **Stores Ledger Control A/c** Cr

Particulars	(₹)	Particulars	(₹)
To Balance b/d	5000	By General Ledger Adjustment A/c	200
To General Ledger Adjustment A/c	29500	By WIP A/c	30500
		By Abnormal Loss A/c	400
		By Production Overhead A/c	1300
		By Balance c/d	2100
	34500		**34500**

Dr **WIP Control A/c** Cr

Particulars	(₹)	Particulars	(₹)
To Balance b/d	2000	By Finished Goods A/c	66000
To General Ledger Adjustment (Special Job) A/c	1800		
To Wages Control A/c (Direct Wages)	20500		

To General Ledger Adjustment A/c (Direct Expenses)	2200		
To Stores Ledger Control A/c	30500		
To Production Overhead A/c (W N)	11000		
		By Balance c/d	2000
	68000		**68000**

Dr **Finished Goods Control A/c** Cr

Particulars	**(₹)**	**Particulars**	**(₹)**
To Balance b/d	1000	By Cost of Sales A/c	69500
To Administrative Overhead A/c	7200	By Balance c/d	4700
To WIP A/c	66000		
	74200		**74200**

Dr **Wages Control A/c** Cr

Particulars	**(₹)**	**Particulars**	**(₹)**
To General Ledger Adjustment A/c	31,100	By WIP A/c	20500
		By Production Overhead A/c	4500
		By Administrative Overhead A/c	3400
		By Selling Overhead A/c	2400
		By Abnormal Loss A/c	300
	31,100		**31,100**

Dr **Production Overhead A/c** Cr

Particulars	**(₹)**	**Particulars**	**(₹)**
To Wages Control A/c	4500	By WIP A/c (WN)	11000
To General Ledger Adjustment A/c	5100		
To Stores Ledger Control A/c	1300		
To Costing Profit and Loss A/c	100		
	11000		**11000**

WN – Absorbed Production Overhead:

Direct Materials - ₹ 32300 [₹ 30500 + ₹ 1800]

Direct Wages – ₹ 20500

Direct Expenses – ₹ 2200

Prime Cost – ₹ 55000

Production Overhead Absorbed - [₹ 55000 x 20%] = ₹ 11000

Dr **Administrative Overhead A/c** Cr

Particulars	(₹)	Particulars	(₹)
To Wages Control A/c	3400	By Finished Goods A/c	7200
To General Ledger Adjustment A/c	4100	By Costing profit and Loss A/c	300
	7500		**7500**

Dr **Selling Overhead A/c** Cr

Particulars	(₹)	Particulars	(₹)
To Wages Control A/c	2400	By Cost of Sales (₹ 80,000 x 6%)	4800
To General Ledger Adjustment A/c	2600	By Costing Profit and Loss A/c	200
	5000		**5000**

Dr **Cost of Sales A/c** Cr

Particulars	(₹)	Particulars	(₹)
To Selling Overhead A/c	4800	By Costing profit and Loss A/c	74300
To Finished Goods A/c	69500		
	74300		**74300**

Dr **Costing profit and Loss A/c** Cr

Particulars	(₹)	Particulars	(₹)
To Administrative Overhead	300	By General Ledger Adjustment A/c (Sales)	80,000
To Selling Overhead	200	By Production Overhead A/c	100
To Abnormal Loss	700		
To Cost of Sales A/c	74300		
To General Ledger Adjustment A/c (Profit)	4600		

	80100		**80100**

Dr **Abnormal Loss A/c** Cr

Particulars	**(₹)**	**Particulars**	**(₹)**
To Wages Control A/c	300	By Costing profit and Loss A/c	700
To Stores Ledger Control A/c	400		
	700		**700**

Dr **General Ledger Adjustment A/c** Cr

Particulars	**(₹)**	**Particulars**	**(₹)**
To Stores Ledger Control A/c	200	By Balance b/d	8000
To Costing profit and Loss A/c	80,000	By Stores Ledger Control A/c	29500
		By WIP A/c	1800
		By wages control A/c	31100
		By WIP A/c	2200
		By Production Overhead A/c	5100
		By Administrative Overhead A/c	4100
		By Selling Overhead A/c	2600
		By Costing profit and Loss A/c	4600
To Balance c/d	8800		
	89000		**89000**

Trial balance

Particulars	**Debit (₹)**	**Credit (₹)**
Stores Ledger Control A/c	2100	
WIP A/c	2000	
Finished Goods A/c	4700	
General Ledger Adjustment A/c		8800
	8800	**8800**

PROBLEM – 4A:

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

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

During the next three months the following items arose:

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

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

SOLUTION:

Journal entries are as follows:

			Dr (₹)	Cr (₹)
1.	Finished stock ledger Control A/c	Dr	2,10,835	
	To Work-in-Process Control A/c			2,10,835
2.	Manufacturing Overhead Control A/c	Dr	91,510	
	To Cost Ledger Control A/c			91,510
3.	Stores Ledger Control A/c	Dr	1,23,000	
	To Cost Ledger Control A/c			1,23,000

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

COST LEDGERS

Cost Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To Stores Ledger Control A/c (return)	2,900	By Balance b/d	6,65,220
To Balance c/d	9,49,025	By Manufacturing Overheads 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**

Stores Ledger Control Account

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

Wages Control Account

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	72,195	By Work in Process Control A/c	50,530
		By Manufacturing Overheads Control A/c	21,665
	72,195		**72,195**

Manufacturing Overhead Control Account

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

Work-in-Process Control Account

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

Finished Stock Ledger Control Account

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

Cost of Sales Account

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

	1,85,890		1,85,890

Trial Balance

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

PROBLEM – 4B:

A company operates on historic job cost accounting system, which is not integrated with the financial accounts. At the beginning of a month, the opening balances in cost ledger were:

	(₹ in lakhs)
Stores Ledger Control Account	80
Work-in-Process Control Account	20
Finished Goods Control Account	430
Building Construction Account	10
Cost Ledger Control Account	540

During the month, the following transactions took place:

			(₹ in lakh)
Materials	Purchased		40
	Issued to production		50
	Issued to factory maintenance		6
	Issued to building construction		4
Wages	Gross wages paid		150
	Indirect wages		40
	For building construction		10
Works Overheads	Actual amount incurred		160
	(Excluding items shown above)		
	Absorbed in building construction		20

	Under absorbed		8
Royalty paid	(Related to production)		5
Selling, Distribution and Administration overheads			25
Sales			450

At the end of the month, the stock of raw material and work-in-Process was ₹ 55 lakhs and ₹ 25 lakhs respectively. The loss arising in the raw material accounts is treated as factory overheads. The building under construction was completed during the month. Company's gross profit margin is 20% on sales.

PREPARE the relevant control accounts to record the above transactions in the cost ledger of the company.

SOLUTION:

Cost Ledger Control A/c

Amount (₹ in lakhs)

Particulars	(₹)	Particulars	(₹)
To Costing P&L A/c	450	By Balance b/d	540
To Building Construction A/c	44	By Stores Ledger Control A/c	40
To Balance c/d	483	By Wages Control A/c	150
		By Works OH Control A/c	160
		By Royalty A/c	5
		By Administrative Overheads and Selling & Distribution Overheads A/c	25
		By Costing P&L A/c	57
	977		**977**

Stores Ledger Control A/c

Particulars	(₹)	Particulars	(₹)
To Balance b/d	80	By Work-in-Process A/c	50
To Cost Ledger Control A/c	40	By Works Overheads Control A/c	6
		By Building Construction A/c	4
		By Works Overheads Control A/c (Balancing Figure) (Loss)	5
		By Balance c/d	55
	120		**120**

Wages Control A/c

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	150	By Works Overheads Control A/c	40
		By Building Construction A/c	10
		By Work-in-process Control A/c (Balancing figure)	100
	150		**150**

Works Overhead Control A/c

Particulars	(₹)	Particulars	(₹)
To Stores Ledger Control A/c	6	By Building Const. A/c	20
To Wages Control A/c	40	By Work-in-process Control A/c (Balancing figure)	183
To Cost Ledger Control A/c	160	By Costing Profit and Loss A/c (under- absorption)	8
To Store Ledger Control A/c (Loss)	5		
	211		**211**

Royalty A/c

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	5	By Work-in-process Control A/c	5
	5		**5**

Work-in-Process Control A/c

Particulars	(₹)	Particulars	(₹)
To Balance b/d	20	By Finished Goods Control A/c (Balancing figure)	333
To Stores Ledger Control A/c	50		
To Wages Control A/c	100		
To Works OH Control A/c	183		
To Royalty A/c	5	By Balance c/d	25
	358		**358**

Finished Goods Control A/c

Particulars	(₹)	Particulars	(₹)
To Balance b/d	430	By Cost of Goods Sold A/c	360
To Work-in-process Control A/c	333	(80% of ₹ 450)	
		By Balance c/d	403

	763		**763**

Cost of Goods Sold A/c

Particulars	(₹)	Particulars	(₹)
To Finished Goods Control A/c	360	By Cost of sales A/c	360
	360		**360**

Selling, Distribution and Administration Overhead A/c

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	25	By Cost of sales A/c	25
	25		**25**

Cost of Sales A/c

Particulars	(₹)	Particulars	(₹)
To Cost of Goods Sold	360	By Costing Profit and Loss A/c	385
To Administrative Overheads and Selling & Distribution Overheads A/c	25		
	385		**385**

Costing Profit and Loss A/c

Particulars	(₹)	Particulars	(₹)
To Cost of Sales A/c	385	By Cost Ledger Control A/c (Sales)	450
To Works Overhead Control A/c	8		
To Cost Ledger Control A/c (Profit) (Balancing figure)	57		
	450		**450**

Building Construction A/c

Particulars	(₹)	Particulars	(₹)
To Balance b/d	10	By Cost Ledger Control A/c	44
To Stores Ledger Control A/c	4		
To Wages Control A/c	10		
To Works Overhead Control A/c	20		
	44		**44**

Trial Balance (₹ in lakhs)

Particulars	Dr (₹)	Cr (₹)
Stores control A/c	55	
Work-in-Process A/c	25	
Finished Goods A/c	403	
Cost Ledger Adjustment A/c		483
	483	**483**

PROBLEM – 4C:

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

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

Cost of Goods completed and transferred into finished goods during the month		65,000
Physical value of work-in-Process at the end of the month		40,000

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

Required: PREPARE the following accounts for the month:

a. Stores Ledger Control Account.

b. Work-in-Process Control Account.

c. Finished Goods Control Account.

d. Production Overhead Control Account.

e. Costing Profit and Loss Account.

SOLUTION:

Stores Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	25,000	By Work in Process Control A/c	30,000
To Creditors/ Bank A/c	75,000	By Production Overhead Control A/c	4,000
		By Balance c/d	66,000
	1,00,000		**1,00,000**

Wages Control Account

Particulars	(₹)	Particulars	(₹)
To Bank A/c (Paid to direct workers)	25,000	By Work in Process Control A/c (Charged to batches)	20,000
To Bank A/c (Paid to indirect workers)	5,000	By Production Overhead Control A/c	5,000
		By Production Overhead Control A/c (Non-productive wages)	5,000
	30,000		**30,000**

Production Overhead Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d (Prepaid amount)	3,000	By Work-in-Process Control A/c (150% of direct wages)	30,000
To Stores Ledger Control A/c	4,000		
To Wages Control A/c (₹ 5,000 + ₹ 5,000)	10,000		

To	Bank A/c	12,000		
To	Costing Profit and Loss A/c (Over-absorption, Balancing Figure)	1,000		
		30,000		**30,000**

Work-in-Process Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	20,000	By Finished Goods Control A/c	65,000
To Store Ledger Control A/c	30,000	By Balance c/d (Physical value)	40,000
To Wages Control A/c	20,000		
To Production Overheads Control A/c (150% of Direct Wages)	30,000		
To Costing Profit and Loss A/c (Stock Gains)	5,000		
	1,05,000		**1,05,000**

Finished Goods Control Account

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

* Alternatively, Costing Profit & Loss Account

Costing Profit & Loss Account

Particulars	(₹)	Particulars	(₹)
To Finished Goods Control A/c or Cost of Goods Sold A/c	80,000	By Sales A/c	1,00,000
To Selling & Distribution Overheads A/c	6,000	By Production Overheads Control A/c	1,000
To Balance c/d	20,000	By Work-in-Process Control A/c (Stock gain)	5,000
	1,06,000		**1,06,000**

Notes:

(1) Materials Transferred Between Batches Will Not Affect the Control Accounts.

(2) Non-Production Time of Direct Workers is a Production Overhead and Therefore Will Not Be Charged to Work-In-Process Control A/C.

(3) Production Overheads Absorbed in Work-In-Process Control A/c Equals to ₹ 30,000 (150% Of ₹ 20,000).

(4) In The Work-In-Process Control A/C The Excess Physical Value of Stock Is Taken Resulting in Stock Gain. Stock Gain Is Transferred to Profit & Loss A/C.

PROBLEM – 4D: (MTP 1 JAN 25)

The following information have been extracted from the cost records of a manufacturing company:

		(₹)
	Stores	
*	**Opening balance**	**9,000**
*	**Purchases**	**48,000**
*	**Transfer from WIP**	**24,000**
*	**Issue to work-in-progress**	**48,000**
*	**Issue for repairs**	**6,000**
*	**Deficiency found in stock**	**1,800**
	Work-in-Progress:	
*	**Opening balance**	**18,000**
*	**Direct Wages applied**	**18,000**
*	**Overhead charged**	**72,000**
*	**Closing balance**	**12,000**
	Finished Production:	
*	**Entire production is sold at a profit of 10% on cost from work-in-progress**	
*	**Wages paid.**	**21,000**
*	**Overhead incurred**	**75,000**

DRAW the Stores Leger Control A/c, Work-in-Progress Control A/c, Overheads Control A/c and Costing Profit and Loss A/c.

SOLUTION:

Stores Ledger Control A/c

Particulars	(₹)	Particulars	(₹)
To Balance b/d	9,000	By Work in Process	48,000
To General Ledger Adjustment A/c	48,000	By Overhead Control A/c	6,000
To Work in Process A/c	24,000	By Overhead Control A/c (Deficiency)	1,800*
		By Balance c/d	25,200
	81,000		**81,000**

*Deficiency assumed as normal (alternatively can be treated as abnormal loss)

Work in Progress Control A/c

Particulars	(₹)	Particulars	(₹)
To Balance b/d	18,000	By Stores Ledger Control a/c	24,000
To Stores Ledger Control A/c	48,000	By Costing P/L A/c (Balancing figures being Cost of finished goods)	1,20,000
To Wages Control A/c	18,000	By Balance c/d	12,000
To Overheads Control a/c	72,000		
	1,56,000		**1,56,000**

Overheads Control A/c

Particulars	(₹)	Particulars	(₹)
To Stores Ledger Control A/c	6,000	By Work in Process A/c	72,000
To Stores Ledger Control A/c	1,800	By Balance c/d (Under absorption)	13,800
To Wages Control A/c (₹ 21,000- ₹ 18,000)	3,000		
To General Ledger Adjustment A/c	75,000		
	85,800		**85,800**

Costing Profit & Loss A/c

Particulars	(₹)	Particulars	(₹)
To Work in progress	1,20,000	By General Ledger Adjustment A/c (Sales) (1,20,000 + 12,000)	1,32,000

To General Ledger Adjustment A/c (Profit)	12,000		
	1,32,000		1,32,000

PROBLEM – 5:

The following are the extracts of balances of X Co. Ltd., in its integrated ledgers on 1st January, 20x1:

PARTICULARS	DEBIT	CREDIT
Stores Control account	₹ 36,000	
Work-in-progress account	₹ 34,000	
Finished goods account	₹ 26,000	
Cash at bank	₹ 20,000	
Creditors control account		₹ 16,000
Fixed assets account	₹ 1,10,000	
Debtors control account	₹ 24,000	
Share capital account		₹ 1,60,000
Depreciation provision account		₹ 10,000
Profit and loss account		₹ 64,000
Total	₹ 2,50,000	₹ 2,50,000

Transaction for the twelve months ended 31st December 20x1 was:

PARTICULARS	AMOUNT (₹)	REMARKS
Wages – direct paid	1,74,000	
Wages – indirect paid	10,000	
Stores purchased on credit	2,00,000	
Stores issued to repair order	4,000	
Stores issued to production	2,20,000	
Goods finished during the period at cost	4,30,000	
Goods sold at sales value (on credit)	6,00,000	
Goods sold at cost	4,40,000	
Production overhead recovered	96,000	
Production overhead	80,000	Paid for by cheque
Administration overhead	24,000	
Selling and distribution overhead	28,000	

Depreciation (works)	2,600	
Payments to suppliers	2,02,000	By cheque
Payments from customers	5,80,000	
Rates prepaid included in production overhead incurred	600	
Purchases of fixed assets	4,000	
Charitable donation	2,000	
Fines paid	1,000	
Interest on bank loan	200	
Income – tax	40,000	

You are required to write up the accounts in the integral ledger and make out a trial balance. The administration overhead is written off to profit and loss account.

SOLUTION:

Dr. **Stores Ledger Control A/c** Cr.

Particulars	(₹)	Particulars	(₹)
To Balance b/d	36000	By Production Overheads Control A/c	4000
To creditors A/c	200000	By WIP	220000
		By Balance c/d	12000
	236000		**236000**

Dr. **WIP A/c** Cr.

Particulars	(₹)	Particulars	(₹)
To Balance b/d	34000		
To wages Control A/c	174000	By Finished Goods	430000
To Stores Ledger Control A/c	220000	By Balance c/d	94000
To Production Overheads	96000		
	5,24,000		**5,24,000**

Dr **Finished Goods A/c** Cr

Particulars	(₹)	Particulars	(₹)
To Balance b/d	26000	By Cost of Sales	440000
To WIP	430000	By Balance c/d	16000
	456000		**456000**

Dr. **Wages Control A/c** Cr.

Particulars	(₹)	Particulars	(₹)
To Bank A/c	184000	By WIP A/c	174000
		By Production Overheads A/c	10000
	184000		**184000**

Dr. **Production Overheads A/c** Cr.

Particulars	(₹)	Particulars	(₹)
To Wages A/c	10,000	By WIP A/c	96000
To Stores Ledger Control A/c	4000	By Prepaid Expense A/c	600
To Bank A/c	80000		
To Depreciation A/c	2600		
	96600		**96600**

Dr. **Administrative Overheads A/c** Cr.

Particulars	(₹)	Particulars	(₹)
To Bank A/c	24000	By Profit and Loss A/c	24000
	24000		**24000**

Dr. **Selling Overhead A/c** Cr.

Particulars	(₹)	Particulars	(₹)
To Bank A/c	28000	By Cost of Sales A/c	28000
	28000		**28000**

Dr. **Cost of Sales A/c** Cr.

Particulars	(₹)	Particulars	(₹)
To Finished Goods A/c	440000	By Costing Profit and Loss A/c	468000
To Selling Overhead A/c	28000		
	468000		**468000**

Dr. **Costing Profit and Loss A/c** Cr.

Particulars	(₹)	Particulars	(₹)
To Cost of Sales A/c	468000	By Sales A/c	600,000

To Profit & Loss (EBIT) A/c	132000		
	600000		**600000**

Dr. **Cash at Bank A/c** Cr.

Particulars	**(₹)**	**Particulars**	**(₹)**
To Balance b/d	20000	By Wages A/c	184000
To Debtors A/c	580000	By Production Overhead A/c	80000
		By Administrative Overhead A/c	24000
		By Selling Overhead A/c	28000
		By Creditors A/c	202000
		By Fixed Asset A/c	4000
		By Donation A/c	2000
		By Fines A/c	1000
		By Interest A/c	200
		By Income tax A/c	40000
		By Balance c/d	34800
	600000		**600000**

Dr. **Creditors A/c** **Cr.**

Particulars	**(₹)**	**Particulars**	**(₹)**
To Bank A/c	202000	By Balance b/d	16000
To Balance c/d	14000	By Stores Ledger Control A/c	200000
	216000		**216000**

Dr. **Fixed Asset A/c** **Cr.**

Particulars	**(₹)**	**Particulars**	**(₹)**
To Balance b/d	1,10,000		
To Bank A/c	4000		
		By Balance c/d	1,14,000
	1,14,000		**1,14,000**

Dr. **Debtors A/c** **Cr.**

Particulars	**(₹)**	**Particulars**	**(₹)**
To Balance b/d	24000	By Bank A/c	580000
To Sales A/c	600000	By Balance c/d	44000
	624000		**624000**

Dr. **Share Capital A/c** Cr.

Particulars	(₹)	Particulars	(₹)
To Balance c/d	160000	By Balance b/d	160000
	160000		**160000**

Dr. **Depreciation Provision A/c** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Balance c/d	12600	By Balance b/d	10000
		By Depreciation A/c	2600
	12600		**12600**

Dr. **Prepaid Expenses A/c** Cr.

Particulars	(₹)	Particulars	(₹)
To Production Overhead A/c	600	By Balance c/d	600
	600		**600**

Dr. **Profit and Loss A/c** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Donations	2000	By Balance b/d	64000
To Fines	1000	By Costing Profit and Loss A/c	132000
To Interest	200		
To Income tax	40000		
To Administrative Overhead	24000		
To Balance c/d	128800		
	196000		**196000**

Trial Balance

Particulars	Dr (₹)	Cr (₹)
Stores Ledger Control	12000	
WIP	94000	
Finished Goods	16000	
Bank	34800	
Creditors		14000
Fixed Asset	114000	
Debtors	44000	

Share Capital		160000
Provision for Depreciation		12600
Prepaid Expenses	600	
Profit and Loss A/c		128800
Total	**315400**	**315400**

PROBLEM – 5A:

Acme Manufacturing Co. Ltd. opens the costing records, with the balances as on 1st July as follows:

	₹	₹
Material Control A/c	1,24,000	
Work-in-Process Control A/c	62,500	
Finished Goods Control A/c	1,24,000	
Production Overhead Control A/c	8,400	
Administrative Overhead Control A/c		12,000
Selling & Distribution Overhead Control A/c	6,250	
Cost Ledger Control A/c		3,13,150
	3,25,150	3,25,150

The following are the transactions for the quarter ended 30th September:

	₹
Materials purchased	4,80,100
Materials issued to jobs	4,77,400
Materials to works maintenance	41,200
Materials to administrative office	3,400
Materials to sales department	7,200
Wages Direct	1,49,300
Wages Indirect	65,000
Transportation for Indirect Materials	8,400
Production Overheads incurred	2,42,250
Absorbed Production Overheads	3,59,100
Administrative Overheads incurred	74,000
Administrative Overheads allocated to production	52,900
Administrative Overheads allocated to sales department	14,800
Selling & Distribution overheads incurred	64,200

Selling & Distribution overheads absorbed	**82,000**
Finished goods produced	**9,58,400**
Finished goods sold	**9,77,300**
Sales	**14,43,000**

Make up the various accounts as you envisage in the Cost Ledger and PREPARE a Trial Balance as at 30th September.

SOLUTION:

Cost Ledgers Material Control A/c*

Particulars	(₹)	Particulars	(₹)
To Balance b/d	1,24,000	By Work-in-process Control A/c	4,77,400
To Cost Ledger Control A/c (purchase)	4,80,100	By Production Overhead Control A/c	41,200
		By Administrative Overhead Control A/c	3,400
		By Selling and Distribution Overhead Control A/c	7,200
		By Balance c/d	74,900
	6,04,100		**6,04,100**

*Material Control A/c may also be written as Stores Ledger Control A/c

Wages Control A/c

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	2,14,300	By Work-in-process Control A/c	1,49,300
		By Production Overhead Control A/c	65,000
	2,14,300		**2,14,300**

Production Overhead Control A/c

Particulars	(₹)	Particulars	(₹)
To Balance b/d	8,400	By Work-in-process Control A/c	3,59,100
To Cost Ledger Control A/c:			
- Transportation	8,400		
- Production Overhead	2,42,250		
To Wages Control A/c	65,000		

To Material Control A/c	41,200	By Balance c/d	6,150
	3,65,250		**3,65,250**

Administrative Overhead Control A/c

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	74,000	By Balance b/d	12,000
To Material Control A/c:	3,400	By Finished Goods Control A/c	52,900
To Balance c/d	2,300	By Cost of sales A/c	14,800
	79,700		**79,700**

Work-in-Process Control A/c

Particulars	(₹)	Particulars	(₹)
To Balance b/d	62,500	By Finished goods Control A/c	9,58,400
To Material Control A/c	4,77,400		
To Wages Control A/c	1,49,300		
To Production Overhead Control A/c	3,59,100		
		By Balance c/d	89,900
	10,48,300		**10,48,300**

Finished Goods Control A/c

Particulars	(₹)	Particulars	(₹)
To Balance b/d	1,24,000	By Cost of Sales A/c	9,77,300
To Administrative Overhead Control A/c	52,900		
To Work-in-process Control A/c	9,58,400	By Balance c/d	1,58,000
	11,35,300		**11,35,300**

Selling and Distribution Overhead Control A/c

Particulars	(₹)	Particulars	(₹)
To Balance b/d	6,250	By Cost of Sales A/c	82,000
To Cost Ledger Control A/c:	64,200		
To Material Control A/c	7,200		
To Balance c/d	4,350		
	82,000		**82,000**

Cost of Sales A/c

Particulars	(₹)	Particulars	(₹)
To Finished Goods Control A/c	9,77,300	By Costing P&L A/c	10,74,100
To Administrative Overhead Control A/c	14,800		
To Selling and Distribution Overhead Control A/c	82,000		
	10,74,100		**10,74,100**

Cost Ledger Control A/c

Particulars	(₹)	Particulars	(₹)
To Costing P&L A/c (Sales)	14,43,000	By Balance b/d	3,13,150
		By Material Control A/c	4,80,100
		By Wages Control A/c (₹ 1,49,300 + ₹ 65,000)	2,14,300
		By Production Overhead Control A/c (₹ 8,400 + ₹ 2,42,250)	2,50,650
		By Administrative Overhead A/c	74,000
		By Selling and Distribution Overhead Control A/c	64,200
To Balance c/d	3,22,300	By Costing Profit & Loss A/c	3,68,900
	17,65,300		**17,65,300**

Costing Profit & Loss A/c

Particulars	(₹)	Particulars	(₹)
To Cost of sales A/c	10,74,100	By Cost Ledger Control A/c (sales)	14,43,000
To Cost Ledger Control A/c (profit) (Balancing Figure)	3,68,900		
	14,43,000		**14,43,000**

Trial Balance as at 30th September

	Dr (₹)	Cr (₹)
Material Control A/c	74,900	
Production OH Control A/c	6,150	

Administrative OH Control A/c		2,300
Selling & Distribution OH Control A/c		4,350
Work-in-process Control A/c	89,900	
Finished Goods Control A/c	1,58,000	
Cost Ledger Control A/c		3,22,300
Total	**3,28,950**	**3,28,950**

PROBLEM – 5B:

Dutta Enterprises operates an Integral system of accounting. You are required to PASS the Journal Entries for the following transactions that took place for the year ended 31st March.

(Narrations are not required.)

	Amount (₹)
Raw Materials purchased (50% on Credit)	**6,00,000**
Materials issued to production	**4,00,000**
Wages paid (50% Direct)	**2,00,000**
Wages charged to production	**1,00,000**
Factory Overheads incurred	**80,000**
Factory Overheads charged to production	**1,00,000**
Selling and Distribution Overheads incurred	**40,000**
Finished Goods at cost	**5,00,000**
Sales (50% Credit)	**7,50,000**
Closing stock	**Nil**
Receipts from debtors	**2,00,000**
Payments to creditors	**2,00,000**

SOLUTION:

Journal Entries are as Follows:

		Dr (₹)	**Cr (₹)**
Stores Ledger Control A/c	Dr	6,00,000	
To Payables (Creditors) A/c			3,00,000
To Cash or Bank			3,00,000
Work-in-Process Control A/c	Dr	4,00,000	
To Stores Ledger Control A/c			4,00,000

Wages Control A/c	Dr	2,00,000	
To Bank A/c			2,00,000
Factory Overhead Control A/c	Dr	1,00,000	
To Wages Control A/c			1,00,000
Work-in-Process Control A/c	Dr	1,00,000	
To Wages Control A/c			1,00,000
Factory Overhead Control A/c	Dr	80,000	
To Bank A/c			80,000
Work-in-Process Control A/c	Dr	1,00,000	
To Factory Overhead Control A/c			1,00,000
Selling and Dist. Overhead Control A/c	Dr	40,000	
To Bank A/c			40,000
Finished Goods Control A/c	Dr	5,00,000	
To Work-in-Process Control A/c			5,00,000
Cost of Sales A/c	Dr	5,40,000	
To Finished Goods Control A/c			5,00,000
To Selling and Distribution Control A/c			40,000
Receivables (Debtors) A/c	Dr	3,75,000	
Bank or Cash A/c	Dr	3,75,000	
To Sales A/c			7,50,000
Bank A/c	Dr	2,00,000	
To Receivables (Debtors) A/c			2,00,000
Payables (Creditors) A/c	Dr	2,00,000	
To Bank A/c			2,00,000

PROBLEM – 6:

The following incomplete accounts are furnished to you for the month ended 31st October, 20x2.

Stores Ledger Control Account		
1.10.20x2	**To Balance**	**₹ 54,000**
Work in Process Control Account		
1.10. 20x2	**To Balance**	**₹ 6,000**
Finished Goods Control Account		
1.10. 20x2	**To Balance**	**₹ 75,000**
Factory Overheads Control Account		

Total debits for October, 20x2		₹ 45,000
Factory Overheads Applied Account		
Cost of Goods Sold Account		
Creditors for Purchases Account		
1.10. 20x2	By Balance	₹ 30,000

Additional information:

1. The factory overheads are applied by using a budgeted rate based on direct Labour hours The budget for overheads for 20x2 is ₹ 6,75,000 and the budget of direct Labour hours is 4,50,000.
2. The balance in the account of creditors for purchases on 31.10. 20x2 is ₹15,000 and the payments made to creditors in October, 20x2 amount to ₹ 1,05,000.
3. The finished goods inventory as on 31st October, 20x2 is ₹ 66,000.
4. The cost of goods sold during the month was ₹ 1,95,000.
5. On 31st October, 20x2 there was only one unfinished job in the factory. The cost records show that ₹ 3,000 (1,200 direct Labour hours) of direct Labour cost and ₹ 6,000 of direct material cost had been charged.
6. A total of 28,200 direct Labour hours were worked in October, 20x2. All factory workers earn same rate of pay.
7. All actual factory overheads incurred in October, 20x2 have been posted.

You are required to FIND:

a. Materials purchased during October, 20x2.
b. Cost of goods completed in October, 20x2.
c. Overheads applied to production in October, 20x2.
d. Balance of Work-in-Process Control A/c on 31st October, 20x2.
e. Direct Materials consumed during October, 20x2.
f. Balance of Stores Ledger Control Account on 31st October, 20x2.
g. Over absorbed or under absorbed overheads for October, 20x2

SOLUTION:

Working Notes:

(i) Overhead recovery rate per direct labour hour:

Budgeted Factory Overheads = ₹ 6,75,000

Budgeted Direct Labour hours = 4,50,000

$$\text{Overhead recovery rate} = \frac{\text{Budgeted Factory Overheads}}{\text{Budgeted Direct Labour hours}}$$

$$= \frac{₹\ 6,75,000}{4,50,000 \text{ hours}}$$

= **₹ 1.50 per Direct Labour**

(ii) Direct Wage rate per hour:

Direct Labour cost of WIP = ₹ 3,000

(on 31st October 2022)

Direct Labour hours of WIP = 1,200 hours

$$\text{Direct wage rate per hour} = \frac{\text{Direct Labour Cost on WIP}}{\text{Direct Labour Hours on WIP}}$$

$$= \frac{₹\ 3,000}{1,200 \text{ hours}} = ₹\ 2.50$$

(iii) Total Direct Wages charged to production:

Total direct Labour hours spent on production × Direct wage rate per hour

= 28,200 hours × ₹ 2.50 = ₹ 70,500

a) Material Purchased During October,2022

	(₹)
Payment Made to Creditors	1,05,000
Add: Closing Balance in the Account Of Creditors forPurchase	15,000
Less: Opening Balance	(30,000)
Material Purchased	**90,000**

b) Cost of Finished Goods in October,2022

	(₹)
Cost Of Goods Sold During the Month	1,95,000
Add: Closing Finished Goods Inventory	66,000
Less: Opening Finished Goods Inventory	(75,000)
Cost Of Goods Completed During the Month	**1,86,000**

c) Overhead Applied to Production in October, 2022

= 28,200 hours × ₹ 1.50 = ₹ 42,300

d) Balance of Work-in-Process on 31st October, 2022

	(₹)
Direct Material Cost	6,000
Direct Labour Cost	3,000

Overheads (₹ 1.50 × 1,200 Hours)	1,800
	10,800

e) Direct material consumed during October, 2022 = ₹ 78,000

(Refer to following Accounts)

Work in Process Control A/c

Particulars	**(₹)**	**Particulars**	**(₹)**
To Balance b/d	6,000	By Finished goods control A/c [Refer (b) above]	1,86,000
To Wages Control A/c [Refer working note (iii)]	70,500	By Balance c/d [Refer (d) above]	10,800
To Factory OH Control A/c [Refer (c) above]	42,300		
To Material consumed (Balancing Figure)	78,000		
	1,96,800		1,96,800

f) Balance of Stores Control Account on 31st October, 2022 = ₹ 66,000

(Refer to following Account)

Stores Ledger Control Account

Particulars	**(₹)**	**Particulars**	**(₹)**
To Balance b/d	54,000	By Work-in-process Control A/c [Refer (e) above]	78,000
To Payables (Creditors) A/c [Refer (a) above}	90,000	By Balance c/d (Balancing Figure)	66,000
	1,44,000		**1,44,000**

g) Over-absorbed or under-absorbed overheads for October, 2022: Balance in Factory Overhead Account below showing that ₹ 2,700 is under-absorbed.

Factory Overhead Account

Particulars		(₹)	Particulars		(₹)
To	Bank A/c	45,000	By	Work-in-process Control A/c (Factory OH applied)	42,300
			By	Costing P/L A/c (Under-absorbed)	2,700
		45,000			45,000

PROBLEM – 6A:

A fire destroyed some accounting records of a company. You have been able to collect the following from the spoilt papers/records and as a result of consultation with accounting staff for the period of January, 20x1:

Incomplete Ledger Entries:

Materials Control A/c

PARTICULARS	AMOUNT	PARTICULARS	AMOUNT
To Balance b/d	₹ 32,000		

Work-in-Process Control A/c

PARTICULARS	AMOUNT	PARTICULARS	AMOUNT
To Balance b/d	₹ 9,200	By Finished Goods Control A/c	₹ 1,51,000

Payables (Creditors) A/c

PARTICULARS	AMOUNT	PARTICULARS	AMOUNT
		By Balance b/d	₹ 16,400
To Balance c/d	₹ 19,200		

Manufacturing Overheads Control A/c

PARTICULARS	AMOUNT	PARTICULARS	AMOUNT
To Bank A/c (Amount spent)	₹ 29,600		

Finished Goods Control A/c

PARTICULARS	AMOUNT	PARTICULARS	AMOUNT
To Balance b/d	₹ 24,000		

		By Balance c/d	₹ 30,000

Additional Information:

1. The bank book showed that ₹ 89,200 has been paid to creditors for raw material.
2. Ending inventory of work-in-process included materials of ₹ 5,000 on which 300 direct labour hours have been booked against wages and overheads.
3. The job card showed that workers have worked for 7,000 hours. The wage rate is ₹ 10 per labour hour.
4. Overhead recovery rate was ₹4 per direct labour hour.

You are required to COMPLETE the above accounts in the cost ledger of the company.

SOLUTION

Materials Control A/c

Particulars	(₹)	Particulars	(₹)
To Balance b/d		By Work-in-processcontrol	
Cost Ledger Control A/c	32,000	A/c	53,000
To Payables (Creditors) A/c		By Balance c/d	71,000
(Purchases)	92,000		
	1,24,000		**1,24,000**

Manufacturing Overheads A/c

Particulars	(₹)	Particulars	(₹)
To Bank A/c (Amount spent)	29,600	By Work-in-process control A/c (₹ 4 × 7,000hours)	28,000
		By Costing P/L A/c (Under-absorbed OH)	1,600
	29,600		**29,600**

Work-in-Process Control A/c

Particulars	(₹)	Particulars	(₹)
To Balance b/d	9,200	By Finished Goods Control A/c	1,51,000
To Wages Control A/c (₹ 10 × 7,000 hours)	70,000	By Balance c/d:	
To Overheads Control A/c	28,000	- Material 5,000	

(₹ 4 × 7,000 hours)			
		- Wages (₹ 10 × 3,000 300 hours)	
To Materials Control A/c (Balancing figure)	53,000	- Overheads (₹ 4 × 300 hours) 1,200	9,200
	1,60,200		**1,60,200**

Finished Goods Control A/c

Particulars	**(₹)**	**Particulars**	**(₹)**
To Balance b/d	24,000	By Cost of sales A/c (Bal. fig.)	1,45,000
To Work-in-process Control A/c (as above)	1,51,000	By Balance c/d	30,000
	1,75,000		**1,75,000**

Payables (Creditors) A/c

Particulars	**(₹)**	**Particulars**	**(₹)**
To Bank A/c	89,200	By Balance b/d	16,400
To Balance c/d	19,200	By Material Control A/c (Purchases) (Balancing Figure)	92,000
	1,08,400		**1,08,400**

PROBLEM – 7: **(RTP SEP 24)**

A manufacturing company disclosed a net loss of ₹ 3,47,000 as per their cost accounts for the year ended March 31,2024. The financial accounts however disclosed a net loss of Rs.5,10,000 for the same period. The following information was revealed as a result of scrutiny of the figures of both the sets of accounts.

	(₹)
(i) Factory Overheads under-absorbed	**40,000**
(ii) Administration Overheads over-absorbed	**60,000**
(iii) Depreciation charged in Financial Accounts	**3,25,000**
(iv) Depreciation charged in Cost Accounts	**2,75,000**
(v) Interest on investments not included in Cost Accounts	**96,000**

(vi) Income-tax provided	54,000
(vii) Interest on loan funds in Financial Accounts	2,45,000
(viii) Transfer fees (credit in financial books)	24,000
(ix) Stores adjustment (credit in financial books)	14,000
(x) Dividend received	32,000

PREPARE a memorandum Reconciliation Account

SOLUTION:

Memorandum Reconciliation Accounts

Dr. Cr.

Particulars	(₹)	Particulars	(₹)
To Net Loss as per Costing books	3,47,000	By Administration overheads over recovered in cost accounts	60,000
To Factory overheads under absorbed in Cost Accounts	40,000	By Interest on investment not included in Cost Accounts	96,000
To Depreciation under charged in Cost Accounts	50,000	By Transfer fees in financial books	24,000
To Income-Tax not provided in Cost Accounts	54,000	By Stores adjustment (Credit in financial books)	14,000
To Interest on Loan Funds in Financial Accounts	2,45,000	By Dividend received in financial books	32,000
		By Net loss as per financial books	5,10,000
	7,36,000		7,36,000

PROBLEM – 7A: **(PYP MAY 24)**

S.K. Manufacturing Co. Ltd. showed a net profit of ₹ 5,40,400 as per their cost accounts for the year ended 31.03.2004. However, the financial books disclosed a net profit of ₹ 2,60,500 for the same period. The following information was revealed as a result of scrutiny of the figures of both the sets of books:

	₹
Factory overheads under absorbed	84,800
Administrative overheads over absorbed	24,000
Interest paid on bank borrowings	50,000
Interest & Divided received	65,200
Notional rent of own premises charged in cost accounts	60,000

Losses on the sales of fixed assets and investments	48,000
Donations and subscriptions	18,800
Overvaluation of closing stock of finished goods in Cost accounts	1,25,000
Store adjustments (credited in financial books)	7,500
Depreciation over charged in cost accounts	40,000
Income tax provided	1,50,000

You are required to:

(i) Prepare a reconciliation statement taking net profit as per cost accounts as base.

(ii) State when is the reconciliation statement of Cost and Financial accounts not required?

SOLUTION:

(i) Statement of Reconciliation of profit as obtained under Cost and Financial Accounts

	Amount (₹)	Amount (₹)
Profit as per Cost Records		**5,40,400**
Add: Administrative Overhead over absorbed	24,000	
Interest & Dividend Received	65,200	
Notional rent of own premises	60,000	
Stores adjustments (credited in financial books)	7,500	
Depreciation over charged in cost accounts	40,000	1,96,700
		7,37,100
Less: Factory overheads under absorbed	84,800	
Interest paid on bank borrowings	50,000	
Losses on sale of fixed assets and investments	48,000	
Donations and subscriptions	18,800	
Over-valuation of closing stock of finished goods in cost accounts	1,25,000	
Income tax	1,50,000	(4,76,600)
Profit as per Financial Records		**2,60,500**

(ii) Circumstances where reconciliation statement can be avoided:

When the Cost and Financial Accounts are integrated - there is no need to have a separate reconciliation statement between the two sets of accounts. Integration means that the same set of accounts fulfil the requirement of both i.e., Cost and Financial Accounts.

PROBLEM – 7B: **(PYP SEP 24)**

XYZ Ltd. declared a net profit of ₹ 2,25,000 based on their financial accounts for the year ending 31st March, 2024. The profit disclosed in cost books are not matched with financial accounts. The following information were revealed during the scrutiny of the figures of both the sets of books:

S.No	Particulars	₹
1.	Preliminary expenses written off in financial accounts	35,000
2.	Factory Overheads Over charged in cost accounts	20,000
3.	Expenses on issue of shares in financial accounts	30,000
4.	Undervaluation of closing stock in cost accounts	65,000
5.	Interest on Bank Deposits in financial accounts	60,000
6.	Under recovery of administration overheads in cost accounts	25,000
7.	Notional Rent of own premises charged in cost accounts	30,000
8.	Under recovery of selling overheads in cost accounts	35,000
9.	Bad debts recovered in financial accounts	50,000

Required:

Prepare Reconciliation Statement to arrive at net profit/loss as per Cost Accounts.

SOLUTION:

Reconciliation Statement

Particulars	(₹)	(₹)
Profit (loss) as per Financial Accounts		2,25,000
Add:		
Preliminary expenses written off	35,000	
Expenses on issue of shares in financial accounts	30,000	
Under recovery of administration overheads in cost accounts	25,000	
Under recovery of selling overheads in cost accounts	35,000	
		1,25,000
Less:		
Factory Overheads Over charged in cost accounts	20,000	
Undervaluation of closing stock in cost accounts	65,000	
Interest on Bank Deposits	60,000	
Notional Rent of own premises charged in cost accounts	30,000	
Bad debts recovered in financial accounts	50,000	
		(2,25,000)

Net Profit as per Cost Accounts		1,25,000

PROBLEM – 8:

The following figures are available from the financial records of ABC Manufacturing Co. Ltd. for the year ended 31st March.

	₹
Sales (20,000 units)	25,00,000
Materials	10,00,000
Wages	5,00,000
Factory Overheads	4,50,000
Administrative Overhead (production related)	2,60,000
Selling and Distribution Overheads	1,80,000
Finished goods (1,230 units)	1,50,000

	₹	₹
Work-in-Process:		
Materials	30,000	
Labour	20,000	
Factory overheads	20,000	70,000
Goodwill written off		2,00,000
Interest on loan taken		20,000

In the Costing records, factory overhead is charged at 100% of wages, administrative overhead 10% of factory cost and selling and distribution overhead at the rate of ₹ 10 per unit sold.

PREPARE a statement reconciling the profit as per cost records with the profit as per financial records.

SOLUTION:

Profit & Loss Account of ABC Manufacturing Co. Ltd. (for the year ended 31st March)

Particulars	(₹)	Particulars	(₹)
To Opening Stock	-	By Sales (20,000 units)	25,00,000
To Materials	10,00,000	By Closing Stock:	
To Wages	5,00,000	Finished goods(1,230 units)	1,50,000
To Factory Overheads	4,50,000	Work-in-Process	70,000
To Administrative Overheads	2,60,000		

To Selling & Distribution Overheads	1,80,000		
To Goodwill written off	2,00,000		
To Interest on loan	20,000		
To **Net Profit**	**1,10,000**		
	27,20,000		**27,20,000**

Cost Sheet

Particulars	**(₹)**
Materials	10,00,000
Wages	5,00,000
Direct Expenses	Nil
Prime Cost	**15,00,000**
Add: Factory Overhead @ 100% of wages	5,00,000
Gross Factory Cost	**20,00,000**
Less: Closing WIP	(70,000)
Factory Cost of (20,000 + 1,230) units	**19,30,000**
Add: Administrative Overhead @ 10% of Factory cost	1,93,000
	21,23,000
Less: Closing Stock of finished goods (1,230 units)	(1,23,000)*
Cost of Goods sold (20,000 units)	**20,00,000**
Add: Selling & Distribution Overhead @ ₹ 10 per unit	2,00,000
Cost of sales (20,000 units)	**22,00,000**
Sales of 20,000 units	25,00,000
Profit	**3,00,000**

* (₹ 21,23,000 × 1,230 units ÷ 21,230 units)

Reconciliation Statement

Particulars	**(₹)**	**(₹)**
Profit as per Cost Accounts		**3,00,000**
Add: Factory overheads over-absorbed (₹ 5,00,000 – ₹ 4,50,000)	50,000	
Selling & Distribution Overhead over-absorbed (₹ 2,00,000 – ₹ 1,80,000)	20,000	
Difference in the valuation of closing stock of finished goods (₹ 1,50,000 – ₹ 1,23,000)	27,000	97,000

		3,97,000
Less: Administrative overhead under-absorbed (₹ 2,60,000 – ₹ 1,93,000)	67,000	
Goodwill written off	2,00,000	
Interest on loan	20,000	2,87,000
Profit As Per Financial Accounts		**1,10,000**

PROBLEM – 8A:

Following are the figures extracted from the Cost Ledger of a manufacturing unit.

	Amount (₹)
Stores:	
Opening balance	**15,000**
Purchases	**80,000**
Transfer from WIP	**40,000**
Issue to WIP	**80,000**
Issue to repairs and maintenance	**10,000**
Sold as a special case at cost	**5,000**
Shortage in the year	**3,000**
Work-in-Process:	
Opening inventory	**30,000**
Direct Labour cost charged	**30,000**
Overhead cost charged	**1,20,000**
Closing Balance	**20,000**
Finished Products:	
Entire output is sold at 10% profit on actual cost from Work-in-Process.	
Others:	
Wages for the period	**35,000**
Overhead Expenses	**1,25,000**

ASCERTAIN the profit or loss as per financial account and cost accounts and reconcile them.

SOLUTION:

Stores Ledger Control A/c

Particulars		(₹)	Particulars		(₹)
To	Balance b/d	15,000	By	Work-in-Process ControlA/c (Issued to WIP)	80,000
To	Cost Ledger ControlA/c (Purchases)	80,000	By	Overhead Control A/c(Issued for repairs)	10,000
To	Work-in-Process Control A/c (Return from WIP)	40,000	By	Cost Ledger Control A/c(Sold at cost)	5,000
			By	Overheads Control A/c* (Shortages)	3,000
			By	Balance c/d	37,000
		1,35,000			**1,35,000**

* Assumed normal

Wages Control A/c

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	35,000	By Work-in-process ControlA/c	30,000
		By Overhead Control A/c	5,000
	35,000		**35,000**

Overhead Control A/c

Particulars	(₹)	Particulars	(₹)
To Stores Ledger Control A/c	10,000	By Work-in-Process Control A/c	1,20,000
To Stores Ledger Control A/c	3,000		
To Cost Ledger Control A/c	1,25,000		
To Wages Control A/c	5,000	By Balance c/d	23,000
	1,43,000		**1,43,000**

WIP Control A/c

Particulars	(₹)	Particulars	(₹)
To Balance b/d	30,000	By Stores LedgerControl A/c	40,000
To Stores Ledger Control A/c	80,000	By Finished GoodsControl A/c	2,00,000*
To Wages Control A/c	30,000		

To Overheads Control A/c	1,20,000	By Balance c/d	20,000
	2,60,000		**2,60,000**

* Finished output at cost	2,00,000
Profit at 10% on actual cost from WIP Sales	20,000
	2,20,000

Statement of Profit as Per Costing Records

Particulars	**(₹)**
Direct Material Cost (₹ 80,000 – ₹ 40,000)	40,000
Direct wages	30,000
Prime Cost	**70,000**
Production Overheads	1,20,000
Works Cost	**1,90,000**
Add: Opening WIP	30,000
	2,20,000
Less: Closing WIP	(20,000)
Cost of finished goods	**2,00,000**
Profit (10% of cost)	20,000
Sales	**2,20,000**

Profit & Loss A/c

Particulars	**(₹)**	**Particulars**	**(₹)**
To Material (Opening Balance + Purchases - Sale)	90,000	By Sales A/c	2,20,000
To Opening WIP	30,000	By Closing WIP	20,000
To Wages for the period	35,000	By Closing stock of Raw Material	37,000
To Overheads expenses	1,25,000	**By Net loss**	**3,000**
	2,80,000		**2,80,000**

Reconciliation Statement

Particulars	**(₹)**
Profit (Loss) as per Financial Accounts	**(3,000)**
Add: Overheads over absorbed (Refer Overhead control A/c)	23,000
Net Profit as per Cost Accounts	**20,000**

PROBLEM – 8B: (MTP 2 SEP 24)

(The financial books of a company reveal the following data for the year ended 31st March, 2024:

	Amount (₹)
Opening Stock:	
Finished goods 545 units	48,250
Work-in-process	38,000
01.04.2023 to 31.03.2024	
Raw materials consumed	5,00,000
Direct Labour	4,20,000
Factory overheads	3,56,000
Administration overheads	2,10,000
Stores Adjustment debited in financial Account	50,000
Dividend paid	98,000
Bad Debts	16,000
Selling and Distribution Overheads	84,000
Income tax paid	34,000
Interest received	42,000
Sales 14,250 units	13,96,500
Closing Stock: Finished goods 460 units	44,500
Work-in-process	36,200

The cost records provide as under:

- Factory overheads are absorbed at 60% of direct wages.
- Administration overheads are recovered at 20% of factory cost.
- Selling and distribution overheads are charged at ₹ 6 per unit sold.
- Opening Stock of finished goods is valued at ₹ 90 per unit.
- The company values work-in-process at factory cost for both Financial and Cost Profit Reporting.

Required:

(i) Prepare statements for the year ended 31st March, 2024 show
  - the profit as per financial records
  - the profit as per costing records.

(ii) Present a statement reconciling the profit as per costing records with the profit as per Financial Records.

SOLUTION:

(a)

(i) **Statement of Profit as Per Financial Records**

(for the year ended March 31, 2024)

	(₹)		(₹)
To Opening stock of Finished Goods	48,250	By Sales	13,96,500
To Work-in-Process	38,000	By Closing Stock Of Finished Goods	44,500
To Raw Materials Consumed	5,00,000	By Work-in-Process	36,200
To Direct Labour	4,20,000	By Interest Received	42,000
To Factory Overheads	3,56,000	By Loss	3,35,050
To Administration Overheads	2,10,000		
To Selling & Distribution Overheads	84,000		
To Dividend Paid	98,000		
To Bad Debts	16,000		
To Stores Adjustment	50,000		
To Income Tax	34,000		
	18,54,250		**18,54,250**

Statement of Profit as per Costing Records

(for the year ended March 31,2024)

Particulars	(₹)
Sales revenue (A) (14,250 units)	13,96,500
Cost of sales:	
Opening stock (545 units x ₹ 90)	49,050
Add: Cost of production of 14,165 units (Refer to working note 2)	14,08,560
Less: Closing stock (₹ 99.44 x 460 units)	45,742
Production cost of goods sold (14,250 units)	**14,11,868**
Selling & distribution overheads	
(14,250 units x ₹ 6)	85,500

Cost of sales: (B)	14,97,368
Profit / Loss: {(A) – (B)}	**(1,00,868)**

(ii) Statement of Reconciliation

(Reconciling the profit as per costing records with the profit as per financial records)

Particulars	**(₹)**	**(₹)**
Loss as per Cost Accounts		(1,00,868)
Add: Administration overheads over absorbed (₹ 2,34,760 – ₹ 2,10,000)	24,760	
Opening stock overvalued (₹ 49,050 – ₹ 48,250)	800	
Interest received	42,000	
Selling & distribution overheads over recovered (₹ 85,500 – ₹ 84,000)	1,500	69,060
		(31,808)
Less: Factory overheads over recovered (₹ 3,56,000 - ₹ 2,52,000)	1,04,000	
Closing stock overvalued (₹ 45,742 – ₹ 44,500)	1,242	
Stores adjustment	50,000	
Income tax	34,000	
Dividend	98,000	
Bad debts	16,000	(3,03,242)
Loss as per financial accounts		**(3,35,050)**

Working Notes:

1. Number of Units Produced	
	Units
Sales	14,250
Add: Closing stock	460
Total	**14,710**
Less: Opening stock	545
Number of units produced	**14,165**
2. Cost Sheet	
	(₹)
Raw materials consumed	5,00,000
Direct labour	4,20,000
Prime cost	**9,20,000**

Factory overheads (60% of direct wages)	2,52,000
Factory cost	**11,72,000**
Add: Opening work-in-process	38,000
Less: Closing work-in-process	36,200
Factory Cost of Goods Produced	**11,73,800**
Administration overheads (20% of factory cost)	2,34,760
Cost of Production of 14,165 units (Refer to working note 1)	**14,08,560**
Cost of production per unit: $\frac{₹\ 14,08,560}{14,165}$	99.44

PROBLEM – 8C:

The following information is available from the financial books of a company having a normal production capacity of 60,000 units for the year ended 31st March, 20x1:

1. **Sales ₹ 10,00,000 (50,000 units).**
2. **There was no opening and closing stock of finished units.**
3. **Direct material and direct wage costs were ₹ 5,00,000 and ₹ 2,50,000 respectively.**
4. **Actual factory expenses were ₹ 1,50,000 of which 60% are fixed.**
5. **Actual administrative expenses related to production activities were ₹ 45,000 which are completely fixed.**
6. **Actual selling and distribution expenses were ₹ 30,000 of which 40% are fixed.**
7. **Interest and dividends received ₹ 15,000.**

You are required to:

a. **Find out profit as per financial books for the year ended 31st March, 20x1;**

b. **PREPARE the cost sheet and ascertain the profit as per cost accounts for the year ended 31st March, 20x1 assuming that the indirect expenses are absorbed on the basis of normal production capacity; and**

c. **PREPARE a statement reconciling profits shown by financial and cost books.**

SOLUTION:

a) Profit & Loss Account (for the year ended 31st March)

Particulars		(₹)	Particulars		(₹)
To	Direct Material	5,00,000	By	Sales (50,000units)	10,00,000
To	Direct Wages	2,50,000	By	Interest anddividends	15,000

To	Factory expenses	1,50,000		
To	Administrative expenses	45,000		
To	Selling & Dist. Expenses	30,000		
To	**Net Profit**	**40,000**		
		10,15,000		**10,15,000**

(b) Cost Sheet (for the year ended 31st March)

Particulars	**(₹)**	**(₹)**
Direct Material		5,00,000
Direct Wages		2,50,000
Prime cost		**7,50,000**
Factory expenses:		
Variable (40% of ₹ 1,50,000)	60,000	
Fixed (₹ 90,000 × 50,000 Units ÷ 60,000 Units)	75,000	1,35,000
Works Cost/ Cost of Production		**8,85,000**
Administrative expenses: (₹ 45,000 ×50,000 Units ÷ 60,000 Units)		37,500
Selling & Distribution expenses:		
Variable (60% of ₹ 30,000)	18,000	
Fixed* (₹ 12,000 × 50,000/60,000)	10,000	28,000
Cost of Sales		**9,50,500**
Profit (Balancing Figure)		49,500
Sales revenue		**10,00,000**

*It is assumed that the company sells what it generally produces i.e. normalproduction.

Statement of Reconciliation

(Reconciling profit shown by Financial and Cost Accounts)

Particulars	**Amount (₹)**	**Amount (₹)**
Profit as per Cost Account		**49,500**
Add: Income from interest and dividends		15,000
		64,500

Less: Factory expenses under-charged inCost Accounts (₹ 1,50,000 – ₹ 1,35,000)	15,000	
Administrative expenses under-charged inCost Accounts (₹ 45,000 – ₹ 37,500)	7,500	
Selling & distribution expenses under—charged in Cost Accounts (₹ 30,000 – ₹ 28,000)	2,000	(24,500)
Profit as per Financial Accounts		**40,000**

CHAPTER 06: JOB COSTING

PROBLEM – 1

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

Particulars	Per unit
Materials	₹ 70
Direct wages 18 hours @ 2.50	₹ 45
(Dept. X - 8 Hrs; Dept. Y - 6 Hrs; Dept. Z - 4 Hrs)	
Chargeable expenses	₹ 5
	₹ 120
Add: 33-$^1/_3$ % for expenses cost	₹ 40
Total	₹ 160

Analysis of the Profit/Loss Account (for the year 20x1)

Particulars	Amount (₹)	Particulars	Amount (₹)
Materials used	₹ 1,50,000	Sales less returns	₹ 2,50,000
Direct wages:			
- Dept. X - 10,000			
- Dept. Y - 12,000			
- Dept. Z - 8,000	₹ 30,000		
Special stores items	₹ 4,000		
Overheads:			
Dept. X - 5,000			
Dept. Y - 9,000			
Dept. 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:

a. **Draw up a job cost sheet.**

b. **Calculate the entire revised cost using 20x1 actual figures as the basis.**

c. **Add 20% to the total cost to determine the selling price.**

SOLUTION:

Job Cost Sheet	
Customer Details ———	Job No ———
Date of commencement ———	Date of completion ———
Particulars	**Amount (₹)**
Direct Materials	70
Direct Wages	
X ₹ 2.50 × 8 Hours = ₹ 20.00	
Y ₹ 2.50 × 6 Hours = ₹ 15.00	
Z ₹ 2.50 × 4 Hours = ₹ 10.00	45
Chargeable Expenses	5
Prime Cost	**120**
Overheads:	
X = $\frac{₹\,5,000}{₹\,10,000}$ x 100 = 50% of ₹ 20 = ₹ 10.00	
Y = $\frac{₹\,9,000}{₹\,12,000}$ x 100 = 75% of ₹ 15 = ₹ 11.25	
Z = $\frac{₹\,2,000}{₹\,8,000}$ x 100= 25% of ₹ 10 = ₹ 2.50	₹ 23.75
Works cost	**143.75**
Selling expenses= $\frac{₹\,20,000}{₹\,2,00,000}$ x 100 = 10% of work cost	14.38
Total Cost	**158.125**
Profit (20% of Total Cost)	31.63
Selling Price	**189.76**

PROBLEM – 2

In a factory following the Job Costing Method, an abstract from the work-in-progress as on 30th September was prepared as under.

JOB NO:	MATERIALS	DIRECT HOURS	LABOUR	FACTORY OVERHEAD APPLIED
115	₹ 1,325	400 Hrs	₹ 800	₹ 640
118	₹ 810	250 Hrs	₹ 500	₹ 400
120	₹ 765	300 Hrs	₹ 475	₹ 380
	₹ 2,900		₹ 1,775	₹ 1,420

Materials used in October were as follows:

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

A summary for Labour hours deployed during October is as under:

PARTICULARS	NUMBER OF HOURS	
	SHOP A	SHOP B
Direct Labour:		
Job no: 115	25	25
Job no: 118	90	30
Job no: 120	75	10
Job no: 121	65	-
Job no: 124	25	10
Indirect Labour:		
Waiting of material	20	10
Machine breakdown	10	5
Idle time	5	6
Overtime premium	6	5
Total	321	101

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

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

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

SOLUTION:

Factory Cost Statement Of Completed Job.

Month	Job No	Materials	Direct Labour	Factory Overheads (80% Of Direct Labour Cost)	Factory Cost
		(₹)	(₹)	(₹)	(₹)
September	115	1,325	800	640	2765
October	115	-	125	100	225
	Total	**1,325**	**925**	**740**	**2,990**
September	118	810	500	400	1,710
October	118	515	330	264	1,109
	Total	**1,325**	**830**	**664**	**2,819**
September	120	765	475	380	1,620
October	120	665	245	196	1,106
	Total	**1,430**	**720**	**576**	**2,726**

Invoice Price of Complete Job

Job No	115 (₹)	118 (₹)	120 (₹)
Factory Cost	2,990	2,819	2,726
Administration And Selling Overheads @ 10% Of Factory Cost	299	281.90	272.60
Total Cost	**3,289**	**3,100.90**	**2,998.60**
Profit (20% Of Total Cost)	657.80	620.18	599.72

Invoice Price	**3,946.80**	**3,721.08**	**3,598.32**

W N 1: Calculation of Absorption Rate for Factory Overheads

Job No (1)	Labour Cost (2)	Factory Overheads (3)	Absorption Rate (4 = 3 ÷ 2)
115	800	640	80% on Direct Labour
118	500	400	80% on Direct Labour
120	475	380	80% on Direct Labour

PROBLEM – 3

The manufacturing cost of a work order is ₹ 1,00,000; 8% of the production against that order spoiled and the rejection is estimated to have a realisable value of ₹ 2,000 only. The normal rate of spoilage is 2%. Record this in the costing journal.

SOLUTION:

Actual loss due to spoilage = 8% of ₹ 1,00,000 = ₹ 8,000 and Normal loss = 2% of ₹ 1,00,000 = ₹ 2,000, therefore abnormal loss = ₹ 6,000.

The rejection has a realisable value of ₹ 2,000, which is to be apportioned betweennormal loss and abnormal loss in the ratio of 2 : 6.

The accounting entries necessary for recording the above facts would be:

		(₹)	(₹)
Material Control Account	Dr.	2,000	
Overhead Control Account	Dr.	1,500	
Costing Profit and Loss Control Account	Dr.	4,500	
To Work-in-Progress Control Account			8,000

In the case of defectives being inherent in the manufacturing process, the rectification cost may be charged to the specific jobs in which they have arisen. In case detectives cannot be identified with jobs, the cost of rectification may betreated as factory overheads. Abnormal defectives should be written off to theCosting Profit and Loss Account.

PROBLEM – 4

Ares Plumbing and Fitting Ltd. (APFL) deals in plumbing materials and also provides plumbing services to its customers. On 12th August, 20x2, APFL received a job order for a students' hostel to supply and fitting of plumbing materials. The work is to be done on the basis of specification provided by the hostel owner. Hostel will be

inaugurated on 5th September, 20x2 and the work is to be completed by 3rd September, 20x2. Following are the details related with the job work:

Direct Materials

APFL uses a weighted average method for the pricing of materials issues. Opening stock of materials as on 12th August 20x2:

- 15mm GI Pipe, 12 units of (15 feet size) @ ₹ 600 each
- 20mm GI Pipe, 10 units of (15 feet size) @ ₹ 660 each
- Other fitting materials, 60 units @ ₹ 26 each
- Stainless Steel Faucet, 6 units @ ₹ 204 each
- Valve, 8 units @ ₹ 404 each

Purchases:

On 16th August 20x2:

- 20mm GI Pipe, 30 units of (15 feet size) @ ₹ 610 each
- 10 units of Valve @ ₹ 402 each

on 18th August 20x2:

- Other fitting materials, 150 units @ ₹ 28 each
- Stainless Steel Faucet, 15 units @ ₹ 209 each

on 27th August 20x2:

- 15mm GI Pipe, 35 units of (15 feet size) @ ₹ 628 each
- 20mm GI Pipe, 20 units of (15 feet size) @ ₹ 660 each
- Valve, 14 units @ ₹ 424 each

Issues for the hostel job:

On 12th August 20x2:

- 20mm GI Pipe, 2 units of (15 feet size)
- Other fitting materials, 18 units

on 17th August 20x2:

- 15mm GI Pipe, 8 units of (15 feet size)
- Other fitting materials, 30 units

on 28th August 20x2:

- 20mm GI Pipe, 2 units of (15 feet size)
- 15mm GI Pipe, 10 units of (15 feet size)
- Other fitting materials, 34 units
- Valve, 6 units on 30th August 20x2:
- Other fitting materials, 60 units
- Stainless Steel Faucet, 15 units

Direct Labour:

Plumber: 180 hours @ ₹ 50 per hour (includes 12 hours overtime)

Helper: 192 hours @ ₹ 35 per hour (includes 24 hours overtime)

Overtimes are paid at 1.5 times of the normal wage rate.

Overheads:

Overheads are applied @ ₹ 13 per labour hour.

Pricing policy:

It is company's policy to price all orders based on achieving a profit margin of 25% on sales price.

You are required to

i. Calculate the total cost of the job.

ii. Calculate the price to be charged from the customer

SOLUTION:

(a) Calculation of Total Cost for the Hostel Job:

Particulars	Amount (₹)	Amount (₹)
Direct Material Cost:		
- 15mm GI Pipe (Working Note- 1)	11,051.28	
- 20mm GI Pipe (Working Note- 2)	2,588.28	
- Other fitting materials (Working Note-3)	3,866.07	
- Stainless steel faucet $15 \text{ units} \times \left(\frac{6 \times ₹\,204 + 15 \times ₹\,209}{21 \text{ units}}\right)$	3,113.57	
- Valve $6 \text{ units} \times \left(\frac{8 \times ₹\,404 + 10 \times ₹\,402 + 14 \times ₹\,424}{32 \text{ units}}\right)$	2,472.75	23,091.95
Direct Labour:		
- Plumber [(180 hours × ₹ 50) + (12 hours × ₹ 25)]	9,300.00	
- Helper [(192 hours × ₹ 35) + (24 hours × ₹ 17.5)]	7,140.00	16,440.00
- Overheads [₹ 13 × (180 + 192) hours]		4,836.00
Total Cost		**44,367.95**

(b) Price To Be Charged For The Job Work:

	Amount (₹)
Total Cost incurred on the job	44,367.95
Add: 25% Profit on Job Price $\left(\frac{44,367.95}{75\%} \times 25\%\right)$	14,789.32
	59,157.27

Working Note:

1. Cost of 15mm GI Pipe

Date		Amount (₹)
17-08-2022	8 units × ₹ 600	4,800.00
28-08-2022	10 units x $\left(\frac{4 \times ₹\,600 + 35 \times ₹\,628}{39 \text{ units}}\right)$	6,251.28
		11,051.28

2. Cost of 20mm GI Pipe

Date		Amount (₹)
12-08-2022	2 units × ₹ 660	1,320.00
28-08-2022	2 units x $\left(\frac{8 \times ₹\,660 + 30 \times ₹\,610 + 20 \times ₹\,660}{58 \text{ units}}\right)$	1,268.28
	Total	**2,588.28**

3. Cost of Other fitting materials

Date		Amount (₹)
12-08-2022	18 units × ₹ 26	468.00
17-08-2022	30 units × ₹ 26	780.00
28-08-2022	34 units x $\left(\frac{12 \times ₹\,26 + 150 \times ₹\,28}{162 \text{ units}}\right)$	946.96
30-08-2022	60 units x $\left(\frac{12 \times ₹\,26 + 150 \times ₹\,28}{162 \text{ units}}\right)$	1,671.11
		3,866.07

CHAPTER 07: UNIT & BATCH COSTING

PROBLEM – 1:

The following data relate to the manufacture of a standard product during the 4-week ended 28th February 20x1:

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

You are required to find out the cost per unit and profit for the 4- week ended 28th February 20x1.

SOLUTION:

Statement Of Cost Per Unit and Profit Per Unit for the 4 Weeks Ended 28th Feb 20x1:

No. Of Units Produced: 10,000 Units

Particulars	Cost per unit (₹)	Amount (₹)
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 × ₹ 40)	12.80	1,28,000
Gross 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 × ₹ 20)	20.00	2,00,000
Cost Of Sales	**104.48**	**10,44,800**
Add: Profit (Balancing Figure)	15.52	1,55,200
Sales	**120.00**	**12,00,000**

PROBLEM – 2

Atharva Pharma care Limited produced a uniform type of product and has a manufacturing capacity of 3,000 units per week of 48 hours from the records of the company, the following data are available relating to output and cost of 3 consecutive weeks.

Week Number	Units Manufactured	Direct Material	Direct Wage	Factory Overheads
1	1,200	₹ 9,000	₹ 3,600	₹ 31,000
2	1,600	₹ 12,000	₹ 4,800	₹ 33,000
3	1,800	₹ 13,500	₹ 5,400	₹ 34,000

Assuming that the company charges a profit of 20% on selling price, find out the selling price per unit when the weekly output is 2,000 units.

SOLUTION:

Statement Of Cost And Selling Price For 2,000 Units Of Output

Particulars	Cost per unit (₹)	Total Cost (₹)
Direct Materials	7.50	15,000
Direct Labour	3.00	6,000
Prime Cost	**10.50**	**21,000**
Add: Factory Overheads (Refer Working Note-2)	17.50	35,000
Total Cost	**28.00**	**56,000**
Add: Profit	7.00	14,000
(20% Of Sales Is Equivalent To 25% Of Cost)		
Sales	**35.00**	**70,000**

W N 1: Segregation of Factory Overheads into Variable and Fixed Cost:

We select week 1 and week 3 using high – low method

Variable Cost Per Unit = Change in Cost ÷ Change in Units

= (₹ 34000 - ₹ 31000) ÷ (1800 units – 1200 units)

= ₹ 5 Per Unit

Fixed Cost = Total Cost – Variable Cost = ₹ 34000 - (₹ 5 x 1800 units)

= ₹ 34000 - ₹ 9000 = ₹ 25000

Fixed Overheads for 2000 units = (₹ 5 x 2000 units) + ₹ 25000 = ₹ 35000

PROBLEM – 3

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

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

Particulars	Amount (₹)
Direct Materials	₹ 500
Direct Wages	₹ 50
Oven set-up cost	₹ 150

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

Determine the selling price for 600 muffins.

SOLUTION:

Statement Of Cost Per Batch And Per Order

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

Particulars	Cost per batch (₹)	Total Cost (₹)
Direct Material Cost	500.00	6,000
Direct Wages	50.00	600
Oven set-up cost	150.00	1,800
Add: Production Overheads (20% of Direct wages)	10.00	120
Total Production cost	**710.00**	**8,520**
Add: S&D and Administration overheads (10% of Total production cost)	71.00	852
Total Cost	**781.00**	**9,372**
Add: Profit (1/3rd of total cost)	260.33	3,124
Selling price	**1,041.33**	**12,496**
Selling Price per unit = 1041.33 ÷ 50 = ₹ 20.83		

PROBLEM – 3A **(MTP 1 Jan 25)**

Luxz Ltd. is into luxury pens business manufacturing 120 pens in a batch. To process a single batch of 120 pens, company needs to incur following expenditure:

Particulars	(₹)
Direct Materials	57,375

Direct wages	6,750
Batch Set-up cost	18,900

For each batch, the company absorbs the Production Overheads at a rate of 20% of direct wages and 15% of the total production cost is allocated to cover selling, distribution, and administrative overheads.

During the month of March, Luxz Ltd. received an order for 2,400 pens and the company aims to achieve a profit margin of 25% on its sales value.

You are required to DETERMINE the total sales value for 2,400 pens.

SOLUTION:

Determination of total sales value of Luxury pens	Amount per Batch	Amount for 2,400 units or 20 batches
Particulars	**(₹)**	**(₹)**
Direct materials	57,375	11,47,500
Direct wages	6,750	1,35,000
Batch set-up cost	18,900	3,78,000
Production overheads (20% of direct wages)	1,350	27,000
Total Production Cost	**84,375**	**16,87,500**
Selling, distribution and administration cost (15% of Total Production cost)	12,656	2,53,125
Total Cost	**97,031**	**19,40,625**
Add: Profit (25% of Sales value or 1/3rd of Total cost)	32,344	6,46,875
Total Sales value	1,29,375	**25,87,500**

PROBLEM – 4

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

Determine economic batch quantity. Also, calculate the Total Cost.

SOLUTION:

$$EBQ = \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 500 \times 12 \times 60}{0.1 \times 20}} = 600 \text{ units}$$

PROBLEM – 5

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

1. **What would be the optimum run size of bearing manufacture?**
2. **What would be the interval between two consecutive optimum runs?**
3. **Find out the minimum inventory cost?**

SOLUTION:

(i) Optimum Batch Size Or Economic Batch Quantity (EBQ):

$$EBQ = \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 48{,}000 \times 3{,}200}{12}} = 5{,}060 \text{ units}$$

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

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

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

Average Inventory = 5,060 units ÷ 2 = 2,530 units

Carrying Cost per unit per annum= ₹ 1 × 12 months = ₹ 12

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

PROBLEM – 6

XYZ Ltd. has obtained an order to supply 48000 bearings per year from a concern. On a steady basis, it is estimated that it costs ₹ 0.20 as inventory holding cost per bearing per month and the set-up cost per run of bearing manufacture is ₹ 384.

You are required to:

1. **compute the optimum run size and number of runs for bearing manufacture.**
2. **compute the interval between two consecutive runs.**
3. **find out the extra costs to be incurred, if company adopts a policy to manufacture 8000 bearings per run as compared to optimum run Size.**
4. **give your opinion regarding run size of bearing manufacture. Assume 365 days in a year.**

SOLUTION:

i) Optimum Batch Size Or Economic Batch Quantity (EBQ):

$$EBQ = \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 48{,}000 \times 384}{2.4}} = 3919.18 \text{ or } 3{,}920 \text{ units}$$

Number of Optimum runs = 48,000 ÷ 3,920 = 12.245 or 13 run

ii) Interval between 2 runs (in days) = 365 days ÷ 13 = 28 days Or 365 ÷ 12.24 = 29.82 days

iii) Statement Showing Total Cost At Production Run Size Of 3,600 And 8,000 Bearings

A.	Annual Requirement	48,000	48,000
B.	Run Size	3,920	8,000
C.	No. Of Runs (A ÷ B)	12.245	6
D.	Set Up Cost Per Run	₹ 384	₹ 384
E.	Total Set Up Cost (C x D)	₹ 4,702	₹ 2,304
F.	Average Inventory (B ÷ 2)	1,960	4,000
G.	Carrying Cost Per Unit P.A.	2.40	2.40
H.	Total Carrying Cost (F x G)	4,704	9,600
I.	**Total Cost (E + H)**	**9,406**	**11,904**

Extra cost incurred, if run size is of 8,000 = ₹ 11,904 - 9,406 = ₹ 2,498

iv) To save cost the company should run at optimum batch size ie 3,920 Units. It saves ₹ 2,498. Run size should match with the Economic production run of bearing manufacture. When managers of a manufacturing operation make decisions about the number of units to produce for each production run, they must consider the costs related to setting up the production process and the costs of holding inventory

PROBLEM – 7

A Company has an annual demand from a single customer for 50,000 litres of a paint product. The total demand can be made up of a range of colours to be produced in a continuous production run after which a set-up of the machinery will be required to accommodate the colour change. The total output of each colour will be stored and then delivered to the customer as s single load immediately before production of the next colour commences.

The Setup costs are ₹ 100 per set up. The Service is supplied by an outside company as required. The Holding costs are incurred on rented storage space which costs ₹ 50 per sq. meter per annum. Each square meter can hold 250 Litres suitably stacked.

You are required to calculate

1. **Calculate the total cost per year where batches may range from 4,000 to 10,000 litres in multiples of 1,000 litres and hence choose the production batch size which will minimize the cost.**
2. **Use the economic batch size formula to calculate the batch size which will minimise total cost.**

SOLUTION:

(i)

Production Batch Size (Litres)	Set-up costs per annum (₹)	Holding Costs per annum (₹)	Total Costs per annum (₹)
4,000	1,250	400	1,650
5,000	1,000	500	1,500
6,000	833	600	1,433
7,000	714	700	1,414
8,000	625	800	1,425
9,000	556	900	1,456
10,000	500	1000	1,500

As the Total cost is minimum at 7,000 Litres i.e. ₹ 1,414, thus economic production lot would be 7,000 Litres

ii) Economic Batch Quantity (EBQ):

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

Where,

D = Annual demand for the product = 50,000 Litres

S = Setting up cost per batch = ₹ 100 per set-up

C = Carrying cost per unit of production

= ₹ 50 ÷ 250 Litres = 0.20 per Litre per annum

$$EBQ = \sqrt{\frac{2 \times 50{,}000 \times 100}{0.2 \times 1}} = 7{,}071 \text{ Litres}$$

Working Note:

1. For Production batch size of 7,000 litres

   Number of set ups per year = 50,000 ÷ 7,000 = 7.14 or 8 set-upsHence, annual set up cost per year = 8 × ₹ 100 = ₹ 800

   Average Quantity = 7,000 ÷ 2 = 3,500 litres

   Holding Costs = 3,500 ltr. ÷250 × 50 = ₹ 700

2. It can be seen that EBQ determined with mathematical formula (7,071 litres) slightly varies from the one determined by trial and error method (7,000 Litres)

PROBLEM – 8

Wonder Ltd. has a capacity of 1,20,000 Units per annum as its optimum capacity. The production costs are as under:

Direct Material	₹ 90 per unit
Direct Labour	₹ 60 per unit
Overheads:	
Fixed	₹ 30,00,000 per annum
Variable	₹ 100 per unit

Semi Variable Overheads: ₹ 20,00,000 per annum up to 50% capacity and an extra amount of ₹ 4,00,000 for every 25% increase in capacity or part thereof. The production is made to order and not for stocks. If the production programme of the factory is as indicated below and the management desires a profit of ₹ 20,00,000 for the year work out the average selling price at which each unit should be quoted.

First 3 months: 50% capacity and remaining 9 months: 80% capacity.

Ignore Administration, Selling and Distribution overheads.

SOLUTION:

Statement of Cost and Total Sales Amount **(₹)**

Particulars	First 3 Months	Next 9 Months	Total
Capacity Utilisation (No of units)	120,000 x 3 ÷ 12 x 50% = 15,000	120,000 x 9 ÷ 12 x 80% = 72,000	87,000
Direct Material	13,50,000	64,80,000	78,30,000
Direct Labour	9,00,000	43,20,000	52,20,000
Add: Overheads:			
- Fixed (1:3)	7,50,000	22,50,000	30,00,000
- Variable	15,00,000	72,00,000	87,00,000
Semi Variable	5,00,000 (For first 3 months at the rate of ₹ 20,00,000)	21,00,000 (at the rate of ₹ 28,00,000 for 9 months)	26,00,000
Total cost	**50,00,000**	**2,23,50,000**	**2,73,50,000**
Add: Profit			20,00,000
Sales			**2,93,50,000**

Average Selling Price = ₹ 2,93,50,000 ÷ 87,000 units = ₹ 337.356

PROBLEM – 9

Rio Limited undertakes to supply 1000 units of a component per month for the Months of January, February and March 20x1. Every month a batch order is opened against which materials and labour costs are booked at actual. Overheads are levied at a rate per labour hour. The selling price is contracted at ₹ 15 per unit.

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

MONTH	BATCH OUTPUT	MATERIAL COST	LABOUR COST
January 20x1	1250 nos	₹ 6,250	₹ 2,500
February 20x1	1500 nos	₹ 9,000	₹ 3,000
March 20x1	1000 nos	₹ 5,000	₹ 2,000

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

MONTH	OVERHEADS	TOTAL LABOUR HOURS
January 20x1	₹ 12,000	4,000
February 20x1	₹ 9,000	4,500
March 20x8	₹ 15,000	5,000

SOLUTION:

Statement Of Cost and Profit Per Unit Of Each Batch

	January	February	March	Total
a) Batch Output (Nos.)	1,250	1,500	1,000	3,750
b) Sales Value (@ ₹ 15 per unit)	₹ 18,750	₹ 22,500	₹ 15,000	₹ 56,250
Cost				
Material	6,250	9,000	5,000	20,250
Wages	2,500	3,000	2,000	7,500
Overheads	3,750	3,000	3,000	9,750
c) Total	**12,500**	**15,000**	**10,000**	**37,500**
d) Profit per batch (b) – (c)	6,250	7,500	5,000	18,750
e) Cost per unit (c) ÷ (a)	10	10	10	
f) Profit per unit (d) ÷ (a)	5	5	5	

Overall Position of the Order for 3,000 Units

Sales value (3,000 units × ₹ 15)	₹ 45,000
Less: Total cost (3,000 units × ₹ 10)	₹ 30,000
Profit	**₹ 15,000**

Calculation Of Overhead Per Hour:

	January	February	March
i. Labour hours:			
$= \frac{\text{Labour Cost}}{\text{Labour Rates per hour}}$	$= \frac{₹\,2,500}{2} = 1,250$	$= \frac{₹\,3,000}{2} = 1,500$	$= \frac{₹\,2,000}{2} = 1,000$
ii. Overhead per hour:			
$= \frac{\text{Total overheads}}{\text{Total Labour hour}}$	$= \frac{₹\,12,000}{4,000} = ₹\,3$	$= \frac{₹\,9,000}{4,500} = ₹\,2$	$= \frac{₹\,15,000}{5,000} = ₹\,3$
iii. Overhead for batch (i) × (ii)	₹ 3,750	₹ 3,000	₹ 3,000

PROBLEM – 10

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

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

The other details are:

Monthly chargeable	Expenses	Direct labour
January	₹ 12,000	4800 hrs
February	₹ 10,560	4400 hrs
March	₹ 12,000	5000 hrs
April	₹ 10,580	4600 hrs
May	₹ 13,000	5000 hrs
June	₹ 12,000	4800 hrs

SOLUTION:

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

Overall position of the order for 1,200 units

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

- (Overheads ÷ Direct Labour Hour for the Month) x Direct Labour Hours for Batch

PROBLEM – 11

X Ltd. is committed to supplying 24,000 bearings per annum to Y Ltd. on a steady basis. It is estimated that it costs 10 paise as inventory holding cost per bearing per month and that the set-up cost per run of bearing manufacture is ₹ 324.

a. **What would be the optimum run size for bearing manufacture?**
b. **Assuming that the company has a policy of manufacturing 6,000 bearings per run, how much extra costs the company would be incurring as compared to the optimum run suggested in a above?**
c. **What is the minimum inventory holding cost?**

SOLUTION:

(a) Optimum Production Run Size (Q) = $\sqrt{\frac{2DS}{C}}$

where,

D = No. Of Units to Be Produced Within One Year.

S = Set-Up Cost Per Production Run

C = Carrying Cost Per Unit Per Annum.

$$= \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 24{,}000 \times ₹\ 324}{0.10 \times 12}} = 3{,}600 \text{ bearings}$$

(b) Total Cost (of maintaining the inventories) when production run size (Q) are 3,600 and 6,000 bearings respectively

Total cost = Total set-up cost + Total carrying cost.

	When run size is 3,600 bearings	**When run size is 6,000 bearings**
Total set up cost	$= \frac{24{,}000}{3{,}600} \times ₹\ 324 = ₹\ 2{,}160$ Or, No. of setups = 6.67 (7 setups) = 7 x 324 = ₹ 2,268	$= \frac{24{,}000}{6{,}000} \times ₹\ 324 = ₹\ 1{,}296$
Total Carrying cost	$\frac{1}{2} \times 3{,}600 \times 0.10P \times 12$ = ₹ 2,160	$\frac{1}{2} \times 6{,}000 \times 0.10P \times 12$ = ₹ 3,600
Total Cost	₹ 4,320 / ₹ 4,428	₹ 4,896

₹ 576 / ₹ 468 is the excess cost borne by the firm due to run size not being economic batch quantity.

(c) Inventory holding cost at EBQ $= \frac{1}{2} Q \times C$

(when Q = 3,600 bearings) $= \frac{1}{2} \times 3{,}600$ bearings $\times 0.10P \times 12$

$= ₹\ 2{,}160$

PROBLEM – 12

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

a. Find the most economic production run.

b. Calculate the extra cost that company incur due to the processing of 18,000 columns in a batch.

SOLUTION:

(i) Total Cost of production= ₹ 2,120 + 60 + 20 = ₹ 2,200

Calculation of Economic Batch Quantity (EBQ):

$$EBQ = = \sqrt{\frac{2 \times 90{,}000 \times ₹\ 1500}{5\%\ of\ ₹\ 2{,}200}} = \sqrt{\frac{27{,}00{,}00{,}000}{₹\ 110}} = 1{,}567\ columns.$$

(ii) Calculation of Extra Cost due to processing of 18,000 columns in a batch

	When run size is 1,567 columns	When run size is 18,000 columns
Total set up cost	No. of setups = 90,000 ÷ 1567 = 57.43 (58 setups) $= \frac{90{,}000}{1{,}567} \times ₹\,1{,}500$ = ₹87,000	$= \frac{90{,}000}{18{,}000} \times ₹1{,}500$ = ₹ 7,500
Total Carrying cost	$\frac{1}{2} \times 1{,}567 \times ₹110$ = ₹86,185	$\frac{1}{2} \times 18{,}000 \times ₹110$ = ₹9,90,000
Total Cost	**₹ 1,73,185**	**₹ 9,97,500**

Thus, extra cost = ₹ 9,97,500 – ₹ 1,73,185 = ₹ 8,24,315

PROBLEM - 13: **(RTP MAY 24)**

Arnav Ltd. operates in beverages industry where it manufactures soft- drink in three sizes of Large (3 litres), Medium (1.5 litres) and Small (600 ml) bottles. The products are processed in batches. The 5,000 litres capacity processing plant consumes electricity of 90 Kilowatts per hour and a batch takes 1 hour 45 minutes to complete. Only symmetric size of products can be processed at a time. The machine set-up takes 15 minutes to get ready for next batch processing. During the set-up power consumption is only 20%.

(i) The current price of Large, Medium and Small are ₹ 150, ₹ 90 and ₹ 50 respectively.

(ii) To produce a litre of beverage, 14 litres of raw material-W and 25 ml of Material-C are required which costs ₹ 0.50 and ₹ 1,000 per litre respectively.

(iii) 20 direct workers are required. The workers are paid ₹ 880 for 8 hours shift of work.

(iv) The average packing cost per bottle is ₹ 3

(v) Power cost is ₹ 7 per Kilowatt -hour (Kwh)

(vi) Other variable cost is ₹ 30,000 per batch.

(vii) Fixed cost (Administration and marketing) is ₹ 4,90,00,000.

(viii) The holding cost is ₹ 1 per bottle per annum.

The marketing team has surveyed the following demand (bottle) of the product:

Large	Medium	Small
3,00,000	7,50,000	20,00,000

You are required to CALCULATE profit/ loss per batch and also COMPUTE Economic Batch Quantity (EBQ).

Answer:

Workings:

1. Maximum Number Of Bottles That Can Be Processed In A Batch:

$$= \frac{5{,}000 \text{ Litres}}{\text{Bottle volume}}$$

Large		Medium		Small	
Qty (Litres)	Max bottles	Qty (Litres)	Max bottles	Qty (Litres)	Max bottles
3	1,666	1.5	3,333	0.6	8,333

*For simplicity of calculation small fractions has been ignored.

2. Number Of Batches To Be Run:

		Large	Medium	Small	Total
A	Demand	3,00,000	7,50,000	20,00,000	
B	Bottles per batch (Refer WN-1)	1,666	3,333	8,333	
C	No. of batches [A÷B]	180	225	240	645

*For simplicity of calculation small fractions has been ignored.

Quantity of Material-W and Material C required to meet demand:

	Particulars	Large	Medium	Small	Total
A	Demand (bottle)	3,00,000	7,50,000	20,00,000	
B	Qty per bottle (Litre)	3	1.5	0.6	
C	Output (Litre) [A × B]	9,00,000	11,25,000	12,00,000	32,25,000
D	Material-W per litre of output (Litre)	14	14	14	
E	**Material-W required (Litre) [C × D]**	**1,26,00,000**	**1,57,50,000**	**1,68,00,000**	**4,51,50,000**
F	Material-C required per litre of output (ml)	25	25	25	
G	**Material-C required (Litre) [(C × F) ÷ 1000]**	**22,500**	**28,125**	**30,000**	**80,625**

3. **No. of Man-shift required:**

		Large	Medium	Small	Total
A	No. Of Batches	180	225	240	645
B	Hours Required Per Batch	2	2	2	
	(Hours)				
C	Total Hours Required (Hours) [A × B]	360	450	480	1,290
D	No. Of Shifts Required [C ÷ 8]	45	57	60	162
E	**Total Manshift [D × 20 Workers]**	**900**	**1,140**	**1,200**	**3,240**

4. **Power consumption in Kwh**

		Large	Medium	Small	Total
For processing					
A	No. of batches	180	225	240	645
B	Hours required per batch (Hours)	1.75	1.75	1.75	1.75
C	Total hours required (Hours) [A × B]	315	393.75	420	1,128.75
D	Power consumption per hour	90	90	90	90
E	**Power consumption in Kwh [C × D]**	**28,350**	**35,437.5**	**37,800**	**1,01,587.5**
F	**Per batch consumption (Kwh) [E ÷ A]**	**157.5**	**157.5**	**157.5**	**157.5**
For set-up					
G	Hours required per batch (Hours)	0.25	0.25	0.25	0.25
H	Total hours required (Hours) [A×G]	45	56.25	60	161.25
I	Power consumption per hour [20%×90]	18	18	18	18
J	**Power consumption in Kwh [H × I]**	**810**	**1,012.5**	**1,080**	**2,902.5**
K	**Per batch consumption (Kwh) [J ÷ A]**	**4.5**	**4.5**	**4.5**	**4.5**

Calculation of Profit or Loss per batch:

	Particulars	Large	Medium	Small	Total
A	Demand (bottle)	3,00,000	7,50,000	20,00,000	30,50,000
B	Price per bottle (₹)	150	90	50	
C	**Sales value (₹) [A × B]**	**4,50,00,000**	**6,75,00,000**	**10,00,00,000**	**21,25,00,000**
	Direct Material cost:				
E	Material-W (₹) [Qty in WN-3 × ₹ 0.50]	63,00,000	78,75,000	84,00,000	2,25,75,000
F	Material-C (₹) [Qty in WN-3 x ₹ 1,000]	2,25,00,000	2,81,25,000	3,00,00,000	8,06,25,000
G	**[E+F]**	**2,88,00,000**	**3,60,00,000**	**3,84,00,000**	**10,32,00,000**
H	Direct Wages (₹) [Man-shift in WN- 4 × ₹ 880]	7,92,000	10,03,200	10,56,000	28,51,200
I	Packing cost (₹) [A × ₹ 3]	9,00,000	22,50,000	60,00,000	91,50,000
	Power cost (₹)				
J	For processing (₹) [WN-5 × ₹ 7]	1,98,450	2,48,062.5	2,64,600	7,11,112.5
K	For set-up time (₹) [WN-5 × ₹ 7]	5,670	7,087.5	7,560	20,317.5
L	[J+K]	**2,04,120**	**2,55,150**	**2,72,160**	**7,31,430**
M	Other variable cost (Rs.) [No. of batch in WN-2 × ₹ 30,000]	54,00,000	67,50,000	72,00,000	1,93,50,000
N	**Total Variable cost per batch**	**3,60,96,120**	**4,62,58,350**	**5,29,28,160**	**13,52,82,630**
	[G + H + I + L + M]				
O	**Profit/ loss before fixed cost [C - N]**	**89,03,880**	**2,12,41,650**	**4,70,71,840**	**7,72,17,370**
P	Fixed Cost				4,90,00,000
Q	**Total Cost [O - P]**				**2,82,17,370**

Computation of Economic Batch Quantity (EBQ):

$$EBQ = \sqrt{\frac{2 \times D \times S}{C}}$$

D = Annual Demand for the Product = Refer A below

S = Set-up cost per batch = Refer D below

C = Carrying cost per unit per annum = Refer E below

	Particulars	Large	Medium	Small
A	Annual Demand (bottle)	3,00,000	7,50,000	20,00,000
Set-up Cost:				
B	Power cost for set-up time (₹) [Consumption per batch in WN-5 × Rs.7]	31.50	31.50	31.50
C	Other variable cost (₹) *	30,000	30,000	30,000
D	Total Set-up cost [B + C]	30,031.50	30,031.50	30,031.50
E	Holding cost:	1.00	1.00	1.00
F	**EBQ (Bottle)**	**1,34,234**	**2,12,243**	**3,46,592**

* Other variable cost is assumed to be part of set-up cost.

CHAPTER 08: MATERIAL COST

PROBLEM – 1:

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

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

b. Documents substantiating payment of GST are enclosed for claiming Input credit.

SOLUTION:

Computation Of Cost Per Unit

	(₹)
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 GST paid; hence it will not be added to purchase cost.

PROBLEM – 1A:

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

	₹
Chemical A: 10,000 kgs. at ₹ 10 per kg.	1,00,000

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

A shortage of 500 kgs. in chemical A and 320 kgs. in chemical B is noticed due to normal breakages. You are required to 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 (₹)	Chemical B (₹)
Purchase price 10,000@ ₹ 10 per kg, 8,000 @ ₹ 13 per kg	1,00,000	1,04,000
Add: Basic Custom Duty @10%	10,000	10,400
Add: Railway freight (in the ratio of quantity purchased i.e., 5:4)	2,133	1,707
Total cost (A)	**1,12,133**	**1,16,107**
Effective Quantity (see working) (B)	9,310 kg	7,526.4 kg
Rate per kg (A ÷ B)	**12.04**	**15.43**

PROBLEM – 1B: **(MTP 1 MAY 24)**

S & Sons, an unregistered supplier under GST, purchases material from V Ltd. which is a GST registered supplier. The following information is available for one lot of 5,000 units of material purchased:

Listed price of one lot	₹ 5,00,000
Trade discount	@ 10% on listed price
CGST and SGST (Credit Not available)	18% (9% CGST + 9% SGST)

Cash discount	**@ 10%**
(Will be given only if payment is made within 30 days.)	
Toll Tax paid	**₹ 1,800**
Freight and Insurance	**₹ 36,000**
Demurrage paid to transporter	**₹ 5,000**
Commission and brokerage on purchases	**₹ 10,000**
Amount deposited for returnable containers	**₹ 30,000**
Amount of refund on returning the container	**₹ 26,000**

Other Expenses @ 2% of total cost 5% of material shortage is due to normal reasons.

The payment to the supplier was made within 21 days of the purchases.

You are required to calculate cost per unit of material purchased by S & Sons.

SOLUTION:

Calculation Of Cost Per Unit:

Particulars		**Units**	**(₹)**
Listed Price of Materials		5,000	5,00,000
Less: Trade discount @ 10% on Invoice Price			(50,000)
			4,50,000
Add: GST @18% of ₹ 4,50,000			81,000
			5,31,000
Add: Toll Tax			1,800
Freight and Insurance			36,000
Commission and Brokerage Paid			10,000
Add: Cost of Returnable Containers:			
Amount Deposited	₹ 30,000		
Less: Amount Refunded	₹ 26,000		4,000
			5,82,800
Add: Other Expenses @ 2% of Total Cost $\left(\frac{₹\,5,82,800}{98} \times 2\right)$			11,894
Total cost of material			**5,94,694**
Less: Shortage Material Due to Normal Reasons @ 5%		250	-
Total Cost Of Material Of Good Units		4,750	5,94,694
Cost Per Unit (₹ 5,94,694 ÷ 4,750 units)			**125.20**

Note:

1. GST Is Payable on Net Price that is Listed Price Less Discount.
2. GST Paid on Purchase Is Added with Cost as ITC On GST Cannot Be Claimed
3. Cash Discount Is Treated as Interest and Finance Item; Hence It Is Ignored.
4. Demurrage Is Penalty Imposed by The Transporter for Delay in Uploading Or Off-Loading Of Materials. It Is an Abnormal Cost and Not Included.
5. Shortage Due to Normal Reasons Should Not Be Deducted From Cost To Ascertain Total Cost Of Good Units.

PROBLEM – 2:

From the following information calculate ordering cost and holding cost:

Estimated Annual material consumption	**1,20,000 units**	**Ordering cost per order**	**₹ 100**
Order quantity or order size	**10,000 units**	**Holding cost per unit per annum**	**₹ 6**

Also, state whether the above ordering quantity is the optimum ordering quantity. Also, calculate the relevant total cost at EOQ.

SOLUTION:

Part I: Calculation of Ordering Cost and Holding Cost

Step 1: Ordering Cost

Ordering Cost = No of Orders x Ordering Cost Per Order

$$\text{No of orders} = \frac{\text{Annual Consumption}}{\text{Ordering Quantity}} = \frac{A}{OQ}$$

$$= \frac{A}{OQ} \times O$$

$$= \frac{120000 \text{ Units}}{10000 \text{ Units}} \times ₹100 = ₹1200$$

Step 2: Holding cost:

Holding cost = Average Inventory Held x Holding Cost Per Unit Per Annum

$$\text{Average Inventory} = \frac{1}{2} \times OQ \times C$$

$$= \frac{1}{2} \times 10000 \text{ Units} \times ₹6$$

$$= ₹30000$$

Total Relevant Inventory Cost = ₹ 30000 + ₹ 1200 = ₹ 31200

Part – II: Calculation of Economic Order Quantity (EOQ)

Economic Order Quantity (EOQ) = $\sqrt{\frac{2AO}{C}}$

The Order Quantity At Which The Total Cost Is Minimum Is Called Economic Order Quantity (EOQ)

Where A = Annual Material Requirement

O = Ordering Cost Per Order

C = Carrying Cost Per Unit Per Annum

$$EOQ = \sqrt{\frac{2 \times 120000 \text{ Units} \times ₹ 100}{₹ 6}} = 2000 \text{ Units}$$

PROBLEM – 3:

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

Annual Demand	**5,000 units**
Unit price	**₹ 20.00**
Order cost	**₹ 16.00**
Storage rate	**2% per annum**
Interest rate	**12% per annum**
Obsolescence rate	**6% per annum**

DETERMINE the total cost that would result for the items if a new price of ₹ 12.80 is used.

SOLUTION:

(i) Carrying Cost (C) Storage Rate = 2%

Interest Rate = 12%

Obsolescence Rate = 6%

Total = 20% Per Annum

C = 20% Of ₹ 20 = ₹ 4 Per Unit Per Annum

Economic Order Quantity (EOQ) = $\sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 5000 \text{ Units} \times ₹ 16}{₹ 4}} = \sqrt{40,000} = 200 \text{ Units}$

Total Cost:

Purchase Price Of 5,000 Units @ ₹ 20.00 Per Unit = ₹ 1,00,000

Ordering Cost = $\frac{5000 \text{ Units}}{200 \text{ Units}}$ = 25 Orders @ ₹ 16 = ₹ 400

Carrying Cost of Average Inventory

$= \frac{200 \text{ Units}}{2} = 100 \text{ Units @ ₹ } 4$ = ₹ 400

Total Cost **₹ 1,00,800**

(ii) If The New Price Of ₹ 12.80 Is Used:

C = 20% Of 12.80 = ₹ 2.56 Per Unit Per Annum

$$\text{Economic Order Quantity (EOQ)} = \sqrt{\frac{2 \text{ X } 5000 \text{ Units x ₹ } 16}{₹ \ 2.56}} = 250 \text{ Units}$$

Total Cost:

Purchase Price Of 5,000 Units @ ₹ 12.80 Per Unit = ₹ 64,000

Ordering Cost = 5000 Units ÷ 250 Units = 20 Orders @ ₹ 16 = ₹ 320

Carrying Cost (Of Average Inventory) $= \frac{250}{2}$ = 125 Units @ ₹ 2.56 = ₹ 320

Total Variable Cost = **₹ 64,640**

PROBLEM – 4:

The Gardener is deciding on the economic order quantity for two brands of lawn fertilizer: Super Grow and Nature's own. The following information is collected:

PARTICULARS	FERTILIZERS	
	SUPER GROW	NATURE'S OWN
Annual Demand	2,000 bags	1,280 bags
Relevant ordering cost per purchase order	₹ 1,200	₹ 1,400
Annual relevant carrying cost per bag	₹ 480	₹ 560

Required:

a. **Compute EOQ for super Grow and Nature's own.**

b. **For the EOQ, what is the sum of the total annual relevant ordering costs and total annual relevant carrying costs for Super Grow and Nature's Own?**

c. **For the EOQ, compute the number of deliveries per year for Super Grow and Nature's Own.**

SOLUTION:

$$\text{Economic Order Quantity (EOQ)} = \sqrt{\frac{2AO}{C}}$$

Where,

A = Annual Demand

O = Ordering Cost Per Order

C = Inventory Carrying Cost Per Unit Per Annum

(i) Calculation of EOQ

Super Grow	Nature's Own
$EOQ = \sqrt{\frac{2 \times 2,000 \times ₹1,200}{₹480}}$	$EOQ = \sqrt{\frac{2 \times 1,280 \times ₹1,400}{₹560}}$
$= \sqrt{10,000}$ or 100 bags	$= \sqrt{6,400}$ or 80 bags

(ii) Total Annual Relevant Cost = Total Annual Relevant Ordering Costs + Total Annual Relevant Carrying Cost

	Super Grow	Nature's Own
Number of Orders = Annual Requirement ÷ EOQ	2,000 ÷ 100 = 20 orders	1,280 ÷ 80 = 16 orders
Ordering Cost	20 × ₹ 1200 = ₹ 24000	16 × ₹ 1400 = ₹ 22,400
Carrying Cost	$\frac{1}{2} \times 100 \times ₹480 = ₹24,000$	$\frac{1}{2} \times 80 \times ₹560 = ₹22,400$
Total of Ordering and Carrying Cost	= ₹ 24,000 + ₹ 24,000 = ₹ 48,000	₹ 22,400 + ₹ 22,400 = ₹ 44,800

(iii) Number of deliveries for Super Grow and Nature's own fertilizer per year

$$= \frac{\text{Annual demand for fertilizer bags}}{EOQ}$$

Super Grow	Nature's Own
$= \frac{2,000 \text{ Bags}}{100 \text{ Bags}} = 20$ orders	$= \frac{1,280 \text{ Bags}}{80 \text{ Bags}} = 16$ orders

PROBLEM – 5:

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

You are required to CALCULATE:

i. Economic order quantity.

ii. If the minimum lot size to be supplied is 4,000 units, what is the extra cost, the company has to incur?

iii. What is the minimum carrying cost, the company has to incur?

SOLUTION:

(i) Economic Order Quantity (EOQ):

A (Annual Requirement or Component 'X') = 4,000 units per month × 12 months

= 48,000 units

C (Purchase Cost Per Unit) = ₹ 20

O (Ordering Cost Per Order) = ₹ 120

C (Holding cost) = 10% Per Unit Per Annum

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 48{,}000 \text{ units} \times ₹\ 120}{10\% \text{ of } ₹\ 20}} = \mathbf{2{,}400 \text{ units}}$$

(ii) Extra Cost Incurred by the Company:

A. Total Cost When Order Size Is Equal 4,000 Units:

Total Cost = Total Ordering Cost + Total Carrying Cost

$$= \frac{A}{Q} \times O + \frac{1}{2} Q (C\ )$$

$$= \left(\frac{48{,}000 \text{ units}}{4{,}000 \text{ units}} \times ₹\ 120\right) + \left(\frac{1}{2} \times 4{,}000 \text{ units} \times 10\% \times ₹\ 20\right)$$

= ₹ 1,440 + ₹ 4,000 = **₹ 5,440**

B. Total Cost When Order Size Is Equal Economic Order Quantity that is 2,400 Units:

$$= \left(\frac{48{,}000 \text{ units}}{2{,}400 \text{ units}} \times ₹\ 120\right) + \left(\frac{1}{2} \times 2{,}400 \text{ units} \times 10\% \times ₹\ 20\right)$$

= ₹ 2,400 + ₹ 2,400 = **₹ 4,800**

Extra cost that the company has to incur = (A) – (B)

= ₹ 5,440 – ₹ 4,800

= ₹ **640**

(iii) Minimum Carrying Cost: Carrying Cost Depends Upon the Size of The Order. It Will Be Minimum on The Least Order Size. (In This Part of The Question The Two Order Sizes Are 2,400 Units And 4,000 Units. Here 2,400 Units Is The Least Of The Two Order Sizes. At This Order Size Carrying Cost Will Be Minimum.)

The Minimum Carrying Cost In This Case Can Be Computed As Under:

Minimum Carrying Cost = $\frac{1}{2}$ × 2,400 Units × 10% × ₹ 20 = **₹ 2,400**

PROBLEM – 5A:

Anil & Company buys its annual requirement of 36,000 units in 6 instalments. Each unit costs ₹ 1 and the ordering cost is ₹25. The inventory carrying cost is estimated at 20% of unit value. FIND the total annual cost of the existing inventory policy. CALCULATE, how much money can be saved by Economic Order Quantity?

SOLUTION:

a) Total Annual Cost in Existing Inventory Policy

	(₹)
Ordering cost (6 orders @ ₹ 25)	150
Carrying cost of average inventory (36,000 ÷ 6) = 6,000 units per order	
Average inventory = 3,000 units	
Carrying cost = 20% of ₹ 1 x 3,000 = 3,000 x 0.20	600
Total cost (A)	**750**

b) Total Annual Cost in E.O.Q

$$EOQ = \sqrt{\frac{2 \times 36{,}000 \text{ units} \times 25}{₹\ 1 \times 20\%}} = \textbf{3,000 units}$$

	(₹)
No. of orders = 36,000 ÷ 3,000 units = 12 orders	
Ordering cost (12 x ₹ 25)	300
Carrying cost of average inventory (3,000 x 0.20) ÷ 2	300
Total Cost (B)	**600**
Savings due to E.O.Q (750 – 600) (A – B)	**150**

Note: As the units purchase cost of ₹ 1 does not change in both the computation, the same has not been considered to arrive at total cost of inventory for the purpose of savings.

PROBLEM – 6:

From the details given below, CALCULATE:

a. Re-ordering level

b. Maximum level

c. Minimum level

d. Danger level.

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

Cost of placing a purchase order is ₹ 20.

Number of units to be purchased during the year is 5,000

Purchase price per unit inclusive of transportation cost is ₹ 50

Annual cost of storage per units is ₹ 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) = 5000 units

O (Ordering cost per order) = ₹ 20

C (Annual cost of storage per unit) = ₹ 5

Purchase price per unit inclusive of transportation cost = ₹ 50

Computations:

(i) Re-Ordering Level (ROL)	=	Maximum Usage Per Period × Maximum Lead Time
	=	20 Units Per Day × 15 Days
	=	**300 Units**
(ii) Maximum Level		ROL + ROQ – [Minimum Rate of Consumption × Minimum Lead Time] (Refer to Working Notes 1 And 2)
	=	300 units + 200 units – [10 Units Per Day × 5 Days]
	=	**450 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**

Working Notes:

1. Minimum Rate of Consumption Per Day

$$\text{Average Rate Of Consumption} = \frac{\text{Minimum Rate Of Consumption} + \text{Maximum Rate Of Consumption}}{2}$$

$$15 \text{ Units Per Day} = \frac{(X \text{ Units} \div \text{Day}) + 20 \text{ Units Per Day}}{2} \quad \text{Or } X = 10 \text{ Units Per Day.}$$

2. Re-Order Quantity (ROQ) = $\sqrt{\frac{2AOQ}{C}}$

$$\sqrt{\frac{2 \times 5000 \text{ Units} \times ₹ 20}{5}} = 200 \text{ Units}$$

PROBLEM – 6A: (MTP 1 JAN 25)

Following information is extracted from the purchase department of A Ltd.:

(i) Number of units to be purchased during the year is 10,000

(ii) Cost of placing a purchase order is ₹ 40

(iii) Purchase price per unit is ₹ 80

(iv) Insurance charges to be paid for protecting goods during transit is ₹ 20 per unit

(v) Cash discount to be received is 2%

(vi) Annual cost of storage per unit is ₹ 5

(vii) Details of lead time:

Average-	**20 days**
Maximum-	**30 days**
Minimum-	**10 days**
For emergency purchases	**8 days.**

(viii) Rate of consumption:

Average-	**30 units per day**
Maximum-	**40 units per day.**

From the information given above, you are required to CALCULATE:

(i) Re-ordering level

(ii) Maximum level

(iii) Minimum level

(iv) Danger level.

SOLUTION:

Basic Data:

A (Number of units to be purchased annually) = 10,000 units

O (Ordering cost per order) = ₹ 40

C (Annual cost of storage per unit) = ₹ 5

Purchase price per unit = ₹ 80 + ₹ 20 (Insurance charges)

= ₹ 100

(Note: Cash Discount Is Treated as an Interest and Finance Item And Thus, It Is Ignored.)

Computations:

(i) Re-ordering level = Maximum Usage Per Period× Maximum Lead Time

(ROL) = 40 Units Per Day × 30 Days

= **1,200 Units**

(ii) Maximum Level = ROL + ROQ – [Minimum Rate Of Consumption × Minimum Lead Time]

(Refer To Working Notes 1 And 2)

= 1200 Units + 400 Units – [20 Units Per Day × 10 Days]

= **1,400 Units**

(iii)Minimum Level = ROL – [Average Rate Of Consumption × Average Re – Order - Period]

= 1,200 Units – (30 Units Per Day × 20 Days)

= **600 Units**

(iv)Danger Level = Average Consumption × Lead Time For Emergency Purchases

= 30 Units Per Day × 8 Days

= **240 Units**

Working Notes:

1. Minimum Rate Of Consumption Per Day (X)

$$\text{Average Rate Of Consumption} = \frac{\text{Minimum Rate Of Consumption} + \text{Maximum Rate Of Consumption}}{2}$$

$$30 \text{ Units Per Day} = \frac{(X \text{ Units} \div \text{Day}) + 40 \text{ Units Per Day}}{2}$$

Or, X = 20 Units Per Day

2. Re-Order Quantity (ROQ) Or Economic Order Quantity (EOQ)

$$= \sqrt{\frac{2 \times 10{,}000 \text{ Units} \times ₹ 40}{₹ 5}}$$

= 400 Units

PROBLEM – 7:

Mohit Enterprises manufactures a special product "ZED". The following particulars were collected for the year

a. Monthly demand of ZED – 1,000 units.

b. Cost of placing an order 100.

c. Annual carrying cost per unit ₹ 15.

d. Normal usage 50 units per week.

e. Minimum usage 25 units per week.

f. Maximum usage 75 units per week.

g. Re-order period 4 to 6 weeks.

Compute from the above:

1	**Re-order Quantity**
2	**Re-order Level**
3	**Minimum Level**
4	**Maximum Levels**
5	**Average Stock Level**

SOLUTION:

Step 1: Re-order Quantity ROQ (or) Economic Order Quantity EOQ

$$EOQ = \sqrt{\frac{2AO}{C}}$$ $O = 100$ $C = ₹15$ Per Unit Per Annum

A = Normal Usage Per Week x 52 Weeks

A = 50 Units x 52 weeks

= 2600 Units

$$= \sqrt{2 \times \frac{2600 \times ₹100}{₹15}} = 186 \text{ Units}$$

Step 2: Re order level

ROL = Maximum consumption x Maximum Lead time

= 75 Units x 6 weeks

= 450 Units

Step 3: Minimum Level

= Re Order Level – (Average consumption x Average Lead Time)

= 450 Units – [50 Units x 5]

= 450 Units – 250 Units = 200 Units

Step 4: Maximum Level:

Re Order Level – [Minimum consumption x Minimum Lead Time] + Re-order Quantity ROQ

= 450 – [25 Units x 4 Days] + 186

= 450 – [100] + 186

= 350 + 186

= 536 Units

Step 5: Average Stock Level

Formula 1	Formula 2
$\frac{\text{Minimum Level (+) Maximum Level}}{2}$ $= \frac{200 + 536}{2}$ = 368 Units	Minimum level + $\frac{1}{2}$ x ROQ = 200 + $\frac{1}{2}$ x 186 = 200 + 93 = 293 Units

PROBLEM – 8:

A Company manufactures a special product which requires a component 'Alpha'. The following particulars are collected for the year 2022-23:

i. Annual demand of Alpha 8,000 units

ii. Cost of placing an order ₹ 200 per order

iii. Cost per unit of Alpha ₹ 400

iv. Carrying cost p.a. 20%

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

Required:

i. COMPUTE the economic order quantity

ii. STATE whether the quantity discount offer can be accepted.

SOLUTION:

(i) Calculation of Economic Order Quantity

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 8{,}000 \text{ units} \times ₹\ 200}{(₹\ 400 \times 20 \div 100)}} = \textbf{200 units}$$

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

a. When Economic Order Quantity (EOQ) is ordered

		(₹)
Purchase Cost	(8,000 units × ₹ 400)	32,00,000
Ordering Cost	[(8,000 units ÷ 200 units) × ₹ 200]	8,000
Carrying Cost	(200 units × ₹ 400 × ½ × 20 ÷ 100)	8,000
Total Cost		**32,16,000**

b. When Quantity Discount is accepted

		(₹)
Purchase Cost	(8,000 units × ₹ 384 *)	30,72,000
Ordering Cost	[(8,000 units ÷ 4000 units) × ₹ 200]	400

Carrying Cost	(4000 units x ₹ 384 × ½ × 20 ÷ 100)	1,53,600
Total Cost		**32,26,000**

*Unit Cost ₹ 400

Less Quantity Discount @ 4% = ₹ 16

Purchase Cost = ₹ 400 - ₹ 16 = ₹ 384

Advise – The Total Cost of Inventory Is Lower If EOQ Is Adopted. Hence, The Company Is Advised Not to Accept the Quantity Discount.

PROBLEM – 8A: **(PYP MAY 24)**

Tesco cycles Ltd. used about 3,60,000 cycle locks per annum and the usage is fairly constant at 30,000 per month. The cycle lock costs ₹ 240 each at wholesale rate and carrying cost is estimated to be 10% of the annual average inventory value. The cost to place an order is ₹ 1200. It takes 45 days to receive delivery from the date of order. In order to avoid any kind of disruption in assembly line, safety stock of 6,500 cycle locks is always maintained by Tesco Cycles Ltd.

(Assume 360 days in a year). Compute:

(i) E.O.Q.

(ii) The re-order level.

(iii)The company has been offered a quantity discount of 2% on the purchase of cycle locks provided the order size is 30,000 units at a time. Advise whether quantity discount offer can be accepted?

SOLUTION:

(i) Calculation of Economic Order Quantity

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 3,60,000 \text{ units} \times ₹ 1200}{₹ 24}} = 6,000 \text{ units}$$

Where,

A = Annual Demand = 3,60,000 units

O = Ordering cost per order = ₹ 1200

C = Inventory carrying cost per unit per annum = 10% of ₹ 240 = ₹ 24

(ii) Re-order Level = Safety Stock + Lead Time Consumption

= 6,500 + (1,000 x 45) units = **51,500 units**

Or,

Minimum level of cycle locks + [Average rate of consumption × Average time required to obtain fresh delivery]

= 6,500 + (1,000 x 45) units = **51,500 units**

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

(a) When EOQ is ordered (order size of 6,000 units)

		(₹)
Purchase Cost	(3,60,000 units x ₹ 240)	8,64,00,000
Ordering Cost	[(3,60,000 units ÷ 6,000 units) x ₹ 1,200]	72,000
Carrying Cost	(6,000 units x ₹ 240 x $\frac{1}{2}$ x 10 ÷ 100)	72,000
Total Cost		**8,65,44,000**

(b) When Quantity Discount is accepted (order size of 30,000 units)

		(₹)
Purchase Cost	[3,60,000 units x ₹ 235.2 (₹ 240 - ₹ 4.8)]	8,46,72,000
Ordering Cost	[(3,60,000 units ÷ 30,000 units) x ₹ 1,200]	14,400
Carrying Cost	(30,000 units x ₹ 235.2 x $\frac{1}{2}$ x 10 ÷ 100)	3,52,800
Total Cost		**8,50,39,200**

Advise – The Total Cost of Inventory Is Lower If Discount Is Accepted. Hence, The Company Is Advised to Accept the Quantity Discount.

PROBLEM – 8B: **(RTP JAN 25)**

Ani Ltd. uses 6 kg. of Material 'EXE' to produce 1 finished unit of Product 'EME'. The current demand of Product 'EME' is 16,000 units quarterly. 1 kg. of Material 'EXE' costs ₹ 40. The cost relating to quotations, documentation works, employee cost directly attributable to the procurement of material, every-time the order is made, is ₹ 2,000. The cost of fund invested in inventories, cost of storage, insurance cost, etc. is estimated to be 15% per annum of average inventory.

You are required the following:

(i) CALCULATE the Economic Order Quantity for Material 'EXE'.

(ii) COMMENT, should Ani Ltd. accept an offer of 2.5% discount by the supplier of Material 'EXE', if supply of the annual requirement of the Material is made in 4 equal installments?

SOLUTION:

Annual Demand of Material 'EXE'

= 16,000 Units (Per Quarter) x 4 (No. Of Quarter in A Year) x 6 Kg (For Every Finished Product)

= 3,84,000 kg.

(i) Calculation of Economic Order Quantity (EOQ) for material 'EXE'

$$EOQ = \sqrt{\frac{2 \times \text{Annual Demand} \times \text{Ordering Cost}}{\text{Carrying Cost Per Unit Per Annum}}}$$

$$= \sqrt{\frac{2 \times 3,84,000 \text{ kg} \times ₹ 2,000}{₹ 40 \times 15\%}}$$

= 16,000 kg

(ii) Evaluation Of Cost Under Different Options Of 'Order Quantity'.

Particulars	**When EOQ is ordered**	**When discount of 2.5% is accepted and supply is in 4 equal installments**
Order size	16,000 kg	96,000 kg (3,84,000 kg ÷ 4 Kg)
No. of orders	24 (3,84,000 kg ÷ 16,000 kg)	4
Purchase Cost per kg.	₹ 40	₹ 39 {₹ 40 - (₹ 40 × 2.5%)}
Total Purchase Cost (A)	₹ 1,53,60,000 (3,84,000 kg x ₹ 40)	₹ 1,49,76,000 (3,84,000 kg x ₹ 39)
Ordering Cost (B)	₹ 48,000 (24 orders x ₹ 2,000)	₹ 8,000 (4 orders x ₹ 2,000)
Carrying Cost (C)	₹ 48,000 = (16,000 kg ÷ 2) x 15% x ₹ 40	₹ 2,80,800 = (96,000 kg ÷ 2) x 15% x ₹ 39
Total Cost (A + B + C)	**₹ 1,54,56,000**	**₹ 1,52,64,800**

COMMENT – The Total Cost Is Lower If Ani Ltd. Accept an Offer Of 2.5% Discount By The Supplier, When Supply Of The Annual Requirement Of Material 'EXE' Is Made In 4 Equal Installments.

PROBLEM – 9:

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

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

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

COMPUTE the following quantities:

i. **Minimum stock of A,**

ii. **Maximum stock of B,**

iii. **Re-order level of C,**

iv. **Average stock level of A.**

SOLUTION:

(i) Minimum Stock of A

Re-Order Level – (Average Rate of Consumption x Average Time Required To Obtain Fresh Delivery)

= 8,000 – (200 × 10 × 2) = **4,000 Kgs.**

(ii) Maximum Stock Of B

Re-Order Level + Re-Order Quantity – (Minimum Consumption × Minimum Delivery Period)

= 4,750 + 5,000 – (175 × 4 × 3)

= 9,750 – 2,100 = **7,650 Kgs.**

(iii) Re-Order Level Of C

Maximum Delivery Period × Maximum Usage

= 4 × 225 × 6 = 5,400 Kgs.

OR

Re-Order Level Of C

= Minimum Level of C + [Average Rate of Consumption × Average Time Required to Obtain Fresh Delivery]

= 2,000 + [(200 × 6) × 3] Kgs = **5,600 Kgs.**

(iv) Average Stock Level Of A

= Minimum Stock Level of A + ½ Re-Order Quantity Of A

$= 4{,}000 + \frac{1}{2} \times 10{,}000 = 4{,}000 + 5{,}000 = 9{,}000$ Kgs

OR

Average Stock Level Of A

$= \frac{\text{Minimum Stock Level of A + Maximum Stock Level of A}}{2}$

(Refer To Working Note)

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

Working Note:

Maximum Stock of A = ROL+ ROQ – (Minimum Consumption x Minimum Re-Order Period)

= 8,000 + 10,000 – [(175 x 10) x 1] = 16,250 Kgs

PROBLEM – 10:

M/s Tyro tubes trades in four-wheeler tyres and tubes. It stocks a sufficient quantity of tyres for almost every vehicle. In year-end 20x1-x2, the report of sales manager revealed that M/s Tyro tubes experienced stock-out of tyres.

The stock-out data is as follows:

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

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

DETERMINE optimum safest stock level.

SOLUTION:

Computation Of Stock-Out and Inventory Carrying Cost

Safety Stock Level (units) (1)	Stock- out (units) (2)	Probability (3)	Stock- out cost (₹) (4) = (2) × ₹ 150	Expected stock-out cost (₹) (5) = (3) × (4)	Inventory carrying cost (₹) (6) = (1) × ₹ 50	Total cost (₹) (7) = (5) + (6)
100	0	0.33	0	0	5,000	5,000
80	20	0.02	3,000	60	4,000	4,060
50	50	0.02	7,500	150		
	30	0.05	4,500	225		
			12,000	**375**	**2,500**	**2,875**
20	80	0.02	12,000	240		
	60	0.05	9,000	450		
	30	0.10	4,500	450		
			25,500	**1,140**	**1,000**	**2,140**
10	90	0.02	13,500	270		
	70	0.05	10,500	525		
	40	0.10	6,000	600		
	10	0.20	1,500	300		
			31,500	**1,695**	**500**	**2,195**
0	100	0.02	15,000	300		2,700
	80	0.05	12,000	600		
	50	0.10	7,500	750		
	20	0.20	3,000	600		
	10	0.30	1,500	450		
			39,000	**2,700**	**0**	**2,700**

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

Working Note:

Computation of Probability of Stock-Out

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

PROBLEM – 11:

From the following particulars with respect to a particular item of materials of a manufacturing company, calculate the best quantity to order:

Ordering quantities (Tone's)	Price per Tone
Less than 250	₹ 6.00
250 but less than 800	₹ 5.90
800 but less than 2,000	₹ 5.80
2,000 but less than 4,000	₹ 5.70
4,000 and above	₹ 5.60

The annual demand for the material is 4,000 tonnes.

Stock holding costs are 20% of material cost p.a. The delivery cost per order is ₹ 6.00.

SOLUTION:

Order Qty (1)	No. of Orders (2) $\left[\frac{A}{OQ}\right]$	Average Inventory (3) $\left[\frac{1}{2} \times OQ\right]$	Carrying Cost Per Unit Per Annum (4) 20% of Purchase Price	Total Ordering Cost (5) 2 x ₹ 6	Total Carrying Cost (6) (3) x (4)	Total Per Cost (7) A x Purchase Price	Total Cost (8) 5 + 6 + 7
200	20	100	₹ 1.2	₹ 120	₹ 120	₹ 24000	₹ 24240
250	16	125	₹ 1.18	₹ 96	₹ 147.50	₹ 23600	₹ 23844
800	5	400	₹ 1.16	₹ 30	₹ 464	₹ 23200	₹ 23694
2000	2	1000	₹ 1.14	₹ 12	₹ 1140	₹ 22800	₹ 23952
4000	1	2000	₹ 1.12	₹ 6	₹ 2240	₹ 22400	₹ 24646

Since The Total Cost Is Lowest When the Orders Size 800Tones EOQ = 800Tones

PROBLEM – 11A:

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

Price per ton (₹)	Ton (Nos.)
1,200	Less than 500
1,180	500 and less than 1,000
1,160	1,000 and less than 2,000
1,140	2,000 and less than 3,000
1,120	3,000 and above.

The annual requirement for the material is 5,000 tons. The ordering cost per order is ₹ 1,200 and the stock holding cost is estimated at 20% of material cost per annum. You are required to

i. COMPUTE the most economical purchase level.

ii. WHAT will be your answer to the above question if there are no discounts offered and the price per ton is ₹ 1,500?

SOLUTION:

a)

Total Annual Requirement (A)	Order Size (Tonne) (Q)	No Of Orders A ÷ Q	Cost Of Inventory A x Per Tonne Cost (₹)	Ordering Cost (A ÷ Q) x ₹ 1200 (₹)	Carrying Cost Per Tonne Per Annum 1/2 x Q x 20% Of Cost Per Tonne (₹)	Total Cost (4 + 5 + 6) (₹)
1	2	3	4	5	6	7
5,000	400	12.5 (13) *	60,00,000	15,600	48,000	60,63,600
Ton			(5,000 x ₹ 1200)		(200 x ₹ 240)	
	500	10	59,00,000	12,000	59,000	59,71000
			(5,000 x ₹ 1180)		(250 x ₹ 236)	
	1,000	5	58,00,000	6,000	1,16,000	59,22,000
			(5,000 x ₹ 1160)		(500 x ₹ 232)	
	2,000	2.5 (3)*	57,00,000	3,600	2,28,000	59,31,600
			(5,000 x ₹ 1140)		(1,000 x ₹ 228)	
	3,000	1.666 (2)*	56,00,000	2,400	3,36,000	
			(5,000 x ₹ 1120)		(1,500 x ₹ 224)	59,38,400

* Since number of orders cannot be in decimals, thus 12.5 orders are taken as 13 orders, 2.5 are taken as 3 order and 1.66 orders are taken as 2 orders.

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

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

$$EOQ = \sqrt{\frac{2AO}{C}}$$

Where A = annual inventory requirement

O = ordering cost per order and

C = carrying cost per unit per annum.

$$= \sqrt{\frac{2 \times 5{,}000 \text{ units} \times ₹\ 1200}{20\% \times ₹\ 1500}} = 200 \text{ units}$$

PROBLEM – 12:

The following is a summary of the receipts and issues of materials in a factory during a month:

Date	Particulars
1	Opening balance 500 units at ₹ 25 per unit
3	Issue 70 units
4	Issue 100 units
8	Issue 80 units
13	Received 200 units @ ₹ 24.50 per unit
14	Returned to store 15 units @ ₹ 24 per unit
15	Stock Taking
16	Issue 180 units
20	Received 240 units @ ₹ 24.75 per unit.
24	Issue 304 units
25	Received 320 units @ ₹ 24.50 per unit.
26	Issue 112 units
27	Stock Taking
27	Returned to store 12 units @ ₹ 24.50 per unit
28	Received 100 units at ₹ 25 per unit

Work out on the basis of 'FIFO' and 'LIFO' the value of closing stock. It was revealed that on 15th there was a shortage of 5 units and on 27th of 8 units.

SOLUTION:

FIFO Method

Date	Particulars	Budgets			Issue			Balance		
		Qty	Rate	₹	Qty	Rate	₹	Qty	Rate	₹
1	Opening Balance	-	-	-	-	-	-	500	25	12500
3	MRN No	-	-	-	70	25	1750	430	25	10750
4	MRN No	-	-	-	100	25	2500	330	25	8250
8	MRN No	-	-	-	80	25	2000	250	25	6250
13	GRN No	200	24.5	4900				250	25	6250
								200	24.5	4900
14	MR No	15	24	360				250	25	6250
								200	24.5	4900
								15	24	360
15	Stock Taking				5	25	125	245	25	6125
								200	24.5	4900
								15	24	360
16	MRN No.				180	25	4500	65	25	1625
								200	24.5	4900
								15	24	360
20	GRN No	240	24.75	5940				65	25	1625
								200	24.5	4900
								15	24	360
								240	24.75	5940
24	MRN No				65	25	1625			
					200	24.5	4900			
					15	24	360			
					24	24.75	594	216	24.75	5346
25	GRN	320	24.5	7840				216	24.75	5346
								320	24.5	7840
26	MRN				112	24.75	2772	104	24.75	2574
								320	24.5	7840
27	GRN	12	24.5	294						

27	Stock Taking				8	24.75	198	96	24.75	2376
								320	24.75	2574
								12	24.5	294
28	GRN	100	25	2500				96	24.75	2376
								320	24.75	2574
								12	24.5	294
								100	25	2500
								528		**13010**

LIFO Method

Date	Particulars	Budgets			Issue			Balance		
		Qty	Rate	₹	Qty	Rate	₹	Qty	Rate	₹
1	Opening Balance	-	-	-	-	-	-	500	25	12500
3	MRN No	-	-	-	70	25	1750	430	25	10750
4	MRN No	-	-	-	100	25	2500	330	25	8250
8	MRN No	-	-	-	80	25	2000	250	25	6250
13	GRN No	200	24.5	4900	-	-	-	250	25	6250
								200	24.5	4900
14	MR No	15	24	360				250	25	6250
								200	24.5	4900
								15	24	360
15	Vide Shortage				5	24	120	250	25	6250
								200	24.5	4900
								10	24	240
16	Vide MRN				10	24	240	250	25	6250
					170	24.5	4165	30	24.5	735
20	GRN No	240	24.75	5940				250	25	6250
								30	24.5	735
								240	24.75	5940
24	MRN No				240	24.75	5940			
					30	24.5	735			
					34	25	850	216	25	5400

25	GRN	320	24.5	7840				216	25	5400
								320	24.5	7840
26	MRN				112	24.5	2744	216	25	5400
								208	24.5	5096
27	GRN	12	24.5	294				216	25	5400
								208	24.5	5096
								12	24.5	294
27	Stock Taking				8	24.75	196	216	25	5400
								208	24.5	5096
								4	24.5	98
28	GRN	100	25	2500	-	-	-	216	25	5400
								208	24.5	5096
								4	24.5	98
								100	25	2500
								528		**13094**

PROBLEM – 12A:

The following information is provided by Sunrise Industries for the fortnight of April, 2023:

Material Exe:

Stock on 1-4-2023 100 units at ₹ 5 per unit.

Purchases

5-4-2023, 300 units at ₹ 6

8-4-2023, 500 units at ₹ 7

12-4-2023, 600 units at ₹ 8

Issues

6-4-2023, 250 units

10-4-2023, 400 units

14-4-2023, 500 units

Required:

A. CALCULATE using FIFO and LIFO methods of pricing issues:

a. the value of materials consumed during the period

b. the value of stock of materials on 15-4-2023.

B. EXPLAIN why the figures in a. and b. in part A of this question are different under

the two methods of pricing of material issues used. You need not draw up the Stores Ledgers.

SOLUTION:

(a) Value of Material Exe consumed during the period 1-4-2023 to 15-4-2023 by using FIFO method.

Date	Description Units	Qty (Units)	Rate (₹)	Amount (₹)
1-4-2023	Opening balance	100	5	500
5-4-2023	Purchased	300	6	1,800
6-4-2023	Issued	100 150	5 6	1,400
8-4-2023	Purchased	500	7	3,500
10-4-2023	Issued	150 250	6 7	2,650
12-4-2023	Purchased	600	8	4,800
14-4-2023	Issued	250 250	7 8	3,750
15-4-2023	Balance	350	8	2,800

Total value of material Exe consumed during the period under FIFO method comes to (₹ 1,400 + ₹ 2,650 + ₹ 3,750) ₹ 7,800 and balance on 15-4-2023 is of ₹ 2,800.

Value of material Exe consumed during the period 01-4-2023 to 15-4-2023 by using LIFO method

Date	Description	Qty (Units)	Rate (₹)	Amount (₹)
1-4-2023	Opening balance	100	5	500
5-4-2023	Purchased	300	6	1,800
6-4-2023	Issued	250	6	1,500
8-4-2023	Purchased	500	7	3,500
10-4-2023	Issued	400	7	2,800
12-4-2023	Purchased	600	8	4,800
14-4-2023	Issued	500	8	4,000
15-4-2023	Balance	350	—	2,300*

Total value of material Exe issued under LIFO method comes to (₹ 1,500 + ₹ 2,800 + ₹ 4,000) ₹ 8,300.

*The balance 350 units on 15-4-2023 of ₹ 2,300, relates to opening balance on 1-4-2023 and purchases made on 5-4-2023, 8-4-2023 and 12-4-2023. (100 units @ ₹ 5, 50 units @ ₹ 6, 100 units @ ₹ 7 and 100 units @ ₹ 8).

(b) As shown in (a) above, the value of stock of materials on 15-4-2023: Under FIFO method ₹ 2,800

Under LIFO method ₹ 2,300

Total value of material Exe issued to production under FIFO and LIFO methods comes to ₹ 7,800 and ₹ 8,300 respectively. The value of closing stock of material Exe on 15-4-2023 under FIFO and LIFO methods comes to ₹ 2,800 and ₹ 2,300 respectively.

The reasons for the difference of ₹ 500 (₹ 8,300 – ₹ 7,800) as shown by the following table in the value of material Exe, issued to production under FIFO and LIFO is as follows:

Date	Quantity Issued	Value FIFO	Total	Value LIFO	Total
	(Units)	(₹)	(₹)	(₹)	(₹)
6-4-2023	250	1,400		1,500	
10-4-2023	400	2,650		2,800	
14-4-2023	500	3,750	7,800	4,000	8,300

1. On 6-4-2023, 250 units were issued to production. Under FIFO their value comes to ₹ 1,400 (100 units × ₹ 5 + 150 units × ₹ 6) and under LIFO ₹ 1,500 (250 × ₹ 6). Hence, ₹ 100 more was charged to production under LIFO.
2. On 10-4-2023, 400 units were issued to production. Under FIFO their value comes to ₹ 2,650 (150 × ₹ 6 + 250 × ₹ 7) and under LIFO ₹ 2,800 (400 × ₹ 7). Hence, ₹ 150 more was charged to production under LIFO.
3. On 14-4-2023, 500 units were issued to production. Under FIFO their value comes to ₹ 3,750 (250 × ₹ 7 + 250 × ₹ 8) and under LIFO ₹ 4,000 (500 × ₹ 8). Hence, ₹ 250 more was charged to production under LIFO.

   Thus, the total excess amount charged to production under LIFO comes to ₹ 500.

The reasons for the difference of ₹ 500 (₹ 2,800 – ₹ 2,300) in the value of 350 units of Closing Stock of material Exe under FIFO and LIFO are as follows:

1. In the case of FIFO, all the 350 units of the closing stock belongs to the purchase of material made on 12-4-2023, whereas under LIFO these units were from opening balance and purchases made on 5-4-2023, 8-4-2023 and 12-4-2023.
2. Due to different purchase price paid by the concern on different days of purchase, the value of closing stock differed under FIFO and LIFO. Under FIFO 350 units of closing

stock were valued @ ₹ 8 Per Unit Whereas under LIFO first 100 units were valued @ ₹ 5 Per Unit next 50 units @ ₹ 6 Per Unit next 100 units @ ₹ 7 Per Unit and last 100 units @ ₹ 8 Per Unit

Thus, under FIFO, the value of closing stock increased by ₹ 500.

PROBLEM – 13:

Prepare a statement showing the pricing of issues, on the basis of

a. Simple Average Method and

b. Weighted Average Method

from the following information pertaining to material 'X'.

Date	Particulars
1	Purchased 100 units @ ₹ 10.00 each.
2	Purchased 200 units @ ₹ 10.20 each
5	Issued 250 units to Job A vide MR No. 1
7	Purchased 300 units @ ₹ 10.50 each
10	Purchased 200 units @ ₹ 10.80 each
13	Issued 200 units to Job B vide MR No. 2
18	Issued 200 units to Job C vide MR No. 3
20	Purchased 100 units @ ₹ 11.00 each.
25	Issued 150 units to Job D vide MR No. 4

SOLUTION:

Simple Average Method:

Date	Particulars	Receipts			Issue			Balance	
		Qty	Rate	₹	Qty	Rate	₹	Qty	₹
1	GRN No	100	10	1000	-	-	-	100	1000
2	GRN No	200	10.2	2040	-	-	-	300	3040
5	MRN No	-	-	-	250	10.1	2525	50	515
7	GRN No	300	10.5	3150	-	-	-	350	3665
10	GRN No	200	10.8	2160	-	-	-	550	5825
13	MRN				200	10.5	2100	350	3725
18	MRN				200	10.65	2130	150	1595
20	GRN	100	11	1100				250	2695
25	MRN				150	10.9	1635	100	1060

Weighted Average Method:

Date	Particulars	Receipts			Issue			Balance		
		Qty	Rate	₹	Qty	Rate	₹	Qty	Rate	₹
1	GRN	100	10	1000	-	-	-	100	10	1000
2	GRN	200	10.2	2040	-	-	-	300	10.13	3040
5	MRN-1				250	10.13	2533	50	10.14	507
7	GRN	300	10.5	3150	-	-	-	350	10.45	3657
10	GRN	200	10.8	2160	-	--		550	10.58	5817
13	MRN				200	10.58	2116	350	10.58	3701
18					200	10.58	2116	150	10.58	1585
20	GRN	100	11	1100	-	-	-	250	10.75	2685
25					150	10.75	1613	100	10.72	1072

PROBLEM – 13A:

The following information is extracted from the Stores Ledger:

Material X

Opening Stock Nil

Purchases:

Jan. 1 100 @ ₹ 1 per unit

Jan. 20 100 @ ₹ 2 per unit

Issues:

Jan. 22 60 for Job W 16

Jan. 23 60 for Job W 17

Complete the receipts and issues valuation by adopting the First-In-First-Out, Last-In-First-Out and the Weighted Average Method. TABULATE the values allocated to Job W 16, Job W 17 and the closing stock under the methods aforesaid and discuss from different points of view which method you would prefer.

SOLUTION:

From the point of view of cost of material charged to each job, it is minimum under FIFO and maximum under LIFO (Refer to Tables). During the period of rising prices, the use of FIFO give rise to high profits and that of LIFO low profits. In the case of weighted average, there is no significant adverse or favourable effect on the cost of material as well as on profits.

From the point of view of valuation of closing stock, it is apparent from the above statement, that it is maximum under FIFO, moderate under weighted average and minimum under LIFO.

It is clear from the tables that the use of weighted average evens out the fluctuations in the prices. Under this method, the cost of materials issued to the jobs and the cost of material in hands reflects greater uniformity than under FIFO and LIFO. Thus, from different points of view, weighted average method is preferred over LIFO and FIFO.

Statement of receipts and issues by adopting First-in-First-Out Method

Date	Particulars	Receipts			Issues			Balance		
		Units No.	Rate (₹)	Value (₹)	Units No.	Rate (₹)	Value (₹)	Units No.	Rate (₹)	Value (₹)
Jan. 1	Purchase	100	1	100	—	—	—	100	1	100
Jan. 20	Purchase	100	2	200	—	—	—	100	1	100
								100	2	200
Jan. 22	Issue to Job W 16	—	—	—	60	1	60	40	1	40
								100	2	200
Jan. 23	Issue to Job W 17	—	—	—	40	1	40	80	2	160
					20	2	40			

Statement of receipts and issues by adopting Last-In-First-Out method

Date	Particulars	Receipts			Issues			Balance		
		Units No.	Rate (₹)	Value (₹)	Units No.	Rate (₹)	Value (₹)	Units No.	Rate (₹)	Value (₹)
Jan. 1	Purchase	100	1	100	—	—	—	100	1	100
Jan. 20	Purchase	100	2	200	—	—	—	100	1	100
								100	2	200
Jan. 22	Issue to Job W 16	—	—	—	60	2	120	100	1	100
								40	2	80
Jan. 23	Issue to Job W 17	—	—	—	40	2	80	80	1	80
					20	1	20			

Statement of Receipt and Issues by adopting Weighted Average method

Date	Particulars	Receipts			Issues			Balance		
		Units No.	Rate (₹)	Value (₹)	Units No.	Rate (₹)	Value (₹)	Units No.	Rate (₹)	Value (₹)
Jan. 1	Purchase	100	1	100	—	—	—	100	1	100
Jan. 20	Purchase	100	2	200	—	—	—	200	1.50	300
Jan. 22	Issue to Job W 16	—	—	—	60	1.50	90	140	1.50	210

Jan. 23	Issue to Job W 17	—	—	—	60	1.50	90	80	1.50	120

Statement of Material Values allocated to Job W 16, Job 17 and Closing Stock, under aforesaid methods

	FIFO (₹)	LIFO (₹)	Weighted Average (₹)
Material for Job W 16	60	120	90
Material for Job W 17	80	100	90
Closing Stock	160	80	120
	300	**300**	**300**

PROBLEM – 14:

Imbrios India Ltd. is recently incorporated start-up company back in the year 2019. It is engaged in creating Embedded products and Internet of Things (IoT) solutions for the Industrial market. It is focused on innovation, design, research and development of products and services. One of its embedded products is LogMax, a system on module (SoM) Carrier board for industrial use. It is a small, flexible and embedded computer designed as per industry specifications.

In the beginning of the month of September 2022, company entered into a job agreement of providing 4800 LogMax to NIT, Mandi. Following details w.r.t. issues, receipts, returns of Store Department handling Micro-controller, a component used in the designated assembling process have been extracted for the month of September, 2022:

Sep. 1	Opening stock of 6,000 units @ ₹ 285 per unit
Sep. 8	Issued 4875 units to mechanical division vide material requisition no. Mech 009/22
Sep. 9	Received 17,500 units @ ₹ 276 per unit vide purchase order no. 159/22
Sep. 10	Issued 12,000 units to technical division vide material requisition no. Tech 012/22
Sep. 12	Returned to stores 2375 units by technical division against material requisition no. Tech 012/22.
Sep. 15	Received 9,000 units @ ₹ 288 per units vide purchase order no. 160/ 2222
Sep. 17	Returned to supplier 700 units out of quantity received vide purchase order no. 160/22.
Sep. 20	Issued 9,500 units to technical division vide material requisition no. Tech

	165/22

On 25th September, 2022, the stock manager of the company expressed his need to leave for his hometown due to certain contingency and immediately left the job same day. Later, he also switched his phone off.

As the company has the tendency of stock-taking every end of the month to check and report for the loss due to rusting of the components, the new stock manager, on 30th September, 2022, found that 900 units of Micro-controllers were missing which was apparently misappropriated by the former stock manager. He, further, reported loss of 300 units due to rusting of the components.

From the above information you are required to prepare the Stock Ledger account using 'Weighted Average' method of valuing the issues.

SOLUTION:

Store Ledger of Imbrios India Ltd. (Weighted Average Method)

Date	Receipts			Issues			Balance of Stock		
Sep.	Qty (kg.)	Rate (₹)	Amount (₹)	Qty (kg.)	Rate (₹)	Amount (₹)	Qty (kg.)	Rate (₹)	Amount (₹)
1	-	-	-	-	-	-	6,000	285.00	17,10,000
8	-	-	-	4,875	285.00	13,89,375	1,125	285.00	3,20,625
9	17,500	276.00	48,30,000	-	-	-	18,625	276.54	51,50,625
10	-	-	-	12,000	276.54	33,18,480	6,625	276.54	18,32,145
12	2,375	276.54	6,56,783	-	-	-	9,000	276.54	24,88,928
15	9,000	288.00	25,92,000	-	-	-	18,000	282.27	50,80,928
17	-	-	-	700	288.00	2,01,600	17,300	282.04	48,79,328
20	-	-	-	9,500	282.04	26,79,380	7,800	282.04	2199948
30	-	-	-	900*	282.04	2,53,836	6,900	282.04	19,46,112
30	-	-	-	300**	-	-	6,600	294.87	19,46,112

* 900 units is abnormal loss, hence it will be transferred to Costing Profit & Loss A/c.

** 300 units is normal loss; hence it will be absorbed by good units.

PROBLEM – 15:

The following transactions in respect of material Y occurred during the six months ended 30th September, 2022:

Month	Purchase (units)	Price per unit (₹)	Issued Units
April	200	25	Nil
May	300	24	250
June	425	26	300

July	475	23	550
August	500	25	800
September	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:

(a) Total number of units purchased = 2,500

Total number of units issued = 2,300

The closing stock at the end of six months' period i.e., on 30th September, 2022 will be 200 units.

Upto the end of August 2022, total purchases coincide with the total issues i.e., 1,900 units. It means that at the end of August 2022, there was no closing stock. In the month of September 2022, 600 units were purchased out of which 400 units were issued. Since there was only one purchase and one issue in the month of September, 2022 and there was no opening stock on 1st September 2022, the Closing Stock of 200 units is to be valued at ₹ 20 per unit.

In the 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.

It may, however, be noted that the argument of Chief Accountant would not stand if one finds the value of the Closing Stock at the end of each month.

(b) LIFO method has an edge over FIFO or any other method of pricing material issues due to the following advantages:

(i) The cost of the materials issued will be either nearer or will reflect the current market price. Thus, the cost of goods produced will be related to the trend of the market price of materials. Such a trend in price of materials enables the matching of cost of production with current sales revenues.

(ii) The use of the method during the period of rising prices does not reflect undue high

profit in the income statement, as it was under the first-in-first-out or average method. In fact, the profit shown here is relatively lower because the cost of production takes into account the rising trend of material prices.

(iii) In the case of falling prices, profit tends to rise due to lower material cost, yet the finished products appear to be more competitive and are at market price.

(iv) During the period of inflation, LIFO will tend to show the correct profit and thus, avoid paying undue taxes to some extent.

PROBLEM – 16:

After inviting tenders, two quotations are received as follows:

Supplier A - ₹ 4.40 per unit

Supplier B - ₹ 4.20 per unit + ₹ 4,000

You are required to

i. Calculate the order quantity for which the purchase price per unit will be the same.

ii. Select the Supplier if the Purchase Department wishes to place an order for 15,000 units.

SOLUTION:

Step 1: Calculation Of Indifference Point:

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

$$= \frac{₹\,4000 - 0}{₹\,4.4 - ₹\,4.2}$$

= 20,000 Units

When The Order Quantity Is 20000 Units Both The Suppliers Are Equally Good Since They Have The Same Cost.

Particulars	**A (₹)**	**B (₹)**
Variable Cost	88000	84000
Add: Fixed Cost	0	4000
Total Cost	**88000**	**88000**

Step 2: Supplier To Be Selected If Order Quantity 15000 Units

Order Quantity	**Supplier**	**Reason**
Less than 20000	A	No Fixed cost
Equal to 20000	A or B	Indifference point
More than 20000	B	Low Variable Cost Per Unit

PROBLEM – 17:

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

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

SOLUTION:

Statement of Total Cost and Ranking

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

Basis for selective control (Assumed)

₹ 50,000 & above	--	'A' items
₹ 15,000 to 50000	--	'B' items
Below ₹ 15,000	--	'C' items

On This Basis, A Plan of A B C Selective Control Is Given Below:

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

PROBLEM – 17A:

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:

Classification of the items of inventory as per ABC analysis

1. 15 number of varieties of inventory items should be classified as 'A' category items because of the following reasons:
   (i) Constitute 0.375% of total number of varieties of inventory handled by stores of factory, which is minimum as per given classification in the table.
   (ii) 50% of total use value of inventory holding (average), which is maximum, according to the given table.
   (iii) Highest in consumption, about 85% of inventory usage (in end-product).
2. 110 number of varieties of inventory items should be classified as 'B' category items because of the following reasons:
   (i) Constitute 2.750% of the total number of varieties of inventory items handled by stores of factory.
   (ii) Requires moderate investment of about 30% of total use value of inventory holding (average).
   (iii) Moderate in consumption, about 10% of inventory usage (in end- product).
3. 3,875 number of varieties of inventory items should be classified as 'C' category items because of the following reasons:
   (i) Constitute 96.875% of total varieties of inventory items handled by stores of factory.
   (ii) Requires about 20% of total use value of inventory holding (average).
   (iii) Minimum inventory consumption, i.e., about 5% of inventory usage (in end-product).

PROBLEM – 18:

From the following data for the year ended 31st March, 20x2, CALCULATE the inventory turnover ratio of the two items and put forward your comments on them.

Particulars	Material A	Material B
Opening stock 01.04.20x1	₹ 10,000	₹ 9,000
Purchase during the year	₹ 52,000	₹ 27,000
Closing stock 31.03.20x2	₹ 6,000	₹ 11,000

SOLUTION:

First Of All, It Is Necessary to Find Out the Material Consumed:

Cost of materials consumed	Material A (₹)	Material B (₹)
Opening stock	10,000	9,000
Add: Purchases	52,000	27,000
	62,000	36,000
Less: Closing stock	6,000	11,000
Materials consumed	**56,000**	**25,000**
Average inventory: (Opening Stock + Closing Stock) ÷ 2	8,000	10,000
Inventory Turnover ratio: (Consumption ÷ Average inventory)	**7 times**	**2.5 times**
Inventory Turnover (Number of Days in a year ÷ Inventory Turnover ratio)	**52 days**	**146 days**

Comments: Material A is moving faster than Material B.

PROBLEM – 19:

The particulars relating to the import of Sealing Ring made by AB & Co., during December, 20x1 are given below:

a. Sealing Ring – 1,000 pieces invoiced @ $ 2.00 C.I.F., Bombay Port.

b. Customs duty was paid @ 100% on Invoice Value (which was converted to Indian currency by adopting an exchange rate of ₹ 17.20 per).

c. Clearing charges - ₹ 1,800 for the entire consignment, and

d. Freight charges - ₹ 1,400 for transporting the consignment from Bombay Port to factory premises.

It was found on inspection that 100 pieces of the above material were broken and, therefore, rejected. There is no scrap value for the rejected part. No refund for the broken material would be admissible as per the terms of the contract. The Management decided to treat 60 pieces as normal loss and the rest 40 pieces as abnormal loss. Assume 700 pieces were consumed and 200 pieces were kept in closing stock.

Calculate:

a. Total cost of material, and

b. Unit cost of material issued to production.

Also, state briefly how the value of 100 pieces rejected in inspection will be treated in costs.

SOLUTION:

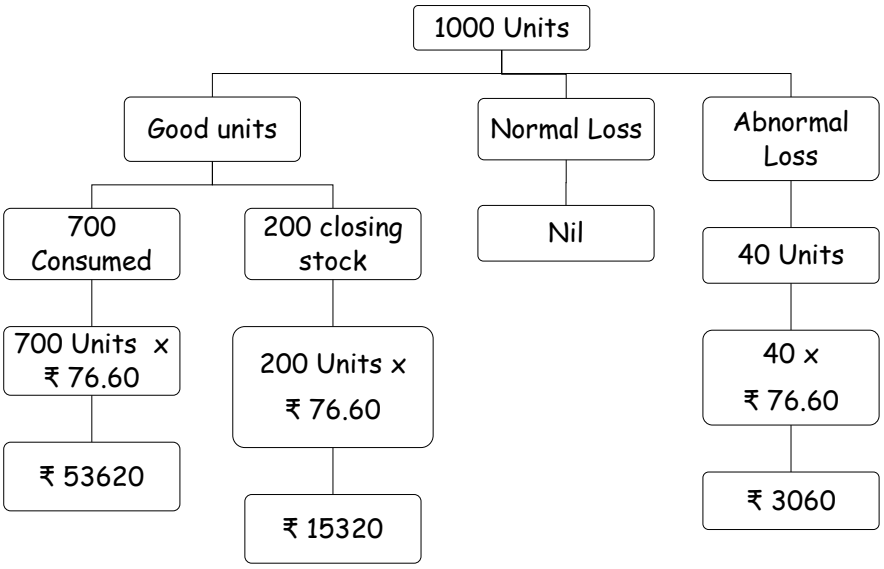
Step 1: Calculation of Total Material Cost

Purchase Price of Sealing Ring	=	1000 Units x 2 x 17.2
	=	₹ 34400
(+) 100% of invoice customers	=	₹ 34400
(+) Freight	=	₹ 1400
(+) Clearing	=	₹ 1800
Purchase price	=	**₹ 72000**

Step 2: Cost Per Price

$$\text{Cost Per Price} = \frac{\text{Purchase Price - Normal Loss Scrap Income}}{\text{Purchase Quantity - Normal Loss Units}}$$

$$= \frac{₹\,72000 - 0}{1000\ \text{Quantity} - 60\ \text{Quantity}} = ₹\,76.5957\ \text{Per Kg}$$



Dr. **Stores Ledger Control A/c** Cr.

Particulars	₹	Particulars	₹
To Bank	72000	By Work In Progress	53620
		By Abnormal Loss	3060
		By Balance c/d	15320
	72000		**72000**

Dr. **Abnormal Loss A/c** Cr.

Particulars	₹	Particulars	₹
To Stores Ledger Control A/c	3060	By Costing Profit and Loss A/c	3060
	3060		**3060**

PROBLEM – 20:

In a certain month, 6,000 kgs of raw material A costing ₹ 150 per kg were processed through Unit No. 3 for the manufacture of solvent X. The total operating cost of Unit No. 3 for the month was ₹12,00,000. Out of the output, 10% was unusable and was disposed of at ₹ 25 per kg. Prepare an account for the month's operation Unit No. 3 assuming that spoilage was:

i. Part of the normal production process;

ii. An abnormal loss due to poor quality material.

Additional information: Out of 5400 kgs, 5000 kgs were sold.

SOLUTION:

Part 1: Treating The Loss as Normal Loss:

Raw Material Consumed = (6000 kg x ₹ 150)

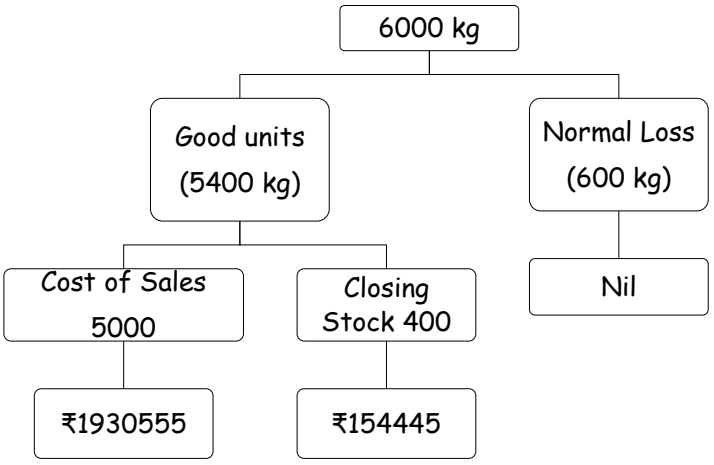
= ₹ 9,00,000

(+) Operating Cost (Given) = ₹ 12,00,000

Total Manufacturing Cost = ₹ 21,00,000

$$\text{Cost per kg} = \frac{\text{Total Cost - Normal Loss Scrap income}}{\text{Input Quantity - Normal Loss units}}$$

$$\frac{₹\ 21,00,000 - (600 \times ₹\ 25)15000}{6000\ \text{Units} - 600\ \text{Units}} = ₹\ 386.11\ \text{Per kg}$$



Dr. **Work In Progress A/c** Cr.

Particulars	₹	Particulars	₹
To Stores Ledger Control A/c	9,00,000	By Normal Loss scrap Income	15,000
To Conversion cost	12,00,000	By Finished Goods A/c (Balancing Figure)	2085000
	21,00,000		**21,00,000**

Dr. **Normal Loss Scrap Income A/c** Cr.

Particulars	₹	Particulars	₹
To Work In Progress	15000	By Bank	15000
	15000		**15000**

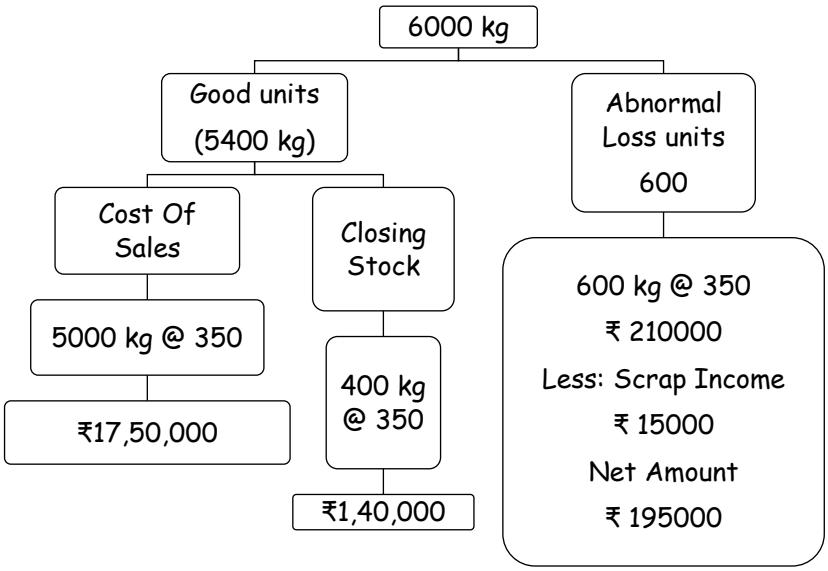
Dr. **Finished Goods A/c** Cr.

Particulars	₹	Particulars	₹
To Work In Progress	2085000	By Cost of Sales	1930555
		By Closing Finished Goods	154445
	2085000		**2085000**

Part II: Treating The Loss as Abnormal Loss:

$$\text{Cost Per Kg} = \frac{\text{Total Cost - Normal Loss Scrap income}}{\text{Input Quantity - Normal Loss Units}}$$

$$= \frac{₹\ 21,00,000 - 0}{6000\ kg - 0} = ₹\ 350\ \text{Per Kg}$$



Dr. **Work In Progress A/c** Cr.

Particulars	₹	Particulars	₹
To Stores Ledger Control A/c	9,00,000	By Abnormal Loss	2,10,000
To Conversion cost	12,00,000	By Finished Goods A/c (Balancing Figure)	18,90,000
	21,00,000		**21,00,000**

Dr. **Finished Goods A/c** Cr.

Particulars	₹	Particulars	₹
To Work In Progress	18,90,000	By Cost of Sales	17,50,000
		By Balance c/d	1,40,000
	18,90,000		**18,90,000**

Dr. **Abnormal Loss A/c** Cr.

Particulars	₹	Particulars	₹
To Work In Progress	2,10,000	By Bank A/c	15000
		By Costing P & L	1,95,000
	2,10,000		**2,10,000**

CHAPTER 09: EMPLOYEE COST AND DIRECT EXPENSES

PROBLEM – 1:

A worker is paid ₹ 10,000 per month and a dearness allowance of ₹ 2,000 p.m. Worker contribution to provident fund is @ 10% and the 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 a bonus each year.

The numbers 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:

Particulars	**(₹)**
Wages paid to worker during the year {(₹ 10,000 + ₹ 2,000) × 12 Months}	1,44,000
Add: Employer Contribution to:	
Provident Fund @ 10% on ₹ 144000	14,400
E.S.I. Premium @ 4.75% (6.5 – 1.75) on ₹ 144000	6,840
Bonus at 2 months' wages (Basic + DA) (₹ 12000 x 2 Months)	24,000
Total	**1,89,240**

Effective Hours Per Year: 285 Days × 8 Hours = 2,280 Hours

Wage-Rate Per Hour (For Costing Purpose): ₹ 1,89,240 ÷ 2,280 Hours = ₹ 83

PROBLEM – 1A:

'X' an employee of ABC Co. gets the following emoluments and benefits:

a.	**Basic pay**	**₹ 10,000 p.m.**
b.	**Dearness allowance**	**₹ 2,000 p.m.**
c.	**Bonus**	**20% of salary and D.A.**
d.	**Other allowances**	**₹ 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 (₹)	Per annum (₹)
(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)}**		**₹ 108.60**

Workings:

Calculation Of Effective Working Hours:

Annual Working Hours Less Normal Idle Time = 2,400 Hours – 400 Hours = 2,000 Hours

PROBLEM – 1B:

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

Basic pay ₹ 10,000 p.m.

D.A. ₹ 3,000 p.m.

Fringe benefits ₹ 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:

(i) 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**

(ii) Total Wages Paid in A Year

Particulars	Amount (₹)
Basic Pay	1,20,000
Dearness Allowance	36,000
Fringe Benefits	12,000
Total Wages	**1,68,000**

Hourly Rate: ₹ 1,68,000 ÷ 2,240 Hours	₹ 75.00

PROBLEM – 2:

During one week the workman X manufactured 200 articles. He receives a wage for a guaranteed 44-hour week at the rate of ₹ 15 per hour. The estimated time to produce one article is 15 minutes and under the incentive scheme, the time allowed is increased by 20%. Calculate his gross wages under each of the following methods of remuneration:

1. **Time rate.**
2. **Piecework with a guaranteed weekly wage.**
3. **Rowan premium bonus.**
4. **Halsey premium bonus, 50% to the workman.**

SOLUTION:

Part I: Simple Time Rate System

Wages = Time Taken x Time Rate

Time Taken = 44 Hours

Time Rate = ₹ 15 Per Hour

Wages = 44 Hours x ₹ 15 Per Hour = ₹ 660

Part –II: Straight Piece Rate System:

Wages = Unit Produce x Piece Rate

Calculation Of Piece Rate = 1 Hour = ₹ 15

$$= 1 \text{ Hour} = 4 \text{ Units } \left[\frac{60 \text{ Minutes}}{15 \text{ Minutes}}\right]$$

4 Units = ₹ 15

1 Unit (₹ 15 ÷ 4 Units) = ₹ 3.75

Wages = 200 Units x ₹ 3.75

= ₹ 750

Note: If This Piece Rate Wage Turns Out to be Less Than 660 Then He Will Get An Guarantee Wages Of ₹ 660.

Part – III & IV: Rowan & Hasley System

Time Taken = 44 Hours

$$\text{Time Allowed} = \left[\frac{15 \text{ Minutes}}{60 \text{ Minutes}}\right] \times 120\% \times 200 \text{ Units}$$

= 60 Hours

Time Saved = 60 Hours – 44 Hours = 16 Hours

Rowan ⇒ Basic Wage

↓

Time Taken x Time Rate

44 Hours x ₹ 15 = ₹ 660

$$\text{Bonus} = \left[\frac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Time Rate}\right] = \frac{44 \text{ Hours}}{60 \text{ Hours}} \times 16 \text{ Hours} \times ₹ 15 = ₹ 176$$

Total Wage Under Rowan **₹ 836**

Hasley = Basic = Time Taken x Time Rate

= 44 Hours x ₹ 15 = ₹ 660

Bonus = 50% Of Time saved x Time rate = (16 Hours x ₹ 15) x 50% = ₹ 120

Total Wage under Halsey = ₹ 780

PROBLEM – 2A: (MTP 1 MAY 24)

The following particulars have been compiled in respect of three workers, which are under consideration of the management.

	I	II	III
Actual hours worked	380	100	540
Hourly rate of wages (in ₹)	40	50	60
Productions in units:			
- Product X	210	-	600
- Product Y	360	-	1350
- Product Z	460	250	-
Standard time allowed per unit of each product is:	X	Y	Z
Minutes	15	20	30

For the purpose of piece rate, each minute is valued at ₹ 1/- You are required to calculate the wages of each worker under:

a) Guaranteed hourly rate basis

b) Piece work earning basis, but guaranteed at 75% of basic pay (Guaranteed hourly rate if his earnings are less than 50% of basic pay.)

c) Premium bonus basis where the worker received bonus based on Rowan scheme.

SOLUTION:

i. Computation Of Wages of Each Worker Under Guaranteed Hourly Rate Basis

Worker	Actual Hours Worked (Hours)	Hourly Wage Rate (₹)	Wages (₹)
I	380	40	15,200
II	100	50	5,000
III	540	60	32,400

ii. Computation Of Wages Of Each Worker Under Piece Work Earning Basis

Product	Piece rate per unit	Worker-I		Worker-II		Worker-III	
	(₹)	Units	Wages (₹)	Units	Wages (₹)	Units	Wages (₹)
X	15	210	3,150	-	-	600	9,000
Y	20	360	7,200	-	-	1,350	27,000
Z	30	460	13,800	250	7,500	-	-
Total			**24,150**		**7,500**		**36,000**

Since each worker's earnings are more than 50% of basic pay. Therefore, worker - I, II and III will be paid the wages as computed i.e. ₹ 24,150, ₹ 7,500 and ₹ 36,000 respectively.

Working Notes:

1. Piece Rate Per Unit

Product	Standard Time Per Unit In Minute	Piece Rate Each Minute (₹)	Piece Rate Per Unit (₹)
X	15	1	15
Y	20	1	20
Z	30	1	30

2. Time Allowed To Each Worker

Worker	Product-X	Product-Y	Product-Z	Total Time (Hours)
I	210 Units × ₹ 15 = ₹ 3,150	360 Units × ₹ 20 = ₹ 7,200	460 Units × ₹ 30 = ₹ 13,800	24,150 ÷ 60 = ₹ 402.50
II	-	-	250 Units × ₹ 30 = 7,500	7,500 ÷ 60 = ₹ 125

III	600 Units × ₹ 15 = ₹ 9,000	1, 350 Units × ₹ 20 = ₹ 27,000	-	36,000 ÷ 60 = ₹ 600

(ii) Computation Of Wages Of Each Worker Under Premium Bonus Basis (Where Each Worker Receives Bonus Based On Rowan Scheme)

Worker	Time Allowed (Hours)	Time Taken (Hours)	Time Saved (Hours)	Wage Rate Per Hour (₹)	Earnings (₹)	Bonus (₹)*	Total Earning (₹)
I	402.5	380	22.5	40	15,200	850	16,050
II	125	100	25	50	5,000	1,000	6,000
III	600	540	60	60	32,400	3,240	35,640

$$\frac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Wage Rate}$$

$$\text{Worker 1} = \frac{380 \text{ Hours}}{402.5 \text{ Hours}} \times 22.5 \text{ Hours} \times ₹ 40 = ₹ 850$$

$$\text{Worker 2} = \frac{100 \text{ Hours}}{125 \text{ Hours}} \times 25 \text{ Hours} \times ₹ 50 = ₹ 1{,}000$$

$$\text{Worker 3} = \frac{540 \text{ Hours}}{600 \text{ Hours}} \times 60 \text{ Hours} \times ₹ 60 = ₹ 3{,}240$$

PROBLEM – 3:

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 a 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 ₹ 5 per man-hour actually worked. The factory cost for the product for 'A' is ₹ 3,490 and for 'B' it is ₹ 3,600.

Required:

a. COMPUTE the normal rate of wages

b. COMPUTE the cost of materials cost,

c. PREPARE a statement comparing the factory cost of the products as made by the two workmen.

SOLUTION:

Step 1: Let X Be The Cost Of Material And Y Be The Normal Rate Of Wages Per Hour.

Step 2: Factory Cost Of Workman 'A'

Particulars	**(₹)**
A. Material Cost	X
B. Wages (Rowan Plan)	30 Y
C. Bonus = $\frac{30}{50}$ x (50 - 30) x Y	12 Y
D. Overheads (30 x ₹ 5)	150
E. Factory Cost	**3,490**
Or, X + 42 Y = ₹ 3,490 (Given) – ₹ 150 = ₹ 3,340 Equation (I)	

Step 3: Factory Cost Of Workman 'B'

Particulars	**(₹)**
A. Material Cost	X
B. Wages (Halsey Plan)	40 Y
C. Bonus = 50% Of (Standard Hours – Actual Hours) x R	5 Y
= 50% Of (50 - 40) x R	
D. Overheads (40 x ₹ 5)	200
E. Factory Cost	**3,600**
Or, X + 45 Y = ₹ 3,600 (Given) – ₹ 200 = ₹ 3,400 Equation (ii)	

Step 4: Subtracting Equation (i) From Equation (ii)

3Y = ₹ 60

Y = ₹ 60 ÷ 3 = ₹ 20 Per Hour.

(A) The Normal Rate Of Wages: ₹ 20 Per Hour

(B) The Cost Of Material: X + 45 x ₹ 20 = ₹ 3,400 Or, X = ₹ 3,400 – ₹ 900 = ₹ 2,500

(C) Comparative Statement Of The Factory Cost Of The Product Made By The Two Workmen.

	'A' (₹)	**'B' (₹)**
Material Cost	2,500	2,500
Direct Wages	600 (30 x ₹ 20)	800 (40 x ₹ 20)
Bonus	240 (12 x ₹ 20)	100 (5 x ₹ 20)

Factory Overhead	150	200
Factory Cost	**3,490**	**3,600**

PROBLEM – 4:

Wage negotiations are going on with the recognised employees' union, and the management wants you as an executive of the company to formulate an incentive scheme with a view to increasing productivity.

The case of three typical workers A, B and C who produce respectively 180, 120 and 100 units of the company's product in a normal day of 8 hours is taken up for study. Assuming that day wages would be guaranteed at ₹ 75 per hour and the piece rate would be based on a standard hourly output of 10 units, CALCULATE the earnings of each of the three workers and the employee cost per 100 pieces under

(i) Day wages, (ii) Piece rate, (iii) Halsey scheme, and (iv) The Rowan scheme

Also, CALCULATE under the above schemes the average cost of labour for the company to produce 100 pieces.

SOLUTION:

Calculation Of Earnings Under Different Wage Schemes:

i. Day Wages

Worker	Day Wages (₹)	Actual Output (Units)	Labour Cost Per 100 Pieces (₹)
A	600	180	333.33
B	600	120	500.00
C	600	100	600.00
Total	**1,800**	**400**	

Average Labour Cost to Produce 100 Pieces:

$$= \frac{\text{Total Wages Paid}}{\text{Total Output}} \times 100 = \frac{₹\,1,800}{400\ \text{Units}} \times 100 = ₹\,450$$

ii. Piece Rate

Worker	Actual Output (Units)	Piece Rate (₹)	Wages Earned (₹)	Labour Cost Per 100 Pieces (₹)
A	180	7.50	1,350	750.00
B	120	7.50	900	750.00
C	100	7.50	750	750.00
Total	**400**		**3,000**	

Average Cost Of Labour For The Company To Produce 100 Pieces:

$= \frac{₹\,3{,}000}{400\ \text{Units}} \times 100 = ₹\,750$

iii. Halsey Scheme

Worker	Actual Output (Units)	Standard Time (Hours)	Actual Time (Hours)	Time Saved (Hours)	Bonus Hours (50% Of Time Saved)	Rate Per Hour (₹)	Total Wages (₹)	Labour Cost Per 100 Pieces (₹)
	A	B	C	D (B-C)	E	F	G (F x (C+E))	H (G ÷ A x 100)
A	180	18	8	10	5	75	975	541.67
B	120	12	8	4	2	75	750	625.00
C	100	10	8	2	1	75	675	675.00
Total	**400**						**2,400**	

Average Cost Of Labour For The Company To Produce 100 Pieces

$= \frac{₹\,2{,}400}{400\ \text{Units}} \times 100 = ₹\,600$

iv. Rowan Scheme:

Worker	Actual Output (Units)	Std Time (Hours)	Actual Time (Hours)	Time Saved (Hours)	Bonus Hours*	Rate Per Hour (₹)	Total Wages Including Bonus (₹)	Labour Cost Per 100 Pieces (₹)
	A	B	C	D=B-C	E	F	G=F×(C+E)	H = G ÷ A x 100
A	180	18	8	10	4.44	75	933	518.33
B	120	12	8	4	2.67	75	800	666.67
C	100	10	8	2	1.60	75	720	720.00
Total	**400**						**2,453**	

* Bonus Hours $= \frac{\text{Time Saved}}{\text{Standard Time}} \times \text{Actual Time}$

Average Cost Of Labour For The Company To Produce 100 Pieces

$= \frac{₹\,2{,}453}{400\ \text{Units}} \times 100 = ₹\,613.25$

PROBLEM – 5:

a. **Bonus paid under the Halsey Plan with a bonus at 50% for the time saved equals the bonus paid under the Rowan System. When will this statement hold good? (Your answer should contain the proof).**

b. **The time allowed for a job is 8 hours. The hourly rate is ₹ 8.**

PREPARE a statement showing:

i. **The bonus earned**

ii. **The total earnings of employee and**

iii. **Hourly earnings.**

Under the Halsey System with 50% bonus for time saved and Rowan System for each hour saved progressively.

SOLUTION:

(a) Bonus under Halsey Plan = $\frac{50}{100} \times (SH - AH) \times R$ (i)

Bonus under Rowan Plan = $\frac{AH}{SH} \times (SH - AH) \times R$ (ii)

Bonus under Halsey Plan will be equal to the bonus under Rowan Plan when the following condition holds good:

$$\frac{50}{100} \times (SH - AH) \times R = \frac{AH}{SH} \times (SH - AH) \times R$$

$$\frac{50}{100} = \frac{AH}{SH}$$

Hence, when the actual time taken (AH) is 50% of the time allowed (SH), the bonus under Halsey and Rowan Plans is equal.

Statement of Bonus, total earnings of Employee and hourly earnings under Halsey and Rowan Systems.

SH	AH	Time saved	Basic wages (AH x ₹8) (B x ₹8)	Bonus under Halsey System $\left[\frac{50}{100} \times C \times 8\right]$	Bonus under Rowan system $\left[\frac{B}{A} \times C \times 8\right]$	Total Earnings under Halsey System D+E	Total Earnings under Rowan System D+F	Hourly Earnings under Halsey System G ÷ B	Hourly Earnings under Rowan System H ÷ B
A Hours	B Hours	C = (A-B) Hours	D (₹)	E (₹)	F (₹)	G (₹)	H (₹)	I (₹)	J (₹)
8	8	-	64	-	-	64	64	8.00	8.00
8	7	1	56	4	7	60	63	8.57	9.00
8	6	2	48	8	12	56	60	9.33	10.00
8	5	3	40	12	15	52	55	10.40	11.00

8	4	4	32	16	16	48	48	12.00	12.00
8	3	5	24	20	15	44	39	14.67	13.00
8	2	6	16	24	12	40	28	20.00	14.00
8	1	7	8	28	7	36	15	36.00	15.00

PROBLEM – 6:

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

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

SOLUTION:

Total earnings (under 50% Halsey Scheme) = Hours worked x Rate per hour + ½ x time saved x Rate per hour

$= 3 \text{ hours} \times ₹ 30 + \frac{1}{2} \times 1 \text{ hour} \times ₹ 30$

= ₹ 105

Effective Hourly Rate

$$\frac{\text{Total earnings}}{\text{Hours taken}} = \frac{₹ 105}{3 \text{ hours}} = ₹ 35$$

Working Note:

Let T hours be the total time worked in hours by the skilled workers (machine man P), ₹ 30 is the rate per hour; standard time is 4 hours per unit and effective hourly earnings rate is ₹ 37.50 then

Earning (under Rowan plan) = Hours worked x Rate per Hour + $\frac{\text{Time saved}}{\text{Time allowed}}$ x Time taken x Rate per Hour

₹ 37.5 T = $T \times ₹ 30 + \frac{(4 - T)}{4} \times T \times ₹ 30$

(Both Sides Are Divided By T)

₹ 37.5 = ₹ 30 + (4 – T) x ₹ 7.5

₹ 37.5 = ₹ 30 + ₹ 30 - 7.5T

or, ₹ 7.5 T = ₹ 60 - ₹ 37.5

or, ₹ 7.5 T = ₹ 22.5

or, T = 3 hours.

PROBLEM – 7:

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

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

Hourly rate of wages (guaranteed)	₹ 40
Average time for producing 1 piece by one worker at the previous performance (This may be taken as time allowed)	2 hours
No. of working days in the month	25 days
No. of working hours per day for each worker	8 working hours
Actual production during the month	1,250 units

Required:

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

SOLUTION:

Working Notes:

1. **Actual Time Taken To Produce 1,250 Pieces**

   = No. Of Working Days In The Month × No. Of Working Hours Per Day Of Each Worker × No. Of Workers

   = 25 Days × 8 Hours × 10 Workers = 2,000 Hours

2. **Total Time Wages Of 10 Workers Per Month:**

   = No. Of Working Days In The Month × No. Of Working Hours Per Day Of Each Worker × Hourly Rate Of Wages × No. Of Workers

   = 25 Days × 8 Hours × ₹40 × 10 Workers = ₹ 80,000

3. **Time Saved Per Month:**

Time Allowed Per Piece To A Worker	2 Hours
No. Of Units Produced During The Month By 10 Workers	1,250 Pieces
Total Time Allowed To Produce 1,250 Pieces (1,250 × 2 Hours)	2,500 Hours

Actual Time Taken To Produce 1,250 Pieces	2,000 Hours
Time Saved (2,500 Hours – 2,000 Hours)	500 Hours

4. Bonus Under Halsey Scheme To Be Paid To 10 Workers:

Bonus = (50% Of Time Saved) × Hourly Rate Of Wages

= (50 ÷ 100) × 500 Hours × ₹ 40 = ₹ 10,000

Total Wages To Be Paid To 10 Workers Are (₹ 80,000 + ₹ 10,000) ₹ 90,000, If Mr. A Considers The Introduction Of Halsey Incentive Scheme To Increase The Employee Productivity.

5. Bonus Under Rowan Scheme To Be Paid To 10 Workers:

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

$$= \frac{2000 \text{ Hours}}{2500 \text{ Hours}} \times 500 \text{ Hours} \times ₹\,40 = ₹\,16{,}000$$

Total Wages To Be Paid To 10 Workers Are (₹ 80,000 + ₹ 16,000) ₹ 96,000, If Mr. A Considers The Introduction Of Rowan Incentive Scheme To Increase The Employee Productivity.

(i) (A) Effective Hourly Rate Of Earnings Under Halsey Scheme:

(Refer To Working Notes 1, 2, 3 And 4)

$$= \frac{\text{Total Time Wages Of 10 Workers + Total Bonus Under Halsey Scheme}}{\text{Total Hours Worked}}$$

$$= \frac{₹\,80{,}000 + ₹\,10{,}000 \text{ Hours}}{2000 \text{ Hours}} = ₹\,45$$

(B) Effective Hourly Rate Of Earnings Under Rowan Scheme:

(Refer To Working Notes 1, 2, 3 And 5)

$$= \frac{\text{Total Time Wages Of 10 Workers + Total Bonus Under Rowan Scheme}}{\text{Total Hours Worked}}$$

$$= \frac{₹\,80{,}000 + ₹\,16{,}000 \text{ Hours}}{2000 \text{ Hours}} = ₹\,48$$

(ii) (A) Saving In Terms Of Direct Employee Cost Per Piece Under Halsey Scheme:

(Refer To Working Note 4)

Employee Cost Per Piece (Under Time Wage Scheme)

= 2 Hours × ₹ 40 = ₹ 80.

Employee Cost Per Piece (Under Halsey Scheme)

$$= \frac{\text{Total Wages Paid Under The Scheme}}{\text{Total Number Of Units Produced}} = \frac{₹\,90{,}000}{1{,}250} = ₹\,72$$

Saving Per Piece: (₹ 80 – ₹ 72) = ₹ 8

(B) Saving In Terms Of Direct Employee Cost Per Piece Under Rowan Scheme:

(Refer To Working Note 5)

Employee Cost Per Piece Under Rowan Scheme

= ₹ 96,000 ÷ 1,250 Units = ₹ 76.80

Saving Per Piece = ₹ 80 – ₹ 76.80 = ₹ 3.20

PROBLEM – 8:

A company uses an old method of machining. The estimates of operating details for a year are as under:

Number of parts to be manufactured and sold	30,000
Raw materials required per part	10 kg @ ₹ 2 per kg.
Average Wage Rate per worker	₹ 40 per day of 8 hours
Average Labour Efficiency	60%
Standard Time required to manufacture one part	2 Hours
Overhead Rate	₹ 10 per clock hour
Material Handling Expenses	2% of Value of Materials

The company has a suggestion box scheme and an award equivalent to three months savings in labour cost is passed on to the employee whose suggestion is accepted. In response to this scheme, a suggestion has been received from an employee to use a special Jig in the manufacture of the aforesaid part. The cost of the Jig which has a life of one year is ₹ 3,000 and the use of the Jig will reduce the standard time by 12 minutes.

You are required to:

- **Determine the amount of award payable to the employee.**
- **Prepare a comparative statement of costs before and after implementation of the suggested scheme.**

SOLUTION:

Step 1: Calculation Of Reward To The Worker:

Particulars	Before Jig	After Jig
A. Units Manufactures	30000	30000
B. Standard Time Per Unit	120 Min	108 Min
C. Actual Time Permit $\left(\frac{\text{Time Allowed}}{\text{Time Taken}}\right)$ = 60%	$\left(\frac{120}{60\%}\right)$ = 200 Minutes	$\left(\frac{108}{60\%}\right)$ = 180 Minutes

D. Actual Time Taken	(30000 Units x 200 Minutes) ÷ 60 Minutes = 1,00,000 Hours	(30000 Units x 180 Minutes) ÷ 60 Minutes = 90,000 Hours
E. Wage Rate $\left(\frac{₹\ 40}{8\ \text{Hours}}\right)$ = ₹ 5	₹ 5,00,000	₹ 450000

Savings in Labour Cost Per Annum

= ₹ 50000 (₹ 5,00,000 – ₹ 4,50,000)

Award = ₹ 50000 x 3 Months ÷ 12 Months = ₹ 12500

Step 2: Competitive Statement Of Cost

Particulars	Before Jig	After Jig
A. Materials (30000 x 10kg x ₹ 2)	₹ 6,00,000	₹ 6,00,000
B. Wages	₹ 5,00,000	₹ 4,50,000
C. Reward	-	12500
D. Overheads	₹ 10,00,000 (1,00,000 Hours x ₹ 10)	₹ 9,00,000 (90,000 Hours x ₹ 10)
E. Material Handling	₹ 12000 (6,00,000 x 2%)	₹ 12000 (6,00,000 x 2%)
F. Cost Of Jig	-	3000
Total	**₹ 21,12,000**	**₹ 19,77,500**

It Is Recommended To Implement The Jig Scheme

PROBLEM – 9: (RTP JAN 25)

AeBee Publishers works for various educational institutes for editing, binding, printing of various books and magazines on job work basis. Currently, the company has employed 30 workers and pays them on hour rate basis for each job assigned. To complete one of the process of binding, the average time allowed to an employee is 8 hours for a 10 pages magazine.

In the month of March, two employees 'Cee' and 'Dee' were given 21 and 30 units of magazines respectively for binding work. The following are the details of the work assigned:

Particulars	'Cee'	'Dee'
Work assigned	21 units	30 units
Time taken	78 hours	114 hours

The existing rate of wages is ₹ 60 per hour along with bonus as per Halsey System.

However, a new wage agreement has been signed between the employees and the company where, employees will be paid ₹ 65 per hour with effect from the April month. But, inadvertently, for the month of March, the accountant of the company paid the wages to these employees considering rate of wages as ₹ 65 per hour.

You are required to CALCULATE the following:

(i) Amount of loss that the company has incurred due to incorrect rate selection in the month of March.

(ii) Loss incurred by the company due to incorrect rate selection if it had followed Rowan scheme of bonus payment.

(iii) Amount that could have been saved if Rowan Scheme of bonus payment were followed.

SOLUTION:

Particulars	**'Cee'**	**'Dee'**
No. Of Binding Work Assigned (Units)	21	30
Hour Allowed Per Magazine (Hours)	8	8
Total Hours Allowed (Hours)	168	240
Hours Taken (Hours)	78	114
Hours Saved (Hours)	90	126

(i) Calculation Of Loss Incurred Due To Incorrect Rate Selection

(While Calculating Loss Only Excess Rate Per Hour Has Been Taken)

Particulars	**'Cee' (₹)**	**'Dee' (₹)**	**Total (₹)**
Basic Wages	390 (78 Hours × ₹ 5)	570 (114 Hours × ₹ 5)	960
Bonus (As Per Halsey Scheme) (50% Of Time Saved × Excess Rate)	225 (50% Of 90 Hours × ₹ 5)	315 (50% Of 126 Hours × ₹ 5)	540
Excess Wages Paid	**615**	**885**	**1,500**

(ii) Amount Of Loss If Rowan Scheme Of Bonus Payment Were Followed

Particulars	**'Cee' (₹)**	**'Dee' (₹)**	**Total (₹)**
Basic Wages	390.00 (78 Hours × ₹ 5)	570.00 (114 Hours × ₹ 5)	960.00

Bonus (As Per Rowan Scheme) $= \frac{\text{Time Taken}}{\text{Time Allowed}} \times$ Time Saved x Excess Rate	208.93 $= \frac{78}{168} \times 90 \times ₹ 5$	299.25 $= \frac{114}{240} \times 126 \times ₹ 5$	508.18
Excess Wages Paid	**598.93**	**869.25**	**1,468.18**

(iii)Calculation Of Amount That Could Have Been Saved If Rowan Scheme Were Followed

Particulars	'Cee' (₹)	'Dee' (₹)	Total (₹)
Wages Paid Under Halsey Scheme	615.00	885.00	1,500.00
Wages Paid Under Rowan Scheme	598.93	869.25	1,468.18
Difference (Savings)	**16.07**	**15.75**	**31.82**

PROBLEM – 10:

A factory having the latest sophisticated machines wants to introduce an incentive scheme for its workers, keeping in view the following:

i. The entire gains of improved production should not go to the workers.

ii. In the name of speed, quality should not suffer.

iii. The rate setting department being newly established are liable to commit mistakes.

You are required to PREPARE a suitable incentive scheme and DEMONSTRATE by an illustrative numerical example how your scheme answers to all the requirements of the management.

SOLUTION:

Rowan Scheme of premium bonus (variable sharing plan) is a suitable incentive scheme for the workers of the factory. If this scheme is adopted, the entire gains due to time saved by a worker will not pass to him.

Another feature of this scheme is that a worker cannot increase his earnings or bonus by merely increasing its work speed. The reason for this is that the bonus under Rowan Scheme is maximum when the time taken by a worker on a job is half of the time allowed. As this fact is known to the workers, therefore, they work at such a speed which helps them to maintain the quality of output too.

Lastly, Rowan System provides a safeguard in the case of any loose fixation of the standards by the rate-setting department. It may be observed from the following illustration that in the Rowan Scheme the bonus paid will be low due to any loose fixation of standards. Workers cannot take undue advantage of such a situation. The above three features of Rowan Plan can be discussed with the help of the following illustration:

(i) Time allowed = 4 hours

Time taken = 3 hours

Time saved = 1 hour

Rate = ₹ 5 per hour

$$\text{Bonus} = \frac{\text{Time Taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{Rate}$$

$$= \frac{3 \text{ hours}}{4 \text{ hours}} \times 1 \text{ hour} \times ₹ 5 = ₹ 3.75$$

In the above illustration time saved is 1 hour and, therefore, total gain is ₹ 5. Out of ₹ 5 according to Rowan Plan only ₹ 3.75 is given to the worker in the form of bonus and the remaining ₹ 1.25 remains with the management. In other words, a worker is entitled for 75 percent of the time saved in the form of bonus.

(ii) The figures of bonus in the above illustration when the time taken is 2 hours and 1 hour respectively are as below:

$$\text{Bonus} = \frac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time saved} \times \text{Rate}$$

$$= \frac{2 \text{ hours}}{4 \text{ hours}} \times 2 \text{ hour} \times ₹ 5 = ₹ 5$$

$$= \frac{1 \text{ hour}}{4 \text{ hours}} \times 3 \text{ hours} \times ₹ 5 = ₹ 3.75$$

The above figures of bonus clearly show that when time taken is half of the time allowed, the bonus is maximum. When the time taken is reduced from 2 to 1 hour, the bonus figure fell by ₹1.25. Hence, it is quite apparent to workers that it is of no use to increase speed of work. This feature of Rowan Plan thus protects the quality of output.

(iii) If the rate-setting department erroneously sets the time allowed as 10 hours instead of 4 hours, in the above illustration; then the bonus paid will be as follows:

$$\text{Bonus} = \frac{3 \text{ hours}}{10 \text{ hours}} \times 7 \text{ hour} \times ₹ 5 = ₹ 10.50$$

The bonus paid for saving 7 hours thus is ₹ 10.50 which is approximately equal to the wages of 2 hours. In other words, the bonus paid to the workers is low. Hence workers cannot take undue advantage of any mistake committed by the time setting department of the concern.

PROBLEM – 11:

A company's basic wages rate is ₹ 12 per hour and its overtime rates are –

Evenings: Time and one-third.

Weekends: Double time.

During the previous year the following hours were worked:

Normal time	22,000 clock hours
Time plus one-third	2,000 clock hours
Double time	1,000 clock hours

The following times have been worked on these jobs:

	Job A Clock Hours	Job B Clock Hours	Job C Clock Hours
Normal time	300	500	400
Evening time	30	60	105
Weekend overtime	10	5	30

You are required to calculate the labour cost chargeable to each job in each of the following circumstances:

a. **Where overtime is worked regularly throughout the year as company policy due to labour shortage.**
b. **Where overtime is worked irregularly to meet the spasmodic production requirements.**
c. **Where overtime is worked specifically at the customer's request to expedite delivery.**
d. **Where overtime is due to abnormal reasons.**

SOLUTION:

Part A: Overtime Is Regular:

Step 1: Total Wages For The Year Including Over Time Premium

Normal Wages = (22,000 Hours x ₹ 12) = ₹ 264000

Evening Wages = (2000 Hours x ₹ 16) = ₹ 32000
(₹ 12 + ₹ 4)

Weekend Wages = (1000 Hours x ₹ 24) = ₹ 24000
(₹ 12 + ₹ 12)

Total Annual Wages = **₹ 3,20,000**

Step 2: Wage Rate Per Hour = $\frac{\text{Total Annual Wages}}{\text{Total Hours}}$

= $\frac{₹\ 3,20,000}{25,000\ \text{Hours}}$ = ₹ 12.8 Per Hour

Step 3: Wages Chargeable To Jobs

A : 340 Hours x ₹ 12.8 = ₹ 4352

B : 565 Hours x ₹ 12.8 = ₹ 7232

C : 535 Hours x ₹ 12.8 =₹ 6848

Note: If We Total The Wages Changed To All The Jobs (A, B, C, D, E……) It Will Be ₹ 3,20,000

The Wages Has He Changed As Prime Cost

Part B: Overtime Is Worked Due To Seasonal Production Requirements:

Step 1: Wage Rate Per Hour:

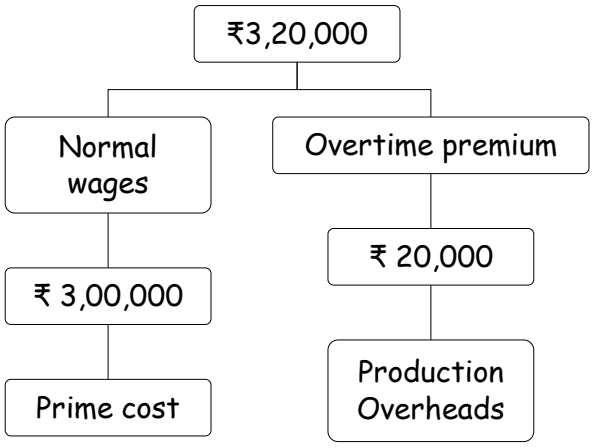
Normal = 22000 Hours x ₹ 12 = ₹ 264000

= 2000 Hours x ₹ 12 = ₹ 24000

= 1000 Hours x ₹ 12 = ₹ 12000

Total Normal Wages = ₹ 3,00,000

Wage Rate Per Hour = $\frac{₹\ 3,00,000}{25,000\ \text{Hours}}$ = ₹ 12 Per Hour



Step 2: Wages Charged To Jobs:

A : 340 Hours x ₹ 12 = ₹ 4080

B : 565 Hours x ₹ 12 = ₹ 6780

C : 535 Hours x ₹ 12 = ₹ 6420

Note: If We Total The Wages Charged To All The Jobs (A, B, C, D…….) It Will Be ₹ 3,00,000. The Balance ₹ 20,000 Is Debited To Production Overheads A/c.

Part C: Overtime Is Due To Specific Customer Request:

Job A = (340 Hours x ₹ 12) + (30 x 4) + (10 x 12)

= ₹ 4080 + ₹ 120 + ₹ 120 = ₹ 4320

Job B = (565 Hours x ₹ 12) + (60 x 4) + (5 x 12)

= ₹ 6780 + ₹ 240 + ₹ 60 = ₹ 7080

Job C = (535 Hours x ₹ 12) + (105 x 4) + (30 x 12)

= ₹ 6420 + ₹ 420 + ₹ 360 = ₹ 7200

Note: When Total The Wages Charged To All The Jobs (A, B, C, D,…..) It Will Total To ₹3,20,000. The Overtime Premium Is Treated As Prime Cost

Part D: Overtime Is Due To Abnormal Reasons:

All The Calculations Are Similar To Part B That Overtime Premium Of ₹ 20,000 Is Charged To The Costing Profit and Loss A/c Instead Of Production Overheads A/c.

PROBLEM – 11A:

In a factory, the basic wage rate is ₹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 hours	**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:

Workings

Basic Wage Rate: ₹ 100 Per Hour

Overtime Wage Rate Before And After Working Hours: ₹ 100 × 175% = ₹ 175 Per Hour

Overtime Wage Rate For Sundays And Holidays: ₹ 100 × 225% = ₹ 225 Per Hour

Computation Of Average Inflated Wage Rate (Including Overtime Premium):

Particulars	(₹)
Annual Wages For The Previous Year For Normal Time (1,00,000 Hours × ₹ 100)	1,00,00,000
Wages For Overtime Before And After Working Hours (20,000 Hours × ₹ 175)	35,00,000
Wages For Overtime On Sundays And Holidays (5,000 Hours × ₹ 225)	11,25,000
Total Wages For 1,25,000 Hours	**1,46,25,000**

Average Inflated Wage Rate = $\frac{₹\ 1,46,25,000}{1,25,000\ Hours}$ = ₹ 117

Where Overtime Is Worked Regularly As A Policy Due To Workers' Shortage:

The Overtime Premium Is Treated As A Part Of Employee Cost And Job Is Charged At An Inflated Wage Rate. Hence, Employee Cost Chargeable To Job Z

= Total Hours × Inflated Wage Rate = 1,125 Hours × ₹ 117 = ₹ 1,31,625

Where Overtime Is Worked Irregularly To Meet The Requirements Of Production:

Basic Wage Rate Is Charged To The Job And Overtime Premium Is Charged To Factory Overheads As Under:

Employee Cost Chargeable To Job Z: 1,125 Hours @ ₹100 Per Hour = ₹ 1,12,500

Factory Overhead: {100 Hours × ₹ (175 – 100)} + {25 Hours × ₹ (225 – 100)}

= {₹ 7,500 + ₹ 3,125} = ₹ 10,625

Where Overtime Is Worked At The Request Of The Customer, Overtime Premium Is Also Charged To The Job As Under:

			(₹)
Job Z Employee Cost	1,125 Hours @ ₹ 100	=	1,12,500
Overtime Premium	100 Hours @ ₹ (175 – 100)	=	7,500
	25 Hours @ ₹ (225 – 100)	=	3,125
Total			**1,23,125**

PROBLEM – 12:

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.

PARTICULARS	A	B
Basic Wages	₹ 10,000	₹ 16,000
Dearness Allowance	50%	50%
Contribution to provident Fund (on basic wages)	8%	8%
Contribution to Employee's State insurance (on basic wages)	2%	2%
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 Workers A and B

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

Statement of Employee Cost:

	A (₹)	B (₹)
Gross Wages (excluding overtime)	15,000	24,000
Add: Employer's contribution to PF	800	1,280
Add: Employer's contribution to ESI	200	320
Gross wages earned	**16,000**	**25,600**
Normal working hours	200	200

Ordinary wages rate per hour	80	128

Statement Showing Allocation of Wages to Jobs

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

Working Notes

1. Normal Wages are considered as basic wages

$$\text{Over time} = \frac{2 \times (\text{Basic wage} + \text{DA}) \times 10 \text{ hours}}{200}$$

$$2 \times \left(\frac{₹\,15{,}000}{200}\right) \times 10 \text{ hours} = ₹\,150 \times 10 \text{ hours} = ₹\,1{,}500$$

PROBLEM – 13:

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

	Worker 'A' paid at 200 per day of 8 hours	Worker 'B" paid at 100 per day of 8 hours	Worker 'C' paid at 300 per day of 8 hours
Monday (hours)	10.5	8.0	10.5
Tuesday (hours)	8.0	8.0	8.0
Wednesday (hours)	10.5	8.0	10.5
Thursday (hours)	9.5	8.0	9.5
Friday (hours)	10.5	8.0	10.5
Saturday (hours)	-	8.0	8.0
Total (hours)	49.0	48.0	57.0

In terms of an award in employee conciliation, the workers are to be paid dearness allowance on the basis of cost-of-living index figures relating to each month which works out @ ₹ 968 for the relevant month. The dearness allowances is payable to all workers

irrespective of wages rate if they are present or are on leave with wages on all working days.

Sunday is a weekly holiday and each worker has to work for 8 hours on all week days and 4 hours on Saturdays, the workers are however paid full wages for Saturday (8 hours for 4 hours worked).

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

CALCULATE the wages payable to each worker.

SOLUTION:

1. Calculation Of Hours To Be Paid For Worker A:

	Normal Hours	Extra Hours	Overtime Hours	Equivalent Normal Hours For Overtime Worked	Total Normal Hours
Monday	8	1	$1\frac{1}{2}$	3	12
Tuesday	8	--	--	--	8
Wednesday	8	1	$1\frac{1}{2}$	3	12
Thursday	8	1	$\frac{1}{2}$	1	10
Friday	8	1	$1\frac{1}{2}$	3	12
Saturday	--	--	--	--	--
Total	**40**	**4**	**5**	**10**	**54**

2. Calculation Of Hours To Be Paid For Worker B:

	Normal Hours	Extra Hours	Overtime Hours	Equivalent Normal Hours For Overtime Worked	Total Normal Hours
Monday	8	---	---	---	8
Tuesday	8	---	---	---	8
Wednesday	8	---	---	---	8
Thursday	8	---	---	---	8
Friday	8	---	---	---	8
Saturday	4	4*	---	---	8
Total	**44**	**4**	**---**	**---**	**48**

(*Worker-B has neither worked more than 9 hours in any day)

3. Calculation Of Hours To Be Paid For Worker C:

	Normal Hours	Extra Hours	Overtime Hours	Equivalent Normal Hours For Overtime Worked	Total Normal Hours
Monday	8	1	$1\frac{1}{2}$	3	12
Tuesday	8	---	---	---	8
Wednesday	8	1	$1\frac{1}{2}$	3	12
Thursday	8	1	$\frac{1}{2}$	1	10
Friday	8	1	$1\frac{1}{2}$	3	12
Saturday	8*	---	---	---	8
Total	**48**	**4**	**5**	**10**	**62**

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

4. Wages payable:

	A	B	C
Basic Wages Per Hour (₹)	25.00	12.50	37.50
Dearness Allowance Per Hour (₹)	5.50	5.50	5.50
Hourly Rate (₹)	30.50	18.00	43.00
Total Normal Hours	54.00	48.00	62.00
Total Wages Payable (₹)	**1,647.00**	**864.00**	**2,666.00**

PROBLEM – 14:

The management of BR Ltd is worried about their increasing employee turnover in the factory and before analysing 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 ₹ 83,03,300 and P/V ratio was 20 per cent. The total number of actual hours worked by the direct employee force was 4.45 lakhs. The actual direct employee hours included 30,000 hours attributable to training new recruits, out of which half of the hours were unproductive. As a result of the delays by the Personnel Department in filling vacancies due to employee turnover, 1,00,000 potentially productive hours (excluding unproductive training hours) were lost.

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

Settlement cost due to leaving	**₹ 43,820**
Recruitment costs	**₹ 26,740**
Selection costs	**₹ 12,750**
Training costs	**₹ 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:

Workings:

(i) Computation Of Productive Hours

Actual Hours Worked (Given)	4,45,000
Less: Unproductive Training Hours	15,000
Actual Productive Hours	**4,30,000**

(ii) Productive Hours Lost:

Loss Of Potential Productive Hours + Unproductive Training Hours

= 1,00,000 + 15,000 = 1,15,000 Hours

(iii) Loss Of Contribution Due To Unproductive Hours:

$$= \frac{\text{Sales Value}}{\text{Actual Productive Hours}} \times \text{Total Unproductive Hours}$$

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

$$\text{Contribution Lost For 1,15,000 Hours} = \frac{₹\,22,20,650}{100} \times 20 = ₹\,4,44,130$$

Computation Of Profit Forgone On Account Of Employee Turnover

	(₹)
Contribution Foregone (As Calculated Above)	4,44,130
Settlement Cost Due To Leaving	43,820
Recruitment Cost	26,740
Selection Cost	12,750
Training Costs	30,490
Profit Foregone	**5,57,930**

PROBLEM – 14A: **(PYP MAY24)**

Super Ltd, a manufacturing company is facing the problem of high labour turnover in the factory. Before analysing the causes and taking remedial steps, the management of the company wants to ascertain the profit lost for the year 2022-23 on account of labour turnover. For this purpose, it has given you the following information:

d) Sales for the last year 2022-23 was ₹ 2,16,80,000 and P/V ratio was 15%.

e) The total number of actual hours worked by the direct labour force was 5,00,000 hours. The actual direct labour hours included 60,000 hours attributable to training new recruits, out of which 40% of the hours were unproductive.

f) Due to delays by the Personnel Department in filling vacancies on account of labour turnover, 95,000 potential productive hours (excluding unproductive training hours) were lost.

g) 1,500 units of the output produced during training period were defective. Cost of rectification of defective units was ₹ 40 per unit.

h) Settlement cost of the workers leaving the organization was ₹ 2,37,880.

i) Recruitment and Selection cost was ₹ 1,40,000.

j) Cost of Training and Induction was ₹ 1,61,950.

Assuming that the potential production lost as a consequence of labour turnover could have been sold at prevailing prices, find the profit lost for the year 2022-23 on account of labour turnover.

SOLUTION:

(i) Workings:

Computation Of Productive Hours

Actual Hours Worked (Given)	5,00,000
Less: Unproductive Training Hours	24,000
Actual Productive Hours	**4,76,000**

(ii) Productive Hours Lost:

Loss Of Potential Productive Hours + Unproductive Training Hours

= 95,000 + 24,000 = 1,19,000 Hours

(iii) Loss Of Contribution Due To Unproductive Hours:

$$\frac{\text{Sales Value}}{\text{Actual Productive Hours}} \times \text{Total Unproductive Hours}$$

$$\frac{₹\ 2,16,80,000}{4,76,000\ \text{Hrs}} \times 119000\ \text{Hours} = ₹\ 54,20,000$$

Contribution Lost For 1,19,000 Hours = ₹ 54,20,000 X 15% = ₹ 8,13,000

Computation Of Profit Forgone On Account Of Employee Turnover

	(₹)
Contribution Foregone (As Calculated Above)	8,13,000
Settlement Cost Due To Leaving	2,37,880
Recruitment And Selection Cost	1,40,000
Training And Induction Costs	1,61,950
Cost Of Rectification (1500 Units X ₹ 40)	60,000
Profit Foregone	**14,12,830**

The Above Question Can Also Be Solved In Alternative Way After Taking Proper Assumptions

Workings:

a. **Computation Of Productive Hours**

Actual Hours Worked (Given)	5,00,000
Less: Unproductive Training Hours	24,000
Actual Productive Hours	**4,76,000**

b. **Productive Hours Lost:**

Loss Of Potential Productive Hours

= 95,000 Hours

c. **Loss Of Contribution Due To Unproductive Hours :**

$$\frac{\text{Sales Value}}{\text{Actual Productive Hours}} \times \text{Total Unproductive Hours}$$

$$\frac{₹\ 2,16,80,000}{4,76,000\ \text{Hrs}} \times ₹\ 95,000 = ₹\ 43,26,891$$

Contribution Lost For 95,000 Hours = ₹ 43,26,891 X 15%

= ₹ 6,49,034 (Approx.)

Computation Of Profit Forgone On Account Of Employee Turnover

	(₹)
Contribution Foregone (As Calculated Above)	6,49,034
Settlement Cost Due To Leaving	2,37,880
Recruitment And Selection Cost	1,40,000
Training And Induction Costs	1,61,950
Cost Of Rectification (1500 Units X ₹ 40)	60,000
Profit Foregone	**12,48,864**

PROBLEM – 15:

From the following data of Big-One Ltd, calculate labour turnover.

- **Number of workers on the payroll at the beginning of the month: 1800.**
- **Number of workers on the payroll at the end of the month: 2200**
- **During the month, 20 workers left, 80 workers were discharged and 500 workers were recruited. Of these, 60 workers were recruited in the vacancies of those separated, while the rest were engaged due to expansion.**

SOLUTION:

No. Of Separations = 20 + 80 = 100

No. Of Replacements = 60 (Given)

No. Of New Joining's = 500 – 60 = 440

No. Of Accessions = (440 + 60) = 500 Workers

$$\text{Average No. Of Workers} = \frac{1800 + 2200}{2} = 2000 \text{ Workers}$$

$$\text{Separation Method} = \frac{\text{No Of Separations}}{\text{Average No Of Workers}} \times 100$$

$$= \frac{100}{2000} \times 100 = 5\% \times 12 \text{ Months} = 60\% \text{ Per Annum}$$

$$\text{Replacement Method} = \frac{\text{No Of Replacement}}{\text{Average No Of Workers}}$$

$$= \frac{60}{2000} \times 100$$

$$= 3\% \times 12 \text{ Months} = 36\% \text{ Per Annum}$$

$$\text{Flux Method} = \frac{\text{No. Of Separations} + \text{No. Of Accessions}}{\text{Average No Of Workers}}$$

$$= \frac{100 + 500}{2000} \times 100$$

$$= 30\% \times 12 \text{ Months} = 360\% \text{ Per Annum}$$

PROBLEM – 16:

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.

If the number of workers replaced during that quarter is 30, FIND OUT the number of workers for the quarter.

- **Recruited and joined and**
- **Left and discharged and**
- **Equivalent employee turnover rates for the year.**

SOLUTION:

Working Note:

Average Number Of Workers On Roll (For The Quarter):

Employee Turnover Rate Using Replacement Method

$$= \frac{\text{No. Of Replacements}}{\text{Average Number Of Workers On Roll}} \text{ X } 100$$

$$\text{Or, } = \frac{5}{100} = \frac{30}{\text{Average Number Of Workers On Roll}}$$

$$\text{Or, Average Number Of Workers On Roll} = \frac{30 \times 100}{5} = 600$$

i. **Number Of Workers Recruited And Joined:**

Employee Turnover Rate (Flux Method)

$$= \frac{\text{No. Of Separations* (S) + No. Of Accessions (A)}}{\text{Average Number Of Workers On Roll}} \text{ X } 100$$

$$\text{Or, } \frac{10}{100} = \frac{18^* + A}{600} \quad \text{Or, } A = \left[\frac{6000}{100} - 80\right] = 42$$

No. Of Workers Recruited And Joined 42

ii. **Number Of Workers Left And Discharged:**

$$\frac{\text{No. Of Separations (S)}}{\text{Average Number Of Workers On Roll}} \text{ X } 100 = \frac{3}{100} = \frac{S}{600} \quad \text{Or, } S^* = 18$$

Hence, Number Of Workers Left And Discharged Comes To 18

iii. **Calculation Of Equivalent Employee Turnover Rates:**

= (Employee Turnover Rate For The Quarter(S) ÷ Number of Quarters) × 4 Quarters

$$\text{Using Flux Method} = \frac{10\%}{1} \times 4 = 40\%$$

$$\text{Using Replacement Method} = \frac{5\%}{1} \times 4 = 20\%$$

$$\text{Using Separation Method} = \frac{3\%}{1} \times 4 = 12\%$$

PROBLEM – 17:

The normal working hours in a factory are 8 hours per day. An idle time of 1 hour is considered normal due to rest, lunch etc. compute the cost of idle time its treatment in the following circumstance.

a. Ram, a production worker worked for 7 hours and was paid ₹ 120/- for the full day. Ram spent 3 hrs in job A and 4 hrs job B. Also calculate the Labour cost chargeable to both the jobs.

b. Raju, an indirect worker, was paid ₹ 20/- as his daily wage.

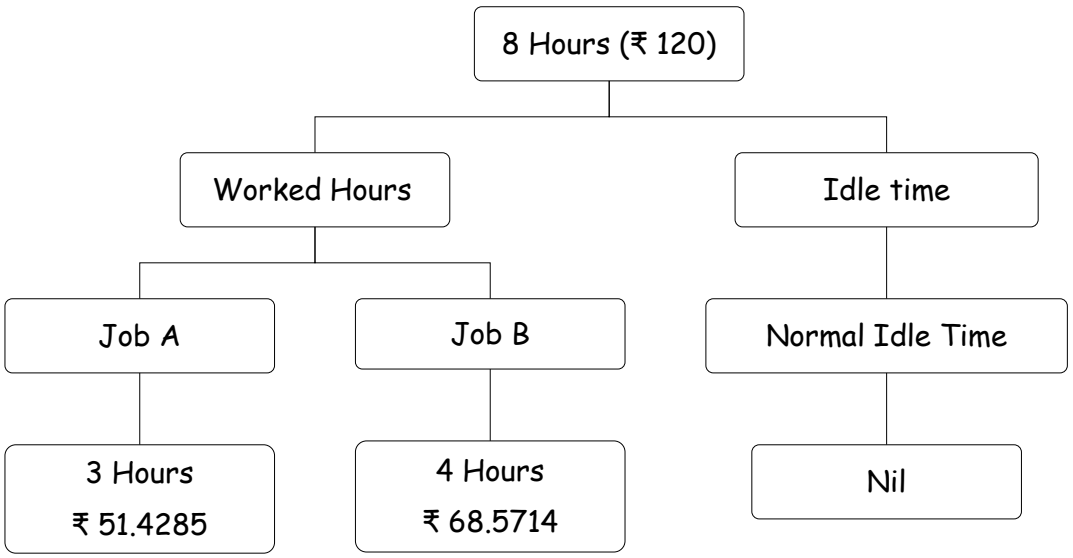
c. Dev, a production worker clocked 6 hours but was paid his full day's wages ₹ 120/- . Due to breakdown of machinery, he could not work for 1 hour during the day. Dev spent 3 hrs in job A and 3 hrs in job B. Also calculate the Labour cost chargeable to both the jobs.

SOLUTION:

Part A = Ram

$$\text{Cost per Hour} = \frac{\text{Total wages}}{\text{Hours paid - Normal idle time}}$$

$$= \frac{₹\ 120}{8\ \text{Hours} - 1\ \text{Hours}} = \frac{₹\ 120}{7\ \text{Hours}} = ₹\ 17.14285$$



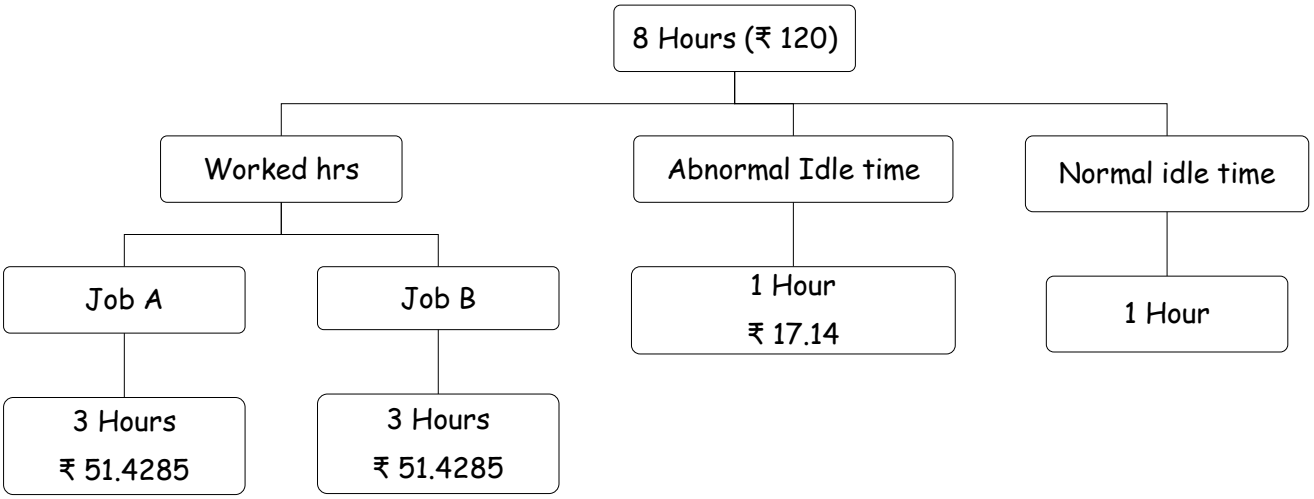
Part B: Raju

Raju Is An Indirect Worker Have The Entire Wages Paid To Him Is Treated As Production Overheads Irrespective Of Where It Is Working Time Or Idle Time.

Part C: Dev

$$\text{Cost per Hour} = \frac{\text{Total wages}}{\text{Hours Paid - Normal idle time}}$$

$$= \frac{₹\ 120}{8\ \text{Hours} - 1\ \text{Hours}} = \frac{₹\ 120}{7\ \text{Hours}} = ₹\ 17.14285$$



PROBLEM – 18:

In a factory working six days in a week and eight hours each day, a worker is paid at the rate of ₹ 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 Hours**
Job Y	**12 Hours**
Job Z	**13 Hours**

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 Hours – (30 Mts. + 10 Mts.)] × 6 Days = 44 Hours

(ii) Total Wages For A Week:

(₹ 100 + 120% Of ₹ 100) × 6 Days = ₹ 1,320

(iii) Wage Rate Per Hour = 1320 ÷ 44 Hours = ₹ 30

(iv) Time Wasted Waiting For Job (Abnormal Idle Time):

= 44 Hours – (15 Hours + 12 Hours + 13 Hours) = 4 Hours

Allocation Of Wages In Cost Accounting

	(₹)
Allocated To Job X : 15 Hours × ₹ 30	450
Allocated To Job Y : 12 Hours × ₹ 30	360

Allocated To Job Z : 13 Hours × ₹ 30	390
Charged To Costing Profit & Loss A/c : 4 Hours × ₹ 30	120
Total	**1,320**

PROBLEM – 19:

Aditya Ltd. is an engineering manufacturing company producing job order on the basis of specification given by the customers During the last the month it has completed three job works namely A, B and C.

The following are the items of expenditures which are incurred apart from direct materials and direct employee cost:

i. **Office and administration cost- ₹ 3,00,000.**
ii. **Product blueprint cost for job A – ₹ 1,40,000**
iii. **Hire charges paid for machinery used for job work B- ₹ 40,000**
iv. **Salary to office attendants- ₹ 50,000**
v. **One time license fee paid for software used to make computerized graphics for job C- ₹50,000.**
vi. **Salary paid to marketing manager- ₹ 1,20,000. Required:**

CALCULATE direct expenses attributable to each job.

SOLUTION:

Calculation of Direct expenses

Particulars	Job A (₹)	Job B (₹)	Job C (₹)
Product blueprint cost	1,40,000	--	--
Hire charges paid for machinery	--	40,000	--
license fee paid for software	--	--	50,000
Total Direct expenses	**1,40,000**	**40,000**	**50,000**

Note:

(i) Office and administration cost is classified as overheads.

(ii) Salary paid to office attendants is classified under office and administration cost.

(iii) Salary paid to marketing manager is classified under selling overheads

PROBLEM – 20:

The following expenditures were incurred in Aditya Ltd. For the month of March 20x3:

		₹
i.	Paid for power & fuel	4,80,200
ii.	Wages paid to factory workers	8,44,000
iii.	Bill paid to job workers	9,66,000
iv.	Royalty paid for production	8,400
v.	Fee paid to technician hired for the job	96,000
vi.	Administrative overheads	76,000
vii.	Commission paid to sales staffs	1,26,000

You are required to CALCULATE direct expenses for the month.

SOLUTION:

Calculation of Direct Expenses

		(₹)
(i)	Paid for power & fuel	4,80,200
(ii)	Bill paid to job workers	9,66,000
(iii)	Royalty paid for production	8,400
(iv)	Fee paid to the technician	96,000
	Total Direct expenses	**15,50,600**

Notes:

(i) Wages paid to factory workers is direct employee cost.

(ii) Administrative overhead is indirect expense.

(iii)Commission paid to sales staffs comes under selling expenses.

CHAPTER 10: PROCESS & OPERATION COSTING

PROBLEM – 1:

Product A is produced after three distinct processes. The following information is obtained from the accounts of a period: -

ITEMS	PROCESS			Total
	I	II	III	
Direct material	₹ 1,800	₹ 300	₹ 100	₹ 2,200
Direct wages	₹ 100	₹ 200	₹ 100	₹ 400
Direct expenses	₹ 300	-	₹ 200	₹ 500

Production overhead incurred is 800 and is covered @ 200% of direct wages.

Production during the period was 100 kg.; there were no opening or closing stocks.

Prepare process cost accounts assuming there is no process loss.

SOLUTION:

Dr. **Process I A/c** Cr.

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Direct Materials	100	1800	By Process II (Transfer) (100 Units x ₹ 24)	100	2400
To wages		100			
To Direct Expenses		300			
To Production overhead (200% of direct wages)		200			
	100	**2400**		**100**	**2400**

$$\text{Cost per kg of process I output} = \frac{\text{Total cost - Normal Loss Scrap Income}}{\text{Input - Normal Loss units}}$$

= ₹ 2400 ÷ 100 Units = ₹ 24 Per Kg

Dr. **Process II A/c** Cr.

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Process I	100	2400	By Process III (Transfer) (100 Units x ₹ 33)	100	3300

To Direct Materials	-	300			
To wages	-	200			
To Direct Expenses	-	-			
To Production overhead (200% of direct wages)	-	400			
	100	**3300**		**100**	**3300**

$$\text{Cost per kg of process II output} = \frac{\text{Total cost - Normal Loss Scrap Income}}{\text{Input - Normal Loss units}}$$

= ₹ 3300 ÷ 100 Units = ₹ 33 Per Kg

Dr. **Process III A/c** Cr.

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Process II	100	3300	By Finished Goods A/c (100 Units x ₹ 39)	100	3900
To Direct Materials	-	100			
To wages	-	100			
To Direct Expenses	-	200			
To Production overhead (200% of direct wages)	-	200			
	100	**3900**		**100**	**3900**

$$\text{Cost per kg of process III output} = \frac{\text{Total cost - Normal Loss Scrap Income}}{\text{Input - Normal Loss units}}$$

= ₹ 3900 ÷ 100 Units = ₹ 39 Per Kg

PROBLEM – 1A: **(MTP 2 MAY 24)**

The product of a manufacturing concern passes through two processes A and B and then to finished stock. The details of expenses incurred on the two processes during the year were as under:

	Process A (₹)	Process B (₹)
Materials	**40,000**	**--**
Labour	**40,000**	**56,000**
Overheads	**16,000**	**40,000**

On completion, the output of Process A is transferred to Process B at a price calculated to give a profit of 20% on the transfer price and the output of Process B is charged to

finished stock at a profit of 25% on the transfer price. The finished stock department realized ₹4,00,000 for the finished goods received from Process B.

You are asked to SHOW process accounts and total profit, assuming that there was no opening or closing work-in-progress.

SOLUTION:

Dr. Process A A/c Cr.

Particulars	Amount (₹)	Particulars	Amount (₹)
To Materials	40,000	By Transfer to Process B A/c	1,20,000
To Labour	40,000		
To Overheads	16,000		
	96,000		
To Profit (20% of transfer price, i.e., 25% of cost)	24,000		
	1,20,000		**1,20,000**

Dr. Process B A/c Cr.

Particulars	Amount (₹)	Particulars	Amount (₹)
To Transferred from Process A A/c	1,20,000	By Transfer to Finished Stock A/c	2,88,000
To Labour	56,000		
To Overhead	40,000		
	2,16,000		
To Profit (25% of transfer price i.e., 33.33% of cost)	72,000		
	2,88,000		**2,88,000**

Statement of Total Profit

Particulars	Amount (₹)
Profit from Process A	24,000
Profit from Process B	72,000
Profit on Sales (₹ 4,00,000 – ₹ 2,88,000)	1,12,000
Total Profit	**2,08,000**

PROBLEM – 2:

Product B is obtained after it passes through three distinct processes. The following information is obtained from the accounts for the week ending May 12, 20x1:

ITEMS	PROCESS			TOTAL
	I	II	III	
Direct material	₹ 2,600	₹ 1,980	₹ 2,962	₹ 7,542
Direct wages	₹ 2,000	₹ 3,000	₹ 4,000	₹ 9,000
Production overhead				₹ 9,000

1,000 units @ ₹ 3 each were introduced to process I.

There was no stock of materials or work-in-process at the beginning or end of the period. The output of each process passes direct to the next process and finally to finished stores. Production overhead is recovered on 100% of direct wages.

The following additional data are obtained:

UNIT	Output during the week	Percentage of normal loss to input	Value of scrap per unit
Process I	950 units	5%	2
Process II	840 units	10%	4
Process III	750 units	15%	5

Prepare process cost accounts and abnormal gain or loss accounts.

SOLUTION:

Dr. Process I A/c Cr.

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Input	1000	3000	By Normal Loss Scrap Income (₹ 2)	50	100
To Direct Materials	-	2600	By Process – II (950 units x ₹ 10)	950	9500
To Direct Wages	-	2000			
To Production Overhead (100% of Direct Wages)	-	2000			
	1000	**9600**		**1000**	**9600**

Actual Loss = 1000 Units – 950 Units = 50 Units

Normal Loss = 1000 Units x 5% = 50 Units

Cost per kg of process I output = $\frac{\text{Total cost - Normal Loss Scrap Income}}{\text{Input - Normal Loss units}}$

$$\frac{₹\ 9600 - (\ 50\ \text{Units} \times ₹\ 2)}{1000\ \text{Units} - 50\ \text{Units}} = ₹\ 10\ \text{Per Unit}$$

Dr. **Process II A/c** **Cr.**

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Process I	950	9500	By Normal Loss Scrap Income @ ₹ 4	95	380
To Direct Materials	-	1980	By Process – III (840 Units ₹ 20)	840	16800
To Direct Wages	-	3000	By Abnormal Loss (₹ 20)	15	300
To Production Overhead (100% of Direct Wages)	-	3000			
	950	**17480**		**950**	**17480**

Actual Loss = 950 Units – 840 Units = 110 Units

Normal Loss = 950 Units x 10 % = 95 Units

Abnormal Loss = 110 Units – 95 Units = 15 Units

Cost per kg of process II output = $\frac{\text{Total cost - Normal Loss Scrap Income}}{\text{Input - Normal Loss units}}$

$$\frac{₹\ 17480 - (\ 95\ \text{Units} \times ₹\ 4)}{950\ \text{Units} - 95\ \text{Units}} = ₹\ 20\ \text{Per Unit}$$

Dr. **Process III A/c** **Cr.**

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Process II	840	16800	By Normal Loss Scrap Income @ ₹ 5	126	630
To Direct Materials		2962	By Finished Goods	750	28500
To Direct Wages		4000			
To Production Overhead (100% of Direct Wages)		4000			
To Abnormal Gain	36	1368			
	876	**29130**		**876**	**29130**

Actual Loss = 840 Units – 750 Units = 90 Units

Normal Loss = 840 Units x 15 % = 126 Units

Abnormal Gain = 126 Units – 90 Units = 36 Units

Cost per kg of process III output = $\frac{\text{Total cost - Normal Loss Scrap Income}}{\text{Input - Normal Loss units}}$

$$\frac{₹\ 27762 - (126\ \text{Units} \times ₹\ 5)}{840\ \text{Units} - 126\ \text{Units}} = ₹\ 38\ \text{Per Unit}$$

Dr. Normal Loss Scrap Income A/c Cr.

Particulars	Amount (₹)	Particulars	Amount (₹)
To Process – I	100	By Bank A/c	100
To Process – II	380	By Bank A/c	380
To Process – III (126 Hours x ₹ 5)	630	By Bank A/c (90 x ₹ 5)	450
		By Abnormal gain (36 x ₹ 5)	180
	1110		**1110**

Dr. Abnormal Loss A/c c Cr.

Particulars	Amount (₹)	Particulars	Amount (₹)
To Process – II	300	By Bank A/c (15 x ₹ 4)	60
		By Costing Profit and Loss A/c	240
	300		**300**

Dr. Abnormal Gain A/c Cr.

Particulars	Amount (₹)	Particulars	Amount (₹)
To Normal Loss Scrap Income (36 Units x ₹ 5)	180	By Process III (36 x ₹ 38)	1368
To Costing Profit and Loss A/c	1188		
	1368		**1368**

PROBLEM – 2A:

RST Limited processes Product Z through two distinct processes – Process- I and Process- II.

On completion, it is transferred to finished stock. From the following information for the current year, PREPARE Process- I, Process- II and Finished Stock A/c:

Particulars	Process- I	Process- II
Raw materials used	7,500 units	--
Raw materials cost per unit	₹ 60	--

Transfer to next process/finished stock	7,050 units	6,525 units
Normal loss (on inputs)	5%	10%
Direct wages	₹ 1,35,750	₹ 1,29,250
Direct Expenses	60% of Direct wages	65% of Direct wages
Manufacturing overheads	20% of Direct wages	15% of Direct wages
Realizable value of scrap per unit	₹ 12.50	₹ 37.50

6,000 units of finished goods were sold at a profit of 15% on cost. Assume that there was no opening or closing stock of work-in-process.

SOLUTION:

Dr. Process- I A/c Cr.

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Raw material used (₹ 60 × 7,500 units)	7,500	4,50,000	By Normal loss (5% of 7,500 units) × ₹ 12.5	375	4,688
To Direct wages	--	1,35,750	By Process- II A/c (₹ 96.7947 × 7,050 units)	7,050	6,82,403
To Direct expenses	--	81,450	By Abnormal loss (₹ 96. 7947 × 75 units)	75	7,259
To Manufacturing overhead		27,150			
	7,500	**6,94,350**		**7,500**	**6,94,350**

Cost per unit of completed units and abnormal loss:

$$\frac{\text{Total cost - Realisable value from normal loss}}{\text{Inputs units - Normal loss units}}$$

$$\frac{₹\,6,94,350 - ₹\,4,688}{7,500 \text{ units} - 375 \text{ units}} = \frac{₹\ 6,89,662}{7,125 \text{ units}} = ₹\,96.7947$$

Dr. Process- II A/c Cr.

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Process- I A/c	7,050	6,82,403	By Normal loss (10% of 7,050 units) × ₹ 37.5	705	26,438
To Direct wages	--	1,29,250	By Finished Stock A/c (₹ 140.0496 × 6,525 units)	6,525	9,13,824

To Direct expenses	--	84,013			
To Manufacturing overhead	--	19,387			
To Abnormal gain (₹ 140.0496 × 180 units)	180	25,209			
	7,230	**9,40,262**		**7,230**	**9,40,262**

Cost per unit of completed units and abnormal loss:

$$\frac{\text{Total cost - Realisable value from normal loss}}{\text{Inputs units - Normal loss units}}$$

$$\frac{₹\,9,15,053 - ₹\,26,438}{7,050 \text{ units} - 705 \text{ units}} = \frac{₹\,8,88,615}{6,345 \text{ units}} = ₹\,140.0496$$

Dr. **Finished Goods Stock A/c** **Cr.**

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Process II A/c	6,525	9,13,824	By Cost of Sales (₹ 140.0496 × 6,000 units)	6,000	8,40,298
			By Balance c/d	525	73,526
	6,525	**9,13,824**		**6,525**	**9,13,824**

Dr. **Income Statement** **Cr.**

Particulars	Amount (₹)	Particulars	Amount (₹)
To Cost of sales (₹ 140.0496 × 6,000 units)	8,40,298	By Abnormal gain {180 units × (₹ 140.0496 – ₹ 37.50)}	18,459
To Abnormal loss {75 units × (₹ 96.7947 – ₹ 12.50)}	6,322	By Sales (₹ 8,40,298 × 115%)	9,66,343
To Net Profit	1,38,182		
	9,84,802		**9,84,802**

PROBLEM – 3:

In Process I, 1,000 units were introduced during January and 200 units, 40% complete in all respects remained as closing work-in-progress at the end of the month. Compute

the equivalent production and obtain the cost of closing work-in-progress if the total process cost during the period were ₹ 1,760.

SOLUTION:

Step 1: Statement Of Equivalent Units

Input		Output		Equivalent units	
Particulars	**Units**	**Particulars**	**Units**	**%**	**Units**
Input	1000	Completed	800	100 %	800
		W I P	200	40 %	80
	1000		**1000**		**880**

Step 2: Statement of cost per Equivalent unit

Particulars	Cost (₹)	Equivalent Units	Cost per Equivalent Units
Total cost	1760	880	₹ 2 Per Unit

Step 3: Statement of Apportionment of Cost

Units Completed and transferred to Process II:

800 Units x ₹ 2 = ₹ 1600

Closing W I P:

80 Units x ₹ 2 = ₹ 160

Total = ₹ 1760

Step 4:

Dr. Process- I A/c Cr.

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Input	1000	1760	By Process II	800	1600
			By Balance c/d	200	160
	1000	**1760**		**1000**	**1760**

PROBLEM – 3A:

An English willow company who manufactures cricket bat buys wood as its direct material. The Forming department processes the cricket bats and the cricket bats are then transferred to the Finishing department where stickers are applied. The Forming department began manufacturing 10,000 initial bats during the month of December for the first time and their cost is as follows:

Direct material: ₹ 33,000

Conversion costs: ₹ 17,000

Total ₹ 50,000

A total of 8,000 cricket bats were completed and transferred to the Finishing department, the rest 2,000 were still in the Forming process at the end of the month. All of the forming departments direct material were placed, but, on average, only 25% of the conversion costs was applied to the ending work in progress inventory.

CALCULATE:

i. Equivalent units of production for each cost.

ii. The Conversion cost per Equivalent units.

iii. Cost of closing work in process (WIP) and finished products.

SOLUTION:

Calculation Of Equivalent Units Of Production:

Input Details	Units	Output Particulars	Units	Equivalent Units			
				Material		Conversion cost	
				%	Units	%	Units
Unit Introduced	10,000	Finished output	8,000	100	8,000	100	8,000
		Closing W-I-P	2,000	100	2,000	25	500
Total	**10,000**	**Total**	**10,000**		**10,000**		**8,500**

Calculation Of Cost Per Equivalent Unit

Particulars	Direct Material	Conversion costs
A. Total cost (₹)	33,000	17,000
B. Equivalent units	10,000	8,500
C (A ÷ B) Cost per equivalent unit (₹)	**3.30**	**2.00**

The Cost Of Closing Work In Process (WIP):

Costs	Equivalent Units	Rate (₹)	Total Cost (₹)
A. Direct Material	2,000	3.30	6,600
B. Conversion Costs	500	2.00	1,000
C. (A ÷ B) Total			**7,600**

The Cost Of Finished Products:

Costs	Equivalent Units	Rate (₹)	Total Cost (₹)
A. Direct Material	8,000	3.30	26,400
B. Conversion Costs	8,000	2.00	16,000

C. (A ÷ B) Total			42,400

PROBLEM – 4

In Process I Opening work-in-progress in February 20x1 was 200 units 40% complete. 1,050 units were introduced during the period, 1,100 completed units were transferred in Process II and 150 units remained as closing work-in-progress 70% complete. Compute equivalent production and apportion the total process costs of ₹ 2,250 to production and work-in-progress inventories under the FIFO method.

NOTE: The cost of Opening work-in-progress b/f is ₹ 500/-

SOLUTION:

Step 1: Statement of Equivalent units (FIFO Method)

Input		Output		Equivalent units	
Particulars	**Units**	**Particulars**	**Units**	**%**	**Units**
Opening W I P	200	Opening W I P completed	200	60%	120
Introduced	1050	Introduced completed	900	100%	900
		Closing W I P	150	70%	105
	1250		**1250**		**1125**

Step 2: Statement of cost per Equivalent unit

Particulars	Cost (₹)	Equivalent Units	Cost per Equivalent Units
Total cost	2250	1125	₹ 2 Per Unit

Step 3: Statement of Apportionment

A. Completed Units

(i) Introduced & Completed (900 Units x ₹ 2) = ₹ 1800

(ii) Opening W I P completed

- Current period cost (120 Units x ₹ 2) = ₹ 240
- Previous period cost (Given) = ₹ 500

₹ 2540

B. Closing W I P (105 Units x ₹ 2) = ₹ 210

Step 4:

Dr. **Process- I A/c** **Cr.**

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Opening W I P	200	500	By Process II	1100	2540

To Input	1050	2250	By Closing W I P	150	210
	1250	**2750**		**1250**	**2750**

PROBLEM – 5

In process A, there was an opening work-in-progress of 100 units 40% complete and closing work-in-progress was 1,100 units 70% complete. Units introduced during the month of January were 11,000 units and completed units transferred to process B were 8,600 units. The normal loss was 10% of production. Compute equivalent production & apportion the total process costs of ₹ 29,190 to production, abnormal loss and work-in-progress.

Note: Cost of Opening WIP b/f is ₹ 1,000/-

SOLUTION:

a) Actual Loss (100 Units + 11000 Units – 8600 Units – 1100 Units) = 1400 Units

b) Normal Loss (10% of Production) = 10% on (100 Units + 11000 Units – 1100 Units)
= 1000 Units

c) Abnormal Loss (a – b) = 400 Units

Step 1: Statement of Equivalent units (FIFO)

Input		Output		Equivalent units	
Particulars	**Units**	**Particulars**	**Units**	**%**	**Particulars**
Opening W I P	100	Opening WIP completed	100	60%	60
Introduced	11000	Introduced and completed	8500	100%	8500
		Closing WIP	1100	70%	770
		Normal Loss	1000	-	-
		Abnormal Loss	400	100%	400
	11100		**11100**		**9730**

Step 2: Statement of cost per Equivalent unit

Particulars	Cost (₹)	Equivalent Units	Cost per Equivalent Units
Total cost	29190	9730	₹ 3 Per Unit

Step 3: Statement of Apportionment

A. Completed Units

(i) Introduced & Completed (8500 Units x ₹ 3) = ₹ 25500

(ii) Opening W I P completed

- Current period cost (60 Units x ₹ 3) = ₹ 180

- Previous period cost (Given) = ₹ 1000

₹ 26680

B. Closing W I P (770 Units x ₹ 3) = ₹ 2310

C. Abnormal Loss (400 Units x ₹ 3) = ₹ 1200

Step 4:

Dr. **Process- I A/c** **Cr.**

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Opening W I P	100	1000	By Normal Loss Scrap Income	1000	-
To Input	11000	29190	By Process B	8600	26680
			By Closing W I P	1100	2310
			By Abnormal Loss	400	1200
	11100	**30190**		**11100**	**30190**

PROBLEM – 6

The following data are available in respect to Process I for February 20x1: -

Opening work-in-progress	**900 units at ₹ 4,500**
Degree of Completion	**Materials 100%, Labour 60%, Overhead 60%**
Input of materials	**9,100 units ₹ 27,300**
Direct wages	**₹ 8,200**
Production overhead	**16,400**
Units scrapped	**1,200 units**
Degree of Completion	**Material 100%, Labour & Overhead 70%**
Closing work-in- progress	**1,000 units**
Degree of Completion	**Materials 100%, Labour 80%, Overhead 80%**
Units transferred to next process	**7,800 units**

Normal process loss is 10% of total input (opening stock plus units put in). The scrap value is ₹ 3 per unit.

You are required to

a. Compute equivalent production;

b. Cost per equivalent unit for each element and cost of abnormal losses, closing work-in-progress and units transferred to next process; and

c. Prepare process accounts.

SOLUTION:

Working Note: Calculation of Normal and Abnormal Loss:

Actual Loss (Given) = 1200 Units

Normal Loss = 10% of Production = 10% (900 Units + 9100 Units) = 1000 Units

Abnormal Loss = 200 Units (Balancing Figure)

Step 1: Statement of equivalent units (FIFO)

Input		Output		Equivalent units					
				Materials		Labour		Overheads	
				%	Units	%	Units	%	Units
Opening W I P	900 Units	Opening W I P completed	900 Units	0%	0	40%	360	40%	360
Introduced	9100 Units	Introduced completed	6900 Units	100%	6900	100%	6900	100%	6900
		Closing W I P	1000 Units	100%	1000	80%	800	80%	800
		Normal Loss	1000 Units	-	-	-	-	-	-
		Abnormal Loss	200 Units	100%	200	70%	140	70%	140
	10000		**10000**		**8100**		**8200**		**8200**

Step 2: Statement of cost per Equivalent unit

Particulars	Cost (₹)	Equivalent Units	Cost per Equivalent Units
Material	= 27300 – 3000 = 24300	8100	₹ 3 Per Unit
Labour	8200	8200	₹ 1 Per Unit
Overheads	16400	8200	₹ 2 Per Unit
		Total Cost	**₹ 6 Per Unit**

Note: Normal Loss Scrap Income – 1000 Units x ₹ 3 = ₹ 3000

Step 3: Statement of Apportionment

A. Completed Units

(i) Introduced & Completed (6900 Units x ₹ 6) = ₹ 41400

(ii) Opening W I P completed

- Current period cost

Labour (360 Units x ₹ 1) = ₹ 360

Overheads (360 Units x ₹ 2) = ₹ 720

- Previous period cost (Given) = ₹ 4500

₹ 46980

B. Closing W I P

Material (1000 Units x ₹ 3) = ₹ 3000

Labour (800 Units x ₹ 1) = ₹ 800

Overheads (800 Units x ₹ 2) = ₹ 1600

= **₹ 5400**

C. Abnormal Loss

Material (200 Units x ₹ 3) = ₹ 600

Labour (140 Units x ₹ 1) = ₹ 140

Overheads (140 Units x ₹ 2) = ₹ 280

= **₹ 1020**

Step 4:

Dr. **Process- I A/c** **Cr.**

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Opening W I P	900	4500	By Normal Loss Scrap Income	1000	3000
To Material	9100	27300	By Process II	7800	46980
To Labour		8200	By Closing WIP	1000	5400
To Overheads		16400	By Abnormal Loss	200	1020
	10000	**56400**		**10000**	**56400**

PROBLEM – 6A:

A company produces a component, which passes through two processes. During the month of April, materials for 40,000 components were put into Process I of which 30,000 were completed and transferred to Process II. Those not transferred to Process II were 100% complete as to materials cost and 50% complete as to Labour and overheads cost. The Process I costs incurred were as follows:

Direct material ₹15,000

Direct wages ₹18,000

Factory overheads ₹12,000

Of those transferred to Process II, 28,000 units were completed and transferred to finished goods stores. There was a normal loss with no salvage value of 200 units in Process

II. There were 1,800 units, remained unfinished in the process with 100% complete as to materials and 25% complete as regard to wages and overheads.

No further process material costs occur after introduction at the first process until the end of the second process, when protective packing is applied to the completed components. The process and packing costs incurred at the end of the Process II were:

Packing materials ₹4,000

Direct wages ₹3,500

Factory overheads ₹4,500

Required:

i. PREPARE Statement of Equivalent Production, Cost per unit and Process I A/c.

ii. PREPARE Statement of Equivalent Production, Cost per unit and Process II A/c.

SOLUTION:

(i) Process I – Statement of Equivalent Production

Particulars	Completed Units	Closing stock of WIP			Equivalent Production units
		Units	% of Completion	Equivalent Units	
	(1)			(2)	(1) + (2)
Material	30,000	10,000	100%	10,000	40,000
Wages	30,000	10,000	50%	5,000	35,000
Overhead	30,000	10,000	50%	5,000	35,000

Process I

Particulars	Process Cost (₹)	Equivalent Production (units)	Process Cost Per Unit (2) ÷ (3)	WIP stock Equivalent units	Cost of WIP Stock (₹) (4) x (5)	Transfer to Process II (2)-(6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Material	15,000	40,000	0.375	10,000	3,750	11,250
Wages	18,000	35,000	0.514	5,000	2,570	15,430
Overhead	12,000	35,000	0.343	5,000	1,715	10,285
	45,000				**8,035**	**36,965**

Dr. Process- I A/c Cr.

Particulars	Unit	Amount (₹)	Particulars	Units	Amount (₹)
To Direct material	40,000	15,000	By Process II A/c	30,000	36,965
To Direct wages	--	18,000	By Closing W-I-P	10,000	8,035
To Factory overhead	--	12,000		--	--
	40,000	**45,000**		**40,000**	**45,000**

(ii) Process II – Statement of Equivalent Production

Particulars	Completed Units	Closing stock of WIP			Equivalent Production units
		Units	% of Completion	Equivalent Units	
	(1)			(2)	(1) + (2)
Material	28,000	1,800	100%	1,800	29,800
Wages	28,000	1,800	25%	450	28,450
Overhead	28,000	1,800	25%	450	28,450

Process II

Particulars	Process Cost (₹)	Equivalent Production (units)	Process Cost Per Unit (2)÷(3)	WIP stock Equivalent units	Cost of WIP Stock (₹) (4) x (5)	Transfer to Finished Stock (2)-(6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Material	36,965	29,800	1.240	1,800	2,232	34,733
Wages	3,500	28,450	0.123	450	55	3,445
Overhead	4,500	28,450	0.158	450	71	4,429
	44,965				**2,358**	**42,607**
Add: Packing Material Cost						4,000
Cost of Finished Stock						**46,607**

Dr. Process- II A/c Cr.

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Process I	30,000	36,965	By Finished Stock	28,000	46,607
To Direct wages	--	3,500	By Normal loss	200	--
To Factory	--	4,500	By WIP stock	1,800	2,358

overhead					
To Packingcharges	--	4,000			
	30,000	**48,965**		**30,000**	**48,965**

PROBLEM – 7:

From the following information for May 20x1, prepare the process cost accounts for Process III:

Opening stock in process	**500 units at**	**₹ 7,200**
Transfer from Process II	**21,300 units**	**₹ 1,65,400**
Direct materials added in Process III		**₹ 80,360**
Direct wages		**₹ 39,620**
Production overhead		**₹ 19,810**
Units scrapped during the period		**1,100 units**
Transferred to Process IV		**18900 units**
Closing stock		**1,800 units**

Degree of completion:

PARTICULARS	OPENING STOCK	CLOSING STOCK	SCRAP
Material	70%	80%	100%
Labour	50%	60%	80%
Overhead	50%	60%	80%

There was a normal loss of 5% of production and units scrapped were sold at ₹ 3 each.

SOLUTION:

Working Note: Calculation of Normal and Abnormal Loss:

Actual Loss (Given) = 1100 Units

Normal Loss = 5% on (500 Units + 21300 Units – 1800 Units) = 1000 Units

Abnormal Loss = 100 Units

Step 1: Statement Of Equivalent Units (FIFO)

Input		Output		Equivalent Units					
				Transfer in Material		Material		Labour and Overheads	
Particulars	**Units**	**Particulars**	**Units**	**%**	**Units**	**%**	**Units**	**%**	**Units**
Opening W I P	500	Opening W I P completed	500	0%	0	30%	150	50%	250
Introduced	21300	Introduced and completed	18400	100%	18400	100%	18400	100%	18400
		Closing W I P	1800	100%	1800	80%	1440	60%	1080
		Normal Loss	1000	-	-	-	-	-	-
		Abnormal Loss	100	100%	100	100%	100	80%	80
	21800		**21800**		**20300**		**20090**		**19810**

Step 2: Statement of cost per Equivalent unit

Particulars	Cost (₹)	Equivalent Units	Cost per Equivalent Units
Transfer in Material	162400	20300	₹ 8 Per Unit
Material	80360	20090	₹ 4 Per Unit
Labour	39620	19810	₹ 2 Per Unit
Overheads	19810	19810	₹ 1 Per Unit
		Total Cost	**₹ 15 Per Unit**

Note: Transfer in Material = Total Cost – Normal Loss Scrap Income

= ₹ 165400 – (1000 x ₹ 3) = ₹ 162400

Step 3: Statement of Apportionment

A. Completed Units

(i) Introduced & Completed (18400 Units x ₹ 15) = ₹ 276000

(ii) Opening W I P completed

- Current period cost

  Material (150 Units x ₹ 4) = ₹ 600

  Labour (250 Units x ₹ 2) = ₹ 500

  Overheads (250 Units x ₹ 1) = ₹ 250

- Previous period cost (Given) = ₹ 7200

₹ 284550

B. Closing W I P

Transfer in Material (1800 Units x ₹ 8) = ₹ 14400
Material (1440 Units x ₹ 4) = ₹ 5760
Labour (1080 Units x ₹ 2) = ₹ 2160
Overheads (1080 Units x ₹ 1) = ₹ 1080
= **₹ 23400**

C. Abnormal Loss

Transfer in Material (100 Units x ₹ 8) = ₹ 800
Material (100 Units x ₹ 4) = ₹ 400
Labour (80 Units x ₹ 2) = ₹ 160
Overheads (80 Units x ₹ 1) = ₹ 80
= **₹ 1440**

Step 4:

Dr. Process- III A/c Cr.

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Opening W I P	500	7200	By Normal Loss Scrap Income	1000	3000
To Process II	21300	165400	By Process IV	18900	284550
To Material		80360	By Closing WIP	1800	23400
To Labour		39620	By Abnormal Loss	100	1440
To Overheads		19810			
	21800	**312390**		**21800**	**312390**

Dr. Abnormal Loss A/c Cr.

Particulars	Amount (₹)	Particulars	Amount (₹)
To Process III	1440	By Bank	300
		By Costing Profit and Loss, A/c	1140
	1440		**1440**

PROBLEM – 8

From the following information during a period prepare process cost accounts for Process III.

Opening WIP in Process III	800 units at	₹ 10,300
Transfer from process II	21200 units at	₹ 1,64,600
Transferred to Process IV	19200 units	
Closing WIP of process III	2000 units	
Units scrapped	800 units	
Direct material added in Process III	79,040	
Direct wages	₹ 39,040	
Production overhead	19,520	

Degree of completion:

PARTICULARS	OPENING STOCK	CLOSING STOCK	SCRAP
Material	80%	70%	100%
Labour	60%	50%	70%
Overhead	60%	50%	70%

The normal loss in the process was 5% of the production and scrap was sold @ ₹ 3 per unit.

SOLUTION:

Working Note: Calculation of Normal Loss and Abnormal Gain:

Actual Loss (Given) = 800 Units

Normal Loss = 5% on (800 Units + 21200 Units – 2000 Units) = 1000 Units

Abnormal Gain = 200 Units

Step 1: Statement of Equivalent units (FIFO)

Input		Output		Equivalent Units					
				Transfer in Material		Material		Labour and Overheads	
Particulars	Units	Particulars	Units	%	Units	%	Units	%	Units
Opening W I P	800	Opening W I P completed	800	0%	0	20%	160	40%	320
Introduced	21200	Introduced completed	18400	100%	18400	100%	18400	100%	18400
		Closing W I P	2000	100%	2000	70%	1400	50%	1000

		Normal Loss	1000	-	-	-	-	-	-
		Abnormal Gain	(200)	100%	(200)	100%	(200)	100%	(200)
	22000		**22000**		**20200**		**19760**		**19520**

Step 2: Statement of cost per Equivalent unit

Particulars	Cost (₹)	Equivalent Units	Cost per Equivalent Units
Transfer in Material	161600	20200	₹ 8 Per Unit
Material	79040	19760	₹ 4 Per Unit
Labour	39040	19520	₹ 2 Per Unit
Overheads	19520	19520	₹ 1 Per Unit
		Total Cost	**₹ 15 Per Unit**

Note: Transfer in Material = Total Cost – Normal Loss Scrap Income

= ₹ 164600 – (1000 x ₹ 3) = ₹ 161600

Step 3: Statement of Apportionment

A. Completed Units

(i) Introduced & Completed (18400 Units x ₹ 15) = ₹ 276000

(ii) Opening W I P completed

- Current period cost

Material (160 Units x ₹ 4) = ₹ 640

Labour (320 Units x ₹ 2) = ₹ 640

Overheads (320 Units x ₹ 1) = ₹ 320

- Previous period cost (Given) = ₹ 10300

₹ 287900

B. Closing W I P

Transfer in Material (2000 Units x ₹ 8) = ₹ 16000

Material (1400 Units x ₹ 4) = ₹ 5600

Labour (1000 Units x ₹ 2) = ₹ 2000

Overheads (1000 Units x ₹ 1) = ₹ 1000

= **₹ 24600**

D. Abnormal Gain (200 Units x ₹ 15) = ₹ 3000

Step 4:

Dr. **Process III** **Cr.**

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Opening W I P	800	10300	By Normal Loss Scrap Income	1000	3000
To Process II	21200	164600	By Process IV	19200	287900
To Material		79040	By Closing WIP	2000	24600
To Labour		39040			
To Overheads		19520			
To Abnormal Gain	200	3000			
	22200	**315500**		**22200**	**315500**

Dr. **Normal Loss Scrap Income A/c** **Cr.**

Particulars	Amount (₹)	Particulars	Amount (₹)
To Process III	3000	By Bank (800 Units x ₹ 3)	2400
		By Abnormal Gain	600
	3000		**3000**

Dr. **Abnormal Gain A/c** **Cr.**

Particulars	Amount (₹)	Particulars	Amount (₹)
To Normal Loss Scrap Income (200 x ₹ 3)	600	By Process III	3000
To Costing Profit and Loss A/c	2400		
	3000		**3000**

PROBLEM – 8A: **(RTP MAY 24)**

The following data are available in respect of Process-I for January 2024:

a) Opening stock of work in process: 600 units at a total cost of ₹ 4,200.

b) Degree of completion of opening work in process:

Material	**100%**
Labour	**60%**
Overheads	**60%**

c) Input of materials at a total cost of ₹ 55,200 for 9,200 units.

d) Direct wages incurred ₹ 18,600

e) Overheads ₹ 8,630.

f) Units scrapped 200 units. The stage of completion of these units was:

Materials	100%
Labour	80%
Overheads	80%

g) Closing work in process; 700 units. The stage of completion of these units was:

Material	100%
Labour	70%
Overheads	70%

h) 8,900 units were completed and transferred to the next process.

i) Normal loss is 4% of the total input (opening stock plus units put in)

j) Scrap value is ₹ 6 per unit. You are required to:

i) PREPARE using FIFO method, Statement of equivalent production,

ii) PREPARE Statement of cost,

iii) CALCULATE cost of closing WIP,

iv) CALCULATE the cost of the units to be transferred to the next process.

SOLUTION:

Statement of Equivalent Production (FIFO Method)

Input		Output		Equivalent Production					
				Materials		Labour		Overheads	
Details	Units	Details	Units	%	Units	%	Units	%	Units
Opening Stock	600	Finished goods transferred to next process:							
		-From opening stock	600	-	-	40	240	40	240
		-From fresh materials	8,300	100	8,300	100	8,300	100	8,300
Fresh inputs	9,200	Closing W-I-P	700	100	700	70	490	70	490
		Normal loss	392	-	-	-	-	-	-
			9,992		9,000		9,030		9,030
			(192)	100	(192)	100	(192)	100	(192)
	9,800	*Less:* Abnormal Gain	**9,800**		**8,808**		**8,838**		**8,838**

Statement of Cost per equivalent units

Elements	(₹)	Cost (₹)	Equivalent units	Cost per equivalent Unit (₹)
Material Cost	55,200			
Less: Scrap realisation 392 units @ ₹ 6 Per Unit.	2,352	52,848	8,808	6
Labour cost		18,600	8,838	2.10
Overheads		8,630	8,838	0.98
Total Cost		**80,078**		**9.08**

Cost of Abnormal Gain – 192 Units

Particulars	(₹)	(₹)
Material cost of 192 units @ ₹ 6.00 Per Unit	1,152.00	
Labour cost of 192 units @ ₹ 2.10 Per Unit	403.20	
Overheads of 192 units @ ₹ 0.98 Per Unit	188.16	1,743.36

Cost of closing WIP – 700 Units

Material cost of 700 equivalent units @ ₹ 6.00 Per Unit	4,200.00	
Labour cost of 490 equivalent units @ ₹2.10 Per Unit	1,029.00	
Overheads of 490 equivalent @ ₹ 0.98 Per Unit	480.20	5709.20

Calculation of cost of 8,900 units transferred to next process

	(₹)
(i) Cost of opening W-I-P Stock Balance Figure – 600 units	4,200.00
(ii) Cost incurred on opening W-I-P stock	
Material cost	—
Labour cost 240 equivalent units @ ₹ 2.10 Per Unit	504.00
Overheads 240 equivalent units @ ₹ 0.98 Per Unit	235.20
	739.20

(iii)Cost of 8,300 completed units	
8,300 units @ ₹ 9.08 Per Unit	75,364.00
Total cost [(i) + (ii) + (iii)]	**80,303.20**

PROBLEM – 9

From the following information during a period prepare process cost account for Process I by Average method:

Opening WIP:	**20,000 units**	
	Material	**₹ 4,500**
	Wages	**₹ 1,300**
	Overhead	**₹ 800**
Units introduced:	**80,000 units**	
	Material	**₹ 18,500**
	Wages	**₹ 9,200**
	Overhead	**₹ 6,200**

During the period 60,000 units were completed and transferred to Process II.

Closing WIP:	**40,000 units**	**Degree completion**
	Materials	**100%**
	Wages and overhead	**25%**

SOLUTION:

Step 1: Statement of Equivalent units

Input		**Output**		**Equivalent units**			
Particulars	**Units**	**Particulars**	**Units**	**Materials**		**Labour and Overheads**	
				%	**Units**	**%**	**Units**
Opening W I P	20000	Completed and transferred	60000	100%	60000	100%	60000
Introduced	80000	Closing WIP	40000	100%	40000	25%	10000
	100000		**100000**		**100000**		**70000**

Step 2: Statement of cost per Equivalent unit

Particulars	Cost (₹)			Equivalent Units	Cost per Equivalent Units
	Previous Period (₹)	Current Period (₹)	Total (₹)		
Material	4500	18500	23000	100000	₹ 0.23 Per Unit
Labour	1300	9200	10500	70000	₹ 0.15 Per Unit
Overheads	800	6200	7000	70000	₹ 0.10 Per Unit
				Total Cost	**₹ 0.48 Per Unit**

Step 3: Statement of Apportionment

A. Completed Units

(i) Introduced & Completed (60000 Units x ₹ 0.48) = ₹ 28800

B. Closing W I P

Material (40000 Units x ₹ 0.23) = ₹ 9200

Labour (10000 Units x ₹ 0.15) = ₹ 1500

Overheads (10000 Units x ₹ 0.10) = ₹ 1000

= **₹ 11700**

Step 4:

Dr. Process I A/c Cr.

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Opening WIP	20000	6600	By Process II	60000	28800
To Materials	80000	18500	By Closing WIP	40000	11700
To Labour	-	9200			
To Overheads	-	6200			
	100000	**40500**		**100000**	**40500**

PROBLEM – 9A:

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

	(₹)
Opening work-in process (2,000 units)	
Materials	80,000
Labour	15,000
Overheads	45,000
Materials introduced in Process-I (38,000 units)	14,80,000
Direct Labour	3,59,000
Overheads	10,77,000
Units scrapped: 3,000 units	
Degree of completion:	
Materials	100%
Labour and overheads	80%
Closing work-in process: 2,000 units	
Degree of completion:	
Materials	100%
Labour and overheads	80%

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

Normal Loss:

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

You are required to PREPARE using average method:

i. Statement of equivalent production

ii. Statement of cost

iii. Statement of distribution cost, and

iv. Process-I Account, Normal Loss Account and Abnormal Loss Account.

SOLUTION:

(i) Statement of Equivalent Production

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

Statement showing cost for each element

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

Statement of Distribution of cost

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

- Materials (2,000 units × ₹ 40)	80,000	
- Labour (1,600 units × ₹ 10)	16,000	
- Overheads (1,600 units × ₹ 30)	48,000	1,44,000

Dr. Process I A/c Cr.

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

Dr. Normal Loss A/c Cr.

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

Dr. Abnormal Loss A/c Cr.

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

PROBLEM – 9B:

'Healthy Sweets' is engaged in the manufacturing of jaggery. Its process involve sugarcane crushing for juice extraction, then filtration and boiling of juice along with some chemicals and then letting it cool to cut solidified jaggery blocks.

The main process of juice extraction (Process – I) is done in conventional crusher, which is then filtered and boiled (Process – II) in iron pots. The solidified jaggery blocks are then cut, packed and dispatched. For manufacturing 10 kg of jaggery, 100 kg of sugarcane is required, which extracts only 45 litre of juice.

Following information regarding Process – I has been obtained from the manufacturing department of Healthy Sweets for the month of January:

		(₹)
Opening work-in process (4,500litre)		
Sugarcane		50,000
Labour		15,000
Overheads		45,000
Sugarcane introduced for juice extraction (1,00,000 kg)		5,00,000
Direct Labour		2,00,000
Overheads		6,00,000
Abnormal Loss: 1,000 kg		
Degree of completion:		
	Sugarcane	100%
	Labour and overheads	80%
Closing work-in process: 9,000litre		
Degree of completion:		
	Sugarcane	100%
	Labour and overheads	80%

Extracted juice transferred for filtering and boiling: 39,500litre (Consider mass of 1litre of juice equivalent to 1 kg)

You are required to PREPARE using average method:

i. Statement of equivalent production,

ii. Statement of cost,

iii. Statement of distribution cost, and

iv. Process-I Account.

SOLUTION:

Statement of Equivalent Production

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Sugarcane		Labour & Overheads	
				%	Units	%	Units
Opening WIP	4,500	Completed and transferred to Process - II	39,500	100	39,500	100	39,500
Units introduced	1,00,000	Normal Loss (55%* of 1,00,000)	55,000	--	--	--	--
		Abnormal loss	1,000	100	1,000	80	800
		Closing WIP	9,000	100	9,000	80	7,200
	1,04,500		**1,04,500**		**49,500**		**47,500**

* 100 kg of sugarcane extracts only 45 litre of juice. Thus, normal loss = 100 – 45 = 55%

Statement showing cost for each element

Particulars	Sugarcane (₹)	Labour (₹)	Overhead (₹)	Total (₹)
Cost of opening work-in-process	50,000	15,000	45,000	1,10,000
Cost incurred during the month	5,00,000	2,00,000	6,00,000	13,00,000
Total cost: (A)	5,50,000	2,15,000	6,45,000	14,10,000
Equivalent units: (B)	49,500	47,500	47,500	
Cost per equivalent unit: (C) = (A ÷ B)	**11.111**	**4.526**	**13.579**	**29.216**

Statement of Distribution of cost

		Amount (₹)	Amount (₹)
1.	Value of units completed and transferred (39,500 units × ₹ 29.216)		**11,54,032**
2.	Value of Abnormal Loss:		
	- Sugarcane (1,000 units × ₹ 11.111)	11,111	
	- Labour (800 units × ₹ 4.526)	3,621	
	- Overheads (800 units × ₹ 13.579)	10,863	**25,595**

3.	Value of Closing W-I-P:		
	- Sugarcane (9,000 units × ₹ 11.111)	99,999	
	- Labour (7,200 units × ₹ 4.526)	32,587	
	- Overheads (7,200 units × ₹ 13.579)	97,769	**2,30,355**

Dr. Process-I A/c Cr.

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W.I.P:			By NormalLoss	55,000	--
- Sugarcane	4,500	50,000	By Abnormalloss ₹ 25,595 + ₹ 18 (difference due to approximation)	1,000	25,613
- Labour	--	15,000	By Process-IIA/c	39,500	11,54,032
- Overheads	--	45,000	By ClosingWIP	9,000	2,30,355
To Sugarcane introduced	100,000	5,00,000			
To Direct Labour		2,00,000			
To Overheads		6,00,000			
	104,500	**14,10,000**		**104,500**	**14,10,000**

PROBLEM – 9C: (MTP 2 SEP 24)

As demand for LED light increases, more entrepreneurs are coming into its manufacturing process. eLED Pvt. Ltd. is also one of the recently formed company whose main business is related to LED lights.

The company has extended its hand into various LED products like COB (Chip On Board) LEDs, SMD (Surface Mounted Device) LEDs, RGB LEDs, Flashing LEDs, Miniature LEDs, OLEDs, Filament Bulbs, etc.

However, at the beginning stage, the company has decided to only assemble the products and enter into manufacturing stage at later yea₹

The details relating to the first process of mounting for the month of August are given below:

Opening Work-in-Process:	**31,000 units**
Material	**₹12,40,000**
Labour	**₹2,32,500**

Overheads	₹6,97,500
Introduction during the process:	5,89,000 units
Material	₹2,29,40,000
Labour	₹55,64,500
Overheads	₹1,66,93,500

The process involve some wastage as well. The management estimated a normal loss of 5% of total input including opening work-in-process which can be sold out for ₹20 per unit. However, the workers reported 46,500 units as scrapped in which 100% material was used along with 80% of Labour and overheads.

5,42,500 units were transferred for next process of soldering.

Some units were still in process and thus, shifted for the next month process of mounting. With 100% material used along with 80% labour and overheads, 31,000 units were shifted.

Following the average method of inventory, you are required to PREPARE:

(i) Statement of cost showing cost per equivalent unit

(ii) Statement of distribution cost

(iii)Process Account (Mounting)

(iv)Normal Loss Account and Abnormal Loss Account.

SOLUTION:

Statement of Equivalent Production

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & Overheads	
				%	Units	%	Units
Opening WIP	31,000	Completed and transferred to Process (Soldering)	5,42,500	100	5,42,500	100	5,42,500
Units introduced	5,89,000	Normal Loss (5% of 6,20,000)	31,000	--	--	--	--
		Abnormal loss (Balancing figure)	15,500	100	15,500	80	12,400
		Closing WIP	31,000	100	31,000	80	24,800
	6,20,000		**6,20,000**		**5,89,000**		**5,79,700**

Statement showing cost for each element

Particulars	Materials (₹)	Labour (₹)	Overhead (₹)	Total (₹)
Cost of opening work-in- process	12,40,000	2,32,500	6,97,500	21,70,000
Cost incurred during the month	2,29,40,000	55,64,500	1,66,93,500	4,51,98,000
Less: Realisable Value of normal scrap (₹ 20 × 31,000 units)	(6,20,000)	--	--	(6,20,000)
Total cost: (A)	2,35,60,000	57,97,000	1,73,91,000	4,67,48,000
Equivalent units: (B)	5,89,000	5,79,700	5,79,700	
Cost per equivalent unit: (C) = (A ÷ B)	**40.00**	**10.00**	**30.00**	**80.00**

Statement of Distribution of cost

	Amount (₹)	Amount (₹)
1. Value of units completed and transferred (5,42,500 units × ₹ 80)		4,34,00,000
2. Value of Abnormal Loss:		
- Materials (15,500 units × ₹ 40)	6,20,000	
- Labour (12,400 units × ₹ 10)	1,24,000	
- Overheads (12,400 units × ₹ 30)	3,72,000	11,16,000
3. Value of Closing W-I-P:		
- Materials (31,000 units × ₹ 40)	12,40,000	
- Labour (24,800 units × ₹ 10)	2,48,000	
- Overheads (24,800 units × ₹ 30)	7,44,000	22,32,000
Total		**4,67,48,000**

Dr. **Process Account (Mounting)** **Cr.**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W.I.P:			By Normal Loss (₹20 × 31,000 units)	31,000	6,20,000
- Materials	31,000	12,40,000	By Abnormal loss	15,500	11,16,000
- Labour	--	2,32,500	By Process A/c (Soldering)	5,42,500	4,34,00,000
- Overheads	--	6,97,500	By Closing WIP	31,000	22,32,000

To Materials introduced	5,89,000	2,29,40,000			
To Direct Labour		55,64,500			
To Overheads		1,66,93,500			
	6,20,000	**4,73,68,000**		**6,20,000**	**4,73,68,000**

Dr. **Normal Loss A/c** **Cr.**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process Account (Mounting)	31,000	6,20,000	By Cost Ledger Control A/c	31,000	6,20,000
	31,000	**6,20,000**		**31,000**	**6,20,000**

Dr. **Abnormal Loss A/c** **Cr.**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process Account (Mounting)	15,500	11,16,000	By Cost Ledger Control A/c	15,500	3,10,000
			By Costing Profit & Loss A/c		8,06,000
	15,500	**11,16,000**		**15,500**	**11,16,000**

PROBLEM – 10:

In a manufacturing unit, raw material passes through four processes I, II, III and IV and the output of each process is the input of the subsequent process. The loss in the four processes I, II, III, and IV are respectively 25%, 20%, 20% and 16 2/3% of the input. If the end product at the end of process IV is 40,000 kg., what is the quantity of raw material required to be fed at the beginning of Process I and the cost of same at ₹ 5 per kg.?

Find out also the effect of increase or decrease in the material cost of the end product for variation of every rupee in the cost of the raw material.

SOLUTION:

Part A: Calculation of process I input if process IV output is 40000 kg

Particulars	P1	P2	P3	P4
Input	100	75	60	48
Output	75 (100 x 75%)	60 (75 x 80%)	48 (60 x 80%)	40 (48 x 83.33%)

Input	Output
100 Kgs	40 Kgs
1,00,000 kg (Balance Figure)	40000 kg

The Co should input 1,00,000 kg of raw materials to get 40000 kg as output

Cost of RM = 1,00,000 x 5 = ₹ 5,00,000

Part B: Variability of end product due to raw materials cost variability:

$$\text{RM cost per kg of output} = \frac{\text{Raw material Consumed}}{\text{Output}} \times \text{Raw Material Cost Per Kg}$$

$$= \frac{\text{Raw material cost per kg}}{\text{40000 Kgs}} \times \text{100000 Kgs}$$

$$= \text{Raw Material Cost Per Kg} \times 2.5$$

For every ₹ 1 Change in Raw Material Cost the finished goods cost changes by ₹ 2.5.

Variability = Input ÷ Output = 100000 ÷ 40000 = 2.5

PROBLEM – 11:

A Ltd. produces product 'AXE' which passes through two processes before it is completed and transferred to finished stock. The following data relate to October 20x1:

Particulars	Process- I	Process - II	Finished Stock
Opening stock	₹ 7,500	₹ 9,000	₹ 22,500
Direct materials	₹ 15,000	₹ 15,750	--
Direct wages	₹ 11,200	₹ 11,250	--
Factory overheads	₹ 10,500	₹ 4,500	--
Closing stock	₹ 3,700	₹ 4,500	₹ 11,250
Inter-process profit included in opening stock	--	₹ 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 processes is valued at prime cost. Finished stock is valued at the price at which it is received from process II. Sales during the period are ₹ 1,40,000.

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

SOLUTION:

Dr. **Process- I A/c** **Cr.**

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	7,500	7,500	--	Process- II A/c*	54,000	40,500	13,500
Direct materials	15,000	15,000	--	Closing Stock	3,700	3,700	--
Direct wages	11,200	11,200	--				
Prime Cost	**33,700**	**33,700**					
Overheads	10,500	10,500	--				
Total Cost	**44,200**	**44,200**					
Profit**	13,500	--	13,500				
	57,700	**44,200**	**13,500**		**57,700**	**44,200**	**13,500**

*Transfer price = $\frac{\text{Total cost - Closing stock}}{75\%} = \frac{44,200 - 3,700}{75\%}$ = ₹ 54,000

**Profit on transfer = 54,000 × 25% = ₹ 13,500

Dr. **Process- II A/c** **Cr.**

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Openingstock	9,000	7,500	1,500	Finished Stock A/c**	1,12,500	75,750	36,750
Transferred from Process-I	54,000	40,500	13,500	Closing stock*	4,500	3,750	750
Direct materials	15,750	15,750	--				
Direct wages	11,250	11,250	--				
Prime cost	**90,000**	**75,000**	**15,000**				
Overheads	4,500	4,500	--				
Total cost	**94,500**	**79,500**	**15,000**				
Profit***	22,500	--	22,500				
	1,17,000	**79,500**	**37,500**		**1,17,000**	**79,500**	**37,500**

*Cost of Closing stock = $\frac{₹ 75,000}{₹ 90,000} \times ₹ 4,500 = ₹ 3,750$

**Transfer price = $\frac{\text{Total cost - Closing stock}}{80\%} = \frac{94,500 - 4,500}{80\%}$ = ₹ 1,12,500

***Profit on transfer = 1,12,500 × 20% = ₹ 22,500

Dr. **Finished Stock A/c** **Cr.**

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	22,500	14,250	8,250	Costing P&L A/c	1,40,000	82,425	57,575
Process- II	1,12,500	75,750	36,750	Closing stock*	11,250	7,575	3,675
Profit	16,250	--	16,250				
	1,51,250	**90,000**	**61,250**		**1,51,250**	**90,000**	**61,250**

* Cost of Closing Stock =

$\frac{\text{Cost per transfer from Process - II}}{\text{Transfer price from Process - II}}$ x Value of closing stock

(As per instruction given in the question)

$\frac{₹ 75,750}{₹ 1,12,500}$ x ₹ 11,250 = ₹ 7,575

CHAPTER 11: JOINT PRODUCTS AND BY PRODUCTS

PROBLEM – 1:

From a joint process, three joint products emerge, namely A, B and C. The joint cost incurred in manufacturing the joint products is ₹ 5,00,000. The output details and the Selling price of the joint products are given in the table below. Apportion the joint cost on the basis of Physical units and prepare a product wise profitability statement. Also, comment on the effectiveness of the Physical unit's method as a method of joint cost apportionment.

PRODUCTS	UNITS PRODUCED	SELLING PRICE
A	30,000	₹ 7.50
B	20,000	₹ 25.00
C	50,000	₹ 3.00

SOLUTION:

Step 1: Apportionment of Joint cost using physical units method:

Products	Units	Proportion	Share Of Joint Cost (₹)
A	30000	0.3	1,50,000
B	20000	0.2	1,00,000
C	50000	0.5	2,50,000
	1,00,000	**1**	**5,00,000**

Step 2: Profitability of the products:

Products	Sales (₹)	Share Of Joint Cost (₹)	Profit (₹)
A	225000	150000	75000
B	500000	100000	4,00,000
C	150000	250000	(1,00,000)
	875000	**5,00,000**	**375000**

Comments: In physical units method we ignore the "Ability to Pay" principle while appropriating the joint cost. And hence it is not that effective.

PROBLEM – 1A:

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

Coke	**3,500 tonnes**
Tar	**1200 tonnes**
Sulphate of ammonia	**52 tonnes**
Benzol	**48 tonnes**

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

SOLUTION:

	Products					
	Coke	**Tar**	**Sulphate Of Ammonia**	**Benzole**	**Wastage**	**Total**
Output (In Tonne)	3,500	1,200	52	48	200	5,000
Wastage (In Tonne) (Refer Note-1)	146	50	2	2	(200)	
Input (In Tonne)	3,646	1,250	54	50	-	5,000
Share Of Joint Cost @ ₹ 1,100 Per Tonne (In ₹)	**40,10,600**	**13,75,000**	**59,400**	**55,000**	**-**	**55,00,000**

Note-1: Apportionment Of Wastage Of 200 Tonnes Over The Four Products OnThe Basis Of Physical Weights (3,500 : 1,200 : 52 : 48) Is As Follows:

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

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

Sulphate Of Ammonia: $\frac{200}{4,800}$ x 52 Tonnes = 2 Tonnes

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

PROBLEM – 2:

FIND OUT the cost of joint products A, B and C using average unit cost method from the following data:

Pre-separation Joint Cost ₹ 60,000

Production data:

Products	Units produced
A	500
B	200
C	300
	1000

SOLUTION:

$$\text{Average Cost Per Unit} = \frac{\text{Total Joint Costs}}{\text{Units Produced}} = \frac{₹\ 60000}{1{,}000\ \text{Units}} = ₹\ 60$$

The Joint Costs Apportioned @ ₹ 60 Are As Follows:

Products	Units	Cost Per Unit (₹)	Value (₹)
A	500	60	30,000
B	200	60	12,000
C	300	60	18,000
			60,000

PROBLEM – 3

From a joint process, three joint products emerge, namely A, B and C. The joint cost incurred in manufacturing the joint products is ₹ 5,00,000. The output details, the selling price and further processing cost of the joint products are given in the table below.

PRODUCTS	UNITS PRODUCED	SELLING PRICE AT SPLIT OFF	SELLING PRICE AFTER FURTHER PROCESSING	FURTHER PROCESSING COST
A	30,000	₹ 7.5	₹ 10	₹ 30,000
B	20,000	₹ 25	₹ 30	₹ 80,000
C	50,000	₹ 3	₹ 5	₹ 50,000

Apportion the joint cost on the basis of the following methods and also calculate the gross margin % under each of the methods.

- **Sales value at split of point method**
- **Final sales value method [sales value after further processing]**
- **Net Realisable value method.**

SOLUTION:

Part I: Sales Value @ Split Off Point Method:

Step 1: Apportionment Of Joint Cost:

Product	Sales Value @ Split Off Point (₹)	Proportion	Share Of Joint Cost (₹)
A	2,25,000	0.2571	128571
B	5,00,000	0.5714	285714
C	1,50,000	0.1715	85715
	8,75,000	**1**	**500000**

Step 2: Gross Margin %:

Product 1	Sales (₹) 2	Share Of Joint Cost (₹) 3	Further Processing Cost (₹) 4	Profit (₹) (2 – 3 – 4)	Gross Margin %
A	300000	(128571)	(30000)	141429	47.143%
B	600000	(285714)	(80000)	234286	39.047%
C	250000	(85715)	(50000)	114285	45.714%
	1150000	**500000**	**160000**	**490000**	**42.608%**

Part II: Sales Value After Further Processing Method:

Step 1: Apportionment Of Joint Cost

Product 1	Sales Value After Further Processing (₹) 2	Proportion 3	Shares Of Joint Cost (₹) 4
A	3,00,000	0.2608	130435
B	6,00,000	0.5217	260870
C	2,50,000	0.21739	108695
	11,50,000	**1**	**5,00,000**

Step 2: Gross Margin %

Product 1	Sales Value (₹) 2	Share Of Joint Cost (₹) 3	Further Processing Cost (₹) 4	Profit (₹) (2 – 3 – 4)	Gross Margin 6
A	3,00,000	(1,30,435)	(30000)	139565	46.52%
B	6,00,000	(2,60,870)	(80000)	259130	43.19%
C	2,50,000	(1,08,695)	(50000)	91305	36.52%
	1150000	**5,00,000**	**160000**	**490000**	**42.608%**

Part III: Net Realisable Value:

Step 1: Calculation of NRV

Product 1	Sale value after further processing (₹) 2	Further processing cost 3	NRV (₹) 4
A	300000	30000	270000
B	600000	80000	520000
C	250000	50000	200000
	1150000	**160000**	**990000**

Step 2: Apportionment Of Joint Cost

Product 1	NRV (₹) 2	Proportion 3	Shares Of Joint Cost (₹) 4
A	270000	0.2727	136364
B	520000	0.5252	262626
C	200000	0.2020	101010
	990000	**1**	**5,00,000**

Step 3: Gross Margin %

Product 1	Sales Value (₹) 2	Share Of Joint Cost (₹) 3	Further Processing Cost (₹) 4	Profit (₹) (2 – 3 – 4)	Gross Margin 6
A	3,00,000	(136364)	(30000)	133636	44.55%
B	6,00,000	(262626)	(80000)	257374	42.90%

C	2,50,000	(101010)	(50000)	98990	39.60%
	1150000	**(5,00,000)**	**(160000)**		**42.608%**

PROBLEM -3A: **(MTP 1 JAN 25)**

Petro Ltd. is a petroleum refining company which uses cracking process for producing gasoline, diesel and Heavy fuel oil (HFO). All three final products are extracted simultaneously at one common split-off point.

Gasoline and diesel are immediately available for sale upon separation, requiring no further processing. In contrast, heavy fuel oil (HFO) undergoes additional processing before it can be sold, as there is no market for it at the split-off point.

Throughout the year, the selling prices and total quantities sold for each item were as follows:

Product	Quantity sold (Gallons)	Selling Price per gallon (₹)
Gasoline	1,674	400
Diesel	4,743	300
Heavy fuel oil (HFO)	6,624	200

The selling prices listed above are projected to remain unchanged in the upcoming year.

The total joint manufacturing costs for the year amounted to ₹ 15,00,000, with an additional cost of ₹ 7,44,000 incurred for finishing Heavy fuel oil (HFO).

There were no opening inventories of gasoline, diesel and Heavy fuel oil (HFO). Though, at the end of the period, the following inventories of complete units were available: 1,620 gallons of gasoline, 540 gallons of diesel, and 225 gallons of Heavy fuel oil (HFO).

You are required to COMPUTE the following for gasoline, diesel and Heavy fuel oil (HFO)-

(i) joint cost allocated, and

(ii) cost of goods sold using Net Realisable Value Method of joint cost allocation.

SOLUTION:

(I) Statement Of Joint Cost Allocation Of Inventories Of Gasoline, Diesel And Heavy Fuel Oil (HFO)

(By Using Net Realisable Value Method) Products				
	Gasoline	**Diesel**	**Heavy Fuel Oil (HFO)**	**Total**
	(₹)	**(₹)**	**(₹)**	**(₹)**
Final Sales Value Of Total Production (Working Note 1)	13,17,600 (3,294 × ₹ 400)	15,84,900 (5,283 × ₹ 300)	13,69,800 (6,849 × ₹ 200)	**42,72,300**
Less: Additional Cost	-	-	(7,44,000)	**(7,44,000)**
Net Realisable Value (At Split-Off Point)	13,17,600	15,84,900	6,25,800	**35,28,300**
Joint Cost Allocated (Working Note 2)	5,60,156	6,73,795	2,66,049	**15,00,000**

(II) Cost Of Goods Sold

(By Using Net Realisable Value Method)

	Products			
	Gasoline	**Diesel**	**Heavy Fuel Oil (HFO)**	**Total**
	(₹)	**(₹)**	**(₹)**	**(₹)**
Allocated Joint Cost (From (I))	5,60,156	6,73,795	2,66,049	**15,00,000**
Additional Costs	--	--	7,44,000	**7,44,000**
Cost Of Goods Available For Sale (CGAS)	5,60,156	6,73,795	10,10,049	**22,44,000**
Less: Cost Of Ending Inventory (Working Note 1)	2,75,485 (CGAS × 49.18%)	68,862 (CGAS × 10.22%)	33,231 (CGAS × 3.29%)	**3,77,578**
Cost Of Goods Sold	**2,84,671**	**6,04,933**	**9,76,818**	**18,66,422**

Working Notes

1. Total Production Of Three Products For The Year

Products	Quantity Sold (In Gallon)	Quantity Of Ending Inventory (In Gallon)	Total Production	Ending Inventory Percentage (%)
(1)	(2)	(3)	(4) = [(2) + (3)}	(5) = (3) ÷ (4)
Gasoline	1,674	1,620	3,294	49.18
Diesel	4,743	540	5,283	10.22
Heavy Fuel Oil (HFO)	6,624	225	6,849	3.29

2. Joint Cost Apportioned To Each Product

$$\frac{\text{Total Joint Cost}}{\text{Net Realisable Value Of Each Product}} \times \text{Total Net Realisable Value}$$

Total Cost Of Gasoline	$\frac{₹\ 15,00,000}{₹\ 35,28,300} \times ₹\ 13,17,600$	₹ 5,60,156
Total Cost Of Diesel	$\frac{₹\ 15,00,000}{₹\ 35,28,300} \times ₹\ 15,84,900$	₹ 6,73,795
Total Cost Of Heavy Fuel Oil (HFO)	$\frac{₹\ 15,00,000}{₹\ 35,28,300} \times ₹\ 6,25,800$	₹ 2,66,049

PROBLEM – 4:

From the following information apportion marginal cost and fixed cost on a suitable basis and obtain profit/loss for each of the joint products –

Sales: A 100 kg @ ₹ 60 per kg and B 120 kg @ ₹ 30 per kg.

Total cost: Marginal cost ₹ 4,400 and Fixed cost ₹ 3,900.

SOLUTION:

The marginal cost (variable cost) of ₹ 4,400 is apportioned over the joint products A and B in the ratio of their physical quantity i.e 100 : 120

Marginal cost for Product A : ₹ 4,400 × $\frac{100}{220}$ = ₹ 2,000

Marginal cost for Product B : ₹ 4,400 × $\frac{120}{220}$ = ₹ 2,400

The fixed cost of ₹ 3,900 is apportioned over the joint products A and B in the ratio of their contribution margin i.e. 40 : 12

(Refer to working note)

Product A : ₹ 3,900 × 40 ÷ 52 = ₹ 3,000

Product B : ₹ 3,900 × 12 ÷ 52 = ₹ 900

Working Note:

Computation of contribution margin ratio

Products	Sales revenue	Marginal cost	Contribution
	(₹)	(₹)	(₹)
A	6,000	2,000	4,000
B	3,600	2,400 (Refer to above)	1,200

Contribution ratio is 40 : 12

PROBLEM – 5:

A factory produces three products from joint process namely Joint products A & B and by-product C. Joint cost incurred in the joint process is ₹ 5,25,000.

Other details are as follows:

A	**30,000 kg**
B	**20,000 kg**
C	**5,000 kg**

The by-product is further processed at a cost of ₹ 5,000 and sold for ₹ 6 per kg. Apportion the joint cost on the basis of physical units.

SOLUTION:

Step 1: Calculation By Product Income:

Sales Value = (5000 Kg x ₹ 6) = ₹ 30,000

(-) Further Processing Cost = ₹ (5000)

Net Realisable Value of By Product = ₹ 25000

Step 2: Apportionable Joint Cost

Joint Cost = ₹ 5,25,000

(-) Net Realisable Value of By Product = ₹ (25000)

Apportionable Joint Cost = ₹ 5,00,000

Step 3: Apportionment Of Joint Cost

Product	Units	Proportion	Share Of Joint Cost (₹)
A	30000	0.6	3,00,000
B	20000	0.4	2,00,000
	50000	**1**	**5,00,000**

Dr. Joint Process A/c Cr.

Particulars	Units	₹	Particulars	Units	₹
To Total Cost	55000	525000	By By - Product	5000	25000
			By Product A	30000	300000
			By Product B	20000	200000
	55000	**525000**		**55000**	**525000**

Dr. By Product Income A/c Cr.

Particulars	₹	Particulars	₹
To Further Processing Cost A/c	5000	By Bank A/c	30000
To Joint Process A/c	25000		
	30000		**30000**

PROBLEM – 6:

JP Ltd. uses joint production process that produces three products at the split -off point. Joint production costs during the month of July, 20x2 were ₹ 33,60,000. Product information for the month of July is as follows:

Particulars	Product A	Product B	Product C
Units produced	3,000	6,000	9,000
Sales prices:			
At the split-off	₹ 200		
After further processing	₹ 300	₹ 350	₹ 100
Costs to process after split-off	6,00,000	6,00,000	6,00,000

Other information is as follows:

Product C is a by-product and the company accounts for the by-product at net realizable value as a reduction of joint cost. Further, Product B & C must be processed further before they can be sold. FIND OUT the joint cost allocated to Product A in the month of July if joint cost allocation is based on Net Realizable Value.

SOLUTION:

Product A

As the question says that "Products B and C must be processed further before they can be sold", it means Product A can be sold at the split-off point.

Cost to process Product A after the split-off point = ₹ 6,00,000

Additional revenue to be earned by processing further = ₹ 3,00,000
(% 100 increase in selling price per unit x 3,000 units)

Therefore, Product A will not be processed further, and the sales value at split-off for A will be used for allocating the joint costs.

Sales value at the split-off for A = ₹ 6,00,000
(₹ 200 x 3,000 units)

Product B

Since Product B must be processed further, we use its net realizable value for the joint cost allocation.

Net realizable value of Product B = ₹ 15,00,000
[(₹ 350 x 6,000 units) — ₹ 6,00,000]
[further processing costs]

Product C

Product C, the by-product, must also be processed further to be sold.

Net realizable value of Product C = ₹ 3,00,000
[(₹ 100 x 9,000 units) - ₹ 6,00,000
[further processing costs]

Joint Cost Allocation

Joint production cost = ₹ 33,60,000

Since, by-product C is accounted for as a reduction to the joint costs, the joint costs to be allocated

= ₹ 30,60,000
(₹ 33,60.000 - ₹ 3,00,000 NRV of Product C)

Allocation of joint costs between Product A and B will be on the basis of
₹ 6.00,000 : ₹ 15,00,000

Joint Cost allocated to Product A = ₹ 30,60,000 x $\frac{₹\ 6,00,000}{₹\ 21,00,000}$ = ₹ 8,74,286

PROBLEM - 6A:

Smile company produces two main products and a by-product out of a joint process. The ratio of output quantities to input quantities of direct material used in the joint process remains consistent on yearly basis. Company has employed the physical volume method to allocate joint production costs to the main products. The net realizable value

of the by-product is used to reduce the joint production costs before the joint costs are allocated to the main products. Details of company's operation are given in the table below. During the month, company incurred joint production costs of ₹ 10,00,000/- The main products are not marketable at the split off point and thus have to be processed further.

Particulars	Product-A	Product-B	By product
Monthly output in kg.	60,000	1,20,000	50,000
Selling price per kg.	₹ 50	₹ 30	₹ 5
Process costs	₹ 2,00,000	₹ 3,00,000	

FIND OUT the amount of joint product cost that Smile company would allocate to the product-B by using the physical volume method to allocate joint production costs?

SOLUTION:

Calculation Of Net Joint Costs To Be Allocated:

Particulars	Amount (₹)
Joint Costs	10,00,000
Less: Net Realizable Value Of By-Product (50,000 × 5)	2,50,000
Net Joint Costs To Be Allocated	7,50,000

Therefore, Amount Of Joint Product Cost That Smile Company Would Allocate To The Product-B By Using The Physical Volume Method To Allocate Joint Production Costs:

$$\frac{\text{Physical Quantity of Product-B}}{\text{Total Quantity}} \times \text{Net Joint Costs To Be Allocated}$$

$$\frac{1,20,000 \text{ Units}}{1,80,000 \text{ units}} \times ₹\ 7,50,000 = ₹\ 5,00,000$$

PROBLEM – 6B: **(RTP Sept 24)**

Three products X, Y and Z along with a byproduct B are obtained again in a crude state which require further processing at a cost of ₹ 5 for X; ₹ 4 for Y; and ₹ 2.50 for Z per unit before sale. The byproduct is however saleable as such to a nearby factory. The selling prices for the three main products and byproduct, assuming they should yield a net margin of 25 percent of cost, are fixed at ₹ 13.75 ₹ 8.75 and ₹ 7.50 and ₹ 1.00 respectively – all per unit quantity sold.

During a period, the joint input cost including the material cost was ₹ 90,800 and the respective outputs were:

X	8,000 units
Y	6,000 units
Z	4,000 units
B	1,000 units

By product should be credited to the joint cost and only the net joint costs are to be allocated to the main products.

CALCULATE the joint cost per unit of each product and the margin available as a percentage on cost.

SOLUTION:

Working Notes:

(i) Computation of Allocation Ratio for Joint Costs

	Products		
	X ₹	Y ₹	Z. ₹
Selling Price	13.75	8.75	7.50
Less: anticipated margin @ 25% on cost of 20% on sales	2.75	1.75	1.50
Cost of sales	11.00	7.00	6.00
Less: post split off cost	5.00	4.00	2.50
Joint cost per unit	6.00	3.00	3.50
Output (units)	8,000	6,000	4,000
Total output cost	48,000	18,000	14,000
Allocation ratio for joint costs	24	9	7

(ii) Computation Of Net Allocable Joint Costs

	₹	₹
Joint Input Cost Including Material Cost		90,800
Less: Credit For Realization From By-Product B:		
Sales Revenue (1,000 × ₹ 1)	1,000	
Less: Profit @ 25% On Cost Or 20% On Sales	200	800
Net Joint Costs To Be Allocated		**90,000**

Determination Of Joint Cost Per Unit Of Each Product

Product	Net Joint Costs Allocation ₹	Output (Units) ₹	Joint Cost Per Unit ₹
X	54,000 (Note: 1)	8,000	6.75
Y	20,250	6,000	3.38
Z	15,750	4,000	3.94
	90,000		

Profit Margin Available On Each Product As A Percentage On Cost

Product	Joint Cost ₹	Post Spilt-Off Cost ₹	Total Cost ₹	Selling Price ₹	Margin ₹	Margin % On Cost ₹
X	6.75	5.00	11.75	13.75	2.00	17.02
Y	3.38	4.00	7.38	8.75	1.37	18.56
Z	3.94	2.50	6.44	7.50	1.06	16.46

Note: 1

$X = \frac{₹\,24}{₹\,40} \times ₹\,90,000 = ₹\,54,000$

$Y = \frac{₹\,9}{₹\,40} \times ₹\,90,000 = ₹\,20,250$

$Z = \frac{₹\,7}{₹\,40} \times ₹\,90,000 = ₹\,15,750$

₹ 90,000

Problem – 7:

From a joint process, two products A and B emerge. The joint cost incurred in the joint process is ₹ 1,00,000. Other details are as follows:

PRODUCTS	UNITS	SP AT SPLIT OFF	SP AFTER FURTHER PROCESSING	FURTHER PROCESSING COST
A	50,000	₹ 10	₹ 12	₹ 1,50,000
B	50,000	₹ 10	₹ 15	₹ 1,50,000

Advise the stage of production at which the joint products should be sold.

SOLUTION:

Further Process Or Not Decision:

Product	Sales Value After Further Process (₹)	Sales Value At Split Off Profit (₹)	Incremental Sales (₹) (A)	Further Processing Cost (B)	Net Benefit (A –B)	
A	600000	5,00,000	1,00,000	(1,50,000)	(50,000)	
B	750000	5,00,000	2,50,000	(1,50,000)	1,00,000	

Since Product A Has A Negative Net Benefit It Should Be Sold @ Split Off Point.

Product B Has A Positive Net Benefit And Hence Should Be Sold After Further Processing.

Note: For Further Process Or Not Decision The Joint Cost Is Irrelevant.

Problem – 7A:

'Buttery Butter' is engaged in the production of Buttermilk, Butter and Ghee. It purchases processed cream and let it through the process of churning until it separates into buttermilk and butter. For the month of January, 'Buttery Butter' purchased 50 Kilolitre processed cream @ ₹ 100 per 1000 ml. Conversion cost of ₹ 1,00,000 were incurred up-to the split off point, where two saleable products were produced i.e. buttermilk and butter. Butter can be further processed into Ghee.

The January production and sales information is as follows:

Products	Production (in Kiloliter/tonne)	Sales Quantity (in Kiloliter/tonne)	Selling price per Litre/Kg (₹)
Buttermilk	28	28	30
Butter	20	—	—
Ghee	16	16	480

All 20 tonne of butter were further processed at an incremental cost of ₹ 1,20,000 to yield 16 Kiloliter of Ghee. There was no opening or closing inventories of buttermilk, butter or ghee in the month of January.

Required:

i. **SHOW how joint cost would be apportioned between Buttermilk and Butter under Estimated Net Realizable Value method.**

ii. **'Healthy Bones' offers to purchase 20 tonne of butter in February at ₹ 360 per kg. In case 'Buttery Butter' accepts this offer, no Ghee would be produced in**

February. SUGGEST whether 'Buttery Butter' shall accept the offer affecting its operating income or further process butter to make Ghee itself?

SOLUTION:

Estimated Net Realisable Value Method:

	Buttermilk Amount (₹)	Butter Amount (₹)
Sales Value	8,40,000	76,80,000
	(₹ 30 × 28 × 1000)	(₹ 480 × 16 × 1000)
Less: Post split-off cost (Further processing cost)	-	(1,20,000)
Net Realisable Value	**8,40,000**	**75,60,000**
Apportionment of Joint Cost of ₹ 51,00,000* in ratio of 1:9	5,10,000	45,90,000

* [(₹ 100 × 50 × 1000) + ₹ 1,00,000] = ₹ 51,00,000

(ii) Incremental revenue from further processing of Butter into Ghee

(₹ 480 × 16 × 1000 - ₹ 360 × 20 × 1000)	₹ 4,80,000
Less: Incremental cost of further processing of Butter into Ghee	₹ 1,20,000
Incremental operating income from further processing	**₹ 3,60,000**

The Operating Income Of 'Buttery Butter' Will Be Reduced By ₹ 3,60,000 In February If It Sells 20 Tonne of Butter To 'Healthy Bones', Instead of Further Processing of Butter into Ghee for Sale. Thus, 'Buttery Butter' Is Advised Not to Accept the Offer and Further Process Butter to Make Ghee Itself.

Problem – 7B:

RST Limited produces three joint products X, Y and Z. The products are processed further. Pre-separation costs are apportioned on the basis of weight of output of each joint product. The following data are provided for a particular month:

Cost incurred up to separation point: ₹ 10,000

Output (in Litre)	Product X 100 ₹	Product Y 70 ₹	Product Z 80 ₹
Cost incurred after separation point	2,000	1,200	800
Selling Price per Litre: After further processing	50	80	60
At pre-separation point (estimated)	25	70	45

You are required to:

i. **Prepare a statement showing profit or loss made by each product after further processing using the presently adopted method of apportionment of pre-separation cost.**

ii. **Advise the management whether, on purely financial consideration, the three products are to be processed further or not.**

SOLUTION:

(I) Statement Showing Profit/Loss By Each Product After Further Processing Products

	Product X (In ₹)	**Product Y (In ₹)**	**Product Z (In ₹)**
Sales Value After Further Processing	5,000	5,600	4,800
Less: Further Processing Cost	2,000	1,200	800
Less: Joint Cost* (As Apportioned)	4,000	2,800	3,200
Profit/(Loss)	**(1,000)**	**1,600**	**800**

* Statement Showing Apportionment Of Joint Cost On The Basis Of Physical Units

	Product X (In ₹)	**Product Y (In ₹)**	**Product Z (In ₹)**	**Total (₹)**
Output (In Litre)	100	70	80	250
Weight	0.4 (100 ÷ 250)	0.28 (70 ÷ 250)	0.32 (80 ÷ 250)	
Joint Cost Apportioned	**4,000**	**2,800**	**3,200**	

(II) Decision Whether To Process Further Or Not

	Product X (In ₹)	**Product Y (In ₹)**	**Product Z (In ₹)**
Incremental Revenue	2,500 [(50 - 25) × 100]	700 [(80 - 70) × 70]	1,200 [(60 - 45) × 80]
Less: Further Processing Cost	2,000	1,200	800
Incremental Profit /(Loss)	**500**	**(500)**	**400**

	Product X (In ₹)	Product Y (In ₹)	Product Z (In ₹)	Total
Sales	2500	4900	3600	11000
Pre Separation Costs	4000	2800	3200	10000
Profit/(Loss)	**(1500)**	**2100**	**400**	**1000**

It Is Advisable to Further Process Only Product X And Z And to Sale Product Y At The Point Of Separation.

Problem – 7C:

OPR Ltd. purchases crude vegetable oil. It does refining of the same. The refining process results in four products at the spilt-off point - S, P, N and A. Product 'A' is fully processed at the split-off point. Product S, P and N can be individually further refined into SK, PM, and NL respectively. The joint cost of purchasing the crude vegetable oil and processing it were ₹ 40,000 which is apportioned on the basis of Sales Value at split-off point. Other details are as follows:

Product	Further processing costs (₹)	Sales at split-off point (₹)	Sales after further processing (₹)
S	80,000	20,000	1,20,000
P	32,000	12,000	40,000
N	36,000	28,000	48,000
A	-	20,000	-

You are required to identify the products which can be further processed for maximizing profits and make suitable suggestions.

SOLUTION:

Statement Of Comparison Of Profits Before And After Further Processing

	S (₹)	P (₹)	N (₹)	A (₹)	Total (₹)
A. Sales At Split Off Point	20,000	12,000	28,000	20,000	80,000
B. Apportioned Joint Costs (Refer Working Note)	**10,000**	**6,000**	**14,000**	**10,000**	40,000
C. **Profit At Split-Off Point**	10,000	6,000	14,000	10,000	40,000
D. Sales After Further Processing	1,20,000	40,000	48,000	-	2,08,000

E. Further Processing Cost	80,000	32,000	36,000	-	1,48,000
F. Apportioned Joint Costs (Refer Working Note)	10,000	6,000	14,000	-	-
G. **Profit If Further Processing (D – E + F)**	**30000**	**2,000**	**(-)2,000**	-	-
H. Increase/ Decrease In Profit After Further Processing (G - C)	20,000	- 4000	- 16,000	-	-

Suggested Product To Be Further Processed For Maximising Profits:

On Comparing The Figures Of "Profit If No Further Processing" And "ProfitsIf Further Processing", One Observes That OPR Ltd. Is Earning More After Further Processing Of Product S Only that is ₹ 20,000. Hence, For Maximizing Profits, Only Product S Should Be Further Processed And Product P, N AndA Should Be Sold At Split-Off Point.

Working Note:

Apportionment Of Joint Costs On The Basis Of Sales Value At Split-Off Point

$$\text{Apportioned Joint Cost} = \frac{\text{Total Joint Cost}}{\text{Total Sales Value At Split - Off Point}} \times \text{Sales Value Of Each Product}$$

Where,

Total Joint Cost = ₹ 40,000

Total Sales at Split Off Point (S, P, N And A) = ₹ 20,000 + ₹ 12,000 + ₹ 28,000 + ₹ 20,000 = ₹ 80,000

$$\text{Share Of S In Joint Cost} = \frac{₹\,40,000}{₹\,80,000} \times ₹\,20,000 = ₹\,10,000$$

$$\text{Share Of P In Joint Cost} = \frac{₹\,40,000}{₹\,80,000} \times ₹\,12,000 = ₹\,6,000$$

$$\text{Share Of N In Joint Cost} = \frac{₹\,40,000}{₹\,80,000} \times ₹\,28,000 = ₹\,14,000$$

$$\text{Share Of A In Joint Cost} = \frac{₹\,40,000}{₹\,80,000} \times ₹\,20,000 = ₹\,10,000$$

PROBLEM – 8:

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 ₹ 40,000. Conversion cost of ₹ 60,000 were incurred up to the split off point, at which time two sealable products were produced. Chlorine can be further processed into PVC.

The July production and sales information is as follows:

	Production (in tonne)	Sales Quantity (in tonne)	Selling price per tonne (₹)
Caustic Soda	1,200	1,200	50
Chlorine	800	—	—
PVC	500	500	200

All 800 tonnes of Chlorine were further processed, at an incremental cost of ₹ 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 ₹ 75 per tonne.

Required:

1. SHOW how joint cost of ₹ 1,00,000 would be apportioned between Caustic Soda and Chlorine under each of following methods:
   a. sales value at split- off point;
   b. physical unit method, and
   c. estimated net realisable value.
2. Lifetime Swimming Pool Products offers to purchase 800 tonnes of Chlorine in August at ₹ 75 per tonne. This sale of Chlorine would mean that no PVC would be produced in August. EXPLAIN how the acceptance of this offer for the month of August would affect operating income?

SOLUTION:

1.

a. Sales Value At Split- Off Point Method

Products	Sales (In Tonne)	Selling Price Per Tonne (₹)	Sales Revenue (₹)	Joint Cost Apportioned (₹)
Caustic Soda	1,200	50	60,000	50,000
Chlorine	800	75	60,000	50,000
			1,20,000	**1,00,000**

Apportionment Of Joint Cost

$$\frac{\text{Total Joint Cost}}{\text{Total Sale Value}} \times \text{Sale Revenue Of Each Product}$$

$$\text{Joint Cost Apportioned To Caustic Soda} = \frac{₹\,1,00,000}{₹\,1,20,000} \times ₹\,60,000 = ₹\,50,000$$

Joint Cost Apportioned To Chlorine $= \frac{₹\ 1,00,000}{₹\ 1,20,000} \times ₹\ 60,000 = ₹\ 50,000$

b. Physical Measure Method

Products	Sales (In Tonne)	Joint Cost Apportioned (₹)
Caustic Soda	1,200	60,000
Chlorine	800	40,000
		1,00,000

Apportionment Of Joint Cost

$\frac{\text{Total Joint Cost}}{\text{Total Physical Value}} \times$ Physical Units Of Each Product

Joint Cost Apportioned To Caustic Soda $= \frac{₹\ 1,00,000}{2,000\ \text{Tonnes}} \times 1,200\ \text{Tonnes} = ₹\ 60,000$

Joint Cost Apportioned To Chlorine $= \frac{₹\ 1,00,000}{2,000\ \text{Tonnes}} \times 800\ \text{Tonnes} = ₹\ 40,000$

c. Estimated Net Realisable Value Method:

	Caustic Soda Amount (₹)	Chlorine Amount (₹)
Sales Value	60,000 (₹ 50 × 1,200 Tonnes)	1,00,000 (₹ 200 × 500 Tonnes)
Less: Post Split-Off Cost (Further Processing Cost)	-	(20,000)
Net Realisable Value	**60,000**	**80,000**
Apportionment Of Joint Cost Of ₹ 1,00,000 In Ratio Of 3:4	42,857	57,143

2. Incremental Revenue From Further Processing Of Chlorine Into PVC

(500 Tonnes × ₹ 200 – 800 Tonnes × ₹ 75)	₹ 40,000
Less: Incremental Cost Of Further Processing Of Chlorine Into PVC	₹ 20,000
Incremental Operating Income From Further Processing	**₹ 20,000**

The Operating Income Of Inorganic Chemicals Will Be Reduced By ₹20,000 In August If It Sells 800 Tonnes Of Chlorine To Lifetime Swimming Pool Products, Instead Of Further Processing Of Chlorine Into PVC For Sale.

PROBLEM – 8A: **(PYP MAY 24)**

A company produces two products, A and B, through a joint production process. The total joint production cost incurred is as under:

Material	**₹ 20,000**
Labour	**₹ 10,000**
Variable overheads	**₹ 6,000**
Fixed Overheads	**₹ 24,000**

Product A and B can be sold for ₹ 20 per unit and ₹ 15 per unit respectively at split off point. The produced quantities are Product A-2,000 units and Product B – 4,000 units.

(i) You are required to calculate the joint production cost allocation for each product using the:

(a) Physical unit method.

(b) Contribution margin method.

(ii) Product B can be further processed by incurring expenditure of ₹ 12,000. Loss in further processing is 2%. It can be sold @ ₹ 18 per unit. Explain the impact on profitability if Product B is further processed.

SOLUTION:

Working

Calculation Of Joint Cost

Description	**Amount (₹)**
Material	20,000
Labour	10,000
Variable Overheads	6,000
Total Variable Cost	**36,000**
Fixed Overheads	24,000
Total Joint Cost	**60,000**

(i)

(A) Allocation Of Joint Cost Using Physical Unit Method:

Product A = ₹ 60,000 × 2,000 ÷ 6,000 = ₹ 20,000

Product B = ₹ 60,000 × 4,000 ÷ 6,000 = ₹ 40,000

(B) Allocation Of Joint Cost Using Contribution Margin Method:

	Description	**Product-A**	**Product-B**
	Units Produced	2,000	4,000
	Selling Price Per Unit (₹)	20	15
A	**Sales Value (₹)**	**40,000**	**60,000**

B	**Allocation Of Joint Variable Cost On The Basis Of Physical Unit**		
	₹ 36,000 × 2,000 ÷ 6,000	(12,000)	
	₹ 36,000 × 4,000 ÷ 6,000		(24,000)
C (A – B)	**Contribution**	**28,000**	**36,000**
D	**Allocation Of Fixed Joint Cost On The Basis Of Contribution Margin**		
	₹ 24,000 × 28,000 ÷ 64,000	(10,500)	
	₹ 24,000 × 36,000 ÷ 64,000		(13,500)
C - D	**Profit At Split Off Point**	**17,500**	**22,500**

Allocation Of Joint Cost On The Basis Of Contribution Margin Method:

Particulars	Product A	Product B
Allocation Of Variable Cost	₹ 12,000	₹ 24,000
Allocation Of Fixed Cost	₹ 10,500	₹ 13,500
Total Joint Cost	**₹ 22,500**	**₹ 37,500**

(ii) Profitability After Further Processing Of Product B

Description	Amount (₹)
Units Produced And Sold 98% Of 4,000 Units	3,920
Selling Price Per Unit (₹)	18
Sales Value (₹)	**70,560**
Joint Cost Upto Split Off Point	(37,500)
Further Processing Cost	(12,000)
Profit After Further Processing	**21,060**

Calculation Of The Profitability After Further Processing Of Product B Can Also Be Done In The Following Manner:

Profitability After Further Processing Of Product B

Description	Amount (₹)
Incremental Revenue On Further Processing (3,920 x ₹ 18) - (4,000 x ₹ 15)	10,560
Further Processing Cost	(12,000)
Incremental Loss After Further Processing	**1,440**

Impact On Profitability On Product B

If Product B Is Sold At Split Off Point It Earns Profit Of ₹ 22,500, But After Further Processing The Profit Is Reduced To ₹ 21,060 that is an Opportunity Loss Of ₹ 1,440/-.

PROBLEM – 9:

Sun-moon Ltd. produces and sells the following products:

Products	Units	Selling price at split-off point (₹)	Selling price after further processing (₹)
A	2,00,000	17	25
B	30,000	13	17
C	25,000	8	12
D	20,000	10	-
E	75,000	14	20

Raw material costs ₹ 35,90,000 and other manufacturing expenses cost ₹ 5,47,000 in the manufacturing process which are absorbed on the products on the basis of their 'Net realizable value'. The further processing costs of A, B, C and E are ₹ 12,50,000; ₹ 1,50,000; ₹ 50,000 and ₹ 1,50,000 respectively. Fixed costs are ₹ 4,73,000.

You are required to PREPARE the following in respect of the coming year:

1. **Statement showing income forecast of the company assuming that none of its products are to be further processed.**
2. **Statement showing income forecast of the company assuming that products A, B, C and E are to be processed further.**
3. **Can you suggest any other production plan whereby the company can maximise its profits? If yes, then submit a statement showing income forecast arising out of adoption of that plan.**

SOLUTION:

Working Note:

Apportionment of joint costs on the basis of Net Realisable Value method

Products	Sales Value (₹)	Post separation Cost (₹)	Net Realisable Value (₹)	Apportioned Cost (₹)
A	50,00,000 (2,00,000 units × ₹ 25)	12,50,000	37,50,000	26,25,000
B	5,10,000 (30,000 units × ₹ 17)	1,50,000	3,60,000	2,52,000

C	3,00,000 (25,000 units × ₹ 12)	50,000	2,50,000	1,75,000
D	2,00,000 (20,000 units × ₹ 10)	—	2,00,000	1,40,000
E	15,00,000 (75,000 units × ₹ 20)	1,50,000	13,50,000	9,45,000
			59,10,000	**41,37,000**

Total joint cost = Raw material costs + Manufacturing expenses

= ₹ 35,90,000 + ₹ 5,47,000 = ₹ 41,37,000

Apportioned Joint Cost

$$= \frac{\text{Total Joint Cost}}{\text{Total Net Realisable Value}} \times \text{Net Realisable Value Of Each Product}$$

Apportioned Joint Cost For Product A

$$= \frac{₹\,41,37,000}{₹\,59,10,000} \times ₹\,37,50,000 = ₹\,26,25,000$$

Similarly, The Apportioned Joint Cost For Products B, C, D And E Are ₹ 2,52,000, ₹ 1,75,000, ₹ 1,40,000 And ₹ 9,45,000 Respectively.

A) Statement Showing Income Forecast Of The Company Assuming That None Of Its Products Are Further Processed

	Products					**Total (₹)**
	A (₹)	**B (₹)**	**C (₹)**	**D (₹)**	**E (₹)**	
Sales Revenue	34,00,000 (₹ 17 × 2,00,000)	3,90,000 (₹ 13 × 30,000)	2,00,000 (₹ 8 × 25,000)	2,00,000 (₹ 10 × 20,000)	10,50,000 (₹ 14 × 75,000)	52,40,000
Less: Apportioned Costs (Refer Working Note)	26,25,000	2,52,000	1,75,000	1,40,000	9,45,000	41,37,000
	7,75,000	**1,38,000**	**25,000**	**60,000**	**1,05,000**	**11,03,000**
Less: Fixed Cost						4,73,000
Profit						**6,30,000**

B) Statement Showing Income Forecast Of The Company: Assuming That Products A, B, C And E Are Further Processed (Refer To Working Note)

	Products					Total (₹)
	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)	
A. Sales Revenue	50,00,000	5,10,000	3,00,000	2,00,000	15,00,000	75,10,000
B. Apportioned Costs	26,25,000	2,52,000	1,75,000	1,40,000	9,45,000	41,37,000
C. FurtherProcessing Cost	12,50,000	1,50,000	50,000	-	1,50,000	16,00,000
D. Total Processing Cost (B + C)	38,75,000	4,02,000	2,25,000	1,40,000	10,95,000	57,37,000
E. Excess Of Sales Revenue(A - D)	11,25,000	1,08,000	75,000	60,000	4,05,000	17,73,000
F. Fixed Cost						4,73,000
G. Profit (E - F)						**13,00,000**

Suggested Production Plan For Maximising Profits:

On Comparing The Figures Of Excess Of Revenue Over Cost Of ManufacturingIn The Above Statements One Observes That The Concern Is Earning More After Further Processing Of A, C And E Products But Is Loosing A Sum Of ₹ 30,000 In The Case Of Product B (If It Is Processed Further). Hence The Best Production Plan Will Be To Sell A, C And E After Further Processing AndB And D At The Point Of Split Off. The Profit Statement Based On This Suggested Production Plan Is As Below:

Profit Statement Based On Suggested Production Plan

	Products					
	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)	Total (₹)
A. Sales Revenue	50,00,000	3,90,000	3,00,000	2,00,000	15,00,000	73,90,000
B. Apportioned Costs	26,25,000	2,52,000	1,75,000	1,40,000	9,45,000	41,37,000
C. Further Processing Cost	12,50,000	-	50,000	-	1,50,000	14,50,000
D. Total Processing Cost(B+ C)	38,75,000	2,52,000	2,25,000	1,40,000	10,95,000	55,87,000
E. Excess Of Sales Revenue (A-D)	11,25,000	1,38,000	75,000	60,000	4,05,000	18,03,000

F. Fixed Cost						4,73,000
G. Profit (E - F)						**13,30,000**

Hence The Profit Of The Company Has Increased By ₹ 30,000.

PROBLEM – 9A: (MTP 1 SEP 24)

A company manufactures one main product (MN) and two by-products AB and PQ. For the month of January 2024, following details are available:

Total Cost upto separation Point ₹ 2,12,400

	MN	AB	PQ
Cost after separation	-	₹ 35,000	₹ 24,000
No. of units produced	4,000	1,800	3,000
Selling price per unit	₹ 100	₹ 40	₹ 30
Estimated net profit as percentage to sales value	-	20%	30%
Estimated selling expenses as percentage to sales value	30%	15%	15%

There are no beginning or closing inventories. PREPARE statement showing:

(i) Allocation of joint cost; and

(ii) Product-wise and overall profitability of the company for January 2024. (6 Marks)

SOLUTION:

i) Statement Showing Allocation Of Joint Cost

Particulars	AB	PQ
No. Of Units Produced	1,800	3,000
Selling Price Per Unit (₹)	40	30
Sales Value (₹)	**72,000**	**90,000**
Less: Estimated Profit (AB -20% & PQ - 30%)	(14,400)	(27,000)
Cost Of Sales	**57,600**	**63,000**
Less: Estimated Selling Expenses (AB -15% & PQ -15%)	(10,800)	(13,500)
Cost Of Production	**46,800**	**49,500**
Less: Cost After Separation	(35,000)	(24,000)
Joint Cost Allocated	**11,800**	**25,500**

ii) Statement Of Profitability

Particulars	MA (₹)	AB (₹)	PQ (₹)
Sales Value (A)	4,00,000 (4,000 x ₹ 100)	72,000	90,000
Less:- Joint Cost	1,75,100 (2,12,400 - 11,800 - 25,500)	11,800	25,500
Cost After Separation	-	**35,000**	**24,000**
Selling Expenses (MA- 30%, AB-15% & PQ-15%)	1,20,000	10,800	13,500
(B)	**2,95,100**	**57,600**	**63,000**
Profit (A –B)	**1,04,900**	**14,400**	**27,000**

Overall Profit = ₹ 1,04,900 + ₹ 14,400 + ₹ 27,000 = ₹ 1,46,300

PROBLEM – 9B: **(RTP JAN 25)**

JPBP Ltd. manufactures two joint products A and B simultaneously from the same process. The process produces another product C which is recovered incidentally from the material used in the manufacture of A and B.

The expenditures incurred up to the point of separation i.e. split-off point are ₹ 14,82,000. As the joint products are capable of being measured in the same units, joint costs are allocated on the basis of physical unit.

Though the joint products A and B are saleable at split-off point, these can also be further processed and sold at a higher market price, with some sales promotion efforts. However, product C can be sold only after further processing.

The management is of the view that, as the net realisable value of the product C at split off point is too small, the value may be deducted from the joint production cost.

The relevant details of the products are as follows:

Particulars	Product A	Product B	Product C
Output (kg.)	16,250	8,125	1,625
Selling price at the split-off point (per kg.) (₹)	72	80	-
Further processing cost (per kg.) (₹)	16	20	8
Further marketing cost (per kg.) (₹)	8	8	4

Selling price after further processing (per kg.) (₹)	**112**	**104**	**24**

You are required the following:

(i) DETERMINE the profit/ (loss) of each joint product if these are sold without further processing.

(ii) WHETHER joint products be processed further? Decide on the basis of incremental profit/ (loss).

SOLUTION:

Workings -

1. Product C Is Produced Incidentally From The Material Used In The Manufacture Of A And B, Thus, Product C Is A By-Product.

	Per Unit (₹)
Selling Price After Further Processing (Per Kg.) (₹)	24
Less: Further Processing Cost (Per Kg)	8
Further Marketing Cost (Per Kg)	4
	12

Calculation Of Joint Cost To Be Borne By By-Product C

Joint Costs To Be Borne By By-Product C = Output (Kg.) x ₹ 12

= 1,625 Kg. × ₹ 12

= ₹ 19,500

2. Allocation Of Joint Cost Among Joint Products (On The Basis Of Physical Units) (Given)

Product A: (₹ 14,82,000 - ₹ 19,500) x $\left(\frac{16,250}{24,375}\right)$ = ₹ 9,75,000

Product B: (₹ 14,82,000 - ₹ 19,500) x $\left(\frac{8,125}{24,375}\right)$ = ₹ 4,87,500

i) Statement Of Profit/ (Loss) If Joint Products Are Sold Without Processing

Particulars	**Product A**	**Product B**	**Total**
(A) Output (Kg.)	16,250	8,125	
(B) Selling Price At The Split-Off Point (Per Kg.) (₹)	72	80	
(C) Sales Value (A) x (B)	11,70,000	6,50,000	18,20,000
(D) Allocation Of Joint Costs	9,75,000	4,87,500	14,62,500
(E) Profit At The Point Of Separation (C)-(D)	1,95,000	1,62,500	3,57,500

(ii) Further Processing Decision

Particulars	Product A (₹)	Product B (₹)
(A) Selling Price At Split Off	72	80
(B) Selling Price After Further Processing	112	104
(C) Incremental Revenue (B)-(A)	40	24
(D) Further Processing Cost	16	20
(E) Further Marketing Cost	8	8
(F) Incremental Cost (D)+(E)	24	28
(G) Incremental Profit/ (Loss) Per Kg (C) - (F)	16	(4)
(H) Total Incremental Profit/ (Loss)	₹ 16 x 16,250 Kg ₹ 2,60,000	(₹ 4) x 8,125 Kg (₹ 32,500)

Therefore, Product A Should Be Processed Further As They Give Incremental Profit. On The Other Hand, Product B Should Be Sold At Split-Off Point As They Suffer Incremental Losses After Further Processing.

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