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CHAPTER 1: COST SHEET

PART – A: ICAI PAST EXAM QUESTIONS

PROBLEM – 1 [MAY 23 – 10 Marks]

The following information is available from SN Manufacturing Limited's for the month of April 2023.

	April 1	April 30
Opening and closing inventories data:		
Stock of finished goods	2,500 units	?
Stock of raw materials	₹ 42,500	₹ 38,600
Work-in progress	₹ 42,500	₹ 42,800
Other data are:		
Raw materials Purchased		₹ 6,95,000
Carriage inward		₹ 36,200
Direct wages paid		₹ 3,22,800
Royalty paid for production		₹ 35,800
Purchases of special designs, moulds and patterns (estimated life 12 Production cycles)		₹ 1,53,600
Power, fuel and haulage (factory)		₹ 70,600
Research and development costs for improving the production process (amortized)		₹ 31,680
Primary packing cost (necessary to maintain quality)		₹ 6920
Administrative Overhead		₹ 46,765
Salary and wages for supervisor and foremen		₹ 28,000

Other information:

- Opening stock of finished goods is to be valued at ₹ 8.05 per unit.
- During the month of April, 1,52,000 units were produced and 1,52,600 units were sold. The closing stock of finished goods is to be valued at the relevant month's cost of production. The company follows the FIFO method.
- Selling and distribution expenses are to be charged at 20 paisa per unit.
- Assume that one production cycle is completed in one month.

Required:

(i) Prepare a cost sheet for the month ended on April 30, 2023 , showing the various elements of cost (raw material consumed, prime cost, factory cost, cost of production, cost of goods sold, and cost of sales).

(ii) Calculate the selling price per unit if profit is charged at 20 percent on sales.

PROBLEM – 2 [NOV 22 – 10 Marks]

PNME Ltd. manufactures two types of masks- 'Disposable Masks' and 'Cloth Masks'. The cost data for the year ended 31st March, 2022 is as follows:

	₹
Direct Materials	12,50,000
Direct Wages	7,00,000
Production Overhead	4,00,000
Total	23,50,000

It is further ascertained that:

- Direct material cost per unit of Cloth Mask was twice as much of Direct material cost per unit of Disposable Mask.
- Direct wages per unit for Disposable Mask were 60% of those for Cloth Mask.
- Production overhead per unit was at same rate for both the types of the masks.
- Administration overhead was 50% of Production overhead for each type of mask.
- Selling cost was ₹ 2 per Cloth Mask.
- Selling Price was ₹ 35 per unit of Cloth Mask.
- No. of units of Cloth Masks sold- 45,000
- No. of units of Production of
  Cloth Masks: 50,000
  Disposable Masks: 1,50,000

You are required to prepare a cost sheet for Cloth Masks showing:

(i) Cost per unit and Total Cost.

(ii) Profit per unit and Total Profit.

PROBLEM – 3 [MAY 22 – 10 Marks]

The following data are available from the books and records of A Ltd. for the month of April 2022:

Particulars	Amount (₹)
Stock of raw materials on 1st April 2022	10,000
Raw materials purchased	2,80,000
Manufacturing wages	70,000
Depreciation on plant	15,000
Expenses paid for quality control check activities	4,000
Lease Rent of Production Assets	10,000
Administrative Overheads (Production)	15,000
Expenses paid for pollution control and engineering & maintenance	1,000
Stock of raw materials on 30th April 2022	40,000
Primary packing cost	8,000

Research & development cost (Process related)	5,000
Packing cost for redistribution of finished goods	1,500
Advertisement expenses	1,300

Stock of finished goods as on 1st April 2022 was 200 units having a total cost of ₹ 28,000. The entire opening stock of finished goods has been sold during the month.Production during the month of April, 2022 was 3,000 units. Closing stock of finished goods as on 30th April, 2022 was 400 units.

You are required to:

I. Prepare a Cost Sheet for the above period showing the:

- **(i)** Cost of Raw Material consumed
- **(ii)** Prime Cost
- **(iii)** Factory Cost
- **(iv)** Cost of Production
- **(v)** Cost of goods sold
- **(vi)** Cost of Sales

II. Calculate selling price per unit, if sale is made at a profit of 20% on sales.

PROBLEM – 4 [DEC 21 10 marks & RTP NOV 19]

G Ltd. manufactures leather bags for office and school purposes.

The following information is related with the production of leather bags for the month of September, 2021.

(1) Leather sheets and cotton clothes are the main inputs and the estimated requirement per bag is two metres of leather sheets and one metre of cott on cloth. 2,000 metre of leather sheets and 1,000 metre of cotton cloths are purchased at
₹ 3,20,000 and ₹ 15,000 respectively. Freight paid on purchases is ₹ 8,500.

(2) Stitching and finishing need 2,000 man hours at ₹ 80 per hour.

(3) Other direct costs of ₹ 10 per labour hour is incurred.

(4) G Ltd. have 4 machines at a total cost of ₹ 22,00,000. Machines have a life of 10 years with a scrap value of 10% of the original cost. Depreciation is charged on a straight-line method.

(5) The monthly cost of administration and sales office staffs are ₹ 45,000 and ₹ 72,000 respectively. G Ltd. pays ₹ 1,20,000 per month as rent for a 2,400 sq. feet factory premises. The administrative and sales office occupies 240 sq. feet and 200 sq. feet respectively of factory space.

(6) Freight paid on delivery of finished bags is ₹ 18,000.

(7) During the month, 35 kgs of scrap (cuttings of leather and cotton) are sold at ₹ 150 per kg.

(8) There are no opening and closing stocks of input materials. There is a finished stock of 100 bags in stock at the end of the month.

You are required to prepare a cost sheet in respect of above for the month of September 2021 showing:

(i) Cost of Raw Material Consumed

(ii) Prime Cost

(iii) Works/Factory Cost

(iv) Cost of Production

(v) Cost of Goods Sold

(vi) Cost of Sales

PROBLEM – 5 [JUL 21 – 10 Marks]

The following data relates to manufacturing of a standard product during the month of March, 2021:

Particulars	**Amount (in ₹)**
Stock of Raw material as on 01-03-2021	80,000
Work in Progress as on 01-03-2021	50,000
Purchase of Raw material	2,00,000
Carriage Inwards	20,000
Direct Wages	1,20,000
Cost of special drawing	30,000
Hire charges paid for Plant	24,000
Return of Raw Material	40,000
Carriage on return	6,000
Expenses for participation in Industrial exhibition	8,000
Legal charges	2,500
Salary to office staff	25,000
Maintenance of office building	2,000
Depreciation on Delivery van	6,000
Warehousing charges	1,500
Stock of Raw material as on 31-03-2021	30,000
Stock of Work in Progress as on 31-03-2021	24,000

- Store overheads on materials are 10% of material consumed.
- Factory overheads are 20% of the Prime cost.
- 10% of the output was rejected and a sum of ₹ 5,000 was realized on sale of scrap.
- 10% of the finished product was found to be defective and the defective products were rectified at an additional expenditure which is equivalent to 20% of proportionate direct wages.
- The total output was 8000 units during the month.

You are required to prepare a Cost Sheet for the above period showing the:

(i) Cost of Raw Material consumed.

(ii) Prime Cost

(iii) Work Cost

(iv) Cost of Production

(v) Cost of Sales

PROBLEM – 6 [JAN 21 – 10 Marks]

The following data are available from the books and records of Q Ltd. for the month of April 2020:

Direct Labour Cost = ₹ 1,20,000 (120% of Factory Overheads)

Cost of Sales = ₹ 4,00,000

Sales = ₹ 5,00,000

Accounts show the following figures:

	1st April, 2020 (₹)	30th April, 2020 (₹)
Inventory:		
Raw material	20,000	25,000
Work-in-progress	20,000	30,000
Finished goods	50,000	60,000
Other details:		
Selling expenses		22,000
General & Admin. Expenses		18,000

You are required to prepare a cost sheet for the month of April 2020 showing:

(i) Prime Cost

(ii) Works Cost

(iii) Cost of Production

(iv) Cost of Goods sold

(v) Cost of Sales and Profit earned.

PROBLEM – 7 [NOV 20 – 10 Marks]

X Ltd. manufactures two types of pens 'Super Pen' and 'Normal Pen'. The cost data for the year ended 30th September, 2019 is as follows:

Particulars	(₹)
Direct Materials	8,00,000
Direct Wages	4,48,000
Production Overhead	1,92,000
Total	14,40,000

It is further ascertained that:

1. Direct materials cost in Super Pen was twice as much of direct material in Normal Pen.

2. Direct wages for Normal Pen were 60% of those for Super Pen.

3. Production overhead per unit was at same rate for both the types.

4. Administration overhead was 200% of direct labour for each.

5. Selling cost was ₹ 1 per Super pen.

6. Production and sales during the year were as follow:

Production		Sales	
	No. of units		No. of units
Super Pen	40,000	Super Pen	36,000
Normal Pen	1,20,000		

7. Selling price was ₹ 30 per unit for Super Pen.

Prepare a Cost Sheet for 'Super Pen' showing:

(i) Cost per unit and Total Cost

(ii) Profit per unit and Total Profit

PROBLEM – 8 [NOV 19 – 10 Marks]

XYZ a manufacturing firm has revealed following information for September, 2019:

	1st September	30th September
Raw Materials	₹2,42,000	₹2,92,000
Works-in-progress	₹2,00,000	₹5,00,000

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

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

Defective output which is 4% of targeted production, realizes ₹ 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.

You are required to:

(i) Calculate the Value of material purchased

(ii) Prepare cost sheet showing the profit earned by the firm.

PROBLEM – 9 [MAY 19 – 10 Marks]

M/s Areeba Private Limited has a normal production capacity of 36,000 units of toys per annum. The estimated costs of production are as under:

(i) Direct Material ₹ 40 per unit

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

(iii) Factory Overheads:

- **a.** Fixed ₹ 3,60,000 per annum
- **b.** Variable ₹ 10 per unit
- **c.** Semi-variable ₹ 1,08,000 per annum up to 50% capacity and additional 46,800 for every 20% increase in capacity or any part thereof.

(iv) Administrative Overheads ₹ 5,18,400 per annum (fixed)

(v) Selling overheads are incurred at ₹ 8 per unit.

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

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

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

You are required to:

(i) Prepare a cost sheet showing Prime Cost, Works Cost, Cost of Production and Cost of Sales.

(ii) Calculate the selling price per unit for remaining nine months to achieve the total annual profit of ₹ 8,76,600.

PROBLEM – 10 [NOV 18 – 10 Marks]

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

(i)	Direct expenses	₹ 1,80,000
(ii)	Direct wages being 175% of factory overheads	₹ 2,57,250
(iii)	Cost of goods sold	₹ 18,75,000
(iv)	Selling & distribution overheads	₹ 60,000
(v)	Sales	₹ 22,10,000
(vi)	Administration overheads are 10% of factory overheads	

Stock details as per Stock Register:

Particulars	**30.06.2018**	**30.09.2018**
Raw material	2,45,600	2,08,000
Work-in-progress	1,70,800	1,90,000
Finished goods	3,10,000	2,75,000

You are required to prepare a cost sheet showing:

(i) Raw material consumed

(ii) Prime cost

(iii) Factory cost

(iv) Cost of goods sold

(v) Cost of sales and profit

PROBLEM – 11 [MAY 18 – 10 Marks]

Following information relate to a manufacturing concern for the year ended 31st March, 2018:

PARTICULARS	₹
Raw Material (opening)	2,28,000
Raw Material (closing)	3,05,000
Purchases of Raw Material	42,25,000
Freight Inwards	1,00,000
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)-1217 Units	6,08,500
Sale of scrap of material	8,000

The firm produced 14000 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 14153 units at a price of ₹ 618 per unit during the year.

Prepare cost sheet of the firm.

PART – B: (REVISION TEST PAPERS)

PROBLEM – 12 [NOV 23 & MAY 22]

A Ltd. produces a single product X. During the month of July 2023, the company has produced 14,560 tonnes of X. The details for the month of July 2023 are as follows:

(i) Materials consumed ₹ 15,00,000

(ii) Power consumed in operating production machinery 13,000 Kwh @ ₹ 7 per Kwh

(iii) Diesels consumed in operating production machinery 1,000 litres @ ₹ 93 per litre

(iv) Wages & salary paid – ₹ 64,00,000

(v) Gratuity & leave encashment paid – ₹ 44,20,000

(vi) Hiring charges paid for Heavy Earth Moving machines (HEMM) engaged in production - ₹ 13,00,000. Hiring charges is paid on the basis of production.

(vii) Hiring charges paid for cars used for official purpose – ₹ 80,000

(viii) Reimbursement of diesel cost for the cars – ₹ 20,000

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

(x) Maintenance cost paid for weighing bridge (used for weighing of final goods at the time of despatch) – ₹ 7,000

(xi) AMC cost of CCTV installed at weighing bridge (used for weighing of final goods at the time of despatch) and factory premises is ₹ 6,000 and ₹ 18,000 per month respectively.

(xii) TA/ DA and hotel bill paid for sales manager- ₹ 16,000

(xiii) The company has 180 employees works for 26 days in a month.

Required:

PREPARE a Cost sheet for the month of July 2023.

PROBLEM – 13 [MAY 23 & MAY 20 RTP]

From the following data of Motilal Ltd., CALCULATE Cost of production:

		(₹)
(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

PROBLEM – 14 [NOV 22]

CT Limited is engaged in producing medical equipment. It has furnished following details related to its products produced during a month:

	Units	Amount (₹)
Raw materials		
Opening stock	1,000	90,00,000
Purchases	49,000	44,10,00,000
Closing stock	1,750	1,57,50,000
Works-in-progress		
Opening	2,000	1,75,50,000
Closing	1,000	94,50,000
Direct employees' wages, allowances etc.		6,88,50,000
Primary packaging cost (per unit)		1,440
R&D expenses & Quality control expenses		2,10,60,000
Consumable stores, depreciation on plant		3,42,00,000
Administrative overheads related to production		3,15,00,000
Selling expenses		4,84,30,800
Royalty paid for production		3,64,50,000
Cost of web-site (for online sale) maintenance		60,75,000
Secondary packaging cost (per unit)		225

There was a normal scrap of 250 units of direct material which realized ₹ 5,400 per unit. The entire finished product was sold at a profit margin of 20% on sales.

You are required to PREPARE a cost sheet showing:

1. Prime cost
2. Gross works cost
3. Factory costs
4. Cost of production

5. Profit

6. Sales

PROBLEM – 15 [RTP – MAY 21]

RTA Ltd. has the following expenditures for the year ended 31ST December, 2020:

Sl. No	Particulars	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)	Expenses paid 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 mangers		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 1stJanuary, 2020:		
	- 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 31stDecember, 2020:		
	- 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/-
From the above data you are requested to PREPARE Statement of Cost for RTA Ltd. for the year ended 31st December, 2020, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales.

PROBLEM – 16 [RTP – NOV 20]

The following details are available from the of R Ltd. for the year ending 31st March 2020:

Particulars	Amount (₹)
Purchase of raw materials	84,00,000
Consumable materials	4,80,000
Direct wages	60,00,000
Carriage inward	1,72,600
Wages to foreman and store keeper	8,40,000
Other indirect wages to factory staffs	1,35,000
Expenditure on research and development on new production technology	9,60,000
Salary to accountants	7,20,000
Employer's contribution to EPF & ESI	7,20,000
Cost of power & fuel	28,00,000
Production planning office expenses	12,60,000
Salary to delivery staffs	14,30,000
Income tax for the assessment year 2019-20	2,80,000
Fees to statutory auditor	1,80,000
Fees to cost auditor	80,000
Fees to independent directors	9,40,000
Donation to PM-national relief fund	1,10,000
Value of sales	2,82,60,000
Position of inventories as on 01-04-20x2:	
- Raw Material	6,20,000
- W-I-P	7,84,000
- Finished goods	14,40,000
Position of inventories as on 31-03-2020:	

- Raw Material	4,60,000
- W-I-P	6,64,000
- Finished goods	9,80,000

From the above information PREPARE a cost sheet for the year ended 31st March 2020

ANSWERS

1.

a. Cost Sheet for the month of April 2023

Particulars	Amount (₹)	Amount (₹)
Raw materials consumed:		
Raw materials purchased	6,95,000	
Add: Carriage inward	36,200	
Add: Value of opening stock of raw materials	42,500	
Less: Value of closing stock of raw materials	(38,600)	7,35,100
Direct wages paid		3,22,800
Royalty paid for production		35,800
Amortised cost of special designs, moulds and patterns (₹153,600 ÷ 12)		12,800
Power, fuel and haulage (factory)*		70,600
Prime Cost*		11,77,100
Salary and wages of supervisor and foremen		28,000
Gross Works Cost		12,05,100
Add: Opening stock of WIP		42,500
Less: Closing stock of WIP		(42,800)
Factory/ Works Cost		12,04,800
Research and development cost	31,680	
Primary packing cost	6,920	38,600
Cost of Production		12,43,400
Add: Opening stock of finished goods (₹ 8.05 × 2,500 units)		20,125
Less: Value of closing stock [(2,500+152,000 -1,52,600) × (12,43,400÷152000)		(15,542)
Cost of Goods Sold		12,47,983
Add: Administrative overheads		46,765
Add: Selling and distribution expenses (₹ 0.20 × 1,52,600)		30,520
Cost of Sales		13,25,268
Add: Profit (20% on Sales or 25% on cost of sales)		3,31,317
Sales value		16,56,585
Selling price per unit (₹ 16,56,585 ÷ 1,52,600 units)		10.86

*May be taken as part of Factory / Works cost, however Total Factory Cost will remain the same. If taken as part of factory cost then prime cost will be ₹ 11,06,500.

Alternative Solution (Based on work-in-progress figure of ₹ 45,500 as on 1st April 2023 as per Hindi part of Question paper)

Particulars	Amount (₹)	Amount (₹)
Raw materials consumed:		
Raw materials purchased	6,95,000	
Add: Carriage inward	36,200	
Add: Value of opening stock of raw materials	42,500	
Less: Value of closing stock of raw materials	(38,600)	7,35,100
Direct wages paid		3,22,800
Royalty paid for production		35,800
Amortised cost of special designs, moulds and patterns (₹ 153,600 ÷ 12)		12,800
Power, fuel and haulage (factory)*		70,600
Prime Cost		11,77,100
Salary and wages of supervisor and foremen		28,000
Gross Works Cost		12,05,100
Add: Opening stock of WIP		45,500
Less: Closing stock of WIP		(42,800)
Factory/ Works Cost		12,07,800
Research and development cost	31,680	
Primary packing cost	6,920	38,600
Cost of Production		12,46,400
Add: Opening stock of finished goods (₹ 8.05 × 2,500 units)		20,125
Less: Value of closing stock [(2,500+1,52,000 -1,52,600) × (12,46,400÷1,52,000)		(15,580)
Cost of Goods Sold		12,50,945
Add: Administrative overheads		46,765
Add: Selling and distribution expenses (₹ 0.20 × 1,52,600)		30,520
Cost of Sales		13,28,230
Add: Profit (20% on Sales or 25% on cost of sales)		3,32,058
Sales value		16,60,288
Selling price per unit (₹ 16,60,288 ÷ 1,52,600 units)		10.88

*May be taken as part of Factory / Works cost, however Total Factory Cost will remain the same. If taken as part of factory cost then prime cost will be ₹ 11,06,500.

2.

Preparation of Cost Sheet for Cloth Masks

No. of units produced = 50,000 units No. of units sold = 45,000 units

Particulars	Per unit (₹)	Total (₹)
Direct materials (Working note- (i))	10.00	5,00,000
Direct wages (Working note- (ii))	5.00	2,50,000
Prime cost	15.00	7,50,000
Production overhead (Working note- (iii))	2.00	1,00,000
Factory Cost	17.00	8,50,000
Administration Overhead* (50% of Production Overhead)	1.00	50,000
Cost of production	18.00	9,00,000
Less: Closing stock (50,000 units – 45,000 units)	-	(90,000)
Cost of goods sold i.e. 45,000 units	18.00	8,10,000
Selling cost	2.00	90,000
Cost of sales/ Total cost	20.00	9,00,000
Profit	15.00	6,75,000
Sales value (₹ 35 × 45,000 units)	35.00	15,75,000

Working Notes:

(i) Direct material cost per unit of Disposable Mask = M Direct material cost per unit of Cloth Mask = 2M

Total Direct Material cost = 2M × 50,000 units + M × 1,50,000 units Or, ₹ 12,50,000 = 1,00,000 M + 1,50,000 M Or, M = 1250000 ÷250000 units

= 5 per unit Therefore, Direct material Cost per unit of Cloth Mask = 2 × ₹ 5 = ₹ 10

(ii) Direct wages per unit for Cloth Mask = W Direct wages per unit for Disposable Mask= 0.6W

So, (W x 50,000) + (0.6W x 1,50,000) = ₹ 7,00,000

W = ₹5 per unit

Therefore, Direct material Cost per unit of Cloth Mask = ₹ 5

Production overhead for Cloth Mask = ₹ 2 × 50,000 units = ₹ 1,00,000

3.

Statement of Cost

S. No.	Particulars	Amount (₹)	Amount (₹)
	Opening stock of Raw material	10,000	
	Add: Purchase of Raw material	2,80,000	
	Less: Closing stock of raw materials	(40,000)	
	Raw material consumed		2,50,000

(i)	Manufacturing wages		70,000
(ii)	Prime Cost		3,20,000
	Factory/work overheads:		
	Depreciation on plant	15,000	
	Lease rent of production Asset	10,000	
	Expenses paid for pollution control and engineering & Maintenance	1,000	26,000
(iii)	Factory/Work Cost		3,46,000
	Expenses paid for quality control check activity		4,000
	Research and Development Cost		5,000
	Administration Overheads (Production)		15,000
	Primary Packing Cost		8,000
(iv)	Cost of Production		3,78,000
	Add: Opening stock of finished goods		28,000
	Less: Closing stock of finished goods		(50,400)
(v)	Cost of Goods Sold		3,55,600
	Advertisement expenses		1,300
	Packing cost for re-distribution of finished goods sold		1,500
(vi)	Cost of Sales		3,58,400

Valuation of Closing Stock of finished goods

378000 ÷ 3000 units * 400 units = 50400

Cost per unit sold = 358400 ÷ 200 + 3000 – 400 = 128 per unit

Selling price = 128 ÷ 80% = 160 per unit

4.

Cost sheet for the month of September 2021

No. of bags manufactured = 1,000 units

	Particulars	Total Cost (₹)	Cost per unit (₹)
1.	Direct materials consumed:		
	- Leather sheets	3,20,000	320.00
	- Cotton cloths	15,000	15.00
	Add: Freight paid on purchase	8,500	8.50

	(i) Cost of material consumed	3,43,500	343.50
2.	Direct wages (₹80 × 2,000 hours)	1,60,000	160.00
3.	Direct expenses (₹10 × 2,000 hours)	20,000	20.00
4.	(ii) Prime Cost	5,23,500	523.50
5.	Factory Overheads: Depreciation on machines {(₹ 22,00,000 × 90%) ÷ 120 months}	16,500	16.50
	Apportioned cost of factory rent	98,000	98.00
6.	(iii) Works/ Factory Cost	6,38,000	638.00
7.	Less: Realisable value of cuttings (₹150×35 kg.)	(5,250)	(5.25)
8.	(iv) Cost of Production	6,32,750	632.75
9.	Add: Opening stock of bags	0	
10.	Less: Closing stock of bags (100 bags × ₹632.75)	(63,275)	
11.	(v) Cost of Goods Sold	5,69,475	632.75
12.	Add: Administrative Overheads:		
	- Staff salary	45,000	50.00
	- Apportioned rent for administrative office	12,000	13.33
13.	Add: Selling and Distribution Overheads		
	- Staff salary	72,000	80.00
	- Apportioned rent for sales office	10,000	11.11
	- Freight paid on delivery of bags	18,000	20.00
14.	(vi) Cost of Sales	7,26,475	807.19

5.

(a) Statement of Cost for the month of March, 2021

Particulars	Amount (₹)	Amount (₹)
(i) Cost of Material Consumed:		
Raw materials purchased (₹ 2,00,000 – ₹ 40,000)	1,60,000	
Carriage inwards	20,000	
Add: Opening stock of raw materials	80,000	
Less: Closing stock of raw materials	-30,000	**2,30,000**
Direct Wages		1,20,000
Direct expenses:		
Cost of special drawing	30,000	
Hire charges paid for Plant	24,000	54,000
(ii) Prime Cost		**4,04,000**
Carriage on return	6,000	

Store overheads (10% of material consumed)	23,000	
Factory overheads (20% of Prime cost)	80,800	
Additional expenditure for rectification of defective products (refer working note)	2,160	1,11,960
Gross factory cost		5,15,960
Add: Opening value of W-I-P		50,000
Less: Closing value of W-I-P		-24,000
(iii) Works/ Factory Cost		**5,41,960**
Less: Realisable value on sale of scrap		-5,000
(iv) Cost of Production		**5,36,960**
Add: Opening stock of finished goods		-
Less: Closing stock of finished goods		-
Cost of Goods Sold		**5,36,960**
Administrative overheads:		
Maintenance of office building	2,000	
Salary paid to Office staff	25,000	
Legal Charges	2,500	29,500
Selling overheads:		
Expenses for participation in Industrial exhibition	8,000	8,000
Distribution overheads:		
Depreciation on delivery van	6,000	
Warehousing charges	1,500	7,500
(v) Cost of Sales		**5,81,960**

Alternative Solution

(Considering Hire charges paid for Plant as indirect expenses) Statement of Cost for the month of March, 2021

Particulars	Amount (₹)	Amount (₹)
Cost of Material Consumed:		
Raw materials purchased (₹ 2,00,000 – ₹ 40,000)	1,60,000	
Carriage inwards	20,000	
Add: Opening stock of raw materials	80,000	
Less: Closing stock of raw materials	-30,000	**2,30,000**
Direct Wages		1,20,000
Direct expenses:		
Cost of special drawing	30,000	30,000

Prime Cost		**3,80,000**
Hire charges paid for Plant	24,000	
Carriage on return	6,000	
Store overheads (10% of material consumed)	23,000	
Factory overheads (20% of Prime cost)	76,000	
Additional expenditure for rectification of defective products (refer working note)	2,160	1,31,160
Gross factory cost		**5,11,160**
Add: Opening value of W-I-P		50,000
Less: Closing value of W-I-P		-24,000
Works/ Factory Cost		**5,37,160**
Less: Realisable value on sale of scrap		-5,000
Cost of Production		**5,32,160**
Add: Opening stock of finished goods		-
Less: Closing stock of finished goods		-
Cost of Goods Sold		**5,32,160**
Administrative overheads:		
Maintenance of office building	2,000	
Salary paid to Office staff	25,000	
Legal Charges	2,500	29,500
Selling overheads:		
Expenses for participation in Industrial exhibition	8,000	8,000
Distribution overheads:		
Depreciation on delivery van	6,000	
Warehousing charges	1,500	7,500
Cost of Sales		**5,77,160**

Working Notes:

1. **Number of Rectified units**

Total Output	8,000 units
Less: Rejected 10%	800 units
Finished product	7,200 units
Rectified units (10% of finished product)	720 units

2. **Proportionate additional expenditure on 720 units**

   = 20% of proportionate direct wages

   = 0.20 x (₹ 1,20,000/8,000) x 720

   = ₹ 2,160

6.

Cost Sheet for the Month of April 2020

Particulars	(₹)
Opening stock of Raw Material	20,000
Add: Purchases [Refer Working Note-2]	1,65,000
Less: Closing stock of Raw Material	(25,000)
Raw material consumed	1,60,000
Add: Direct labour cost	1,20,000
Prime cost	**2,80,000**
Add: Factory overheads	1,00,000
Gross Works cost	**3,80,000**
Add: Opening work-in-progress	20,000
Less: Closing work-in-progress	(30,000)
Works Cost	**3,70,000**
Cost of Production	**3,70,000**
Add: Opening stock of finished goods	50,000
Less: Closing stock of finished goods	(60,000)
Cost of goods sold	**3,60,000**
Add: General and administration expenses	18,000
Add: Selling expenses	22,000
Cost of sales	**4,00,000**
Profit {Balancing figure (₹ 5,00,000 – ₹ 4,00,000)}	1,00,000
Sales	5,00,000

General and administration expenses have been assumed as not relating to the production activity.

Working Note:

1. Computation of the raw material consumed

Particulars	(₹)
Cost of Sales	4,00,000
Less: General and administration expenses	(18,000)
Less: Selling expenses Cost of goods sold	(22,000)
Cost of goods sold	**3,60,000**
Add: Closing stock of finished goods	60,000
Less: Opening stock of finished goods	(50,000)
Cost of production/Gross works cost	**3,70,000**
Add: Closing stock of work-in-progress	30,000
Less: Opening stock of work-in-progress	(20,000)

Works cost	**3,80,000**
Less: Factory overheads (1,20,000 X 100 / 120)	(1,00,000)
Prime cost	**2,80,000**
Less: Direct labour	(1,20,000)
Raw material consumed	**1,60,000**
2. Computation of the raw material Purchased	
Particulars	**(₹)**
Closing stock of Raw Material	25,000
Add: Raw Material consumed	1,60,000
Less: Opening stock of Raw Material	(20,000)
Raw Material purchased	1,65,000

7.

(a) Preparation of Cost Sheet for Super Pen

No. of units produced = 40,000 units

No. of units sold = 36,000 units

Particulars	**Per unit (₹)**	**Total (₹)**
Direct materials (Working note- (i))	8	**3,20,000**
Direct wages (Working note- (ii))	4	**1,60,000**
Prime cost	12	4,80,000
Production overhead (Working note- (iii))	1.2	**48,000**
Factory Cost	13.2	5,28,000
Administration Overhead* (200% of direct wages)	8	**3,20,000**
Cost of production	21.2	8,48,000
Less: Closing stock (40,000 units – 36,000 units)	-	**(84,800)**
Cost of goods sold i.e. 36,000 units	21.2	7,63,200
Selling cost	1	**36,000**
Cost of sales/ Total cost	**22.2**	**7,99,200**
Profit	**7.8**	**2,80,800**
Sales value (₹ 30 × 36,000 units)	30	**10,80,000**

Working Notes:

(i) Direct material cost per unit of Normal pen = M

Direct material cost per unit of Super pen = 2M

Total Direct Material cost = 2M × 40,000 units + M × 1,20,000 units

Or,

₹ 8,00,000 = 80,000 M + 1,20,000 M

Or,

M = ₹ 8,00,000/2,00,000 = ₹4

Therefore, Direct material Cost per unit of Super pen = 2 × ₹ 4 = ₹ 8

(ii) Direct wages per unit for Super pen = W

Direct wages per unit for Normal Pen = 0.6W

So, (W x 40,000) + (0.6W x 1,20,000) = ₹ 4,48,000

W = ₹ 4 per unit

(iii) Production overhead per unit = ₹ 1,92,000/ (40,000 + 1,20,000) = ₹ 1.20

Production overhead for Super pen = ₹ 1.20 × 40,000 units = ₹S 48,000

* Administration overhead is specific to the product as it is directly related to direct labour as mentioned in the question and hence to be considered in cost of production only.

Assumption: It is assumed that in point (1) and (2) of the Question, direct materials cost and direct wages respectively is related to per unit only.

Note: Direct Material and Direct wages can be calculated in alternative ways.

8.

1. Calculation of Sales Quantity:

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

2. Calculation of Cost of Production

Particular	Amount (₹)
Cost of Goods sold (given)	78,26,000
Add: Value of Closing finished goods	4,30,000
₹ 78,26,000/91,000 units x Rs.5,000 units	
Cost of Production	82,56,000

3. Calculation of Factory Cost

Particular	Amount (₹)
Cost of Production	82,56,000
Less: Quality Control Cost	-2,00,000
Less: Research and Development Cost	-2,50,000

Add: Credit for Recoveries/Scrap/By-Products/ misc. income (1,00,000 units × 4% × ₹ 61)	2,44,000
Factory Cost	80,50,000

4. Calculation of Gross Factory Cost

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

5. Calculation of Prime Cost

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

6. Calculation of Cost of Materials Consumed & Labour cost

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

Prime Cost = Cost of Material Consumed + Labour Cost 78,00,000 = M + 0.5M

M = 52,00,000

Therefore, Cost of Material Consumed = ₹ 52,00,000 and

Labour Cost = ₹ 26,00,000

(i) Calculation of Value of Materials Purchased

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

(ii) Cost Sheet

Sl.	Particulars	Total Cost (₹)
1	Direct materials consumed:	
	Opening Stock of Raw Material	2,42,000
	Add: Additions/ Purchases [balancing figure as per requirement (i)]	**52,50,000**
	Less: Closing stock of Raw Material	(2,92,000)
	Material Consumed	**52,00,000**
2	Direct employee (labour) cost	**26,00,000**
3	**Prime Cost (1+2)**	78,00,000

4	Add: Works/ Factory Overheads Consumable stores and spares	3,50,000
	Lease rent of production asset	**2,00,000**
5	Gross Works Cost (3+4)	83,50,000
6	Add: Opening Work in Process	2,00,000
7	Less: Closing Work in Process	(5,00,000)
8	**Works/ Factory Cost (5+6-7)**	80,50,000
9	Add: Quality Control Cost	**2,00,000**
10	Add: Research and Development Cost	**2,50,000**
11	Less: Credit for Recoveries/Scrap/By-Products/misc. income	**(2,44,000)**
12	**Cost of Production (8+9+10-11)**	**82,56,000**
13	Add: Opening stock of finished goods	-
14	Less: Closing stock of finished goods (5000 Units)	**(4,30,000)**
15	**Cost of Goods Sold (12+13-14)**	78,26,000
16	Add: Administrative Overheads (General)	**2,24,000**
17	Add: Secondary packing	**1,82,000**
18	Add: Selling Overheads& Distribution Overheads	4,13,000
19	**Cost of Sales (15+16+17+18)**	**86,45,000**
20	**Profit**	**13,65,000**
21	**Sales 91,000 units@ ₹ 110 per unit**	**1,00,10,000**

9.

Cost Sheet of M/s Areeba Pvt. Ltd. for the year 2019.

Normal Capacity: 36,000 units p.a.

Particulars	**3 Months**		**9 Months**	
	4,500 Units		**21,600 units**	
	Amount	**Cost per unit**	**Amount**	**Cost per unit**
	(₹)	**(₹)**	**(₹)**	**(₹)**
Direct material	1,80,000		8,64,000	
Less: Scrap	(22,500)		(1,08,000)	
Materials consumed	1,57,500	35	7,56,000	35
Direct Wages	1,44,000	32	6,48,000	30
Prime Cost	**3,01,500**	67	**14,04,000**	65
Factory overheads:				
- Fixed	90,000		2,70,000	
- Variable	45,000		2,16,000	
- Semi variable	27,000	36	1,51,200	29.5

Works Cost	**4,63,500**	103	**20,41,200**	94.5
Add: Administrative overheads	1,29,600	28.8	3,88,800	18
Cost of Production	**5,93,100**	131.8	**24,30,000**	112.5
Selling Overheads	36,000	8	1,72,800	8
Cost of Sales	**6,29,100**	139.8	**26,02,800**	120.5

Working Notes:

i) Calculation of Costs:

	Amount (₹)	**Amount (₹)**
Material	1,80,000 (₹ 40 × 4,500 units)	8,64,000 (₹ 40 × 21,600 units)
Wages	1,44,000 (Max. of ₹ 30 × 4,500 units = ₹ 1,35,000 and ₹ 48,000 × 3 months = ₹ 1,44,000)	6,48,000 (21600 Units×30)
Variable Cost	45,000 (₹ 10 × 4,500 units)	2,16,000 (₹ 10 × 21,600 units)
Semi-variable Cost	27,000 (₹ 1,08,000 ×3 Months) 12 Months	1,51,200[(₹ 1,08,000 ×9 Months) 12 Months
		+46,800(for 20 % increase) +23,400(for 10% increase)
Selling Overhead	36,000 (₹ 8 × 4,500 units)	1,72,800(₹ 8 × 21,600 units)

Notes:

1. Alternatively scrap of raw material can also be reduced from Work cost.
2. Administrative overhead may be treated alternatively as a part of general overhead. In that case, Works Cost as well as Cost of Production will be same i.e. ₹ 4,63,500 and Cost of Sales will remain same as ₹ 6,29,100.

ii) Calculation of Selling price for nine months period

Particulars	**Amount (₹)**
Total Cost of sales ₹ (6,29,100+26,02,800)	32,31,900
Add: Desired profit	8,76,600
Total sales value	41,08,500
Less: Sales value realised in first three months (₹ 145 × 4,500 units)	-6,52,500
Sales Value to be realised in next nine months	**34,56,000**
No. of units to be sold in next nine months	21,600
Selling price per unit (₹ 34,56,000 ÷ 21,600 units)	**160**

10.

Cost Sheet for the quarter ending 30 September 2018:

Particulars	Amount (₹)
(i) Raw materials consumed	
Opening stock of raw materials	2,45,600
Add: Purchase of materials	12,22,650
Less: Closing stock of raw materials	(2,08,000)
Raw materials consumed	12,60,250
Add: Direct wages (1,47,000 × 175%)	2,57,250
Direct Expenses	1,80,000
(ii) Prime cost	**16,97,500**
Add: Factory overheads (2,57,250/175%)	1,47,000
Gross Factory cost	18,44,500
Add: Opening work-in-process	1,70,800
Less: Closing work-in-process	(1,90,000)
(iii) Factory cost	**18,25,300**
Add: Administration overheads (10% of factory overheads)	14,700
Add: Opening stock of finished goods	3,10,000
Less: Closing stock of finished goods	(2,75,000)
(iv) Cost of goods sold	**18,75,000**
Add: Selling & distribution overheads	60,000
Cost of sales	19,35,000
(v) Net Profit	**2,75,000**
Sales	22,10,000

*(18,75,000 + 2,75,000 – 3,10,000 – (1,47,000 × 10%) + 1,90,000 –1,70,800 – (2,57,250 × 100/175%) - 1,80,000 – 2,57,250 + 2,08,000 – 2,45,600) = 12,22,650

Working notes

Purchase of raw materials = Raw material consumed + Closing stock - opening stock of raw material

Raw material consumed = Prime cost - Direct wages - Direct expenses

Factory Overheads = 2,57,250 x 100/175

Prime cost = Factory cost + Closing WIP – Opening WIP – Factory overheads

Factory Cost = Cost of Production goods sold + Closing stock of Finished goods – Opening stock of finished goods – Administrative overheads

Net Profit = Sales - Cost of sales.

Alternative solution: (NOV 18)

Cost Sheet for the quarter ending 30 September 2018:

Particulars	**Amount (₹)**
(i) Raw materials consumed	
Opening stock of raw materials	2,45,600
Add: Purchase of materials	12,37,350
Less: Closing stock of raw materials	(2,08,000)
Raw Material consumed	12,74,950
Add: Direct wages (1,47,000×175%	2,57,250
Direct Expenses	1,80,000
(ii) Prime cost	**17,12,200**
Add: Factory overheads (2,57,250/175%)	1,47,000
Gross Factory cost	18,59,200
Add: Opening work-in-process	1,70,800
Less: Closing work-in-process	(1,90,000)
(iii) Factory cost/works cost/cost of production	**18,40,000**
Add: Opening stock of finished goods	3,10,000
Less: Closing stock of finished goods	(2,75,000)
(iv) Cost of goods sold	**18,75,000**
Add: Administration overheads (10% of factory overheads)	14,700
Add: Selling & distribution overheads	60,000
Cost of sales	19,49,700
(v) Net Profit	**2,60,300**
Sales	22,10,000

*(18,75,000 + 2,75,000 – 3,10,000 + 1,90,000 –1,70,800 – 1,47,500 - 1,80,000 – 2,57,250 + 2,08,000 – 2,45,600) = 12,37,350

Working notes:

Purchase of raw materials = Raw material consumed + Closing stock - opening stock of raw material

Raw material consumed = Prime cost - Direct wages - Direct expenses

Factory Overheads = 257250 x 100/175

Prime cost = Factory cost + Closing WIP – Opening WIP – Factory overheads

Factory Cost = Cost of Production goods sold + Closing stock of Finished goods – Opening stock of finished goods

Net Profit = Sales - Cost of sales

11. Cost sheet

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

Particulars	**Amount (₹)**
Raw materials purchased	42,25,000
Add: Freight Inward	1,00,000
Add: Opening value of raw materials	2,28,000
Less: Closing value of raw materials	(3,05,000)
	42,48,000
Less: Sale of scrap of material	8,000
Materials consumed	42,40,000
Direct Wages (12,56,000 + 1,50,000)	14,06,000
Prime Cost	56,46,000
Factory overheads (20% of Prime Cost)	11,29,200
Add: Opening value of W-I-P	1,92,500
Less: Closing value of W-I-P	(1,40,700)
Factory Cost	68,27,000
Add: Administrative overheads	1,73,000
Cost of Production	70,00,000
Add: Value of opening finished stock	6,08,500
Less: Value of closing finished stock	
[500(70,00,000/14,000) × 1,064) (1,217+ 14,000 – 14,153 = 1,064 units)	(5,32,000)
Cost of Goods Sold	70,76,500
Distribution expenses (16 × 14,153 units)	2,26,448
Cost of Sales	73,02,948
Profit (Balancing figure)	14,43,606
Sales (618 × 14,153 units)	87,46,554

12.

Cost Sheet of A Ltd. for the month of July 2023

Particulars	**Amount (₹)**	**Amount (₹)**
Materials consumed		15,00,000
Wages & Salary	64,00,000	
Gratuity & leave encashment	44,20,000	1,08,20,000
Power cost (13,000 kwh × ₹ 7)	91,000	
Diesel cost (1,000 ltr × ₹ 93)	93,000	1,84,000
HEMM hiring charges		13,00,000

Prime Cost		1,38,04,000
AMC cost of CCTV installed at factory premises		18,000
Cost of Production/ Cost of Goods Sold		1,38,22,000
Hiring charges of cars	80,000	
Reimbursement of diesel cost	20,000	
	1,00,000	
Add: GST @5% on RCM basis	5,000	1,05,000
Maintenance cost for weighing bridge	7,000	
AMC cost of CCTV installed at weigh bridge	6,000	13,000
TA/ DA & hotel bill of sales manager		16,000
Cost of Sales		1,39,56,000

13.

Calculation of Cost of Production of Arnav Metallic 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
Wages paid	23,20,000
Prime cost	85,62,000
Repair and maintenance cost of plant & machinery	9,80,500
Insurance premium paid for plant & machinery	96,000
Quality control cost	86,000
Research & development cost	92,600
Administrative overheads related with factory and production	9,00,000
	1,07,17,100
Add: Opening value of W-I-P	4,06,000
Less: Closing value of W-I-P	(6,02,100)
	1,05,21,000
Less: Amount realised by selling scrap	(9,200)
Add: Primary packing cost	10,200
Cost of Production	1,05,22,000

Notes:

(i) Other administrative overhead does not form part of cost of production.

(ii) Salary paid to Director (Technical) is an administrative cost.

14.

Cost Sheet

Particulars	Units	Amount (₹)
Material		
Opening stock	1,000	90,00,000
Add: Purchases	49,000	44,10,00,000
Less: Closing stock	(1,750)	(1,57,50,000)
	48,250	43,42,50,000
Less: Normal wastage of materials realized @ ₹ 5,400 per unit	(250)	(13,50,000)
Material consumed		43,29,00,000
Direct employee's wages and allowances		6,88,50,000
Direct expenses- Royalty paid for production		3,64,50,000
Prime cost	48,000	53,82,00,000
Factory overheads - Consumable stores, depreciation etc.		3,42,00,000
Gross Works Cost	48,000	57,24,00,000
Add: Opening WIP	2,000	1,75,50,000
Less: Closing WIP	(1,000)	(94,50,000)
Factory/Works Cost	49,000	58,05,00,000
Administration Overheads related to production		3,15,00,000
R&D expenses and Quality control cost		2,10,60,000
Add: Primary packaging cost @ ₹ 1,440 per unit		7,05,60,000
Cost of production	49,000	70,36,20,000
Selling expenses		4,84,30,800
Cost of maintaining website for online sale		60,75,000
Secondary packaging cost @ ₹ 225 per unit	49,000	1,10,25,000
Cost of sales		76,91,50,800
Add: Profit @ 20% on sales or 25% of cost		19,22,87,700
Sales value		96,14,38,500

15.

Statement of Cost of RTA Ltd. for the year ended 31st December, 2020:

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: Realisable 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

16.

Statement of Cost of R Ltd. for the year ended 31st March, 2020:

Particulars	**Amount (₹)**	**Amount (₹)**
Material Consumed:		
- Raw materials purchased	84,00,000	
- Carriage inward	1,72,600	
Add: Opening stock of raw materials	6,20,000	
Less: Closing stock of raw materials	(4,60,000)	87,32,600
Direct employee (labour) cost:		
- Direct wages	60,00,000	
- Employer's Contribution towards PF & ESIS	7,20,000	67,20,000
Direct expenses:		
- Consumable materials	4,80,000	
- Cost of power & fuel	28,00,000	32,80,000
Prime Cost		1,87,32,600
Works/ Factory overheads:		
- Wages to foreman and store keeper	8,40,000	
- Other indirect wages to factory staffs	1,35,000	9,75,000
Gross factory cost		1,97,07,600
Add: Opening value of W-I-P		7,84,000
Less: Closing value of W-I-P		(6,64,000)
Factory Cost		1,98,27,600
Research & development cost paid for improvement in production process		9,60,000
Production planning office expenses		12,60,000
Cost of Production		2,20,47,600
Add: Opening stock of finished goods		14,40,000
Less: Closing stock of finished goods		(9,80,000)
Cost of Goods Sold		2,25,07,600

Administrative overheads:		
- Salary to accountants	7,20,000	
- Fees to statutory auditor	1,80,000	
- Fees to cost auditor	80,000	
- Fee paid to independent directors	9,40,000	19,20,000
Selling overheads& Distribution overheads:		
- Salary to delivery staffs		14,30,000
Cost of Sales		2,58,57,600
Profit (balancing figure)		24,02,400
Sales		2,82,60,000

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

CHAPTER 2: OVERHEADS

PART – A: ICAI PAST EXAM QUESTIONS

PROBLEM – 1: (MAY 23 – 5 Marks)

Beta Limited produces 50,000 Units, 45,000 Units and 62,000 Units of product 'A', 'B' and 'C' respectively. At present the company follows absorption costing method and absorbs overhead on the basis of direct labour hours. Now, the company wants to adopt Activity Based Costing

The information provided by Beta Limited is follows:

	Product A	Product B	Product C
Floor Space Occupied	5,000 Sq.Ft.	4,500 Sq.Ft.	6,200 Sq.Ft.
Direct Labour Hours	7,500 Hours	7,200 Hours	7,800 Hours
Direct Machine Hours	6,000 Hours	4,500 Hours	4,650 Hours
Power consumption	32%	28%	40%

Overhead for year are as follows:	₹
Rent & Taxes	8,63,500
Electricity Expenses	10,66,475
Indirect labour	13,16,250
Repair & Maintenance	1,28,775
	33,75,000

Required:

(i) Calculate the overhead rate per labour hour under Absorption Costing.

(ii) Prepare a cost statement showing overhead cost per unit for each product - 'A', 'B' and 'C' as per Activity based Costing.

PROBLEM – 2 : (NOV 22 – 10 Marks)

USP Ltd. is the manufacturer of 'double grip motorcycle tyres'. In the manufacturing process, it undertakes three different jobs namely, Vulcanising, Brushing and Striping. All of these jobs require the use of a special machine and also the aid of a robot when necessary. The robot is hired from outside and the hire charges paid for every six months is₹ 2,70,000. An estimate of overhead expenses relating to the special machine is given below:

- Rent for a quarter is ₹ 18,000.
- The cost of the special machine is ₹ 19,20,000 and depreciation is charged @10% per annum on straight line basis.
- Other indirect expenses are recovered at 20% of direct wages.

The factory manager has informed that in the coming year, the total direct wages will be ₹ 12,00,000 which will be incurred evenly throughout the year

During the first month of operation, the following details are available from the job book: Number of hours the special machine was used

Jobs	Without the aid of the robot	With the of the robot
Vulcanising	500	400
Brushing	1000	400
Striping	-	1200

You are required to :

(i) Compute the Machine Hour Rate for the company as a whole for a month (A) when the robot is used and (B) when the robot is not used.

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

PROBLEM – 3: (MAY 22 – 10 Marks)

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

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

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

	Job 1 (₹)	**Job 2 (₹)**
Direct materials	1,08,000	75,000
Direct wages	84,000	60,000
Selling price	3,33,312	2,52,000
Profit percentage on total cost	12%	20%

You are required to:

(i) Compute the percentage recovery rates of factory overheads and administrative overheads.

(ii) Calculate the amount of factory overheads, administrative overheads and profit for each of the two jobs.

(iii) Using the above recovery rates, determine the selling price to be quoted for job 3. Additional data pertaining to Job 3 is as follows:

Direct materials	₹ 68,750
Direct wages	₹ 22,500
Profit percentage on selling price	15%

PROBLEM – 4: (DEC 21 – 10 Marks)

XYZ Ltd. manufactures a single product. It recovers factory overheads at a pre - determined rate of ₹ 20 per man-day.

During the year 2020-21, the total factory overheads incurred and the man-days actually worked were ₹ 35.50 lakhs and 1.50 lakh days respectively. Out of the amount of ₹ 35.50 lakhs, ₹ 2.00 lakhs were

in respect of wages for stick period and ₹ 1.00 lakh was in respect of expenses of previous year booked in this current year. During the period, 50,000 units were sold. At the end of the period, 12,000 completed units were held in stock but there was no opening stock of finished goods. Similarly, there was no stock of uncompleted units at the beginning of the period but at the end of the period there were 20,000 uncompleted units which may be treated as 65% complete in all respects.

On investigation, it was found that 40% of the unabsorbed overheads were due to factory inefficiency and the rest were attributable to increase in the cost of indirect materials and indirect labour.

You are required to:

(i) Calculate the amount of unabsorbed overheads during the year 2020 -21.

(ii) Show the accounting treatment of unabsorbed overheads in cost accounts and pass journal entry

PROBLEM – 5: (JUL 21 – 5 Marks)

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

Departments / **Main Department:**	**Expenses (in ₹)**	**Area in (Sq. Mtr)**	**Number of Employees**
Purchase Department	5,00,000	12	800
Packing Department	8,00,000	15	1700
Distribution Department	3,50,000	7	700
Service Departments:			
Maintenance Department	6,40,000	4	200
Personnel Department	3,20,000	6	250

You are required to:

(i) Prepare a Statement showing the distribution of expenses of Service Departments to the Main Departments using the "Step Ladder method" of Overhead Distribution.

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

PROBLEM – 6: (JAN 21 – 5 Marks)

A machine shop has 8 identical machines manned by 6 operators. The machine cannot work without an operator wholly engaged on it. The original cost of all the 8 machines works out to ₹ 32,00,000. The following particulars are furnished for a six months period:

Normal available hours per month per operator	208
Absenteeism (without pay) hours per operator	18
Leave (with pay) hours per operator	20

Normal unavoidable idle time-hours per operator	10
Average rate of wages per day of 8 hours per operator	₹ 100
Production bonus estimated	10% on wages
Power consumed	₹ 40,250
Supervision and Indirect Labour	₹ 16,500
Lighting and Electricity	₹ 6,000

The following particulars are given for a year:

Insurance	₹ 3,60,000
Sundry work Expenses	₹ 50,000
Management Expenses allocated	₹ 5,00,000
Depreciation	10% on the original cost

Repairs and Maintenance (including consumables): 5% of the value of all the machines.

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

PROBLEM – 7: (NOV 20 – 10 Marks)

TEE Ltd. is a manufacturing company having three production departments 'P', 'Q' and 'R' and two service departments 'X' and 'Y' details pertaining to which are as under:

Particulars	P	Q	R	X	Y
Direct wages (₹)	5,000	1,500	4,500	2,000	800
Working hours	13,191	7,598	14,995	-	-
Value of machine (₹)	1,00,000	80,000	1,00,000	20,000	50,000
H.P. of machines	100	80	100	20	50
Light points (Nos.)	20	10	15	5	10
Floor space (sq. ft.)	2,000	2,500	3,500	1,000	1,000

The expenses are as follows:

Particulars	(₹)
Rent and Rates	10,000
General Lighting	600
Indirect Wages	3,450
Power	3,500
Depreciation on Machines	70,000
Sundries (apportionment on the basis of direct wages)	13,800

The expenses of Service Departments are allocated as under:

	P	Q	R	X	Y
X	45%	15%	30%	-	10%
Y	35%	25%	30%	10%	-

Product 'A' is processed for manufacture in Departments P, Q and R for 6, 5 and 2 hours respectively.

PROBLEM –8 : (NOV 18 – 5 Marks)

M/s. NOP Limited has its own power plant and generates its own power. Information regarding power requirements and power used are as follows:

	Production Dept.		Service Dept.	
	A	**B**	**X**	**Y**
	(Horse power hours)			
Needed capacity production	20,000	25,000	15,000	10,000
Used during the quarter ended September 2018	16,000	20,000	12,000	8,000

During the quarter ended September 2018, costs for generating power amounted to₹ 12.60 lakhs out of which ₹ 4.20 lakhs was considered as fixed cost.

Service department X renders services to departments A, B, and Y in the ratio of 6:4:2 whereas department Y renders services to department A and B in the ratio of 4: 1. The direct labour hours of department A and B are 67500 hours and 48750 hours respectively.

Required:

1. Prepare overheads distribution sheet.
2. Calculate factory overhead per labour hour for the dept. A and dept. B.

PART – B: REVISION TEST PAPER

PROBLEM – 9 : (RTP NOV 23)

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 2018) was ₹ 10,00,000. Its estimated life is 10 years, the estimated scrap value at the end of its life is ₹ 10,000, and the estimated working time per year (50 weeks of 44 hours) is 2,200 hours. Out 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 ₹ 7 per unit. No power is consumed during maintenance or setting up.

(iii) The machine required a chemical solution which is replaced at the end of week at a cost of ₹ 2,000 each time.

(iv) The estimated cost of maintenance per year is ₹ 1,20,000.

(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 is ₹ 9,000.

(vi) Departmental and general works overhead allocated to this machine for the current year amount to ₹ 20,000.

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

PROBLEM – 10 : (RTP MAY 23)

SANDY Ltd. is a manufacturing company having three production departments, 'A', 'B' and 'C' and two service departments 'X' and 'Y'. The following is the budget for December 2022:

	Total (₹)	A (₹)	B (₹)	C (₹)	X (₹)	Y (₹)
Direct material		1,60,000	3,20,000	6,40,000	3,20,000	1,60,000
Direct wages		8,00,000	3,20,000	12,80,000	1,60,000	3,20,000
Factory rent	6,40,000					
Power	4,00,000					
Depreciation	1,60,000					
Other overheads	14,40,000					
Additional information:						
Area (Sq. ft.)		800	400	800	400	800
Capital value of assets (₹) lakhs)		32	64	32	16	16
Machine hours		1,600	3,200	6,400	1,600	1,600

Horsepower of machines		80	64	32	24	40

Apportionment of expenses of service departments is as under:

	A	B	C	X	Y
Service Dept. 'X'	72	24	48	–	16
Service Dept. 'Y'	96	56	–	8	–

Required:

PREPARE a statement showing distribution of overheads to various departments.

PREPARE a statement showing re-distribution of service departments expenses to production departments using Repeated Distribution method. Also CALCULATE machine hour rate of the production departments 'A', 'B', 'C'.

PROBLEM – 11: (RTP NOV 22)

SE Limited manufactures two products- A and B. The company had budgeted factory overheads amounting to ₹ 36,72,000 and budgeted direct labour hour of 1,80,000 hours. The company uses pre-determined overhead recovery rate for product costing purposes.

The department-wise break-up of the overheads and direct labour hours were as follows:

Particulars	Budgeted overheads	udgeted direct labour hours	Rate per direct labour hour
Department Pie	₹ 25,92,000	90,000 hours	₹ 28.80
Department Qui	₹ 10,80,000	90,000 hours	₹ 12.00
Total	₹ 36,72,000	1,80,000 hours	

Additional Information:

Each unit of product A requires 4 hours in department Pie and 1 hour in department Qui. Also, each unit of product B requires 1 hour in department Pie and 4 hours in department Qui.

This was the first year of the company's operation. There was no WIP at the end of the year. However, 1,800 and 5,400 units of Products A and B were on hand at the end of the year.

The budgeted activity has been attained by the company.

You are required to:

(i) DETERMINE the production and sales quantities of both products 'A' and 'B' for the above year.

(ii) ASCERTAIN the effect of using a pre-determined overhead rate instead of department-wise overhead rates on the company's income due to its effect on stock value.

(iii) CALCULATE the difference in the selling price due to the use of pre-determined overhead rate instead of using department-wise overhead rates. Assume that the direct costs (material and labour costs) per unit of products A and B were ₹ 25 and ₹ 40 respectively and the selling price is fixed by adding 40% over and above these costs to cover profit and selling and administration overhead.

PROBLEM – 12 : (RTP NOV 21)

PL Ltd. has three production departments P1, P2 and P3 and two service departments S1 and S2.

The following data are extracted from the records of the company for the month of October, 2020:

Particulars	(₹)
Rent and rates	12,50,000
General lighting	1,50,000
Indirect Wages	3,75,000
Power	5,00,000
Depreciation on machinery	10,00,000
Insurance of machinery	4,00,000

Other Information:

Particulars	P1	P2	P3	S1	S2
Direct wages (₹)	7,50,000	5,00,000	7,50,000	3,75,000	1,25,000
Horse Power of Machines used	60	30	50	10	-
Cost of machinery (₹)	60,00,000	80,00,000	1,00,00,000	5,00,000	5,00,000
Floor space (Sq. ft)	2,000	2,500	3,000	2,000	500
Number of light points	10	15	20	10	5
Production hours worked	6,225	4,050	4,100	-	-

Expenses of the service departments S1 and S2 are reapportioned as below:

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

Required:

i. COMPUTE overhead absorption rate per production hour of each production department.

ii. DETERMINE the total cost of product X which is processed for manufacture in department P1, P2 and P3 for 5 hours, 3 hours and 4 hours respectively, given that its direct material cost is ₹ 12,500 and direct labour cost is ₹ 7,500.

PROBLEM – 13 : (RTP MAY 21)

A manufacturing unit has purchased and installed a new machine at a cost of ₹ 24,90,000 to its fleet of 5 existing machines. The new machine has an estimated life of 12 years and is expected to realise ₹ 90,000 as scrap value at the end of its working life.

Other relevant data are as follows:

i. Budgeted working hours are 2,496 based on 8 hours per day for 312 days. Plant maintenance work is carried out on weekends when production is totally halted. The estimated maintenance hours are 416. During the production hours machine set -up and change over works are carried out. During the set-up hours no production is done. A total 312 hours are required for machine set-ups and change overs.

ii. An estimated cost of maintenance of the machine is ₹ 2,40,000 p.a.

iii. The machine requires a component to be replaced every week at a cost of ₹ 2,400.

iv. There are three operators to control the operations of all the 6 machines. Each operator is paid ₹ 30,000 per month plus 20% fringe benefits.

v. Electricity: During the production hours including set-up hours, the machine consumes 60 units per hour. During the maintenance the machine consumes only 10 units per hour. Rate of electricity per unit of consumption is ₹ 6.

vi. Departmental and general works overhead allocated to the operation during last year was ₹ 5,00,000. During the current year it is estimated to increase by 10%.

Required:

COMPUTE the machine hour rate.

PROBLEM – 14 : (RTP NOV 20)

You are given the following information of the three machines of a manufacturing department of X Ltd.:

Particulars	Preliminary estimates of expenses (per annum)			
	Total (₹)	Machines		
		A (₹)	B (₹)	C (₹)
Depreciation	2,00,000	75,000	75,000	50,000
Spare parts	1,00,000	40,000	40,000	20,000
Power	4,00,000			
Consumable stores	80,000	30,000	25,000	25,000
Insurance of machinery	80,000			
Indirect labour	2,00,000			
Building maintenance expenses	2,00,000			
Annual interest on capital outlay	1,00,000	40,000	40,000	20,000
Monthly charge for rent and rates	20,000			
Salary of foreman (per month)	42,000			
Salary of Attendant (per month)	12,000			

(The foreman and the attendant control all the three machines and spend equal time on them.)

The following additional information is also available:

Particulars	Machines		
	A	B	C
Estimated Direct Labour Hours	1,00,000	1,50,000	1,50,000
Ratio of K.W. Rating	3	2	3
Floor space (sq. ft.)	40,000	40,000	20,000

There are 12 holidays besides Sundays in the year, of which two were on Saturdays. The manufacturing department works 8 hours in a day but Saturdays are half days. All machines work at 90% capacity throughout the year and 2% is reasonable for breakdown.

You are required to:

- An increase of 15% in the price of spare parts.
- An increase of 25% in the consumption of spare parts for machine 'B' & 'C' only.
- 20% general increase in wages rates.

PROBLEM –15: (RTP MAY 20)

ABC Ltd. has three production departments P1, P2 and P3 and two service departments S1 and S2. The following data are extracted from the records of the company for the month of January, 2020:

Particulars	(₹)
Rent and rates	6,25,000
General lighting	7,50,000
Indirect wages	1,87,500
Power	25,00,000
Depreciation on machinery	5,00,000
Insurance of machinery	2,00,000

Other Information:

Particulars	P1	P2	P3	S1	S2
Direct wages (₹)	3,75,000	2,50,000	3,75,000	1,87,500	62,500
Horse Power of Machines used	60	30	50	10	-
Cost of machinery (₹)	30,00,000	40,00,000	50,00,000	2,50,000	2,50,000
Floor space (Sq. ft)	2,000	2,500	3,000	2,000	500
Number of light points	10	15	20	10	5
Production hours worked	6,225	4,050	4,100	-	-

Expenses of the service departments S1 and S2 are reapportioned as below:

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

Required:

i. COMPUTE overhead absorption rate per production hour for each production department.

ii. DETERMINE the total cost of product X which is processed for manufacture in department P1, P2 and P3 for 5 hours, 3 hours and 4 hours respectively, given that its direct material cost is ₹6,250 and direct labour cost is ₹3,750.

PROBLEM – 16: (RTP NOV 19)

PLR Ltd. manufacturers a single product and recovers the overheads by adopting a single blanket rate based on machine hours. The budgeted production overheads of the factory for the FY 2019-20 are ₹ 50,40,000 and budgeted machine hours are 6,000.

For a period of first six months of the financial year 2019 - 20, following information were extracted from the books:

Actual production overheads	₹ 34,08,000
Amount included in the production overheads:	
Paid as per court's order	₹ 4,50,000
Expenses of previous year booked in current year	₹ 1,00,000
Paid to workers for strike period under an award	₹ 4,20,000
Obsolete stores written off	₹ 36,000

Production and sales data of the concern for the first six months are as under:

Production:	
Finished goods	1,10,000 units
Works-in-progress	
(50% complete in every respect)	80,000 units
Sale:	
Finished goods	90,000 units

The actual machine hours worked during the period were 3,000 hours. It is revealed from the analysis of information that 40% of the over/under-absorption was due to defective production policies and the balance was attributable to increase in costs.

You are required:

i. To determine the amount of over/ under absorption of production overheads for the period,

ii. To show the accounting treatment of over/ under-absorption of production overheads, and

iii. To apportion the over/ under-absorbed overheads over the items.

PROBLEM – 17: (RTP MAY 19)

The Union Ltd. has the following account balances and distribution of direct charges on 31st March, 2019.

Particulars	Total	Production Depts.		Service Depts.	
		Machine Shop	Packing	General Plant	Stores
Allocated Overheads:	**(₹)**	**(₹)**	**(₹)**	**(₹)**	**(₹)**
Indirect labour	29,000	8,000	6,000	4,000	11,000
Maintenance Material	9,900	3,400	1,600	2,100	2,800
Misc. supplies	5,900	1,500	2,900	900	600
Supervisor's salary	16,000	--	--	16,000	--

Cost & payroll salary	80,000	--	--	80,000	--

Overheads to be apportioned:

Power	78,000
Rent	72,000
Fuel and Heat	60,000
Insurance	12,000
Taxes	8,400
Depreciation	1,20,000

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

	Floor Space	Radiator Section	No. of employees	Investment	H.P. hours
Machine Shop	2,000 Sq. ft.	45	20	8,00,000	3,500
Packing	800 Sq. ft.	90	12	2,40,000	500
General Plant	400 Sq. ft.	30	4	80,000	-
Stores & maintenance	1,600 Sq. ft.	60	8	1,60,000	1,000

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

Machine shop 50%; Packing 20%; General Plant 30%;

A General Plant overhead is distributed on the basis of number of employees.

i. PREPARE an overhead distribution statement with supporting schedules to show computations and basis of distribution.

ii. DETERMINE the service department distribution by simultaneous equation method.

ANSWERS

1.

(i) Calculation of Overhead rate per hour

$$\frac{\text{Total Overheads}}{\text{Total hours}}$$

$$\frac{33,75,000}{22,500} = ₹\ 150 \text{ per hour}$$

(ii) Statement showing overhead cost per unit as per Activity Based Costing

			Product		
Overheads	**Cost Driver**	**Total**	**A**	**B**	**C**
		₹	₹	₹	₹
Rent & Taxes	Floor space (50:45:62)	8,63,500	2,75,000	2,47,500	3,41,000
Electricity	Power Consumption (32:28:40)	10,66,475	3,41,272	2,98,613	4,26,590
Indirect labour	Labour hours (75:72:78)	13,16,250	4,38,750	4,21,200	4,56,300
Repair & Maintenance	Machine hours (600:450:465)	1,28,775	51,000	38,250	39,525
Total Cost		33,75,000	11,06,022	10,05,563	12,63,415
Units			50,000	45,000	62,000
Cost per Unit			22.12	22.35	20.38

2.

Working notes:

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

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

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

iv. Total overheads of the machine per month

Rent (₹ 18,000 ÷ 3 months) 6,000

Depreciation [(₹ 19,20,000 x 10%) ÷ 12 months] 16,000

Indirect expenses [(₹ 12,00,000 x 20%) ÷ 12 months] 20,000

Total 42,000

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

vi. Overheads for using machines without robot

42000 ÷ 3500 Hrs * 1500 Hrs 18000

vii. Overheads for using machines with robot

42000 ÷ 3500 * 2000 Hrs + 45000 69000

(i) Computation of Machine hour rate for the firm as a whole for a month.

(A) When the robot was used: $\frac{\text{Rs.}69,000}{2,000\text{hours}}$ = ₹ 34.50 per hour

(B) When the robot was not used: $\frac{\text{Rs.}18,000}{1,500\text{ hours}}$ = 12 Per Hour

(ii) Computation of Machine hour rate for the individual job

	Rate per hour	Job					
		Vulcanising		Brushing		Striping	
	(₹)	Hrs.	(₹)	Hrs.	(₹)	Hrs.	(₹)
Overheads							
Without robot	12.00	500	6,000	1,000	12,000	-	-
With robot	34.50	400	13,800	400	13,800	1,200	41,400
Total		900	19,800	1,400	25,800	1,200	41,400
Machine hour rate			22		18.43		34.50

3.

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

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

Factory Cost of Jobs:

Direct materials + Direct wages + Factory overhead

For Job 1 = ₹ 1,08,000 +₹ 84,000 + ₹ 84,000F

For Job 2 = ₹ 75,000 +₹ 60,000 + ₹ 60,000F

Total Cost of Jobs:

Factory cost + Administrative overhead

For Job 1 = (₹1,92,000 + ₹84,000F) + (₹1,92,000 + ₹84,000F) A = ₹2,97,600*

For Job-2 = (₹1,35,000 + ₹60,000F) + (₹1,35,000+ ₹60,000F) A = ₹2,10,000**

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

1,92,000 + 84,000F + 1,92,000A + 84,000AF = ₹2,97,600 ……eqn (i)

1,35,000 + 60,000F + 1,35,000A + 60,000AF = ₹2,10,000 ……eqn (ii)

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

9,60,000 + 4,20,000F + 9,60,000A + 4,20,000AF = ₹14,88,000 ...eqn (iii)

9,45,000 + 4,20,000F + 9,45,000A + 4,20,000AF = ₹14,70,000 ...eqn (iv)

- - - - -

15,000 + 15,000A = ₹18,000

15,000 A = 18,000 – 15,000

A = 0.20

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

1,92,000 + 84,000F + (1,92,000 × 0.20) + (84,000 F × 0.20)= ₹2,97,600

Or

1,92,000 + 84,000F+38,400+16,800 F = ₹2,97,600

1,00,800 F = 67,200

F = 0.667

On solving the above relations: F = 0.667 and A = 0.20

Hence, percentage recovery rates of:

Factory overheads = 66.7% or 2/3rd of wages and

Administrative overheads = 20% of factory cost.

Working note:

$$\text{Total Cost} = \frac{\text{Selling price}}{(100\% + \text{Percentage of profit})}$$

$$*\text{For Job 1} = \frac{\text{Rs.3,33,31 2}}{(100\% + 12\%)} = \text{Rs.2,97,600}$$

$$**\text{For Job 2} = \frac{\text{Rs.2,52,00 0}}{(100\% + 20\%)} = \text{Rs.2,10,000}$$

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

	Job 1	**Job 2**
	(₹)	**(₹)**
Direct materials	1,08,000	75,000
Direct wages	84,000	60,000
Prime cost	1,92,000	1,35,000
Factory overheads		
2/3rd of direct wages	56,000	40,000
Factory cost	2,48,000	1,75,000
Administrative overheads		
20% of factory cost	49,600	35,000
Total cost	2,97,600	2,10,000
Profit (12% & 20% respectively)	35,712	42,000
Selling price	3,33,312	2,52,000

(iii) Selling price of Job 3

	(₹)
Direct materials	68,750
Direct wages	22,500
Prime cost	91,250
Factory overheads (2/3rd of Direct Wages)	15,000
Factory cost	1,06,250
Administrative overheads (20% of factory cost)	21,250
Total cost	1,27,500
Profit margin (balancing figure)	22,500
Selling price Total cost ÷ 85 %	1,50,000

4.

(a) **(i)** Amount of under-absorption of overheads during the year 2020-21

		(₹)
Total production overheads actually incurred during the year 2020-21		35,50,000
Less: Wages paid during strike period	₹2,00,000	
Wages of previous year booked in current year	₹ 1,00,000	3,00,000
Net production overheads actually incurred: (A)		32,50,000
Production overheads absorbed by 1.50 lakh man-days @ ₹ 20 per man-day: (B)		30,00,000
Amount of under-absorption of production overheads: [(A)–(B)]		2,50,000

(ii) Accounting treatment of under absorption of production overheads: It is given in the statement of the question that 62,000 units (50,000 sold + 12,000 closing stock – 0 opening stock) were completely finished and 20,000 units were 65% complete, 40% of the under-absorbed overheads were due to factory inefficiency and the rest were attributable to increase in cost of indirect materials and indirect labour.÷

	(₹)
1. (40% of ₹2,50,000) i.e. ₹ 1,00,000 of under – absorbed overheads were due to factory inefficiency. This being abnormal, should be debited to the Costing Profit and Loss A/c	1,00,000
2. Balance (60% of ₹ 2,50,000) i.e. ₹ 1,50,000 of under – absorbed overheads should be distributed over work-in- progress, finished goods and cost of sales by using supplementary rate	1,50,000
Total under-absorbed overheads	2,50,000

Apportionment of unabsorbed overheads of ₹1,50,000 over work-in-progress, finished goods and cost of sales.

	Equivalent	(₹)

	Completed units	
Work-in-progress (13,000 units × ₹ 2) (Refer to Working Note)	20000 * 65% = 13,000	26,000
Finished goods (12,000 units × ₹ 2)	12,000	24,000
Cost of sales (50,000 units × ₹ 2)	50,000	1,00,000
	75,000	1,50,000

Work-in-progress control A/c Dr.	₹ 26,000
Finished goods control A/c Dr.	₹ 24,000
Cost of Sales A/c Dr.	₹ 1,00,000
Costing Profit & Loss A/c Dr.	₹ 1,00,000
To Overhead control A/c	₹ 2,50,000

Working Note:

Supplementary rate = 150000 ÷ 75000 units = 2 Per unit

5.

i) Schedule Showing the Distribution of Expenses of Service Departments using Step ladder method.

	Main Department			Service Department	
	Purchase (₹)	**Packing (₹)**	**Distribution (₹)**	**Maintenance (₹)**	**Personnel (₹)**
Expenses	5,00,000	8,00,000	3,50,000	6,40,000	3,20,000
Distribution of Maintenance Department (12:15:7: - :6)	1,92,000	2,40,000	1,12,000	-6,40,000	96,000
Distribution of Personnel Department (800:1700:700)	1,04,000	2,21,000	91,000	-	-4,16,000
Total	7,96,000	12,61,000	5,53,000	-	-

ii) Calculation of Expenses rate per hour of Main Department

	Purchase	**Packing**	**Distribution**
Total apportioned expenses (₹)	7,96,000	12,61,000	5,53,000
Total Hours worked	4,380	8,760	2,920
	(12 x 365)	(24 x 365)	(8 x 365)
Expenses rate per hour (₹)	**181.74**	**143.95**	**189.38**

6.

Workings:

Particulars	**Six months 6 operators (Hours)**
Normal available hours per month (208 x 6 months x 6 operators)	7,488
Less: Absenteeism hours (18 x 6 operators)	(108)
Paid hours (A)	7,380
Less: Leave hours (20 x 6 operators)	(120)
Less: Normal idle time (10 x 6 operators)	(60)
Effective working hours	7,200

Computation of Comprehensive Machine Hour Rate

Particulars	**Amount for six months (₹)**
Operators' wages (7,380/8 x100)	92,250
Production bonus (10% on wages)	9,225
Power consumed	40,250
Supervision and indirect labour	16,500
Lighting and Electricity	6,000
Repair and maintenance {(5% × ₹ 32,00,000)/2}	80,000
Insurance (₹ 3,60,000/2)	1,80,000
Depreciation {(₹ 32,00,000 × 10%)/2}	1,60,000
Sundry Work expenses (₹ 50,000/2)	25,000
Management expenses (₹ 5,00,000/2)	2,50,000
Total Overheads for 6 months	8,59,225
Comprehensive Machine Hour Rate = ₹ 8,59,225/7,200 hours	₹ 119.33

7.

(i) Statement showing distribution of Overheads

Primary Distribution

Item of cost	**Basis of apportionment**	**Total**	**P (₹)**	**Q (₹)**	**R (₹)**	**X (₹)**	**Y (₹)**
Direct wages	Actual	2,800	--	--	--	2,000	800
Rent and Rates	Floor area (4:5:7:2:2)	10,000	2,000	2,500	3,500	1,000	1,000

General lighting	Light points (4:2:3:1:2)	600	200	100	150	50	100
Indirect wages	Direct wages (50:15:45:20:8)	3,450	1,250	375	1,125	500	200
Power	Horse Power of machines used (10:8:10:2:5)	3,500	1,000	800	1,000	200	500
Depreciation of machinery	Value of machinery (10:8:10:2:5)	70,000	20,000	16,000	20,000	4,000	10,000
Sundries	Direct wages (50:15:45:20:8)	13,800	5,000	1,500	4,500	2,000	800
Total		**1,04,150**	**29,450**	**21,275**	**30,275**	**9,750**	**13,400**

Secondary Distribution using simultaneous equation method:

Overheads of service cost centres

Let, X be the overhead of service cost centre X

Y be the overhead of service cost centre Y

X = 9,750 + 0.10 Y

Y = 13,400 + 0.10 X

Substituting the value of Y in X we get X = 9,750 + 0.10 (13,400 + 0.10 X)

X = 9,750 + 1,340 + 0.01 X

0.99 X = 11,090

Therefore X = ₹ 11,202

Therefore Y = 13,400 + 0.10 11,202 = ₹ 14,520.20

Secondary Distribution Summary

Particulars	**Total (₹)**	**P (₹)**	**Q (₹)**	**R (₹)**
Allocated and Apportioned over-heads as per primary distribution		29450	21275	30275
X	11202	5041	1680	3361
Y	14520	5082	3630	4356
Total		39573	26585	37992

(ii) Calculation of Overhead recovery rate per hour

Particulars	**P (₹)**	**Q (₹)**	**R (₹)**
Total overheads cost	**39,572.97**	**26,585.35**	**37,991.66**
Working hours	13,191	7,598	14,995
Rate per hour (₹)	3	3.5	2.53

(iii) Cost of Product A

Particulars	**(₹)**
Direct material	65
Direct labour	40
Prime cost	105
Production on overheads	0

Particulars		**(₹)**	
P	6 hours x 3	₹ 18	
Q	5 hours x 3.50	₹ 17.50	40.56
R	2 hours x 2.53	₹ 5.06	
Total cost			145.56

Note: Secondary Distribution can also be done using repeated distribution Method

8.

1. Overheads distribution Sheet

Item	**Basis**	**Total Amount (₹)**	**Production Departments**		**Service Departments**	
			A (₹)	**B (₹)**	**X (₹)**	**Y (₹)**
Variable overheads (₹ 12.60 lakhs - ₹ 4.20 lakhs)	Horse Power hours used	8,40,000	2,40,000	3,00,000	1,80,000	1,20,000
Fixed Overheads	Horse power for Capacity production	4,20,000	1,20,000	1,50,000	90,000	60,000
Total Overheads		12,60,000	3,60,000	4,50,000	2,70,000	1,80,000
Service dept X allocated to A, B & Y	As per the ratio given 6:4:2	(2,70,000)	1,35,000	90,000		45,000
Service dept Y allocated to A & B	As per the ratio of 4:1	(1,80,000+45000 = 2,25,000)	1,80,000	45,000		
Total Overheads of Production departments			6,75,000	5,85,000		

2. Calculation of Factory overhead per labour hour

Item	Production Departments	
	A (₹)	B (₹)
Total overheads	6,75,000	5, 85,000
Direct labour hours	67,500	48,750
Factory overheads per hour	10	12

9.

Working Notes:

(i) Total Productive hours = Estimated Working hours – Machine Maintenance hours = 2,200 hours – 200 hours = 2,000 hours

(ii) Depreciation per annum = 1000000 – 10000 ÷ 10 years = 99000

(iii) Chemical solution cost per annum = ₹ 2,000 × 50 weeks = ₹ 1,00,000

(iv) Wages of attendants (p.a) = 9000 * 50 weeks ÷ 6 weeks = 75000

Calculation of Machine hour rate

Particulars	Amount (per annum)	Amount (per hour)
A. Standing Charge		
(i) Wages of attendants	75,000	
(ii) Departmental and general works overheads	20,000	
Total Standing Charge	95,000	
Standing Charges per hour		47.50
B. Machine Expense		
(iii) Depreciation	99,000	49.50
(iv) Electricity (7 × 1,900 × 16 units) ÷ 2,000	-	106.40
(v) Chemical solution	1,00,000	50.00
(vi) Maintenance cost	1,20,000	60.00
Machine operating cost per hour (A + B)		313.40

10.

i) Overhead Distribution Summary

	Basis	Total (₹)	A (₹)	B (₹)	C (₹)	X (₹)	Y (₹)
Direct materials	Direct	–	–	–	–	3,20,000	1,60,000
Direct wages	Direct	–	–	–	–	1,60,000	3,20,000
Factory rent (2:1:2:1:2)	Area	6,40,000	1,60,000	80,000	1,60,000	80,000	1,60,000

Power (10:16:16:3:5)*	H.P. × Machine Hrs.	4,00,000	80,000	1,28,000	1,28,000	24,000	40,000
Depreciation (2:4:2:1:1)	Capital value of assets	1,60,000	32,000	64,000	32,000	16,000	16,000
Other overheads (1:2:4:1:1)	Machine hrs.	14,40,000	1,60,000	3,20,000	6,40,000	1,60,000	1,60,000
Total		26,40,000	4,32,000	5,92,000	9,60,000	7,60,000	8,56,000

*{(1600×80) : (3200×64) : (6400×32) : (1600×24) : (1600×40)}

(1,28,000 : 2,04,800 : 2,04,800 : 38,400 : 64,000)

(10:16:16:3:5)

(ii) Redistribution of service department's expense using repeated distribution

Method:

	A (₹)	B (₹)	C (₹)	X (₹)	Y (₹)
Total overheads	4,32,000	5,92,000	9,60,000	7,60,000	8,56,000
Dept. X overhead apportioned in the ratio (72:24:48: —:16)	3,42,000	1,14,000	2,28,000	-7,60,000	76,000
Dept. Y overhead apportioned in the ratio (96:56: —:8: —)	5,59,200	3,26,200	-	46,600	-9,32,000
Dept. X overhead apportioned in the ratio (72:24:48: —:16)	20,970	6,990	13,980	-46,600	4,660
Dept. Y overhead apportioned in the ratio (96:56: —:8: —)	2,796	1,631	-	233	-4,660
Dept. X overhead apportioned in the ratio (72:24:48: —:16)	105	35	70	-233	23
Dept. Y overhead apportioned in the ratio (96:56: —:8: —)	15	8	-	-	-23
	13,57,086	10,40,864	12,02,050	-	-

Calculation of machine hour rate

		A	B	C
A	Total overheads (₹)	13,57,086	10,40,864	12,02,050
B	Machine hours	1,600	3,200	6,400
C	Machine hour rate (₹) [A ÷ B]	848.18	325.27	187.82

11.

(i) Computation of production and sales quantities:

The products processing times are as under –

Product	A	B	Total
Department Pie	4 hours	1 hour	90,000 hours
Department Qui	1 hour	4 hours	90,000 hours

Let X and Y be the number of units (production quantities) of the two products. Converting these into equations, we have –

4X + Y = 90,000

X + 4Y = 90,000

Solving the above, we get X = 18,000; Y = 18,000

Hence, the Production and Sales Quantities are determined as under –

Product	Production Quantity	Closing Stock (Given)	Sales Quantity (Balancing Figure)
A	18,000 units	1,800 units	16,200 units
B	18,000 units	5,400 units	12,600 units

Effect of using pre-determined rate of overheads on the company's profit

Product	Closing Stock Quantity	Overhead included using pre- determined rate	Overhead included using department rate	Difference in overhead in closing stock value / Effect on closing stock value
A	1,800 units	1,800 x 5 hours x ₹ 20.40 = ₹ 1,83,600	Pie = 1,800 units x 4 hours x ₹ 28.80 = ₹ 2,07,360 Qui = 1,800 units x 1 hour x ₹ 12 = ₹ 21,600	(-) ₹ 45,360
B	5,400 units	5,400 x 5 hours x ₹ 20.40 = ₹ 5,50,800	Pie = 5,400 units x 1 hour x ₹ 28.80 = ₹ 1,55,520	(+) ₹ 1,36,080
			Qui = 5,400 units x 4 hours x ₹12 = ₹ 2,59,200	
Total		₹ 7,34,400	₹ 6,43,680	(+) ₹ 90,720

Use of pre-determined overhead rate has resulted in over valuation of stock by ₹ 90,720 due to which the company's income would be affected (increase) by ₹ 90,720. Profit would be affected only to the extent of Overhead contained in closing finished goods and closing WIP, if any.

Effect of using pre-determined on the products' selling prices

Particulars	Product A	Product B
Selling Price per unit if pre-determined overhead rate is used	₹177.80	₹ 198.80
Selling Price per unit if department wise rate is used	₹ 213.08	₹163.52
Difference	₹ 35.28	₹ 35.28
	Under-Priced	Over-Priced

Working Note

1. Pre determined Rate = 3672000 ÷ 180000 Hours = 20.40

Per Direct Labour Hour

Particulars	Product A in ₹	Product B in ₹
Materials & Labour	25.00	40.00
Add: Production Overhead	102.00	102.00
A = 5 hours x ₹ 20.40 per hour B = 5 hours x ₹ 20.40 per hour		
Cost of production	127.00	142.00
Add: 40% of margin	50.80	56.80
	177.80	198.50

2. If department-wise recovery rate is used

Particulars	Product A in ₹	Product B in ₹
Materials & Labour	25.00	40.00
Add: Production Overhead	127.20	76.80
A = Pie = 4 hours x ₹ 28.80 Qui = 1 hour x ₹ 12		
B = Pie = 1 hour x ₹ 28.80		
Qui = 4 hours x ₹ 12		
Cost of production	152.20	116.80
Add: 40% of margin	60.88	46.72
Selling Price per unit	213.08	163.52

12.

Primary Distribution Summary

Item of cost	Basis of apportionment	Total (₹)	P1(₹)	P2(₹)	P3(₹)	S1(₹)	S2(₹)
Direct wages	Actual	5,00,000	--	--	--	3,75,000	1,25,000
Rent and Rates	Floor area (4: 5: 6: 4: 1)	12,50,000	2,50,000	3,12,500	3,75,000	2,50,000	62,500
General lighting	Light points (2: 3: 4: 2: 1)	1,50,000	25,000	37,500	50,000	25,000	12,500
Indirect wages	Direct wages (6: 4: 6: 3: 1)	3,75,000	1,12,500	75,000	1,12,500	56,250	18,750
Power	Horse Power of machines used (6: 3: 5: 1)	5,00,000	2,00,000	1,00,000	1,66,667	33,333	--
Depreciation of machinery	Value of machinery (12: 16: 20: 1: 1)	10,00,000	2,40,000	3,20,000	4,00,000	20,000	20,000
Insurance of machinery	Value of machinery (12 : 16 : 20 : 1 : 1)	4,00,000	96,000	1,28,000	1,60,000	8,000	8,000
		41,75,000	**9,23,500**	**9,73,000**	**12,64,167**	**7,67,583**	**2,46,750**

Overheads of service cost centres:

Let S1 be the overhead of service cost centre S1 and S2 be the overhead of service cost centre S2.

S1 = 7,67,583 + 0.10 S2

S2 = 2,46,750 + 0.10 S1

Substituting the value of S2 in S1 we get

S1 = 7,67,583 + 0.10 (2,46,750 + 0.10 S1)

S1 = 7,67,583 + 24,675 + 0.01 S1

0.99 S1 = 7,92,258

S1 = ₹ 8,00,260

S2 = 2,46,750 + 0.10 x 8,00,260 = ₹ 3,26,776

Secondary Distribution Summary

Particulars	Total (₹)	P1 (₹)	P2 (₹)	P3 (₹)
Allocated and Apportioned over-heads as per primary distribution	31,60,667	9,23,500	9,73,000	12,64,167
S1	8,00,260	1,60,052	2,40,078	3,20,104
S2	3,26,776	1,30,710	65,355	98,033
		12,14,262	**12,78,433**	**16,82,304**

(i) Overhead rate per hour

Particulars	P1	P2	P3
Total overheads cost (₹)	12,14,262	12,78,433	16,82,304
Production hours worked	6,225	4,050	4,100
Rate per hour (₹)	195.06	315.67	410.32

(ii) Cost of Product X

Particulars	(₹)
Direct material	12,500.00
Direct labour	7,500.00
Prime cost	**20,000.00**
Production on overheads	
P1 5 hours x 195.06 = 975.3	
P2 3 hours x 315.67 = 947.01	
P3 4 hours x 410.32 = 1,641.28	3,563.59
Factory cost	**23,563.59**

13.

Working Note:

1. Effective machine hour:

= Budgeted working hours – Machine Set-up time

= 2,496 hours – 312 hours = 2,184 hours.

2. Operators' salary per annum:

Salary (3 operators × ₹ 30,000 × 12 months)	₹ 10,80,000
Add: Fringe benefits (20% of ₹ 10,80,000)	₹ 2,16,000
	₹ 12,96,000

3. Depreciation per annum

₹24,90,000 - 90,000/12years = ₹ 2,00,000

Computation of Machine hour Rate

Particulars	Amount p.a. (₹)	Amount p.a. (₹)
Standing charges		
Operators' Salary ₹ 12,96,000/ 6machines x 1/2,184 hours	12,96,000	98.9
Departmental and general overheads:		
(5,00,000 x 110%)		
(₹5,50,000/ 6machines x 1/2,184 hours)	5,50,000	41.97
(A)	18,46,000	140.87
Machine Expenses		

Depreciation (2,00,000/2,184 hours)	2,00,000	91.58
Electricity:		
During working hours (2,496 hours × 60 units x ₹6)	8,98,560	411.43
During maintenance hours (416 hours × 10 units x ₹6)	24,960	11.43
Component replacement cost (2,400 × 52 weeks)	1,24,800	57.14
Machine maintenance cost	2,40,000	109.89
(B)	14,88,320	681.47
Machine Hour Rate (A+B)		822.34

14.

Computation of Machine Hour Rate

Particulars	**Basis of apportionment**		**Machines**		
		Total (₹)	**A (₹)**	**B (₹)**	**C (₹)**
(A) Standing Charges					
Insurance	Depreciation Basis (3:3:2)	80,000	30,000	30,000	20,000
Indirect Labour	Direct Labour (2:3:3)	2,40,000	60,000	90,000	90,000
Building maintenance expenses	Floor Space (2:2:1)	2,00,000	80,000	80,000	40,000
Rent and Rates	Floor Space (2:2:1)	2,40,000	96,000	96,000	48,000
Salary of foreman	Equal	5,04,000	1,68,000	1,68,000	1,68,000
Salary of attendant	Equal	1,44,000	48,000	48,000	48,000
Total standing charges		**14,08,000**	**4,82,000**	**5,12,000**	**4,14,000**
Hourly rate for standing charges			**247.43**	**262.83**	**212.53**
(B)Machine Expenses:					
Depreciation	Direct	2,00,000	75,000	75,000	50,000
Spare parts	Final estimates	1,32,250	46,000	57,500	28,750
Power	K.W. rating (3:2:3)	4,00,000	1,50,000	1,00,000	1,50,000
Consumable Stores	Direct	80,000	30,000	25,000	25,000
Total Machine expenses		8,12,250	3,01,000	2,57,500	2,53,750
Hourly Rate for Machine expenses			154.52	132.19	130.26
Total (A + B)		**22,20,250**	**7,83,000**	**7,69,500**	**6,67,750**
Machine Hour rate			**401.95**	**395.02**	**342.79**

Working Notes:

i. Calculation of effective working hours:

No. of full off-days = No. of Sunday + No. of holidays

= 52 + 12 = 64 days

No. of half working days = 52 days – 2 holidays = 50 days

No. of full working days = 365 days – 64 days – 50 days = 251 days

Total working Hours = {(251 days × 8 hours) + (50 days × 4 hours)}

= 2,008 hours + 200 = 2,208 hours.

Total effective hours = Total working hours × 90% - 2% for break-down

= 2,208 hours × 90% - 2% (2,208 hours × 90%)

= 1,987.2 hours – 39.74 hours

= 1947.46 or Rounded up to 1948 hours.

ii. Amount of spare parts is calculated as under:

Particulars	A (₹)	B (₹)	C (₹)
Preliminary estimates	40,000	40,000	20,000
Add: Increase in price @ 15%	6,000	6,000	3,000
	46,000	46,000	23,000
Add: Increase in consumption @ 25%		11,500	5,750
Estimated cost	46,000	57,500	28,750

iii. Amount of Indirect Labour is calculated as under:

Particulars	(₹)
Preliminary estimates	2,00,000
Add: Increase in wages @ 20%	40,000
	2,40,000

iv. Interest on capital outlay is a finance cost; therefore it has been excluded from the cost accounts.

15.

Primary Distribution Summary

Item of cost	Basis of apportionment	Total (₹)	P1 (₹)	P2 (₹)	P3 (₹)	S1 (₹)	S2 (₹)
Direct wages	Actual	2,50,000	--	--	--	1,87,500	62,500
Rent and rates	Floor area (4 : 5 : 6 : 4 : 1)	6,25,000	1,25,000	1,56,250	1,87,500	1,25,000	31,250
General lighting	Light points (2 : 3 : 4 : 2 : 1)	7,50,000	1,25,000	1,87,500	2,50,000	1,25,000	62,500
Indirect wages	Direct wages (6 : 4 : 6 : 3 : 1)	1,87,500	56,250	37,500	56,250	28,125	9,375
Power	Horse Power of machines used (6 : 3 : 5 : 1)	25,00,000	10,00,000	5,00,000	8,33,333	1,66,667	--

Depreciation of machinery	Value of machinery (12:16:20:1:1)	5,00,000	1,20,000	1,60,000	2,00,000	10,000	10,000
Insurance of machinery	Value of machinery (12:16:20:1:1)	2,00,000	48,000	64,000	80,000	4,000	4,000
		50,12,500	14,74,250	11,05,250	16,07,083	6,46,292	1,79,625

Overheads of service cost centres:

Let S1 be the overhead of service cost centre S1 and S2 be the overhead of service cost centre S2.

S1 = 6,46,292 + 0.10 S2

S2 = 1,79,625 + 0.10 S1

Substituting the value of S2 in S1 we get

S1 = 6,46,292 + 0.10 (1,79,625 + 0.10 S1)

S1 = 6,46,292 + 17,962.5 + 0.01 S1

0.99 S1 = 6,64,254.5

S1 = ₹ 6,70,964

S2 = 1,79,625 + 0.10 ₹ 6,70,964 = ₹ 2,46,721.4

Secondary Distribution Summary

Particulars	Total (₹)	P1 (₹)	P2 (₹)	P3 (₹)
Allocated and Apportioned overheads as per primary distribution	41,86,583	14,74,250	11,05,250	16,07,083
S1	6,70,964	1,34,192.80	2,01,289.20	2,68,385.60
S2	2,46,721.40	98,689	49,344	74,017
		17,07,131.40	13,55,883.50	19,49,485.10

(i) Overhead rate per hour

	P1	P2	P3
Total overheads cost (₹)	17,07,131.40	13,55,883.50	19,49,485.10
Production hours worked	6,225	4,050	4,100
Rate per hour (₹)	274.24	334.79	475.48

(ii) Cost of Product X

Particulars	(₹)
Direct material	6,250.00
Direct labour	3,750.00
Prime cost	10,000.00
Production on overheads	

P1 5 hours x ₹ 274.24 = 1,371.20	
P2 3 hours x ₹ 334.79 = 1,004.37	
P3 4 hours x ₹ 475.48 = 1,901.92	4,277.49
Factory cost	14,277.49

16.

Amount of over/ under absorption of production overheads during the period of first six months of the year 2019-20:

Particulars	**Amount (₹)**	**Amount(₹)**
Total production overheads actually incurred during the period		34,08,000
Less: Amount paid to worker as per court order	4,50,000	
Expenses of previous year booked in the current year	1,00,000	
Wages paid for the strike period under an award	4,20,000	
Obsolete stores written off	36,000	10,06,000
		24,02,000
Less: Production overheads absorbed as per machine hour rate (3,000 hours × ₹840*)		25,20,000
Amount of over absorbed production overheads		1,18,000

*Budgeted Machine hour rate (Blanket rate) = ₹ 50,40,000/6,000 hours = ₹840 per hour

i. Accounting treatment of over absorbed production overheads:

As, 40% of the over absorbed overheads were due to defective production policies, this being abnormal, hence should be credited to Costing Profit and Loss Account.

Amount to be credited to Costing Profit and Loss Account = ₹1,18,000× 40% = ₹47,200.

Balance of over absorbed production overheads should be distributed over Works in progress, finished goods and Cost of sales by applying supplementary rate*.

Amount to be distributed = ₹1,18,000× 60% = ₹70,800

Supplementary rate = ₹ 70,800/1,50,000 units = ₹ 0.472 per unit

ii. Apportionment of over absorbed production overheads over WIP, Finished goods and Cost of sales:

	Equivalent completed units	**Amount (₹)**
Work-in-Progress (80,000 units × 50% ×0.472)	40,000	18,880
Finished goods (20,000 units × 0.472)	20,000	9,440
Cost of sales (90,000 units × 0.472)	90,000	42,480
Total	**1,50,000**	**70,800**

17.

a. Overhead Distribution Statement

Particulars	Production Departments		Service Departments	
	Machine Shops	Packing	General Plant	Stores
Allocated Overheads:	(₹)	(₹)	(₹)	(₹)
Indirect labour	8,000	6,000	4,000	11,000
Maintenance Material	3,400	1,600	2,100	2,800
Misc. supplies	1,500	2,900	900	600
Supervisor's salary	--	--	16,000	--
Cost & payroll salary	--	--	80,000	--
Total allocated overheads	**12,900**	**10,500**	**1,03,000**	**14,400**
Add: Apportioned Overheads	1,84,350	70,125	22,775	73,150
(As per Schedule below)	1,97,250	80,625	1,25,775	87,550

Schedule of Apportionment of Overheads

Particulars	Basis	Production Depts.		Service Depts.	
		Machine Shop	Packing	General Plant	Stores
	(₹)	(₹)	(₹)	(₹)	(₹)
Power	HP hours (7 : 1 : - : 2)	54,600	7,800	--	15,600
Rent	Floor space (5 : 2 : 1 : 4)	30,000	12,000	6,000	24,000
Fuel & Heat	Radiator sec. (3 : 6 : 2 : 4)	12,000	24,000	8,000	16,000
Insurance	Investment (10 : 3 : 1 : 2)	7,500	2,250	750	1,500
Taxes	Investment (10 : 3 : 1 : 2)	5,250	1,575	525	1,050
Depreciation	Investment (10 : 3 : 1 : 2)	75,000	22,500	7,500	15,000
		1,84,350	**70,125**	**22,775**	**73,150**

b. Re-distribution of Overheads of Service Departments to Production Departments:

Let, the total overheads of General Plant = 'a' and the total overheads of Stores = 'b'

a = 1,25,775 + 0.3b……..(i)

b = 87,550 + 0.2a……(ii)

Putting the value of 'b' in equation no.

a) = 1,25,775 + 0.3 (87,550 + 0.2a)

Or a = 1,25,775 + 26,265 + 0.06a

Or 0.94a = 1,52,040

Or a = 1,61,745 (appx.)

Putting the value of a = 1,61,745 in equation no.

(ii) To get the value of 'b'

b) = 87,550 + 0.2 × 1,61,745 = 1,19,899

Secondary Distribution Summary

Particulars	Total (₹)	Machine Shops (₹)	Packing (₹)
Allocated and Apportioned overheads as per Primary distribution	2,77,875	1,97,250.00	80,625.00
General Plant	1,61,745	80,872.50	48,523.50
		(1,61,745 × 5/10)	(1,61,745 × 3/10)
Stores	1,19,899	59,949.50	23,979.80
		(1,19,899 × 50%)	(1,19,899 × 20%)
		3,38,072.00	1,53,128.30

CHAPTER 3: ACTIVITY BASED COSTING

PART – A: PAST EXAM QUESTIONS

PROBLEM – 1: (NOV 22 – 5 Marks)

XYZ Ltd. is engaged in manufacturing two products- Express Coffee and Instant Coffee. It furnishes the following data for a year:

Product	Actual Output (units)	Total Machine hours	Total Number of Purchase orders	Total Number of set ups
Express Coffee	5,000	20,000	160	20
Instant Coffee	60,000	1,20,000	384	44

The annual overheads are as under:

Particulars	₹
Machine Processing costs Set up related costs	7,00,000
Purchase related costs	7,68,000
	6,80,000

You are required to:

(i) Compute the costs allocated to each product – Express Coffee and Instant Coffee from each activity on the basis of Activity- Based Costing (ABC) method.

(ii) Find out the overhead cost per unit of each product – Express coffee and Instant coffee based on (i) above.

PROBLEM – 2: (MAY 22 – 10 Marks)

Star Limited manufacture three products using the same production methods. A conventional product costing system is being used currently. Details of the three products for a typical period are:

Product	Labour Hrs per unit	Machine Hrs per unit	Materials per Unit	Volume in Units
AX	1.00	2.00	35	7,500
BX	0.90	1.50	25	12,500
CX	1.50	2.50	45	25,000

Direct Labour costs ₹ 20 per hour and production overheads are absorbed on a machine hour basis. The overhead absorption rate for the period is ₹ 30 per machine hour.

Management is considering using Activity Based Costing system to ascertain the cost of the products. Further analysis shows that the total production overheads can be divided as follows:

Particulars	%
Cost relating to set-ups	40
Cost relating to machinery	10
Cost relating to material handling	30

Costs relating to inspection	20
Total production overhead	100

The following activity volumes are associated with the product line for the period as a whole. Total activities for the period:

Product	No. of set-ups	No. of movements of Materials	No. of inspections
AX	350	200	200
BX	450	280	400
CX	740	675	900
Total	1,540	1,155	1,500

Required:

(i) Calculate the cost per unit for each product using the conventional method.

(ii) Calculate the cost per unit for each product using activity based costing method.

PROBLEM – 3: (DEC 21 – 10 Marks)

A Drug Store is presently selling three types of drugs namely 'Drug A', 'Drug B' and 'Drug C'. Due to some constraints, it has decided to go for only one product line of drugs. It has provided the following data for year 2020-21 for each product line:

	Drugs Types		
	A	B	C
Revenues (in ₹)	74,50,000	1,11,75,000	1,86,25,000
Cost of goods sold (in ₹)	41,44,500	68,16,750	1,20,63,750
Number of purchase orders placed (in nos.)	560	810	630
Number of deliveries received	950	1,000	850
Hours of shelf-stocking time	900	1,250	2,350
Units sold (in Nos.)	1,75,200	1,50,300	1,44,500

Following additional information is also provided:

Activity	Description of activity	Total Cost (₹)	Cost-allocation base
Drug Licence fee	Drug Licence fee	5,00,000	To be distributed in ratio 2:3:5 between A, B and C
Ordering	Placing of orders for purchases	8,30,000	2,000 purchase orders
Delivery	Physical delivery and receipt of foods	18,20,000	2,800 deliveries
Shelf stocking	Stocking of goods	32,40,000	4,500 hours of shelf-stocking time

Customer Support	Assistance provided to customers	28,20,000	4,70,000 units sold

You are required to:

(i) Calculate the operating income and operating income as a percentage (%) of revenue of each product line if:

(a) All the support costs (Other than cost of goods sold) are allocated in the ratio of cost of goods sold.

(b) All the support costs (Other than cost of goods sold) are allocated using activity-based costing system.

(ii) Give your opinion about choosing the product line on the basis of operating income as a percentage (%) of revenue of each product line under both the situations as above.

PROBLEM – 4: (JUL 21 – 10 Marks)

PQR Ltd. is engaged in the production of three products P, Q and R. The company calculates Activity Cost Rates on the basis of Cost Driver capacity which is provided as below:

Activity	Cost Driver	Cost Driver Capacity	Cost (₹)
Direct Labour hours	Labour hours	30,000 Labour hours	3,00,000
Production runs	No. of Production runs	600 Production runs	1,80,000
Quality Inspections	No. of Inspection	8000 Inspections	2,40,000

The consumption of activities during the period is as under:

Activity / Products	P	Q	R
Direct Labour hours	10,000	8,000	6,000
Production runs	200	180	160
Quality Inspection	3,000	2,500	1,500

You are required to:

(i) Compute the costs allocated to each Product from each Activity.

(ii) Calculate the cost of unused capacity for each Activity.

(iii) A potential customer has approached the company for supply of 12,000 units of a new product. 'S' to be delivered in lots of 1500 units per quarter. This will involve an initial design cost of ₹ 30,000 and per quarter production will involve the following:

Direct Material	₹ 18,000
Direct Labour hours	1,500 hours
No. of Production runs	15
No. of Quality Inspection	250

Prepare cost sheet segregating Direct and Indirect costs and compute the Sales value per quarter of product 'S' using ABC system considering a markup of 20% on cost.

PROBLEM – 5 : (JAN 21 – 10 Marks)

ABC Ltd. manufactures three products X, Y and Z using the same plant and resources. It has given the following information for the year ended on 31st March, 2020:

Particulars	X	Y	Z
Production Quantity (units) Cost per unit:	1200	1440	1968
Direct Material (₹)	90	84	176
Direct Labour (₹)	18	20	30

Budgeted direct labour rate was ₹ 4 per hour and the production overheads, shown in table below, were absorbed to products using direct labour hour rate. Company followed Absorption Costing Method. However, the company is now considering adopting Activity Based Costing Method.

Particulars	Budgeted Overheads (₹)	Cost Driver	Remarks
Material Procurement	50,000	No. of orders	No. of orders was 25 units for each product.
Set-up	40,000	No. of production Runs	All the three products are produced in production runs of 48 units.
Quality Control	28,240	No. of Inspections	Done for each production run.
Maintenance	1,28,000	Maintenance hours	Total maintenance hours were 6,400 and was allocated in the ratio of 1:1:2 between X, Y & Z.

Required:

1. Calculate the total cost per unit of each product using the Absorption Costing Method.

2. Calculate the total cost per unit of each product using the Activity Based Costing Method.

PROBLEM – 6 : (NOV 20 – 6 Marks)

ABC Ltd. is engaged in production of three types of Fruit Juices: Apple, Orange and Mixed Fruit. The following cost data for the month of March 2020 are as under:

Particulars	Apple	Orange	Mixed Fruit
Units produced and sold	10,000	15,000	20,000
Material per unit (₹)	8	6	5
Direct Labour per unit (₹)	5	4	3
No. of Purchase Orders	34	32	14
No. of Deliveries	110	64	52
Shelf Stocking Hours	110	160	170

Overheads incurred by the company during the month are as under:

Particulars	(₹)
Ordering costs	64,000
Delivery costs	1,58,200
Shelf Stocking costs	87,560

Required:

(i) Calculate cost driver's rate.

(ii) Calculate total cost of each product using Activity Based Costing.

PROBLEM – 7 : (NOV 19 – 10 Marks)

PQR Ltd has decided to analyze the profitability of its five new customers. It buys soft drink bottles in cases at ₹ 45 per case and sells them to retail customers at a list price of ₹ 54 per case. The data pertaining to five customers are given below:

Particulars	A	B	C	D	E
Number of Cases Sold	9,360	14,200	62,000	38,000	9,800
List Selling Price (₹)	54	54	54	54	54
Actual Selling Price (₹)	54	53.4	49	50.2	48.6
Number of Purchase Orders	30	50	60	50	60
Number of Customers visits	4	6	12	4	6
Number of Deliveries	20	60	120	80	40
Kilometres travelled per delivery	40	12	10	20	60
Number of expedite Deliveries	0	0	0	0	2

Its five activities and their cost drivers are:

Activity	Cost Driver
Order taking	₹ 200 per purchase order
Customer visits	₹ 300 per each visit
Deliveries	₹ 4.00 per delivery km travelled
Product Handling	₹ 2.00 per case sold
Expedited deliveries	₹ 100 per such delivery

You are required to:

i) Compute the customer level operating income of each of five retail customers by using the Cost Driver rates.

ii) Examine the results to give your comments on Customer 'D' in comparison with Customer 'C' and on Customer 'E' in comparison with Customer 'A'.

PROBLEM – 8 : (MAY 19 – 10 Marks)

MNO Ltd. manufactures two types of equipment A and B and absorbs overheads on the basis of direct labour hours. The budgeted overheads and direct labour hours for the month of March 2019 are ₹ 15,00,000 and 25,000 hours respectively. The information about the company's products is as follows:

Particular	Equipment	
	A	B
Budgeted Production	3,200 units	3,850 units
Direct Material Cost	₹ 350 per unit	₹ 400 per unit
Direct Labour Cost		
A: 3 hours @ ₹ 120 per hour	₹ 360	
B: 4 hours @ ₹ 120 per hour		₹ 480

Overheads of ₹ 15,00,000 can be identified with the following three major activities:

Order Processing: ₹ 3,00,000

Machine Processing: ₹ 10,00,000

Product Inspection: ₹ 2,00,000

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 hours
A	400	22,500	5,000
B	200	27,500	15,000
Total	**600**	**50,000**	**20,000**

Required:

(i) Prepare a statement showing the manufacturing cost per unit of each product using the absorption costing method assuming the budgeted manufacturing volume is attained.

(ii) Determine cost driver rates and prepare a statement showing the manufacturing cost per unit of each product using activity based costing, assuming the budgeted manufacturing volume is attained.

(iii) MNO 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.

PROBLEM – 9 : (NOV 18 – 10 Marks)

M/s. HMB Limited is producing a product in 10 batches each of 15000 units in a year and incurring following overheads their own:

Particular	Amount (₹)
Material procurement	22,50,000

Maintenance	17,30,000
Set-up	6,84,500
Quality control	5,14,800

The prime costs for the year amounted to ₹ 3,01,39,000.

The company is using currently the method of absorbing overheads on the basis of prime cost. Now it wants to shift to activity-based costing. Information relevant to Activity drivers for a year is as under:

Activity Driver	**Activity Volume**
No. of purchase orders	1500
Maintenance hours	9080
No. of set-ups	2250
No. of inspections	2710

The company has produced a batch of 15000 units and has incurred ₹ 26,38,700 and ₹ 3,75,200 on materials and wages respectively.

The usages of activities of the said batch are as follows:

Materials orders	48 orders
Maintenance hours	810 hours
No. of set-ups	40
No. of inspections	25

You are required to:

(i) Find out cost of product per unit on absorption costing basis for the said batch.

(ii) Determine cost driver rate, total cost and cost per unit of output of the said batch on the basis of activity-based costing.

PROBLEM – 10 : (MAY 18 – 10 Marks)

PQR Pens Ltd. manufactures two products - 'Gel Pen' and 'Ball Pen'. It furnishes the following data for the year 2017:

Product	**Annual Output (Units)**	**Total Machine Hours**	**Total number of Purchase orders**	**Total number of set-ups**
Gel Pen	5,500	24,000	240	30
Ball Pen	24,000	54,000	448	56

The annual overheads are as under:

Particulars	(₹)
Volume related activity costs	4,75,020
Set up related costs	5,79,988
Purchase related costs	5,04,992

Calculate the overhead cost per unit of each Product - Gel Pen and Ball Pen on the basis of:

(i) Traditional method of charging overheads

(ii) Activity based costing method and

(iii) Find out the difference in cost per unit between both the methods.

PROBLEM – 11: (RTP NOV 23)

L Limited manufactures three products P, Q and R which are similar in nature and are usually produced in production runs of 100 units. Product P and R require both machine hours and assembly hours, whereas product Q requires only machine hours. The overheads incurred by the company during the first quarter are as under:

	₹
Machine Department expenses	18,48,000
Assembly Department expenses	6,72,000
Setup costs	90,000
Stores receiving cost	1,20,000
Order processing and dispatch	1,80,000
Inspect and Quality control cost	36,000

The data related to the three products during the period are as under:

	P	Q	R
Units produced and sold	15,000	12,000	18,000
Machine hours worked	30,000 hrs.	48,000 hrs.	54,000 hrs.
Assembly hours worked (direct labour hours)	15,000 hrs.	-	27,000 hrs.
Customers' orders executed (in numbers)	1,250	1,000	1,500
Number of requisitions raised on the stores	40	30	50

Prepare a statement showing details of overhead costs allocated to each product type using activity-based costing.

PROBLEM – 12 : (RTP MAY 23)

Hygiene Care Ltd. is a manufacturer of a range of goods. The cost structure of its different products is as follows:

Particulars	Hand Wash	Detergent Powder	Dishwasher
Direct Materials (₹ / Pu)	150	120	120
Direct Labour @₹10/ hour (₹ / Pu)	45	60	75
Production Overheads (₹ / Pu)	40	50	40
Total Cost (₹ / Pu)	235	230	235
Quantity Produced (Units)	30,000	60,000	90,000

Hygiene Care Ltd. was absorbing overheads on the basis of direct labour hours. Management accountant has suggested that the company should introduce ABC system and has identified cost drivers and cost pools as follows:

Activity Cost Pool	Cost Driver	Associated Cost

		(₹)
Goods Receiving	Number of Dispatch Order	8,88,000
Inspecting and Testing costs	Number of Production Runs	26,82,000
Dispatching	Number of dispatch order	6,30,000
Storage Cost	Number of Batches of material	36,00,000

The following information is also supplied:

Details	Hand Wash	Detergent Powder	Dishwasher
Batches of material	720	780	900
Number of dispatch order	360	540	600
No. of Production Runs	1,500	2,100	2,400
Number of Dispatch Orders	600	900	1,000

Required:

CALCULATE activity-based production cost of all the three products.

PROBLEM – 13: (RTP NOV 22 & MAY 22)

The profit margin of BABY Hairclips Company were over 20% of sales producing BROWN and BLACK hairclips.

During the last year, GREEN hairclips had been introduced at 10% premium in selling price after the introduction of YELLOW hairclips earlier five years back at 10/3% premium. However, the manager of the company is disheartened with the sales figure for the current financial year as follows:

Traditional Income Statement (in ₹)

	Brown	Black	Yellow	Green	Total
Sales	1,50,00,000	1,20,00,000	27,90,000	3,30,000	3,01,20,000
Material Costs	50,00,000	40,00,000	9,36,000	1,10,000	1,00,46,000
Direct Labour	20,00,000	16,00,000	3,60,000	40,000	40,00,000
Overhead (3 times of direct labour)	60,00,000	48,00,000	10,80,000	1,20,000	1,20,00,000
Total Operating Income	20,00,000	16,00,000	4,14,000	60,000	40,74,000
Return on Sales (in %)	13.3%	13.3%	14.8%	18.2%	13.5%

It is a known fact that customers are ready to pay premium amount for YELLOW and GREEN hairclips for their attractiveness; and the percentage returns are also high on new products.

At present, all of the Plant's indirect expenses are allocated to the products at 3 times of the direct labour expenses. However, the manager is interested in allocating indirect expenses on the basis of activity cost to reveal real earner. He provides support expenses category-wise as follows:

Support Expenses	(₹)
Indirect Labour	40,00,000

Labour Incentives	32,00,000
Computer Systems	20,00,000
Machinery depreciation	16,00,000
Machine maintenance	8,00,000
Energy for machinery	4,00,000
Total	1,20,00,000

He provides following additional information for accomplishment of hisinterest: Incentives to be allocated @ 40% of labour expenses (both direct and indirect).

Indirect labours are involved mainly in three activities. About half of indirect labour is involved in handling production runs. Another 40% is required just for the physical changeover from one color hairclip to another because YELLOW hairclips require substantial labour for preparing the machine as compared to other colour hairclips. Remaining 10% of the time is spend for maintaining records of the products in four parts.

Another amount spent on computer system of ₹ 20,00,000 is for maintenance of documents relating to production runs and record keeping of the four products. In aggregate, approx.. 80% of the amount expend is involved in the production run activity and approx.. 20% is used to keep records of the products in four parts.

Other overhead expenses i.e. machinery depreciation, machine maintenance and energy for machinery are incurred to supply machine capacity to produce all the hairclips (practical capability of 20,000 hours).

Activity Cost Drivers:

Particulars	Brown	Black	Yellow	Green	Total
Sales Volume (units)	1,00,000	80,000	18,000	2,000	2,00,000
Selling Price (₹)	150	150	155	165	
Material cost (₹)	50	50	52	55	
Machine hours per unit (Hrs)	0.10	0.10	0.10	0.10	20,000
Production runs	100	100	76	24	300
Setup time per run (Hrs)	4	1	6	4	

You are required to –

(i) CALCULATE operating income and operating income as per percentage of sales using activity-based costing system.

(ii) STATE the reasons for different operating income under traditional income system and activity-based costing system.

PROBLEM – 14 : (RTP NOV 21)

Family Store wants information about the profitability of individual product lines:

Soft drinks, Fresh produce and packaged food. Family store provides the following data for the year 2020-21 for each product line:

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

Family store also provides the following information for the year 2020-21:

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.

PROBLEM – 15: (RTP MAY 21)

The following budgeted information relates to N Ltd. for the year 2021:

	Products		
	X	Y	Z
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 2021 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:

Particulars	Products		
	X	Y	Z
Machine set-ups	4,500	3,000	1,500
Customer orders	2,200	2,400	2,600
Purchase orders	300	350	150

PROBLEM – 16: (RTP NOV 20)

KD Ltd. is following Activity based costing. Budgeted overheads, cost drivers and volume are as follows:

Cost pool	Budgeted overheads (₹)	Cost driver	Budgeted volume
Material procurement	18,42,000	No. or orders	1,200
Material handling	8,50,000	No. of movement	1,240
Maintenance	24,56,000	Maintenance hours	17,550
Set-up	9,12,000	No. of set-ups	1,450
Quality control	4,42,000	No. of inspection	1,820

The company has produced a batch of 7,600 units, its material cost was ₹ 24,62,000 and wages ₹4,68,500. Usage activities of the said batch are as follows:

Material orders	56
Material movements	84
Maintenance hours	1,420 hours
Set-ups	60
No. of inspections	18

Required:

- CALCULATE cost driver rates.
- CALCULATE the total and unit cost for the batch.

PROBLEM – 17: (RTP NOV – 19)

SMP Pvt. Ltd. manufactures three products using three different machines. At present the overheads are charged to products using labour hours. The following statement for the month of September 2019, using the absorption costing method has been prepared:

Particulars	Product X (using machine A)	Product Y (using machine B)	Product Z (using machine C)
Production units	45,000	52,500	30,000
Material cost per unit (₹)	350	460	410
Wages per unit @ ₹80 per hour	240	400	560
Overhead cost per unit (₹)	240	400	560
Total cost per unit (₹)	830	1,260	1,530
Selling price (₹)	1,037.50	1,575	1,912.50

The following additional information is available relating to overhead cost drivers.

Cost driver	Product X	Product Y	Product Z	Total
No. of machine set-ups	40	160	400	600
No. of purchase orders	400	800	1,200	2,400
No. of customers	1,000	2,200	4,800	8,000

Actual production and budgeted production for the month is same. Workers are paid at standard rate. Out of total overhead costs, 30% related to machine set-ups, 30% related to customer order processing and customer complaint management, while the balance proportion related to material ordering.

Required:

i. COMPUTE overhead cost per unit using activity based costing method.

ii. DETERMINE the selling price of each product based on activity-based costing with the same profit mark-up on cost.

ANSWERS

1.

Estimation of Cost-Driver rate

Activity	Overhead cost (₹)	Cost-driver level	Cost driver rate (₹)
Machine processing	7,00,000	1,40,000 Machine hours	5
Set up Costs	7,68,000	64 Number of set up	12,000
Purchase related Costs	6,80,000	544 Number of purchase order	1250

Cost Allocation under Activity based Costing

	Express Coffee (₹)	Instant Coffee (₹)
Overhead Cost		
Machine processing (Cost Driver rate - ₹ 5) (or 20,000:1,20,000)	5 × 20,000 = 1,00,000	5 × 1,20,000 = 6,00,000
Set up Costs (Cost Driver rate - ₹ 12,000)) (or 20:44)	12,000 × 20 = 2,40,000	12,000 × 44 = 5,28,000
Purchase related Costs (Cost Driver rate - ₹ 1250) (or 160:384)	1,250 × 160 = 2,00,000	1,250 × 384 = 4,80,000
Total overhead cost	5,40,000	16,08,000

Overhead Cost per unit

Per unit Overhead cost	(₹)	(₹)
5,40,000 /5,000	108	
16,08,000/60,000		26.80

2.

Statement showing "Cost per unit" using "conventional method"

Particulars of Costs	AX (₹)	BX (₹)	CX (₹)
Direct Materials	35	25	45
Direct Labour	20	18	30
Production Overheads	60	45	75
Cost per unit	115	88	150

Statement Showing "Cost per unit using "Activity Based Costing"

Products	AX	BX	CX
Production (units)	7,500	12,500	25,000
	(₹)	(₹)	(₹)
Direct Materials	2,62,500	3,12,500	11,25,000
Direct Labour	1,50,000	2,25,000	7,50,000
Machine Related Costs	45,000	56,250	1,87,500

Products	AX	BX	CX
Setup Costs	2,62,500	3,37,500	5,55,000
Material handling Cost	1,50,000	2,10,000	5,06,250
Inspection Costs	77,000	1,54,000	3,46,500
Total Costs	9,47,000	12,95,250	34,70,250
Cost per unit (Total Cost ⍰ Units)	126.267	103.62	138.81

Working Notes:

Calculation of Total Machine hours

Particulars	AX	BX	CX
(A) Machine hours per unit	2	1.5	2.5
(B) Production (units)	7,500	12,500	25,000
(C) Total Machine hours (A× B)	15,000	18,750	62,500

Total Machine hours = 96,250

Total Production overheads = 96,250 × 30 = ₹ 28,87,500

Calculation of Cost Driver Rate

Cost Pool	%	Overheads (₹)	Cost Driver (Basis)	Cost Driver (Units)	Cost Driver Rate (₹)
Set up	40	11,55,000	No of set ups	1,540	750 per set up
Machine Operation	10	2,88,750	Machine hours	96,250	3 per machine hour
Material Handling	30	8,66,250	No of material movement	1,155	750 per material movement
Inspection	20	5,77,500	No of inspection	1,500	385 per inspection

3.

(a) 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)

	Drug A (₹)	Drug B (₹)	Drug C (₹)	Total (₹)
Revenues: (A)	74,50,000	1,11,75,000	1,86,25,000	3,72,50,000
Cost of Goods sold (COGS): (B)	41,44,500	68,16,750	1,20,63,750	2,30,25,000
Support cost (40% of COGS): (C) (Refer working notes)	16,57,800	27,26,700	48,25,500	92,10,000
Total cost: (D) = {(B) + (C)}	58,02,300	95,43,450	1,68,89,250	3,22,35,000
Operating income: E = {(A)-(D)}	16,47,700	16,31,550	17,35,750	50,15,000
Operating income as a % of revenues: (E/A) × 100)	22.12%	14.60%	9.32%	13.46%

Working notes:

1. Total support cost:

	(₹)
Drug Licence Fee	5,00,000
Ordering	8,30,000
Delivery	18,20,000
Shelf stocking	32,40,000
Customer support	28,20,000
Total support cost	92,10,000

2. Percentage of support cost to cost of goods sold (COGS):

Total Support Cost ÷ Total Cost of Goods Sold = 9210000 ÷ 23025000 = 40%

Cost for each activity cost driver:

Activity (1)	Total cost (₹) (2)	Cost allocation base (3)	Cost driver rate (4) = [(2) ÷ (3)]
Ordering	8,30,000	2,000 purchase orders	₹ 415 per purchase order
Delivery	18,20,000	2,800 deliveries	₹ 650 per delivery
Shelf-stocking	32,40,000	4,500 hours	₹ 720 per stocking hour

Customer support	28,20,000	4,70,000 units sold	₹ 6 per unit sold

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)

	Drug A (₹)	Drug B (₹)	Drug C (₹)	Total (₹)
Revenues: (A)	74,50,000	1,11,75,000	1,86,25,000	3,72,50,000
Cost & Goods sold	41,44,500	68,16,750	1,20,63,750	2,30,25,000
Drug Licence Fee	1,00,000	1,50,000	2,50,000	5,00,000
Ordering cost* (560:810:630)	2,32,400	3,36,150	2,61,450	8,30,000
Delivery cost* (950:1000:850)	6,17,500	6,50,000	5,52,500	18,20,000
Shelf stocking cost* (900:1250:2350)	6,48,000	9,00,000	16,92,000	32,40,000
Customer Support cost* (175200:150300:144500)	10,51,200	9,01,800	8,67,000	28,20,000
Total cost: (B)	67,93,600	97,54,700	1,56,86,700	3,22,35,000
Operating income C: {(A) - (B)}	6,56,400	14,20,300	29,38,300	50,15,000
Operating income as a % of revenues	8.81%	12.71%	15.78%	13.46%

* Refer to working note 3

Comparison on the basis of operating income as per the percentage (%) of revenue:

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

	Drug A (₹)	Drug B (₹)	Drug C (₹)	Total (₹)
Operating income as a % of revenues	22.12%	14.60%	9.32%	13.46%

On comparing the operating income as a % of revenue of each product, Drug A is the most profitable product line, though its revenue is least but with highest units sold.

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

	Drug A (₹)	Drug B (₹)	Drug C (₹)	Total (₹)
Operating income as a % of revenues	8.81%	12.71%	15.78%	13.46%

On comparing the operating income as a % of revenue of each product, Drug C is the most profitable product line, though its unit sold is least but with highest revenue.

4.

i. Statement of cost allocation to each product from each activity

	Product			
	P (₹)	**Q (₹)**	**R (₹)**	**Total (₹)**
Direct Labour hours (Refer to working note)	1,00,000 (10,000 Labour hours × ₹10)	80,000 (8,000 Labour hours × ₹10)	60,000 (6,000 Labour hours × ₹10)	2,40,000
Production runs (Refer to working note)	60,000 (200 Production runs × ₹ 300)	54,000 (180 Production runs × ₹ 300)	48,000 (160 Production runs × ₹ 300)	1,62,000
Quality Inspections (Refer to working note)	90,000 (3,000 Inspections × ₹30)	75,000 (2,500 Inspections × ₹30)	45,000 (1,500 Inspections × ₹30)	2,10,000

Working note:

Rate per unit of cost driver

Direct Labour hours	(₹ 3,00,000/30,000 Labour hours)	₹ 10 per Labour hour
Production runs	(₹ 1,80,000/600 Production runs)	₹ 300 per Production run
Quality Inspection	(₹ 2,40,000/8,000 Inspections)	₹ 30 per Inspection

ii. Computation of cost of unused capacity for each activity

Particulars	**(₹)**
Direct Labour hours [(₹ 3,00,000 – ₹ 2,40,000) or (6,000 x ₹ 10)]	60,000
Production runs [(₹ 1,80,000 – ₹ 1,62,000) or (60 x ₹ 300)]	18,000
Quality Inspection [(₹ 2,40,000 – ₹ 2,10,000) or (1,000 x ₹ 30)]	30,000
Total cost of unused capacity	1,08,000

iii. Cost sheet and Computation of Sales value per quarter of product 'S' using ABC system

Particulars	**(₹)**
1500 units of product 'S' to be delivered per quarter	
Initial design cost per quarter (₹ 30,000 / 8 quarters)	3,750
Direct Material Cost	18,000
Direct Labour Cost (1,500 Labour hours x ₹ 10)	15,000
Direct Costs (A)	36,750
Set up Cost (15 Production runs × ₹ 300)	4,500
Inspection Cost (250 Inspections × ₹ 30)	7,500
Indirect Costs (B)	12,000

Total Cost (A + B)	48,750
Add: Mark-up (20% on cost)	9,750
Sale Value	58,500
Selling Price per unit 'S' (₹ 58,500/1500 units)	39

5.

Traditional Absorption Costing

	X	Y	Z	Total
(a) Quantity (units)	1,200	1,440	1,968	4608
(b) Direct labour per unit (₹)	18	20	30	-
(c)Direct labour hours (a × b)/ 4	5,400	7,200	14,760	27,360

Overhead rate per direct labour hour:

= Budgeted overheads /Budgeted labour hours

= (₹ 50,000 + ₹ 40,000 + ₹ 28,240 + ₹ 1,28,000)/ 27,360 hours

= ₹ 2,46,240/27,360 hours

= ₹ 9 per direct labour hour

Unit Costs:

Particulars	X	Y	Z
Direct Costs:			
Direct Labour (₹)	18	20	30
Direct Material (₹)	90	84	176
Production Overhead: (₹)	40.5	45	67.5
	(9 x 18/4)	(9 x 20/4)	(9 x 30/4)
Total cost per unit (₹)	148.50	149	273.5

Calculation of Cost-Driver level under Activity Based Costing

Particulars	X	Y	Z	Total
Quantity (units)	1,200	1,440	1,968	-
No. of orders (to be rounded off for fraction)	48 (1200 / 25)	58 (1440 / 25)	79 (1968 / 25)	185
No. of production runs	25 (1200 / 48)	30 (1440 / 48)	41 (1968 / 48)	96
No. of Inspections (done for each production run)	25	30	41	96
Maintenance hours	1,600	1,600	3,200	6400

Calculation of Cost-Driver rate

Activity	Budgeted Cost (₹) (a)	Cost-driver level (b)	Cost Driver rate (₹) (c) = (a) / (b)
Material	50,000	185	270.27
procurement Set-up	40,000	96	416.67
Quality control	28,240	96	294.17
Maintenance	1,28,000	6,400	20

Calculation of total cost of products using Activity Based Costing

Particulars	Product		
	X (₹)	Y (₹)	Z (₹)
Direct Labour	18	20	30
Direct Material	90	84	176
Prime Cost per unit (A)	108	104	206
Material procurement	10.81 [(48 x 270.27)/1200]	10.89 [(58 x 270.27)/1440]	10.85 [(79 x 270.27)/1968]
Set-up	8.68 [(25 x 416.67)/1200]	8.68 [(30 x 416.67)/ 1440]	8.68 [(41 x 416.67)/ 1968]
Quality control	6.13 [(25 x 294.17)/1200]	6.13 [(30 x 294.17)/ 1440]	6.13 [(41 x 294.17)/ 1968]
Maintenance	26.67 [(1,600 x 20)/1200]	22.22 [(1,600 x 20)/ 1440]	32.52 [(3,200 x 20)/ 1968]
Overhead Cost per unit (B)	52.29	47.92	58.18
Total Cost per unit (A + B)	160.29	151.92	264.18

Note: Question may also be solved assuming no. of orders for material procurement to be 25 for each product.

6.

i) Calculation Cost-Driver's rate

Activity	**Overhead cost (₹)**	**Cost-driver level**	**Cost driver rate (₹)**
	(A)	**(B)**	**(C) = (A)/(B)**
Ordering	64,000	34 + 32 + 14 = 80 no. of purchase orders	800
Delivery	1,58,200	110 + 64 + 52 = 226 no. of deliveries	700
Shelf stocking	87,560	110 + 160 + 170 = 440 shelf stocking hours	199

ii) Calculation of total cost of products using Activity Based Costing

Particulars	Fruit Juices		
	Apple (₹)	**Orange (₹)**	**Mixed Fruit (₹)**
Material cost	80,000 (10,000 x ₹ 8)	90,000 (15,000 x ₹ 6)	1,00,000 (20,000 x ₹ 5)
Direct labour cost	50,000 (10,000 x ₹ 5)	60,000 (15,000 x ₹ 4)	60,000 (20,000 x ₹ 3)
Prime Cost (A)	1,30,000	1,50,000	1,60,000
Ordering cost	27,200 (800 x 34)	25,600 (800 x 32)	11,200 (800 x 14)
Delivery cost	77,000 (700 x 110)	44,800 (700 x 64)	36,400 (700 x 52)
Shelf stocking cost	21,890 (199 x 110)	31,840 (199 x 160)	33,830 (199 x 170)
Overhead Cost (B)	1,26,090	1,02,240	81,430
Total Cost (A + B)	2,56,090	2,52,240	2,41,430

7.

Working note:

(i) Computation of revenues (at listed price), discount, and cost of goods sold and customer level operating activities costs:

Particular	Customers				
	A	**B**	**C**	**D**	**E**
Cases sold: (a)	9,360	14,200	62,000	38,000	9,800
Revenues (at listed price) (₹): (b) {(a) × ₹ 54)}	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
Discount (₹): (c) {(a) × Discount per case}	-	8,520 (14,200 cases × ₹ 0.6)	3,10,000 (62,000 cases × ₹ 5)	1,44,400 (38,000 cases × ₹ 3.80)	52,920 (9,800 cases × ₹ 5.40)
Cost of goods sold (₹): (d) {(a) × ₹ 45}	4,21,200	6,39,000	27,90,000	17,10,000	4,41,000
Customer level operating activities costs					
Order taking costs (₹): (No. of purchase × ₹ 200)	6,000	10,000	12,000	10,000	12,000

Customer visits costs (₹) (No. of customer visits × ₹ 300)	1,200	1,800	3,600	1,200	1,800
Delivery vehicles travel costs (₹) (Kms travelled by delivery vehicles × ₹ 4 per km.)	3,200	2,880	4,800	6,400	9,600
Product handling costs (₹) {(a) ×₹2}	18,720	28,400	1,24,000	76,000	19,600
Cost of expediting deliveries (₹) {No. of expedited deliveries × ₹ 100}	-	-	-	-	200
Total cost of customer level operating activities (₹)	29,120	43,080	1,44,400	93,600	43,200

(ii) Computation of Customer level operating income

Particular	Customers				
	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)
Revenues (At list price) (Refer to working note)	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
Less: Discount (Refer to working note)	-	8,520	3,10,000	1,44,400	52,920
Revenue (At actual price)	5,05,440	7,58,280	30,38,000	19,07,600	4,76,280
Less: Cost of goods sold (Refer to working note)	4,21,200	6,39,000	27,90,000	17,10,000	4,41,000
Gross margin	84,240	1,19,280	2,48,000	1,97,600	35,280
Less: Customer level operating activities costs (Refer to working note)	29,120	43,080	1,44,400	93,600	43,200
Customer level operating income	55,120	76,200	1,03,600	1,04,000	(7,920)

Comments

Customer D in comparison with Customer C: Operating income of Customer D is more than of Customer C, despite having only 61.29% (38,000 units) of the unit's volume sold in comparison to Customer C (62,000 units). Customer C receives a higher percent of discount i.e., 9.26% (₹ 5) while Customer D receives a discount of 7.04% (₹ 3.80). Though the gross margin of customer C (₹ 2,48,000) is more than Customer D (₹ 1,97,600) but total cost of customer level operating activities of C (₹ 1,44,400) is more in comparison to Customer D (₹ 93,600). As a result, operating income is more in case of Customer D.

Customer E in comparison with Customer A: Customer E is not profitable while Customer A is profitable. Customer E receives a discount of 10% (₹ 5.4) while Customer A doesn't receive any discount. Sales Volume of Customer A and E is almost same. However, total cost of customer level operating activities of E is far more (₹ 43,200) in comparison to Customer A (₹ 29,120). This has resulted in occurrence of loss in case of Customer E.

8.

i) Overheads application base: Direct labour hours

Particular	Equipment A (₹)	Equipment B (₹)
Direct material cost	350	400
Direct labour cost	360	480
Overheads*	180	240
Total	890	1120

*Pre-determined rate = Budgeted overheads/Budgeted direct labour hours

= ₹ 15,00,000/25,000 hours = ₹ 60

ii) Estimation of Cost-Driver rate

Activity	Overhead cost (₹)	Cost-driver level	Cost driver rate (₹)
Order processing	3,00,000	600 Orders processed	500
Machine processing	10,00,000	50,000 Machine hours	20
Inspection	2,00,000	15,000 Inspection hours	10

Particular	Equipment A (₹)	Equipment B (₹)
Direct material cost	350	400
Direct labour cost	360	480
Prime Cost(A)	710	880
Overhead Cost		
Order processing 400: 200	2,00,000	1,00,000
Machine processing 22,500: 27,500	4,50,000	5,50,000
Inspection 5,000: 15,000	50,000	1,50,000
Total overhead cost	7,00,000	8,00,000

(Overheads cost per unit for each overhead can also be calculated)

Per unit cost	A (₹)	B (₹)
7,00,000 /3,200 (B)-A	218.75	
8,00,000/ 3,850 (B)-B		207.79

Unit manufacturing cost (A+B)	928.75	1,087.79

iii) Calculation of Cost Distortion

Particular	Equipment A (₹)	Equipment B (₹)
Unit manufacturing cost-using direct labour hours as an application base	890.00	1120.00
Unit manufacturing cost-using activity-based costing	928.75	1,087.79
Cost distortion	(38.75)	32.21

9.

Working Note:

Overhead Absorption Rate = 51,79,300/3,01,39,000 × 100 = 17.18%

Cost of Product Under Absorption Costing

Item of Cost	Amount (₹)
Material	26,38,700
Wages	3,75,200
Prime Cost	30,13,900
Overheads: 51,79,300 × 3,01,39,000/30,13,900	5,17,930
Total Cost	35,31,830
Units	15,000
Cost per unit	235.46

Cost driver rate, total cost and cost per unit on the basis of activity-based costing method

Absorption Costing.

Calculation of Cost Driver rate:

Activity	(₹)	Activity Volume	Cost Driver Rate
Material Procurement	22,50,000	1500	1500
Maintenance	17,30,000	9080	190.53
Setup	6,84,500	2250	304.22
Quality Control	5,14,800	2710	189.96

Calculation of total Cost and cost per unit:

Item of Cost	Amount (₹)
Material	26,38,700
Wages	3,75,200
Prime Cost	30,13,900
Material Purchase (22,50,000/1500 × 48)	72,000

Maintenance (17,30,000/9080 × 810)	1,54,328
Setup (6,84,500/2250 × 40)	12,169
Quality Control (5,14,800/2710 x 25)	4,749
Total Cost	32,57,146
Unit	15,000
Cost per unit	217.14

10.

Statement Showing Overhead Cost per unit "Traditional Method"

Particulars	Gel Pen (₹)	Ball Pen (₹)
Units	5,500	24,000
Overheads (₹) (Refer to W.N.)	4,80,000 (20 x 24,000 hrs.)	10,80,000 (20 x 54,000 hrs.)
Overhead Rate per unit (₹)	87.27 (₹ 4,80,000 / 5,500 units)	45 (₹ 10,80,000 /24,000 units)

Working Notes:

Overhead Rate per Machine Hour

= Total Overhead incurred by the Company/Total Machine Hours

=₹ 4,75,020 + 5,79,988 + 5,04,992/24,000 hours + 54,000 hours

=₹15,60,000/78,000 hours

=₹ 20 per machine hour

Statement Showing "Activity Based Overhead Cost"

Activity Cost Pool	Cost Driver	Ratio	Total Amount (₹)	Gel Pen (₹)	Ball Pen (₹)
Volume Related Activity Costs	Machine hours	24:54:00	4,75,020	1,46,160	3,28,860
Setup Related Costs	No. of Setups	30:56:00	5,79,988	2,02,321	3,77,667
Purchase Related Costs	No. of Purchase Orders	240:448	5,04,992	1,76,160	3,28,832
Total Cost				5,24,641	10,35,359
Output (units)				5,500	24,000
Unit Cost (Overheads)				95.39	43.13

Particulars	Gel Pen (₹)	Ball Pen (₹)
Overheads Cost per unit (₹) (Traditional Method)	87.27	45
Overheads Cost per unit (₹) (ABC)	95.39	43.13
Difference per unit	(8.12)	1.87

(Volume related activity cost, set up related costs and purchase related cost can also be calculated under Activity Base Costing using Cost driver rate. However, there will be no changes in the final answer.)

11.

1. **Calculation of "Activity Rate"**

Cost Pool	Cost (₹) [A]	Cost Driver [B]	Cost Driver Rate (₹) [C] = [A]÷[B]
Machine Department Expenses	18,48,000	Machine Hours (1,32,000 hrs.)	14.00
Assembly Department Expenses	6,72,000	Assembly Hours (42,000 hrs.)	16.00
Setup Cost	90,000	No. of Production Runs (450*)	200.00
Stores Receiving Cost	1,20,000	No. of Requisitions Raised on the Stores (120)	1,000.00
Order Processing and Dispatch	1,80,000	No. of Customers Orders Executed (3,750)	48.00
Inspection and Quality Control Cost	36,000	No. of Production Runs (450*)	80.00
Total (₹)	29,46,000		

*Number of Production Run is 450 (150 + 120 + 180)

Statement Showing "Overheads Allocation"

Particulars of Cost	Cost Driver	P	Q	R	Total
Machine Department Expenses	Machine Hours	4,20,000 (30,000 × ₹14)	6,72,000 (48,000 × ₹14)	7,56,000 (54,000 × ₹14)	18,48,000
Assembly Department Expenses	Assembly Hours	2,40,000 (15,000 × ₹16)	---	4,32,000 (27,000 × ₹16)	6,72,000
Setup Cost	No. of Production Runs	30,000 (150 × ₹200)	24,000 (120 × ₹200)	36,000 (180 × ₹200)	90,000
Stores Receiving Cost	No. of Requisitions	40,000 (40	30,000 (30	50,000 (50	1,20,000

	Raised on the Stores	×₹1,000)	×₹1,000)	×₹1,000)	
Order Processing and Dispatch	No. of Customers Orders Executed	60,000 (1,250 × ₹48)	48,000 (1,000 × ₹48)	72,000 (1,500 × ₹48)	1,80,000
Inspection and Quality Control Cost	No. of Production Runs	12,000 (150 × ₹80)	9,600 (120 × ₹80)	14,400 (180 × ₹80)	36,000
Overhead (₹)		8,02,000	7,83,600	13,60,400	29,46,000

12.

1. The Total Production Overhead are 78,00,000

Items	**Labour Hour**	**Overheads allocation on the basis of direct Labour Hour (₹)**
Labour Hour Ratio	(4.5:6:7.5)	
Hand Wash	1,35,000	9,00,000
Detergent Powder	3,60,000	24,00,000
Dishwasher	6,75,000	45,00,000
Total	11,70,000	78,00,000

2. On the basis of ABC analysis this amount will be apportioned as follows: Statement Showing "Activity Based Production Cost"

Activity Cost Pool	**Cost Driver**	**Ratio**	**Total Amount (₹)**	**Hand Wash (₹)**	**Detergent Powder (₹)**	**Dishwasher (₹)**
Goods Receiving	Dispatch order	06:09:10	8,88,000	2,13,120	3,19,680	3,55,200
Inspecting and Testing costs	Production Runs	05:07:08	26,82,000	6,70,500	9,38,700	10,72,800
Dispatching	Dispatch Order	06:09:10	6,30,000	1,51,200	2,26,800	2,52,000
Storage Cost	Batches of material	12:13:15	36,00,000	10,80,000	11,70,000	13,50,000
Total Activity Cost				21,14,820	26,55,180	30,30,000
Quantity Produces				30,000	60,000	90,000
Unit Cost (Overheads)				70.49	44.25	33.67
Add: Conversion Cost (Material + Labour)				195	180	195

Total				265.49	224.25	228.67

Note: This question can also be solved by using cost driver rate

13.

Calculation of operating income using Activity Based Costing

Calculation of Cost-Driver rate

Activity	Overhead cost	Allocation	Overhead cost	Cost-driver level	Cost driver rate
	(₹)		(₹)		(₹)
Indirect labour + 40% for incentives	56,00,000	50%	28,00,000	300 Production runs	9,333.33
		40%	22,40,000	1052* Setup hours	2,129.28
		10%	5,60,000	4 Number of parts	1,40,000
Computer Systems	20,00,000	80%	16,00,000	300 Production runs	5,333.33
		20%	4,00,000	4 Number of parts	1,00,000
Machinery depreciation	16,00,000	100%	16,00,000	20,000 Machine hours	80
Machine Maintenance	8,00,000	100%	8,00,000	20,000 Machine hours	40
Energy for Machinery	4,00,000	100%	4,00,000	20,000 Machine hours	20

* (100 x 4) + (100 x 1) + (76 x 6) + (24 x 4)

= (400 + 100 + 456 + 96)

= 1052 setup hours

Activity Based Costing

	Brown	Black	Red	Green	Total
Quantity (units)	1,00,000	80,000	18,000	2,000	2,00,000
	(₹)	(₹)	(₹)	(₹)	(₹)
Sales	1,50,00,000	1,20,00,000	27,90,000	3,30,000	3,01,20,000
Less: Material Costs	50,00,000	40,00,000	9,36,000	1,10,000	1,00,46,000

Less: Direct labour	20,00,000	16,00,000	3,60,000	40,000	40,00,000
Less: 40% incentives on direct labour	8,00,000	6,40,000	1,44,000	16,000	16,00,000
(A)	**72,00,000**	**57,60,000**	**13,50,000**	**1,64,000**	**1,44,74,000**
Overheads					
Indirect labour + incentives					
- 50% based on Production runs	9,33,333 (9,333.33 x 100)	9,33,333 (9,333.33 x 100)	7,09,334 (9,333.33 x 76)	2,24,000 (9,333.33 x 24)	28,00,000
- 40% based on Setup hours	8,51,711 (2,129.28 x 400)	2,12,928 (2,129.28 x 100)	9,70,951 (2,129.28 x 456)	2,04,410 (2,129.28 x 96)	22,40,000
- 10% based on number of parts	1,40,000 (1,40,000 x 1)	1,40,000	1,40,000	1,40,000	5,60,000
Computer Systems					
- 80% based on Production runs	5,33,333 (5,333.33 x 100)	5,33,333 (5,333.33 x 100)	4,05,334 (5,333.33 x 76)	1,28,000 (5,333.33 x 24)	16,00,000
- 20% based on number of parts	1,00,000 (1,00,000 x 1)	1,00,000	1,00,000	1,00,000	4,00,000
Machinery depreciation	8,00,000 (80 x 0.1 x 1,00,000)	6,40,000 (80 x 0.1 x 80,000)	1,44,000 (80 x 0.1 x 18,000)	16,000 (80 x 0.1 x 2,000)	16,00,000
Machine Maintenance	4,00,000 (40 x 0.1 x 1,00,000)	3,20,000 (40 x 0.1 x 80,000)	72,000 (40 x 0.1 x 18,000)	8,000 (40 x 0.1 x 2,000)	8,00,000
Energy for Machinery	2,00,000 (20 x 0.1 x 1,00,000)	1,60,000 (20 x 0.1 x 80,000)	36,000 (20 x 0.1 x 18,000)	4,000 (20 x 0.1 x 2,000)	4,00,000
Total Overheads (B)	39,58,377	30,39,594	25,77,619	8,24,410	1,04,00,000
Operating Income (A-B)	32,41,623	27,20,406	(12,27,619)	(6,60,410)	40,74,000
Return on Sales (%)	21.61	22.67	(44.00)	(200.12)	13.53

The difference in the operating income 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.

14.

Working notes:

1. Total support cost:

Particulars	(₹)
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):

= Total support cost/Total cost of goods sold x 100

= ₹ 45,00,000/₹ 1,50,00,000 × 100 = 30%

3. Cost for each activity cost driver:

Activity (1)	Total cost (₹)	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: (F)= {(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* (300:2,190:660)	1,20,000	8,76,000	2,64,000	12,60,000
Shelf stocking cost* (540:5,400:2,700)	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: (D) = {(C)/(A) × 100}	10.78%	0.60%	8.75%	4.97%

*Refer to working note 3

15.

1.

i) Profit Statement using Absorption costing method:

Particulars	**Product**			**Total**
	X	**Y**	**Z**	

Sales Quantity	1,00,000	80,000	60,000	2,40,000
Selling price per unit (₹)	90	180	140	
Sales Value (₹) [A×B]	90,00,000	1,44,00,000	84,00,000	3,18,00,000
Direct cost per unit (₹)	50	90	95	
Direct Cost (₹) [A×D]	50,00,000	72,00,000	57,00,000	1,79,00,000
Overheads: Machine department (₹) (Working note-1)	24,00,000	25,60,000	24,00,000	73,60,000
Assembly Department (₹) (Working note-1)	30,00,000	16,00,000	9,00,000	55,00,000
Total Cost (₹) [E+F]	1,04,00,000	1,13,60,000	90,00,000	3,07,60,000
Profit (₹) (C-G)	-14,00,000	30,40,000	-6,00,000	10,40,000

ii) Profit Statement using Activity based costing (ABC) method:

Particulars	**Product**			**Total**
	X	**Y**	**Z**	
Sales Quantity	1,00,000	80,000	60,000	2,40,000
Selling price per unit(₹)	90	180	140	
Sales Value (₹) [A×B]	90,00,000	1,44,00,000	84,00,000	3,18,00,000
Direct cost per unit (₹)	50	90	95	
Direct Cost (₹) [A×D]	50,00,000	72,00,000	57,00,000	1,79,00,000
Overheads: (Refer working note-3)				
Machining services (₹)	21,00,000	22,40,000	21,00,000	64,40,000
Assembly services (₹)	24,00,000	12,80,000	7,20,000	44,00,000
Set-up costs (₹)	4,50,000	3,00,000	1,50,000	9,00,000
Order processing (₹)	2,20,000	2,40,000	2,60,000	7,20,000
Purchasing (₹)	1,50,000	1,75,000	75,000	4,00,000
Total Cost (₹) [E+F]	1,03,20,000	1,14,35,000	90,05,000	3,07,60,000
Profit (₹) (C-G)	-13,20,000	29,65,000	-6,05,000	10,40,000

Working Notes: 1.

Particulars	**Products**			**Total**
	X	**Y**	**Z**	
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 Dept. 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 Dept. cost [G×H]	30,00,000	16,00,000	9,00,000	55,00,000

Machine hour rate = ₹ 73,60,000/9,20,000hours = ₹ 8

Labour hour rate = ₹ 55,00,000/11,00,000hours = ₹ 5

2. Calculation of cost driver rate

Cost Pool	Amount (₹)	Cost Driver	Quantity	Driver rate (₹)
Machining services	64,40,000	Machine hours	9,20,000 hours	7
Assembly services	44,00,000	Direct labour hours	11,00,000 hours	4
Set-up costs	9,00,000	Machine set-ups	9,000 set-ups	100
Order processing	7,20,000	Customer orders	7,200 orders	100
Purchasing	4,00,000	Purchase orders	800 orders	500

3. Calculation of activity-wise cost

Particulars	Products			Total
	X	Y	Z	
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

16.

Calculation of cost driver rate:

Cost pool (₹)	Budgeted overheads (₹)	Cost driver	Cost driver rate (₹)
Material procurement	18,42,000	1,200	1,535.00
Material handling	8,50,000	1,240	685.48
Maintenance	24,56,000	17,550	139.94
Set-up	9,12,000	1,450	628.97
Quality control	4,42,000	1,820	242.86

Calculation of cost for the batch:

Particulars	Amount (₹)	Amount (₹)
Material cost		24,62,000.00
Wages		4,68,500.00
Overheads:		
Material procurement (₹ 1,535 × 56 orders)	85,960.00	
Material handling (₹ 685.48×84 movements)	57,580.32	
Maintenance (₹ 139.94×1,420 hours)	1,98,714.80	
Set-up (₹ 628.97×60 set-ups)	37,738.20	
Quality control (₹ 242.86×18 inspections)	4,371.48	3,84,364.80
Total Cost		33,14,864.80
No. of units		7,600
Cost per units		436.17

17.

Workings:

Total labour hours and overhead cost:

Particulars	Product X	Product Y	Product Z	Total
Production units	45,000	52,500	30,000	1,27,500
Hour per unit	3	5	7	
Total hours	1,35,000	2,62,500	2,10,000	6,07,500
Rate per hour				₹80.00
Total overhead				₹4,86,00,000

Cost per activity and driver

Activity	Machine Set-up	Customer order processing	Customer complaint management	Total
Total overhead (₹)	1,45,80,000	1,45,80,000	1,94,40,000	4,86,00,000
No. of drivers	600	2,400	8,000	
Cost per driver (₹)	24,300	6,075	2,430	

Computation of Overhead cost per unit:

Particulars	Product X	Product Y	Product Z
No. of machine set-ups	40	160	400
Cost per driver (₹)	24,300	24,300	24,300
Total Machine set-up cost (₹) [A]	9,72,000	38,88,000	97,20,000
No. of purchase orders	400	800	1,200
Cost per driver (₹)	6,075	6,075	6,075
Total order processing cost (₹) [B]	24,30,000	48,60,000	72,90,000
No. of customers	1,000	2,200	4,800
Cost per driver (₹)	2,430	2,430	2,430
Total customer complaint management cost (₹) [C]	24,30,000	53,46,000	1,16,64,000
Total Overhead cost (₹) [A+B+C]	58,32,000	1,40,94,000	2,86,74,000
Production units	45,000	52,500	30,000
Cost per unit (₹)	129.6	268.46	955.8

Determination of Selling price per unit

Particulars	Product X (using machine A)	Product Y (using machine B)	Product Z (using machine C)
Material cost per unit (₹)	350	460	410
Wages per unit @ ₹80 per hour	240	400	560
Overhead cost per unit (₹)	129.6	268.46	955.8
Total cost per unit (₹)	719.6	1,128.46	1,925.80
Profit (25% profit mark-up) (₹)	179.9	282.11	481.45
Selling price (₹)	899.5	1,410.57	2,407.25

CHAPTER 4: COST ACCOUNTING SYSTEM

PART – A: ICAI PAST EXAM QUESTIONS

PROBLEM – 1 [MAY 23 – 5 Marks]

The following information has been obtained from financial accounting and cost accounting records.

	Financial Accounting	Cost Accounting
	₹	₹
(i) Factory Overhead	94,750	90,000
(ii) Administrative Overhead	60,000	57,000
(iii) Selling Overhead	55,000	61,000
(iv) Opening Stock	17,500	22,500
(v) Closing Stock	12,500	15,000

Required:

Indicate under-recovery and over-recovery and their effects on cost accounting profit.

PROBLEM – 2 [NOV 22 – 5 Marks]

X Ltd. follows Non-Integrated Accounting System. Financial Accounts of the company show a Net Profit of ₹ 5,50,000 for the year ended 31st March, 2022. The chief accountant of the company has provided following information from the Financial Accounts and Cost Accounts:

Sr. No	Particulars	(₹)
(i)	Legal Chargers Provided in Financial accounts	15,250
(ii)	Interim Dividend received credited in financial accounts	4,50,000
(iii)	Preliminary Expenses written off in financial accounts	25,750
(iv)	Over recovery of selling overheads in cost accounts	11,380
(v)	Profit on sale of capital asset credited in financial accounts	30,000
(vi)	Under valuation of closing stock in cost accounts	25,000
(vii)	Over recovery of production overheads in cost accounts	10,200
(viii)	Interest paid on Debentures shown in financial accounts	50,000

Required:

Find out the Profit (Loss) as per Cost Accounts by preparing a Reconciliation Statement.

PROBLEM – 3 [MAY 22 – 5 Marks]

Journalize the following transactions assuming the cost and financial accounts are integrated:

Particulars	Amount (₹)
Direct Materials issued to production	₹ 5,88,000
Allocation of Wages (Indirect)	₹ 7,50,000

Factory Overheads (Over absorbed)	₹ 2,25,000
Administrative Overheads (Under absorbed)	₹ 1,55,000
Deficiency found in stock of Raw material (Normal)	₹ 2,00,000

PROBLEM – 4 [DEC 21 5 marks]

R Ltd. showed a Net Profit of ₹ 3,60,740 as per their cost accounts for the year ended 31st March, 2021. The following information was revealed as a result of scrutiny of the figures from the both sets of accounts:

Sr. No.	Particulars	(₹)
i.	Over recovery of selling overheads in cost accounts	10,250
ii.	Over valuation of closing stock in cost accounts	7,300
iii.	Rent received credited in financial accounts	5,450
iv.	Bad debts provided in financial accounts	3,250
v.	Income tax provided in financial accounts	15,900
vi.	Loss on sale of capital asset debited in financial accounts	5,800
vii.	Under recovery of administration overheads in cost accounts	3,600

Required:

Prepare a reconciliation statement showing the profit as per financial records

PROBLEM – 5 (JUL 21 – 5 Marks)

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

Profit and Loss account

(For the year ended 31st March, 2021)

To Direct Material	6,50,000	By Sales (15000 units)	15,00,000
To Direct Wages	3,50,000	By Dividend received	9,000
To Factory overheads	2,60,000		
To Administrative overheads	1,05,000		
To Selling overheads	85,000		
To Loss on sale of investments	2,000		
To Net Profit	57,000		
	15,09,000		15,09,000

- Factory overheads are 50% fixed and 50% variable.
- Administrative overheads are 100% fixed.
- Selling overheads are completely variable.
- Normal production capacity of ABC Ltd. is 20,000 units.
- Indirect Expenses are absorbed in the cost accounts on the basis of normal production capacity.

- Notional rent of own premises charged in Cost Accounts is amounting to ₹ 12,000.

You are required to:

(i) Prepare a Cost Sheet and ascertain the Profit as per Cost Records for the year ended 31st March, 2021.

(ii) Reconcile the Profit as per Financial Records with Profit as per Cost Records.

PROBLEM – 6 (MAY 19 – 5 Marks)

M/s Abid Private Limited disclosed a net profit of ₹ 48,408 as per cost books for the year ending 31ST March 2019. However, financial accounts disclosed net loss of ₹ 15,000 for the same period. On scrutinizing both the set of books of accounts, the following information was revealed:

Works Overheads under-recovered in Cost Books……..48,600

Office Overheads over-recovered in Cost Books……11,500

Dividend received on Shares……17,475

Interest on Fixed Deposits……..21,650

Provision for doubtful debts……17,800

Obsolescence loss not charged in Cost Accounts……..17,200

Stores adjustments (debited in Financial Accounts) ……35,433

Depreciation charged in financial accounts……30,000

Depreciation recovered in Cost Books……..35,000

Prepare a Memorandum Reconciliation Account.

PROBLEM – 7 (NOV 18 – 10 Marks)

The following balances were extracted from a Company's ledger as on 30th June, 2018:

Particulars	Debit (₹)	Credit (₹)
Raw material control a/c	2,82,450	
Work-in-progress control a/c	2,38,300	
Finished stock control a/c	3,92,500	
General ledger adjustment a/c		9,13,250
Total	**9,13,250**	**9,13,250**

The following transactions took place during the quarter ended 30th September, 2018:

		₹
(i)	Factory overheads - allocated to work-in-progress	1,36,350
(ii)	Goods furnished - at cost	13,76,200
(iii)	Raw materials purchased	12,43,810
(iv)	Direct wages - allocated to work-in-progress	2,56,800
(v)	Cost of goods sold	14,56,500

(vi)	Raw materials - issued to production	13,60,430
(vii)	Raw materials - credited by suppliers	27,200
(viii)	Raw materials losses - inventory audit	6,000
(ix)	Work-in-progress rejected (with no scrap value)	12,300
(x)	Customer's returns (at cost) of finished goods	45,900

You are required to prepare:

(i) Raw material control a/c

(ii) Work-in-progress control a/c

(iii) Finished stock control a/c

(iv) General ledger adjustment a/c

PROBLEM – 8 (MAY 18 – 5 Marks)

GK Ltd. showed net loss of ₹ 2,43,300 as per their financial accounts for the year ended 31st March, 2018. However, cost accounts disclosed net loss of ₹ 2,48,300 for the same period. On scrutinizing both the set of books of accounts, the following information was revealed:

		₹
(i)	Works overheads over recovered 30,400	30,000
(ii)	Selling overheads under recovered	20,300
(iii)	Administrative overheads under recovered	27,700
(iv)	Depreciation over charged in cost accounts	35,100
(v)	Bad debts w/off in financial accounts	15,000
(vi)	Preliminary Exp. w/off in financial accounts	5,000
(vii)	Interest credited during the year in financial accounts	7,500

Prepare a reconciliation statement reconciling losses shown by financial and cost accounts by taking costing net loss as base.

PART – B: (ICAI REVISION TEST PAPERS)

PROBLEM – 9 (RTP MAY 23)

The financial records of Riva Private Limited showed a net profit of ₹ 1,69,500 for the year ended 31st March, 2022. The cost accounts, however, disclosed a net loss of ₹ 88,500 for the same period. The following information were revealed as a result of scrutiny of the figures of cost accounts and financial accounts:

		(₹)
(i)	(Administrative overhead under recovered	63,750.0
(ii)	Factory overhead over recovered	3,37,500.0
(iii)	Depreciation under charged in Cost Accounts	65,000.0
(iv)	Dividend received	50,000.0
(v)	Loss due to obsolescence charged in Financial Accounts	42,000.0
(vi)	Income tax provided	1,09,000.0
(vii)	Bank interest credited in Financial Accounts	34,000.0
(viii)	Value of opening stock:	
	In Cost Accounts	4,12,500.0
	In Financial Accounts	3,62,500.0
(ix)	Value of closing stock:	
	In Cost Accounts	3,13,750.0
	In Financial Accounts	3,30,000.0
(x)	Goodwill written-off in Financial Accounts	62,500.0
(xi)	Notional rent of own premises charged in Cost Accounts	1,50,000.0
(xii)	Provision for doubtful debts in Financial Accounts	37,500.0

Prepare a reconciliation statement by taking costing net loss as base.

PROBLEM – 10 (RTP MAY 22)

X Ltd. maintains a non-integrated accounting system for the purpose of management information. The following are the data related with year 2021 -22:

Particulars	Amount ('000)
Opening balances:	
- Stores ledger control A/c	48,000
- Work-in-process control A/c	12,000
- Finished goods control A/c	2,58,000
- Building construction A/c	6,000
- Cost ledger control A/c	3,24,000
During the year following transactions took place:	

Materials:	
- Purchased	24,000
- Issued to production	30,000
- Issued to general maintenance	3,600
- Issued to building construction	2,400
Wages:	
- Gross wages paid	90,000
- Indirect wages paid	24,000
- For building construction	6,000
Factory overheads:	
- Actual amount incurred (excluding items shown above)	96,000
- Absorbed in building construction	12,000
- Under-absorbed	4,800
Royalty paid	3,000
Selling distribution and administration overheads	15,000
Sales	2,70,000

At the end of the year, the stock of raw material and work-in-process was ₹ 3,30,00,000 and ₹ 15,00,000 respectively. The loss arising in the raw material account is treated as factory overheads. The building under construction was completed during the year. Gross profit margin is 20% on sales.

Required:

PREPARE the relevant control accounts to record the above transactions in the cost ledger of the company.

PROBLEM – 11 (RTP NOV 21)

XYZ Ltd. maintains a non-integrated accounting system for the purpose of management information. The following are the data related with year 2020-21:

Particulars	(₹ in '000)
Opening balances:	
Stores ledger control A/c	24,000
Work-in-process control A/c	6,000
Finished goods control A/c	1,29,000
Building construction A/c	3,000
Cost ledger control A/c	1,62,000
During the year following transactions took place:	
Materials:	
Purchased	12,000

Issued to production	15,000
Issued to general maintenance	1,800
Issued to building construction	1,200
Wages:	
Gross wages paid	45,000
Indirect wages paid	12,000
For building construction	3,000
Factory overheads:	
Actual amount incurred (excluding items shown above)	48,000
Absorbed in building construction	6,000
Under-absorbed	2,400
Royalty paid	1,500
Selling, distribution and administration overheads	7,500
Sales	1,35,000

At the end of the year, the stock of raw material and work-in-process was ₹ 1,65,00,000 and ₹ 75,00,000 respectively. The loss arising in the raw material account is treated as factory overheads. The building under construction was completed during the year. Gross profit margin is 20% on sales.

Required:

PREPARE the relevant control accounts to record the above transactions in the cost ledger of the company.

PROBLEM – 12 (RTP MAY 21 & NOV 23)

The financial books of a company reveal the following data for the year ended 31st March, 2020:

	(₹)
Opening Stock:	
Finished goods 625 units	1,06,250
Work-in-process	92,000
01.04.2019 to 31.03.2020	
Raw materials consumed	16,80,000
Direct Labour	12,20,000
Factory overheads	8,44,000
Administration overheads (production related)	3,96,000
Dividend paid	2,44,000
Bad Debts	36,000
Selling and Distribution Overheads	1,44,000
Interest received	76,000

Rent received	92,000
Sales 12,615 units	45,60,000
Closing Stock: Finished goods 415 units	91,300
Work-in-process	82,400

The cost records provide as under:

i. Factory overheads are absorbed at 70% of direct wages.

ii. Administration overheads are recovered at 15% of factory cost.

iii. Selling and distribution overheads are charged at ₹ 6 per unit sold.

iv. Opening Stock of finished goods is valued at ₹ 240 per unit.

v. 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, 2020 showing:

a. The profit as per financial records

b. The profit as per costing records.

ii) PREPARE a statement reconciling the profit as per costing records with the profit as per financial records.

PROBLEM – 13 (RTP NOV 20)

A manufacturing company disclosed a net loss of ₹ 6,94,000 as per their cost accounts for the year ended March 31,2020. The financial accounts however disclosed a net loss of ₹ 10,20,000 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	80,000
(ii)	Administration Overheads over-absorbed	1,20,000
(iii)	Depreciation charged in Financial Accounts	6,50,000
(iv)	Depreciation charged in Cost Accounts	5,50,000
(v)	Interest on investments not included in Cost Accounts	1,92,000
(vi)	Income-tax provided	1,08,000
(vii)	Interest on loan funds in Financial Accounts	4,90,000
(viii)	Transfer fees (credit in financial books)	48,000
(ix)	Stores adjustment (credit in financial books)	28,000
(x)	Dividend received	64,000

PREPARE a memorandum Reconciliation Account.

PROBLEM – 14 (RTP MAY 20)

The following are the balances existed in the books of JPG Ltd. for the year ended, 31st March, 2019:

Particulars	Dr. (₹)	Cr. (₹)
Stores Ledger Control A/c	30,00,000	
WIP Control A/c	15,00,000	
Finished Goods Control A/c	25,00,000	
Manufacturing Overheads Control A/c		1,50,000
Cost Ledger Control A/c		68,50,000

During the year 2019-20, the following transactions took place:

Particulars	Amount (₹)
Finished product (at cost)	22,50,000
Manufacturing Overhead incurred	8,50,000
Raw material purchased	12,50,000
Factory wages	4,00,000
Indirect labour	2,00,000
Cost of sales	17,50,000
Materials issued to production	13,50,000
Sales returned (at cost)	90,000
Material returned to suppliers	1,30,000
Manufacturing overhead charged to production	8,50,000

Required:

PREPARE the following control accounts and Trial balance at the end of the year:

Cost Ledger, Stores Ledger, Work-in-process, Finished Stock, Manufacturing Overhead, Wages and Cost of Sales.

PROBLEM – 15 (RTP NOV 19)

As of 30th September, 2019, the following balances existed in a firm's cost ledger, which is maintained separately on a double entry basis:

	Debit (₹)	Credit (₹)
Stores Ledger Control A/c	15,00,000	
Work-in-progress Control A/c	7,50,000	
Finished Goods Control A/c	12,50,000	
Manufacturing Overhead Control A/c		75,000
Cost Ledger Control A/c		34,25,000
	35,00,000	35,00,000

During the next quarter, the following items arose:

	(₹)
Finished Product (at cost)	11,25,000
Manufacturing overhead incurred	4,25,000
Raw material purchased	6,25,000
Factory wages	2,00,000
Indirect labour	1,00,000
Cost of sales	8,75,000
Materials issued to production	6,75,000
Sales returned (at cost)	45,000
Materials returned to suppliers	65,000
Manufacturing overhead charged to production	4,25,000

Required:

PREPARE the Cost Ledger Control A/c, Stores Ledger Control A/c, Work-in-progress Control A/c, Finished Stock Ledger Control A/c, Manufacturing Overhead Control A/c, Wages Control A/c, Cost of Sales A/c and the Trial Balance at the end of the quarter.

ANSWERS

1.

	Financial Accounting ₹	Cost Accounting ₹	Difference ₹	Under/Over-recovery	Effect on Cost Accounting Profit	Net Effect* on Cost Accounting Profit
(i) Factory Overhead	94,750	90,000	4,750	Under-recovery	Increased	To be reduced/ deducted
(ii) Administrative Overhead	60,000	57,000	3,000	Under-recovery	Increased	To be reduced/ deducted
(iii) Selling Overhead	55,000	61,500	-6,500	Over-recovery	Decreased	To be added
(iv) Opening Stock	17,500	22,500	-5,000	Over valuation	Decreased	To be added
(v) Closing Stock	12,500	15,000	-2,500	Over valuation	Increased	To be reduced/ deducted

*Taking Cost Accounting Profit as base

(Under recovery and over recovery with effect are answered by the candidate, or if under recovery and over recovery with treatment (net effect) are answered, due credit shall be given in both cases)

2.

Reconciliation Statement

(Reconciliation the profit as per financial records with the profit as per costing records)

	Particulars	(₹)	Total (₹)
	Profit as per Financial Accounts		5,50,000
Add:	Legal Charges	15,250	
	Preliminary expenses written off	25,750	
	Interest paid	50,000	91,000
			6,41,000
Less:	Under-valuation of closing stock in cost book	25,000	
	Interim Dividend Received	4,50,000	
	Over recovery of selling overheads in cost accounts	11,380	
	Over recovery of production overhead in cost accounts	10,200	5,26,580

	Profit on sale of Assets	30,000	
	Profit as per Cost Accounts		1,14,420

3.

Particulars		(₹)	(₹)
(i) Work-in-Progress Ledger Control A/c	Dr.	5,88,000	
To Stores Ledger Control A/c			5,88,000
(Being issue of direct materials to production)			
(ii) Factory Overhead control A/c	Dr.	7,50,000	
To Wages Control A/c			7,50,000
(Being allocation of Indirect wages)			
(iii) Factory Overhead Control A/c	Dr.	2,25,000	
To Costing Profit & Loss A/c			2,25,000
(Being transfer of over absorption of Factory overhead)			
(iv) Costing Profit & Loss A/c	Dr.	1,55,000	
To Administration Overhead Control A/c			1,55,000
(Being transfer of under absorption of Administration overhead)			
(v) Factory Overhead Control A/c	Dr.	2,00,000	
To Stores Ledger Control A/c			2,00,000
(Being transfer of deficiency in stock of raw material)			

(Note: Costing P/&/L = P/&/L and SLC = MLC)

4.

Statement of Reconciliation

(Reconciling the profit as per costing records with the profit as per financial records)

	(₹)	(₹)
Net Profit as per Cost Accounts		3,60,740
Add:		
Over recovery of selling overheads in cost accounts	10,250	
Rent received credited in financial accounts	5,450	15,700
		376,440
Less:		
Over valuation of closing stock in cost accounts	7,300	
Bad debts provided in financial accounts	3,250	
Income tax provided in financial accounts	15,900	
Loss on sale of capital asset debited in financial accounts	5,800	

Under recovery of administration overheads in cost accounts	3,600	35,850
Profit as per Financial Accounts		3,40,590

5.

Cost Sheet

(For the year ended 31st March, 2021)

	(₹)	**(₹)**
Direct material		6,50,000
Direct wages		3,50,000
Prime cost		**10,00,000**
Factory Overheads:		
Variable (50% of ₹ 2,60,000)	1,30,000	
Fixed (₹ 1,30,000 × 15,000/20,000)	97,500	2,27,500
Works cost		**12,27,500**
Administrative Overheads (₹ 1,05,000 × 15,000/20,000)		78,750
Notional Rent		12,000
Cost of production		**13,18,250**
Selling Overheads		85,000
Cost of Sales		**14,03,250**
Profit (Balancing figure)		96,750
Sales revenue		**15,00,000**

Statement of Reconciliation

(Reconciling profit shown by Financial and Cost Accounts)

	(₹)	**(₹)**
Profit as per Cost Account		96,750
Add: Dividend received	9,000	
Add: Notional Rent	12,000	21,000
Less: Factory Overheads under-charged in Cost Accounts (₹ 2,60,000 – ₹ 2,27,500)	32,500	
Less: Administrative expenses under-charged in Cost Accounts (₹ 1,05,000 – ₹ 78,750)	26,250	
Less: Loss on sale of Investments	2,000	-60,750
Profit as per Financial Accounts		**57,000**

(Note: Solution can be done considering base profit as per Financial Accounts)

6.

Dr. **Cr.**

Particulars	(₹)	Particulars	(₹)
To Works overheads under recovered in Cost Accounts	48,600	By Net profit as per Costing books	48,408
To Provision for doubtful debts	17,800	By Office overheads over recovered in cost accounts	11,500
To Obsolescence loss	17,200	By Dividend received on shares	17,475
To Store adjustment (Debit)	35,433	By Interest on fixed deposit	21,650
		By Depreciation over- charged	5,000
		By Net loss as per financial accounts	15,000
	1,19,033		**1,19,033**

7.

(i) Raw Material Control A/c

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Bal b/d	2,82,450	By General Ledger Adjustment A/c	27,200
To General Ledger Adjustment A/c	12,43,810	By WIP Control A/c (bal. fig.)	13,60,430
		By Costing P&L A/c (Loss) (OR GLA)	6,000
		By Bal c/d	1,32,630
	15,26,260		15,26,260

(ii) Work-in-Progress Control A/c

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Bal b/d	2,38,300		
To Raw Material Control A/c	13,60,430	By Finished Goods Control A/c	13,76,200
To Wages Control A/c	2,56,800	By Costing P&L A/c (OR GLA)	12,300
To Factory OH Control A/c	1,36,350	By Balance c/d	6,03,380
	19,91,880		19,91,880

(iii) Finished Goods Control A/c

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	3,92,500	By Cost of goods sold A/c (OR GLA)	14,56,500
To General Ledger Adjustment A/c	45,900		
To Work-in-process Control A/c	13,76,200	By Balance c/d	3,58,100
	18,14,600		18,14,600

(iv) General Ledger Adjustment A/c

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Costing P&L A/c (sales) (Balancing figure)	2568910	By Balance b/d	9,13,250
To Raw Material Control A/c	27,200	By Raw Material Control A/c	12,43,810
		By Wages Control A/c	2,56,800
		By Factory OH Control A/c	1,36,350
		By Finished Goods Control A/c	45,900
	25,96,110		25,96,110

Or

General ledger adjustment account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Raw Material Control A/c	27200	By Balance b/d	913250
To Raw Material control account(loss)	6000	By Raw Material Control A/c	1243810
To WIP control Account (rejection)	12300	By Wages Control A/c	256800
To Finished stock Control Account	1456500	By Factory OH Control A/c	136350
To Balance c/d	1094110	By Finished Goods Control A/c	45900
	2596110		2596110

Working:

Factory Overhead Control A/c

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To General Ledger Adjustment A/c	136350	By Work-in-progress A/c	136350
	136350		136350

8.

Reconciliation Statement

Particulars	₹	₹
Loss as per Cost Accounts		(2,48,300)
Add: Works overheads over recovered		30,400
Depreciation over charged in cost accounts	35,100	
Interest credited during the year in financial accounts	7,500	73,000
Less: Selling overheads under recovered		20,300
Administrative overheads under recovered	27,700	
Bad debts w/off in financial accounts	15,000	

Preliminary Exp. w/off in financial accounts	5,000	(68,000)
Loss as per Financial Accounts		(2,43,300)

9.

Statement of Reconciliation

Sl. No.	Particulars	(₹)	(₹)
	Net loss as per Cost Accounts		(88,500)
	Additions		
1	Factory O/H over recovered	3,37,500	
2	Dividend Received	50,000	
3	Bank Interest received	34,000	
4	Difference in Value of Opening Stock (4,12,500 – 3,62,500)	50,000	
5	Difference in Value of Closing Stock (3,30,000 – 3,13,7500)	16,250	
6	Notional Rent of own Premises	1,50,000	6,37,750
	Deductions		
1	Administration O/H under recovered	63,750	
2	Depreciation under charged	65,000	
3	Loss due to obsolescence	42,000	
4	Income tax Provided	1,09,000	
5	Goodwill written-off	62,500	
6	Provision for doubtful debts	37,500	(3,79,750)
	Net Profit as per Financial A/c.		1,69,500

10.

1.

Cost Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Costing P&L A/c	2,70,000	By Balance b/d	3,24,000
To Building Construction A/c	26,400	By Stores Ledger Control A/c	24,000
To Balance c/d	2,89,800	By Wages Control A/c	90,000
		By Factory overhead control A/c	96,000
		By Royalty A/c	3,000
		By Selling, Distribution and	15,000

		Administration overheads	
		By Costing P&L A/c	34,200
	5,86,200		5,86,200

Stores Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	48,000	By WIP control A/c	30,000
To Cost Ledger control A/c	24,000	By Factory overheads control A/c	3,600
		By Building construction A/c	2,400
		By Factory overhead control A/c (loss) (Bal. fig)	3,000
		By Balance c/d	33,000
	72,000		72,000

Work-in-process Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	12,000	By Finished goods control A/c	1,99,800
To Stores Ledger control A/c	30,000		
To Wages Control A/c	60,000		
To Factory overhead control A/c	1,09,800		
To Royalty A/c	3,000	By Balance c/d	15,000
	2,14,800		2,14,800

Finished Goods Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	2,58,000	By Cost of Goods Sold A/c (Refer working note)	2,16,000
To WIP control A/c	1,99,800	By Balance c/d	2,41,800
	4,57,800		4,57,800

Cost of Sales Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Goods Sold A/c	2,16,000	By Costing P&L A/c	2,31,000
To Selling, Distribution and Administration A/c	15,000		
	2,31,000		2,31,000

Costing P&L Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Sales A/c	2,31,000	By Cost Ledger control A/c	2,70,000
To Factory overhead control A/c	4,800		
To Cost Ledger control A/c	34,200		
	2,70,000		2,70,000

Building Construction Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	6,000	By Cost Ledger control A/c	26,400
To Stores Ledger control A/c	2,400		
To Wages Control A/c	6,000		
To Factory overhead control A/c	12,000		
	26,400		26,400

Factory Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Stores Ledger control A/c	3,600	By Building Construction A/c	12,000
To Wages Control A/c	24,000	By WIP Control A/c	1,09,800
To Cost Ledger control A/c	96,000	By Costing P&L A/c	4,800
To Stores Ledger control A/c (loss)	3,000		
	1,26,600		1,26,600

Wages Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	90,000	By Factory overhead control A/c	24,000
		By Building Construction A/c	6,000
		By WIP Control A/c	60,000
	90,000		90,000

Royalty Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	3,000	By WIP Control A/c	3,000
	3,000		3,000

Cost of Goods Sold Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Finished Goods control A/c	2,16,000	By Cost of sales A/c	2,16,000
	2,16,000		2,16,000

Selling, Distribution and Administration Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	15,000	By Cost of sales A/c	15,000
	15,000		15,000

Trial Balance

Particulars	Dr. (₹ in '000)	Cr. (₹ in '000)
Stores Ledger Control A/c	33,000	
WIP Control A/c	15,000	
Finished Goods Control A/c	2,41,800	
Cost Ledger Control A/c		2,89,800
	2,89,800	2,89,800

Working Note:

Cost of Goods sold = 2,70,000 × 80/100 = ₹ 2,16,000

11.

Cost Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Costing P&L A/c	1,35,000	By Balance b/d	1,62,000
To Building Construction A/c	13,200	By Stores Ledger Control A/c	12,000
To Balance c/d	1,44,900	By Wages Control A/c	45,000
		By Factory overhead control A/c	48,000
		By Royalty A/c	1,500
		By Selling, Distribution and Administration overheads	7,500
		By Costing P&L A/c	17,100
	2,93,100		2,93,100

Stores Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	24,000	By WIP control A/c	15,000
To Cost Ledger Control A/c	12,000	By overheads control A/c	1,800
		By Building construction, A/c	1,200
		By Factory overhead control A/c (bal. fig.) (loss)	1,500
		By Balance c/d	16,500
	36,000		36,000

Wages Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	45,000	By Factory overhead control A/c	12,000
		By Building Construction A/c	3,000
		By WIP Control A/c (bal. fig.)	30,000
	45,000		45,000

Factory Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Stores Ledger control A/c	1,800	By Building Construction A/c	6,000
To Wages Control A/c	12,000	By WIP Control A/c (bal. fig.)	54,900
To Cost Ledger control A/c	48,000	By Costing P&L A/c (under-absorption)	2,400
To Stores Ledger control A/c (loss)	1,500		
	63,300		63,300

Royalty Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	1,500	By WIP Control A/c	1,500
	1,500		1,500

Work-in-process Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	6,000	By Finished goods control A/c (bal. fig.)	99,900
To Stores Ledger control A/c	15,000		
To Wages Control A/c	30,000		
To Factory overhead control A/c	54,900		
To Royalty A/c	1,500	By Balance c/d	7,500
	1,07,400		1,07,400

Finished Goods Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	1,29,000	By Cost of Goods Sold A/c (Refer working note)	1,08,000
To WIP control A/c	99,900	By Balance c/d	1,20,900
	2,28,900		2,28,900

Cost of Goods Sold Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Finished Goods control A/c	1,08,000	By Cost of sales A/c	1,08,000
	1,08,000		1,08,000

Selling, Distribution and Administration Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	7,500	By Cost of sales A/c	7,500
	7,500		7,500

Cost of Sales Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Goods Sold A/c	1,08,000	By Costing P&L A/c	1,15,500
To Selling, Distribution and Administration A/c	7,500		
	1,15,500		1,15,500

Costing P&L Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Sales A/c	1,15,500	By Cost Ledger control A/c	1,35,000
To Factory overhead control A/c	2,400		
To Cost Ledger control A/c (bal. fig.) (Profit)	17,100		
	1,35,000		1,35,000

Building Construction Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	3,000	By Cost Ledger control A/c	13,200
To Stores Ledger control A/c	1,200		
To Wages Control A/c	3,000		
To Factory overhead control A/c	6,000		
	13,200		13,200

Trial Balance

Particulars	Dr.	Cr.
	(₹ in '000)	(₹ in '000)
Stores Ledger Control A/c	16,500	
WIP Control A/c	7,500	
Finished Goods Control A/c	1,20,900	
Cost Ledger Control A/c		1,44,900
	1,44,900	1,44,900

Workings:

Cost of Goods sold = ₹ 13,50,00,000 x 80/100 = ₹ 10,80,00,000

12

i) Statement of Profit as per financial records

(For the year ended March 31, 2020)

	(₹)		(₹)
To Opening stock of Finished Goods	1,06,250	By Sales	45,60,000
To Work-in-process	92,000	By Closing stock of finished Goods	91,300
To Raw materials consumed	16,80,000	By Work-in-Process	82,400
To Direct labour	12,20,000	By Rent received	92,000
To Factory overheads	8,44,000	By Interest received	76,000
To Administration overheads	3,96,000		
To Selling & distribution overheads	1,44,000		
To Dividend paid	2,44,000		
To Bad debts	36,000		
To Profit	1,39,450		
	49,01,700		49,01,700

Statement of Profit as per costing records

(For the year ended March 31, 2020)

	(₹)
Sales revenue (A) (12,615 units)	45,60,000
Cost of sales:	
Opening stock (625 units × ₹ 240)	1,50,000
Add: Cost of production of 12,405 units	43,28,140
(Refer to working note 2)	
Less: Closing stock ₹ 43,28,140 x 415 units/12,405 units	-1,44,795
Production cost of goods sold (12,615 units)	43,33,345
Selling & distribution overheads (12,615 units × ₹ 6)	75,690
Cost of sales: (B)	44,09,035
Profit: {(A) - (B)}	1,50,965

ii) Statement of Reconciliation

(Reconciling the profit as per costing records with the profit as per financial records)

	(₹)	(₹)
Profit as per Cost Accounts		1,50,965
Add: Administration overheads over absorbed	1,68,540	

(₹ 5,64,540 - ₹ 3,96,000)		
Opening stock overvalued (₹1,50,000 - ₹ 1,06,250)	43,750	
Interest received	76,000	
Rent received	92,000	
Factory overheads over recovered (₹ 8,54,000 - ₹ 8,44,000)	10,000	3,90,290
		5,41,255
Less: Selling & distribution overheads under recovery (₹ 1,44,000 - ₹ 75,690)	68,310	
Closing stock overvalued (₹1,44,795 - ₹ 91,300)	53,495	
Dividend	2,44,000	
Bad debts	36,000	-4,01,805
Profit as per financial accounts		1,39,450

Working notes:

1. Number of units produced

	Units
Sales	12,615
Add: Closing stock	415
Total	13,030
Less: Opening stock	-625
Number of units produced	12,405

2. Cost Sheet

	(₹)
Raw materials consumed	16,80,000
Direct labour	12,20,000
Prime cost	29,00,000
Factory overheads (70% of direct wages)	8,54,000
Factory cost	37,54,000
Add: Opening work-in-process	92,000
Less: Closing work-in-process	-82,400
Factory cost of goods produced	37,63,600
Administration overheads (15% of factory cost)	5,64,540
Cost of production of 12,405 units (Refer to working note 1)	43,28,140
Cost of production per unit:	
Total Cost of Production/No. of units produced = ₹43,28,140/12,405units = ₹348.90	

13.

Memorandum Reconciliation Accounts

Dr. **Cr.**

	(₹)		(₹)
To Net Loss as per Costing books	6,94,000	By Administration overheads over recovered in cost accounts	1,20,000
To Factory overheads under absorbed in Cost Accounts	80,000	By Interest on investment not included in Cost Accounts	1,92,000
To Depreciation under charged in Cost Accounts	1,00,000	By Transfer fees in financial books	48,000
To Income-Tax not provided in Cost Accounts	1,08,000	By Stores adjustment (Credit in financial books)	28,000
To Interest on Loan Funds in Financial Accounts	4,90,000	By Dividend received in financial books	64,000
		By Net loss as per Financial books	10,20,000
	14,72,000		14,72,000

14.

Cost Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To Stores Ledger control A/c	1,30,000	By Balance b/d	68,50,000
To Costing Profit & Loss A/c	17,10,000	By Stores Ledger control A/c	12,50,000
		By Wages Control A/c	6,00,000
To Balance c/d	77,10,000	By Manufacturing overhead control A/c	8,50,000
	95,50,000		95,50,000

Store Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	30,00,000	By WIP Control A/c	13,50,000
To Cost Ledger control A/c	12,50,000	By Cost Ledger control A/c (return)	1,30,000
		By Balance c/d	27,70,000
	42,50,000		42,50,000

WIP Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	15,00,000	By Finished Stock Control A/c	22,50,000

To Wages Control A/c	4,00,000		
To Stores Ledger control A/c	13,50,000		
To Manufacturing overhead control A/c	8,50,000	By Balance c/d	18,50,000
	41,00,000		41,00,000

Finished Stock Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	25,00,000	By Cost of Sales A/c	17,50,000
To WIP Control A/c	22,50,000		
To Cost of Sales A/c (sales return)	90,000	By Balance c/d	30,90,000
	48,40,000		48,40,000

Manufacturing Overhead Control Account

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	8,50,000	By Balance b/d	1,50,000
To Wages Control A/c	2,00,000	By WIP Control A/c	8,50,000
		By Costing P&L A/c (under recovery)	50,000
	10,50,000		10,50,000

Wages Control Account

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	6,00,000	By WIP Control A/c	4,00,000
		By Manufacturing overhead control A/c	2,00,000
	6,00,000		6,00,000

Cost of Sales Account

Particulars	(₹)	Particulars	(₹)
To Finished Stock Control A/c	17,50,000	By Finished Stock Control A/c (sales return)	90,000
		By Costing Profit & Loss A/c	16,60,000
	17,50,000		17,50,000

Trial Balance

Particulars	Dr. (₹)	Cr. (₹)
Stores Ledger Control A/c	27,70,000	
WIP Control A/c	18,50,000	
Finished Goods Control A/c	30,90,000	

Cost Ledger Control A/c		77,10,000
	77,10,000	77,10,000

Working:

Costing P&L Account

Particulars	(₹)	Particulars	(₹)
To Cost of Sales A/c	16,60,000	By Cost Ledger Control A/c	17,10,000
To Manufacturing overhead control A/c	50,000		
	17,10,000		17,10,000

15.

Cost Ledger Control Account

Dr. **Cr.**

	(₹)		(₹)
To Store Ledger Control A/c	65,000	By Opening Balance	34,25,000
To Balance c/d	47,10,000	By Store ledger control A/c	6,25,000
		By Manufacturing Overhead Control A/c	4,25,000
		By Wages Control A/c	3,00,000
	47,75,000		47,75,000

Stores Ledger Control Account

Dr. **Cr.**

	(₹)		(₹)
To Opening Balance	15,00,000	By WIP Control A/c	6,75,000
To Cost ledger control A/c	6,25,000	By Cost ledger control A/c (Returns)	65,000
		By Balance c/d	13,85,000
	21,25,000		21,25,000

WIP Control Account

Dr. **Cr.**

	(₹)		(₹)
To Opening Balance	7,50,000	By Finished Stock Ledger Control A/c	11,25,000
To Wages Control A/c	2,00,000	By Balance c/d	9,25,000
To Stores Ledger Control A/c	6,75,000		

To Manufacturing Overhead Control A/c	4,25,000		
	20,50,000		20,50,000

Finished Stock Ledger Control Account

Dr. **Cr.**

	(₹)		(₹)
To Opening Balance	12,50,000	By Cost of Sales	8,75,000
To WIP Control A/c	11,25,000	By Balance c/d	15,45,000
To Cost of Sales A/c (Sales Return)	45,000		
	24,20,000		24,20,000

Manufacturing Overhead Control Account

Dr. **Cr.**

	(₹)		(₹)
To Cost Ledger Control A/c	4,25,000	By Opening Balance	75,000
To Wages Control A/c	1,00,000	By WIP Control A/c	4,25,000
		By Under recovery c/d	2 5,000
	5,25,000		5,25,000

Wages Control Account

Dr. **Cr.**

	(₹)		(₹)
To Transfer to Cost Ledger Control A/c	3,00,000	By WIP Control A/c	2,00,000
		By Manufacturing Overhead Control A/c	1,00,000
	3,00,000		3,00,000

Cost of Sales Account

Dr. **Cr.**

	(₹)		(₹)
To Finished Stock Ledger Control A/c	8,75,000	By Finished Stock Ledger Control A/c (Sales return)	45,000
		By Balance c/d	8,30,000
	8,75,000		8,75,000

Trial Balance

	(₹)	(₹)
Stores Ledger Control A/c	13,85,000	

WIP Control A/c	9,25,000	
Finished Stock Ledger Control A/c	15,45,000	
Manufacturing Overhead Control A/c	25,000	
Cost of Sales A/c	8,30,000	
Cost ledger control A/c		47,10,000
	47,10,000	47,10,000

CHAPTER 5: JOB COSTING

PART – A: ICAI PAST EXAM QUESTIONS

PROBLEM – 1: (NOV 19 – 5 Marks)

The following data is presented by the supervisor of a factory for a Job:

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

Analysis of the Profit and Loss Account for the year ended

31st March, 2019

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

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

Required:

(i) Prepare a Job Cost Sheet.

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

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

PART – B: (REVISION TEST PAPERS)

PROBLEM – 2: (RTP MAY 21 & NOV 23 & MAY 22)

SM Motors Ltd. is a manufacturer of auto components. Following are the details of expenses for the year 2019-20:

		(₹)
(i)	Opening Stock of Material	15,00,000
(ii)	Closing Stock of Material	20,00,000
(iii)	Purchase of Material	1,80,50,000
(iv)	Direct Labour	90,50,000
(v)	Factory Overhead	30,80,000
(vi)	Administrative Overhead	20,50,400

During the FY 2020-21, the company has received an order from a car manufacturer where it estimates that the cost of material and labour will be ₹ 80,00,000 and ₹ 40,50,000 respectively. The company charges factory overhead as a percentage of direct labour and administrative overheads as a percentage of factory cost based on previous year's cost.

Cost of delivery of the components at customer's premises is estimated at ₹ 4,50,000.

You are required to:

(i) CALCULATE the overhead recovery rates based on actual costs for 2019-20.

(ii) PREPARE a Job cost sheet for the order received and the price to be quoted if the desired profit is 25% on sales.

PROBLEM – 3: (RTP NOV 20, MTP OCT 19)

AP Ltd. received a job order for supply and fitting of plumbing materials. Following are the details related with the job work:

AP Ltd. uses a weighted average method for the pricing of materials issues.

Opening stock of materials as on 12th August 2020:

- 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 2020:

- 20mm GI Pipe, 30 units of (15 feet size) @ ₹ 610 each
- 10 units of Valve @ ₹ 402 each on 18th August 2020:
- Other fitting materials, 150 units @ ₹ 28 each

- Stainless Steel Faucet, 15 units @ ₹ 209 each On 27th August 2020:
- 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 2020:

- 20mm GI Pipe, 2 units of (15 feet size)
- Other fitting materials, 18 units On 17th August 2020:
- 15mm GI Pipe, 8 units of (15 feet size)
- Other fitting materials, 30 units

On 28th August 2020:

- 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 2020:

- Other fitting materials, 60 units
- Stainless Steel Faucet, 15 units

Direct Labour:

Plumber: 180 hours @ ₹ 100 per hour (includes 12 hours overtime)

Helper: 192 hours @ ₹ 70 per hour (includes 24 hours overtime)

Overtimes are paid at 1.5 times of the normal wage rate.

Overheads:

Overheads are applied @ ₹ 26 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:

(a) CALCULATE the total cost of the job.

(b) CALCULATE the price to be charged from the customer.

PROBLEM – 4: (RTP MAY 20, RTP MAY 18, MTP AUG 18)

A factory uses job costing system. The following data are obtained from its books for the year ended 31st March, 2020:

	Amount (₹)
Direct materials	18,00,000
Direct wages	15,00,000
Selling and distribution overheads	10,50,000

Administration overheads	8,40,000
Factory overheads	9,00,000
Profit	12,18,000

i. PREPARE a Job Cost sheet indicating the Prime cost, Cost of Production, Cost of sales and the Sales value.

ii. In 2019-20, the factory received an order for a job. It is estimated that direct materials required will be ₹ 4,80,000 and direct labour will cost ₹ 3,00,000. DETERMINE what should be the price for the job if factory intends to earn the same rate of profit on sales assuming that the selling and distribution overheads have gone up by 15%. The factory overheads is recovered as percentage of wages paid, whereas, other overheads as a percentage of cost of production, based on cost rates prevailing in the previous year.

PROBLEM – 5: (RTP NOV 19)

Ispat Engineers Limited (IEL) undertook a plant manufacturing work for a client. It will charge a profit mark up of 20% on the full cost of the jobs. The following are the information related to the job:

Direct materials utilised – ₹ 1,87,00,000

Direct labour utilised – 2,400 hours at ₹ 80 per hour

Budgeted production overheads are ₹ 48,00,000 for the period and are recovered on the basis of 24,000 labour hours.

Budgeted selling and administration overheads are ₹ 18,00,000 for the period and recovered on the basis of total budgeted total production cost of ₹36,00,00,000.

Required:

CALCULATE the price to be charged for the job.

ANSWERS

1: (NOV 19)

Job Cost Sheet

Customer Details ——— Job No._____

Date of commencement —— Date of completion _____

Particulars	**Amount (₹)**	
Direct materials		120
Direct wages:		
Dept. A ₹ 4.00 × 4 hrs.	₹ 16.00	
Dept. B ₹ 4.00 × 7 hrs.	₹ 28.00	
Dept. C ₹ 4.00 × 2 hrs.	₹ 8.00	
Dept. D ₹ 4.00 × 2 hrs.	₹ 8.00	60
Chargeable expenses		20
Prime cost		**200**
Overheads		
Dept. A = ₹ 12,000/₹ 12,000 × 100 =100% of ₹ 16	₹ 16	
Dept. B = ₹ 6,000/₹ 8,000 × 100 = 75% of ₹ 28	₹ 21	
Dept. C = ₹ 9,000/₹ 10,000 × 100 = 90% of ₹ 8		
= ₹ 9,000/₹ 10,000 × 100 = 90% of ₹ 8 = ₹ 7.20	₹ 7.20	
Dept. D = ₹ 17,000/₹ 20,000 × 100 = 85% of ₹ 8	₹ 6.80	**51**
Works cost		251
Selling expenses = ₹ 90,000/₹ 3,00,000 ×100 = 30% of work cost		75.3
Total cost		326.3
Profit (20% profit on selling price i.e. 25% of total cost)		81.58
Selling price		407.88

2: (RTP MAY 21 & MAY 22 & NOV 23)

i) Calculation of Overhead Recovery Rate:

Factory Overhead Recovery Rate:

= Factory Overhead in 2019 – 20/Direct Labour Costs in 2019 – 20 x 100

= ₹ 30,80,000/₹ 90,50,000 x 100 = 34% of Direct labour

Administrative Overhead Recovery Rate:

= Administrative Overhead in 2019 – 20/Factory Costs in 2019 – 20(W.N.) x 100

= ₹ 20,50,400/₹ 2,96,80,000 x 100 = 6.91% of Factory Cost

Working Note:

Calculation of Factory Cost in 2019-20

Particulars	Amount (₹)
Opening Stock of Material	15,00,000
Add: Purchase of Material	1,80,50,000
Less: Closing Stock of Material	(20,00,000)
Material Consumed	1,75,50,000
Direct Labour	90,50,000
Prime Cost	2,66,00,000
Factory Overhead	30,80,000
Factory Cost	2,96,80,000

ii) Job Cost Sheet for the order received in 2020-21

Particulars	Amount (₹)
Material	80,00,000
Labour	40,50,000
Factory Overhead (34% of ₹ 40,50,000)	13,77,000
Factory Cost	1,34,27,000
Administrative Overhead (6.91% of ₹ 1,34,27,000)	9,27,806
Cost of delivery	4,50,000
Total Cost	1,48,04,806
Add: Profit @ 25% of Sales or 33.33% of cost	49,34,935
Sales value (Price to be quoted for the order)	1,97,39,741

Hence the price to be quoted is ₹ 1,97,39,741

3: (RTP NOV 20, MTP OCT 19, PRACTICE MANUAL)

(a) Calculation of Total Cost for the 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 units × (6 x ₹ 204 + 15 x ₹ 209/21units)	3,113.57	
- Valve 6 units × (8 x ₹ 404 + 10 x ₹ 402 + 14 x ₹ 424/32units)	2,472.75	23,091.95
Direct Labour:		

- Plumber [(180 hours x ₹100) + (12 hours x ₹ 50)]	18,600.00	
- Helper [(192 hours x ₹70) + (24 hours x ₹35)]	14,280.00	32,880.00
- Overheads[₹26 x (180 + 192) hours]		9,672.00
Total Cost		65,643.95

(b) Price to be charged for the job work:

	Amount (₹)
Total Cost incurred on the job	65,643.95
Add: 25% Profit on Job Price (65,643.95/75% x 25%)	21,881.32
	87525.27

Working Note:

1. Cost of 15mm GI Pipe

Date		**Amount (₹)**
17-08-2020	8 units × ₹ 600	4,800.00
28-08-2020	10 units × (4 x ₹ 600 + 35 x ₹ 628/39units	6,251.28
		11,051.28

2. Cost of 20mm GI Pipe

Date		**Amount (₹)**
12-08-2020	2 units × ₹ 660	1,320.00
28-08-2020	2 units × (8 x ₹ 660 + 30 x ₹ 610 + 20 x ₹ 660/58units	1,268.28
		2,588.28

3. Cost of Other fitting materials

Date		**Amount (₹)**
12-08-2020	18 units × ₹ 26	468
17-08-2020	30 units × ₹ 26	780
28-08-2020	34 units × (12 x ₹ 26 + 150 x ₹ 28/162units	946.96
30-08-2020	60 units × (12 x ₹ 26 + 150 x ₹ 28/162units	1,671.11
		3,866.07

4: (RTP MAY 20, RTP MAY 18, MTP AUG 18)

i. Production Statement

For the year ended 31st March, 2020

	Amount (₹)
Direct materials	18,00,000
Direct wages	15,00,000
Prime Cost	**33,00,000**
Factory overheads	9,00,000

Cost of Production	**42,00,000**
Administration overheads	8,40,000
Selling and distribution overheads	10,50,000
Cost of Sales	**60,90,000**
Profit	12,18,000
Sales value	**73,08,000**

Calculation of Rates:

1. Percentage of factory overheads to direct wages
   = ₹9,00,000/₹ 15,00,000 x 100 = 60%
2. Percentage of administration overheads to Cost of production
   = ₹ 8,40,000/₹ 42,00,000 x 100 = 20%
3. Selling and distribution overheads
   = ₹10,50,000 × 115% = ₹12,07,500
4. Selling and distribution overhead % to Cost of production
   = ₹12,07,500/₹ 42,00,000 x 100 = 28.75%
5. Percentage of profit to sales =
   = ₹ 12,18,000/₹ 73,08,000 x 100 = 16.67% or, 1/6

ii. Calculation of price for the job received in 2019-20

	Amount (₹)
Direct materials	4,80,000
Direct wages	3,00,000
Prime Cost	**7,80,000**
Factory overheads (60% of ₹3,00,000)	1,80,000
Cost of Production	**9,60,000**
Administration overheads (20% of ₹9,60,000)	1,92,000
Selling and distribution overheads (28.75% of ₹9,60,000)	2,76,000
Cost of Sales	**14,28,000**
Profit (1/5 of ₹14,28,000)	2,85,600
Sales value	**17,13,600**

5: (RTP NOV 19)

Calculation of job price

Particulars	**Amount (₹)**
Direct materials	1,87,00,000
Direct wages (₹ 80 × 2,400 hours)	1,92,000
Production overheads (₹ 48,00,000/24,000 hrs x 2,400hrs)	4,80,000

Production cost	1,93,72,000
Selling and administration overheads (₹ 18,00,000/ ₹36,00,00,000 x ₹ 1,93,72,000)	96,860
Total cost of sales	1,94,68,860
Profit mark-up @ 20%	38,93,772
Price for the job	2,33,62,632

CHAPTER 6: UNIT & BATCH COSTING

PART – A: ICAI PAST EXAM QUESTIONS

PROBLEM – 1: (NOV – 22 – 5 Marks)

A Ltd. is a pharmaceutical company which produces vaccines for diseases like Monkey Pox, Covid-19 and Chickenpox. A distributor had given an order for 1,600 Monkey Pox Vaccines. The company can produce 80 vaccines at a time. To process a batch of 80 Monkey Pox vaccines, the following costs would be incurred:

Direct Materials	4,250
Direct wages	500
Lab set-up cost	1,400

The Production Overheads are absorbed at a rate of 20% of direct wages and 20% of total production cost is charged in each batch for Selling, distribution and administration Overheads. The company is willing to earn profit of 25% on sales value.

You are required to determine:

i. Total Sales value for 1,600 Monkey Pox Vaccines

ii. Selling price per unit of the Vaccine.

PROBLEM – 2: (JUL – 21 – 5 Marks)

AUX Ltd. has an annual demand from a single customer for 60,000 Covid-19 vaccines. The customer prefers to order in the lot of 15,000 vaccines per order. The production cost of vaccine is ₹ 5,000 per vaccine. The set-up cost per production run of Covid-19 vaccines is ₹ 4,800. The carrying cost is ₹ 12 per vaccine per month.

You are required to:

i. Find the most Economical Production Run.

ii. Calculate the extra cost that company incurs due to production of 15,000 vaccines in a batch.

PROBLEM – 3: (NOV – 18 – 10 Marks)

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

i. Compute the optimum run size and number of runs for bearing manufacture.

ii. Compute the interval between two consecutive runs

iii. 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.

iv. Give your opinion regarding run size of bearing manufacture. Assume 365 days in a year.

PART – B: (REVISION TEST PAPERS)

PROBLEM – 4: (RTP NOV 22)

PS Ltd. manufactures articles in predetermined lots simultaneously. The following costs have been incurred for Batch No. 'PS143' in the month of March, 2022:

Units produced 1,000 units

Direct materials cost ₹ 2,00,000 Direct Labour -

Department A 800 labour hours @ ₹ 100 per hour.

Department B 1,400 labour hours @ ₹ 120 per hour.

Factory overheads are absorbed on labour hour basis and the rates are:

Department A @ ₹ 140 per hour.

Department B @ ₹ 80 per hour.

Administrative overheads are absorbed at 10% of selling price.

The firm expects 25% gross profit (sales value minus factory cost) for determining the selling price.

You are required to CALCULATE the selling price per unit of Batch No. 'PS143'.

PROBLEM – 5: (RTP MAY 22)

Brostom Ltd. manufactures 'Stent' that is used by hospitals in angioplasty, a procedure used to open blocked coronary arteries without open-heart surgery. As per the estimates provided by Pharmaceutical Industry Bureau, there will be a demand of 1 crore 'Stents' in the coming year. Brostom Ltd. is having a market share of 10% of the total market demand of the Stents. It is estimated that it costs ₹ 3.00 as inventory holding cost per stent per month and that the set-up cost per run of stent manufacture is ₹ 450.

Required:

(i) WHAT would be the optimum run size for Stent manufacture?

(ii) WHAT is the minimum inventory holding cost?

PROBLEM – 6: (RTP NOV 21)

Roll-on Ltd. is committed to supply 96,800 bearings per annum to Racing Ltd. on steady basis. It is estimated that it costs 25 paisa as inventory carrying cost per bearing per month and the set-up cost per run of bearing manufacture is ₹ 588.

a. COMPUTE what would be the optimum run size for bearing manufacture?

b. Assuming that the company has a policy of manufacturing 8,800 bearings per run, CALCULATE how much extra costs the company would be incurring as compared to the optimum run suggested in (a) above?

PROBLEM – 7: (RTP NOV 19)

BTL LLP. Manufactures glass bottles for HDL Ltd., a pharmaceutical company, which is in ayurvedic medicines business. BTL can produce 2,00,000 bottles in a month. Set-up cost of each production run is ₹ 5,200 and the cost of holding one bottle for a year is ₹ 1.50.

As per an estimate HDL Ltd. can order as much as 19,00,000 bottles in a year spreading evenly throughout the year.

At present the BTL manufactures 1,60,000 bottles in a batch.

Required:

i. COMPUTE the Economic Batch Quantity for bottle production.

ii. COMPUTE the annual cost saving to BTL by adopting the EBQ of a production.

ANSWERS

1.

Calculation of Sales value and Selling price per unit of Monkey Pox vaccine

Particulars	Amount (₹) per Batch	Amount (₹) for 1600 units or 20 batches	Amount (₹) per unit
Direct materials	4,250	85,000	53.125
Direct wages	500	10,000	6.250
Lab set-up cost	1,400	28,000	17.500
Production overheads (20% of direct wages)	100	2,000	1.250
Production Cost	6,250	1,25,000	78.125
Selling, distribution and administration cost (20% of Production cost)	1,250	25,000	15.625
Total Cost	7,500	1,50,000	93.75
Add: Profit (1/3rd of Total cost or 25% of Sales value)	2,500	50,000	31.25
Sales value	10,000	2,00,000	125.00

2.

i) Calculation of most Economical Production Run

$= \sqrt{\frac{2 \times 60,000 \times Rs.4,800}{12 \times 12}}$ = 2,000 Vaccine

ii) Calculation of Extra Cost due to processing of 15,000 vaccines in a batch

	When run size is 2,000 vaccines	When run size is 15,000 vaccines
Total set up cost	60,000/2,000 x 4,800 = ₹ 1,44,000	60,000/15,000 x 4,800 = ₹ 19,200
Total Carrying cost	1/2 x 2,000 x 144 = ₹ 1,44,000	1/2 x 15,000 x ₹ 144 = ₹ 10,80,000
Total Cost	₹ 2,88,000	₹ 10,99,200

Thus, extra cost = ₹ 10,99,200 - ₹ 2,88,000 = ₹ 8,11,200

3.

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 or 3,920 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. If 8,000 bearings are manufactures in a run: Total cost = Set-up cost + Inventory holding cost

= ₹.384 × (48,000 ÷ 8,000) + (8,000÷2) × ₹.2.4

= 2304+9,600 = 11,904

Extra cost = ₹ (11,904 – 9,406*) =₹ 2,498/-

OR

Extra cost = ₹ (11,904 – 9,696*) = ₹ 2,208/-

* Minimum Inventory Cost = Average Inventory × Inventory Carrying Cost per unit per annum

Average Inventory = 3,920 units ÷ 2 = 1,960 units

Carrying Cost per unit per annum = ₹0.2 × 12 months = ₹2.4

Minimum Inventory Holding Costs = 1,960 units × ₹2.4 = ₹4,704

Total cost = Set-up cost + Inventory holding cost = (12.245×384) + 4704 = ₹ 9,406 (approx.)

Total cost = Set-up cost + Inventory holding cost = (13×384) + 4704 = ₹ 9,696 (approx.)

iv. To save cost the company should run at optimum batch size i.e., 3,920 Units. It saves ₹ 2,498 or 2208. 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

Alternative presentation to part 3(a) (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.	2.4	2.4
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

4.

Statement showing selling price per unit of Batch number 'PS143'

Particulars	Amount (₹)	Amount (₹)
Direct Materials		2,00,000
Direct Labour		
Department A 800 labour hours @ ₹ 100 per hour	80,000	
Department B 1400 labour hours @ ₹ 120 per hour	1,68,000	2,48,000

Factory overheads		
Department A 800 labour hours @ ₹ 140 per hour Department	1,12,000	
B 1400 labour hours @ ₹ 80 per hour	1,12,000	2,24,000
Factory Cost		6,72,000
Add: Administrative overheads (10% of selling price)		89,600
(6,72,000/75% x 10%)		
Cost of production		7,61,600
Add: Profit (15% of selling price) (6,72,000/75% x 15%)		1,34,400
Selling price of batch no 'PS143'		8,96,000
Selling price per unit (8,96,000 / 1000 units)		896

5.

i. Computation of Optimum Run size of 'Stents' or Economic Batch Quantity **(EBQ)**

Economic Batch Quantity (EBQ) = $\sqrt{\frac{2DS}{C}}$

Where, D = Annual demand for the Stents

= 1,00,00,000 × 10% = 10,00,000 units

S = Set- up cost per run

= ₹ 450

C = Carrying cost per unit per annum

= ₹ 3 × 12 = ₹ 36

EBQ = $\sqrt{\frac{2\times 1,00,000\times Rs.450}{Rs.36}}$

= 5,000 units of Stents

ii. Minimum inventory holding cost

Minimum Inventory Cost = Average Inventory × Inventory Carrying Cost per unit per annum

= (5,000 ÷ 2) × ₹ 36

= ₹ 90,000

iii. Calculation of the extra cost due to manufacturing policy

	When run size is 6,000 units	When run size is 5,000 units i.e. at EBQ
Total set up cost	$=\frac{10,00,000}{6,000}\times Rs.450$ = ₹ 75,000	$=\frac{10,00,000}{5,000}\times Rs.450$ = ₹ 90,000
Total Carrying cost	½ × 6,000 × ₹ 36 = ₹ 1,08,000	½ × 5,000 × ₹ 36 = ₹ 90,000
Total Cost	₹ 1,83,000	₹ 1,80,000

Extra cost = ₹ 1,83,000 - ₹ 1,80,000 = ₹ 3,000

6.

Optimum production run size (Q)

$$\sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 96{,}800 \times Rs.588}{0.25 \times 12}}$$ = 6,160 bearings.

Calculation of Extra Cost

Total Cost (of maintaining the inventories) when production run size (Q) are 6,160 and 8,800 bearings respectively.

Total cost = Total set-up cost + Total carrying cost.

Particulars	When run size is 6,160 bearings	When run size is 8,800 bearings
Total set up cost	= 96,800/ 6160 × ₹ 588 = ₹9,240 Or, No. of setups = 15.71 (16 setups) = 16 x ₹ 588 = ₹ 9,408	= 96,800/8,800 × ₹ 588 = ₹6,468
Total Carrying cost	½ × 6,160 × 0.25 × 12 = ₹ 9,240	½ × 8,800 × 0.25 × 12 = ₹ 13,200
Total Cost	₹ 18,480/ ₹ 18,648	₹ 19,668

₹ 1,188/ ₹ 1,020 is the extra cost incurred by the company due to run size not being optimum run size.

7.

Economic Batch Quantity (EBQ) = √2D/S

Where, D = Annual demand for the product

S = Setting up cost per batch

C = Carrying cost per unit of production

(i) Computation of EBQ :

√2 x 19,00,000 x ₹ 5,200/₹ 1.5

= 1,14,775 bottles

(ii) Computation of savings in cost by adopting EBQ:

Batch Size	No. of Batch	Set-up cost	Carrying cost	Total Cost
160000 bottles	12	62400 (₹ 5,200 ×12)	120000 (₹ 1.5 × ½ ×1,60,000)	1,82,400.00
114775 bottles	17	88400 (₹ 5,200 ×17)	86081.25 (₹ 1.5 × ½ × 1,14,775)	1,74,481.25
Saving				7,918.75

CHAPTER 7: MATERIAL COST

PART – A: ICAI PAST EXAM QUESTIONS

PROBLEM – 1 : (MAY 23 – 5 Marks)

TSK Limited manufactures a variety of products. The annual demand for one of its products- Product 'X' is estimated as 1,35,000 units. Product 'X' is to be manufactured done in batches. Set up cost of each batch is ₹3,375 and inventory holding cost is ₹5 per unit. It is expected that demand of Product 'X' would be uniform throughout the year.

Required:

1. Calculate the Economic Batch (EBQ) for Product 'X'.
2. Assuming that the company has a policy of manufacturing 7,500 units of Product 'X' per batch, calculate the additional cost incurred as compared to the cost incurred as per Economic Batch Quantity (EBQ) as computed in (i) above.

PROBLEM – 2 : (NOV 22 – 5 Marks)

MM Ltd. uses 7500 valves per month which is purchased at a price of ₹1.50 per unit. The carrying cost is estimated to be 20% of average inventory investment on an annual basis. The cost to place an order and getting the delivery is ₹15. It takes a period of 1.5 months to receive a delivery from the date of placing an order and a safety stock of 3200 valves is desired.

You are required to determine:

i. The Economic Order Quantity (EOQ) and the frequency of orders.

ii. The re-order point.

iii. The Economic Order Quantity (EOQ) if the valve cost ₹4.50 each instead of 1.50 each. (Assume a year consists of 360 days)

PROBLEM – 3 : (MAY 22 – 5 Marks)

A Limited a toy company purchases its requirement of raw material from S Limited at ₹ 120 per kg. The company incurs a handling cost of ₹ 400 plus freight of ₹ 350 per order. The incremental carrying cost of inventory of raw material is ₹ 0.25 per kg per month. In addition the cost of working capital finance on the investment in inventory of raw material is ₹ 15 per kg per annum. The annual production of the toys is 60,000 units and 5 units of toys are obtained from one kg. of raw material.

Required:

(i) Calculate the Economic Order Quantity (EOQ) of raw materials.

(ii) Advise, how frequently company should order to minimize its procurement cost. Assume 360 days in a year.

(iii) Calculate the total ordering cost and total inventory carrying cost per annum as per EOQ.

PROBLEM – 4 : (DEC 21 – 5 Marks)

XYZ Ltd. uses two types of raw materials – 'Material A' and 'Material B' in the production process and has provided the following data for the year ended on 31 st March, 2021:

Particulars	Material A (₹)	Material B (₹)
Opening stock as on 01.04.2020	30,000	32,000
Purchase during the year	90,000	51,000
Closing stock as on 31.03.2021	20,000	14,000

You are required to calculate:

(a) The inventory turnover ratio of 'Material A' and 'Material B'.

(b) The number of days for which the average inventory is held for both materials 'A' and 'B'.

Based on above calculations, give your comments. (Assume 360 days in a year.)

PROBLEM – 5 : (JUL 21 – 5 Marks)

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

Item Code Number	Units	Unit Cost (₹)
101	25	50
102	300	01
103	50	80
104	75	08
105	225	02
106	75	12

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

You are required to:

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

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

PROBLEM – 6 : (NOV 20 – 10 Marks)

An automobile company purchases 27,000 spare parts for its annual requirements. The cost per order is ₹ 240 and the annual carrying cost of average inventory is 12.5%. Each spare part costs ₹ 50. At present, the order size is 3,000 spare parts. (Assume that number of days in a year = 360 days)

Find out:

(i) How much the company's cost would be saved by opting EOQ model?

(ii) The Re-order point under EOQ model if lead time is 12 days.

(iii) How frequently should orders for procurement be placed under EOQ model?

PROBLEM – 7 : (MAY 19 – 10 Marks)

Surekha Limited produces 4,000 Litres of paints on a quarterly basis. Each Litre requires 2 kg of raw material. The cost of placing one order for raw material is ₹ 40 and the purchasing price of raw material is ₹ 50 per kg. The storage cost and interest cost is 2% and 6% per annum respectively. The lead time for procurement of raw material is 15 days.

Calculate Economic Order Quantity and Total Annual Inventory Cost in respect of the above raw material.

PROBLEM – 8 : (MAY 19 – 10 Marks)

The following are the details of receipt and issue of material 'CXE' in a manufacturing Co. during the month of April 2019:

Date	Particulars	Quantity (kg)	Rate per (kg)
Apr-04	Purchase	3,000	₹ 16
Apr-08	Issue	1,000	
Apr-15	Purchase	1,500	₹ 18
Apr-20	Issue	1,200	
Apr-25	Return to supplier out of purchase made on April 15	300	
Apr-26	Issue	1,000	
Apr-28	Purchase	500	₹ 17

Opening stock as on 01-04-2019 is 1,000 kg @ ₹ 15 per kg.

On 30th April, 2019 it was found that 50 kg of material 'CXE' was fraudulently misappropriated by the store assistant and never recovered by the Company.

Required:

i. Prepare a store ledger account under each of the following method of pricing the issue:
   a) Weighted Average Method
   b) LIFO

ii. What would be the value of material consumed and value of closing stock as on 30-04-2019 as per these two methods?

PROBLEM – 9 : (NOV 18, MTP MAY 21, QFP – 5 Marks)

M/s. SJ Private Limited manufactures 20000 units of a product per month. The cost of placing an order is ₹ 1,500. The purchase price of the raw material is ₹ 100 per kg. The re-order period is 5 to 7 weeks. The consumption of raw materials varies from 200 kg to 300 kg per week, the average consumption being 250 kg. The carrying cost of inventory is 9.75% per annum.

You are required to calculate:

(i) Re-order quantity

(ii) Re-order level

(iii) Maximum level

(iv) Minimum level

(v) Average stock level

PROBLEM – 10 : (MAY 18, MTP NOV 20 – 5 Marks)

M/s. X Private Limited is manufacturing a special product which requires a component “SKY BLUE". The following particulars are available for the year ended 31st March, 2018:

Annual demand of "SKY BLUE"	12000 Units
Cost of placing an order	₹ 1,800
Cost per unit of "SKY BLUE	₹ 640
Carrying cost per annum	18.75%

The company has been offered a quantity discount of 5 on the purchases of "SKY BLUE" provided the order size is 3000 components at a time.

You are required to:

(i) Compute the Economic Order Quantity.

(ii) Advise whether the quantity discount offer can be accepted.

PROBLEM – 11 : (MAY 18 – 5 Marks)

The following details are provided by M/s. SKU Enterprises for the year ended 31st March, 2018:

Particulars	**Material-M (₹)**	**Material-N (₹)**
Stock as on 01-04-2017	6,00,000	10,00,000
Stock as on 31-03-2018	4,50,000	7,25,000
Purchases during the year	9,50,000	18,40,000

You are required to:

(i) Calculate Turnover Ratio of both the materials.

(ii) Advise which of the two materials is fast moving. (Assume 360 days in a year).

PART – B: (REVISION TEST PAPERS)

PROBLEM – 12 : (RTP NOV 23)

Following details are related to a manufacturing concern:

Re-order Level	1,60,000 units
Economic Order Quality	90,000
Minimum Stock Level	1,00,000 units
Maximum Stock Level	1,90,000 units
Average Lead Time	6 days
Difference between minimum lead time and Maximum lead time	4 days

Calculate:

(i) Maximum consumption per day

(ii) Minimum consumption per day

PROBLEM – 13 : (RTP MAY 23)

Reliable India Pvt Ltd is a startup company engaged in manufacturing of Agro Tech product from a raw material, which is purchased at ₹ 190 per kg. The company incurs a handling cost of ₹ 1,470 plus, freight of ₹ 770 per order. The incremental carrying cost of inventory of raw material is ₹ 3 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is ₹ 20 per kg per annum. The annual production of the product is 1,50,000 units and 3 units are obtained from one kg. of raw material. Assume 360 days in a year.

Required:

(i) Calculate the economic order quantity of raw materials.

(ii) Determine, how frequently company should order for procurement be placed.

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

PROBLEM – 14 : (RTP NOV 22)

M/s Tanishka Materials Private Limited produces a product which names "ESS". The consumption of raw material for the production of "ESS" is 210 Kgs to 350 Kgs per week. Other information is as follows:

Procurement Time: 5 to 9 Days

Purchase price of Raw Materials: ₹ 100 per kg

Ordering Cost per Order: ₹ 200

Storage Cost: 1% per month plus ₹ 2 per unit per annum Consider 365 days a year.

You are required to CALCULATE:

(a) Economic Order Quantity

(b) Re-Order Level (ROL)

(c) Maximum Stock Level

(d) Minimum Stock Level

(e) Average Stock Level

(f) Number of Orders to be placed per year

(g) Total Inventory Cost

(h) If the supplier is willing to offer 1% discount on purchase of total annual quantity in two orders, whether offer is acceptable?

(i) If the answer is no, what should be the counteroffer w.r.t. percentage of discount?

PROBLEM – 15 : (RTP MAY 22)

Sky & Co., an unregistered supplier under GST, purchased material from Vye Ltd. which is registered under GST. The following information is available for one lot of 5,000 units of material purchased:

Listed price of one lot ₹ 2,50,000

Trade discount @ 10% on listed price

CGST and SGST (Credit Not available) 12% (6% CGST + 6% SGST) Cash discount @ 10%

(Will be given only if payment is made within 30 days.)

Toll Tax paid ₹ 5,000

Freight and Insurance ₹ 17,000

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 ₹ 20,000

Other Expenses @ 2% of total cost

20% 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 Sky & Co.

PROBLEM – 16 : (RTP NOV 21)

The following data are available in respect of material X for the year ended 31st March, 2021:

	(₹)
Opening stock	9,00,000
Purchases during the year	1,70,00,000
Closing stock	11,00,000

CALCULATE:

1. Inventory turnover ratio, and

2. The number of days for which the average inventory is held.

3. INTERPRET the ratio calculated as above if the industry inventory turnover rate is 10.

PROBLEM – 17 : (RTP MAY 21, RTP MAY 19, MTP APR 19, PM)

Ananya Ltd. produces a product 'X' using a raw material, 'D'. To produce one unit of 'E', 4 kg of Dee is required. As per the sales forecast conducted by the company, it will able to sale 20,000 units of Exe in the coming year.

The following is the information regarding the raw material 'D':

(i) The Re-order quantity is 400 kg. Less than the Economic Order Quantity (EOQ).

(ii) Maximum consumption per day is 40 kg. More than the average consumption per day.

(iii) There is an opening stock of 2,000 kg.

(iv) Time required to get the raw materials from the suppliers is 4 to 8 days.

(v) The purchase price is ₹ 250 per kg.

There is an opening stock of 1,800 units of the finished product X. The carrying cost of inventory is 14% p.a.

To place an order company has to incur ₹ 1,340 on paper and documentation work.

From the above information FIND OUT the followings in relation to raw material D:

(a) Re-order Quantity

(b) Maximum Stock level

(c) Minimum Stock level

(d) Calculate the impact on the profitability of the company by not ordering the EOQ. [Take 300 days for a year]

PROBLEM – 18 : (RTP NOV 20, MTP MAY 21, PM)

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

Raw Material	Usage per unit of product (Kg.)	Re-order Quantity (Kg.)	Price per Kg. (₹)	Delivery period (in weeks)			Re-order level (Kg.)	Minimum level (Kg.)
				Minimum	Average	Maximum		
A	12	12,000	12	2	3	4	60,000	?
B	8	8,000	22	5	6	7	70,000	?
C	6	10,000	18	3	5	7	?	25,500
D	5	9,000	20	1	2	3	?	?

Weekly production varies from 550 to 1,250 units, averaging 900 units of the said product.

What would be the following quantities: –

(i) Minimum Stock of A?

(ii) Maximum Stock of B?

(iii) Re-order level of C?

(iv) Average stock level of A?

(v) Re-order level of D?

(vi) Minimum Stock level of D?

PROBLEM – 19 : (RTP MAY 20)

Date	Particulars	Units	Rate per unit (₹)
15-12-2019	Purchase Order- 008	10,000	9,930
30-12-2019	Purchase Order- 009	10,000	9,780
01-01-2020	Opening stock	3,500	9,810
05-01-2020	GRN*-008 (against the Purchase Order- 008)	10,000	-
05-01-2020	MRN**-003 (against the Purchase Order- 008)	500	-
06-01-2020	Material Requisition-011	3,000	-
07-01-2020	Purchase Order- 010	10,000	9,750
10-01-2020	Material Requisition-012	4,500	-
12-01-2020	GRN-009 (against the Purchase Order- 009)	10,000	-
12-01-2020	MRN-004 (against the Purchase Order- 009)	400	-
15-01-2020	Material Requisition-013	2,200	-
24-01-2020	Material Requisition-014	1,500	-
25-01-2020	GRN-010 (against the Purchase Order- 010)	10,000	-
28-01-2020	Material Requisition-015	4,000	-
31-01-2020	Material Requisition-016	3,200	-

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

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

(i) Re-order level

(ii) Maximum stock level

(iii) Minimum stock level

(iv) PREPARE Store Ledger for the period January 2020 and DETERMINE the value of stock as on 31-01-2020.

(v) Value of components used during the month of January, 2020.

(vi) Inventory turnover ratio.

PROBLEM – 20 : (RTP NOV 19)

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

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

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

*On purchased quantity

Other information:

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

Required:

(i) CALCULATE cost per kg. of material X and Y

(ii) CALCULATE the Economic Order quantity for both the materials.

ANSWERS:

1.

i. Economic Batch Quantity (EBQ)

where,

D = Annual demand for the product

S = Set-up cost per batch

C = Carrying cost per unit per annum.

$\sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 1,35,000 \times 3,375}{5}}$ = 13,500 units

ii. Total Cost (of maintaining the inventories) when batch size (Q) are 13,500 and 7,500 units respectively

Total cost = Total set-up cost + Total carrying cost.

	When batch size is 13,500 units	When batch size is 7,500 units
Total set up cost	= 1,35,000 ÷ 13,500 × ₹ 3,375 ₹ 33,750 Or, No. of setups = 10 = 10 x ₹ 3,375 = ₹ 33,750	= 1,35,000 ÷ 7,500 × ₹ 3,375 = ₹ 60,750
Total Carrying cost	1/2 × 13,500 × 5 = ₹ 33,750	1/2 × 7,500 × 5 = ₹ 18,750
Total Cost	₹ 67,500	₹ 79,500

₹ 12,000 is the excess cost borne by the company due to batch size not being economic batch quantity.

Alternative presentation

	EOQ 13,500	Batch size 7500	Extra cost	Saving
No of setup	10	18	8 x 3375 = 27,000	
Carrying cost	13,500 – 7500 = 6000/ 2 @ 5			15,000

Net extra cost = (27,000- 15,000) = ₹ 12,000

2.

i. Calculation of Economic Order Quantity

Annual requirement (A) = 7500×12= 90,000

Valves Cost per order (O) = ₹ 15

Inventory carrying cost (i) = 20%

Cost per unit of spare (c) = ₹ 1.5

Carrying cost per unit (i × c) = ₹ 1.5 × 20% = ₹ 0.30

Economic Order Quantity (EOQ) $= \sqrt{\frac{2 \times A \times O}{i \times c}}$

$= \sqrt{\frac{2 \times 90{,}000 \times 15}{0.3}}$ = 3,000 Valves

Frequency of order or Number of Orders = 90,000/3,000 = 30 orders.

So Order can be placed in every 12 (360days/30) days

ii. Re-order Quantity = {Maximum Consumption X Maximum lead time} + safety Stock

= {7500X1.5} + 3200 = 14,450 Valves

iii. Calculation of Economic Order Quantity if valve costs ₹ 4.50

Carrying cost is 20% of ₹ 4.50 = ₹ 0.90

Economic Order Quantity (EOQ) $= \sqrt{\frac{2 \times A \times O}{i \times c}}$

$= \sqrt{\frac{2 \times 90{,}000 \times 15}{0.9}}$

= 1732.0508 units or 1733 Valves

3.

Annual requirement of raw material in kg. (A) = 60,000 units ÷ 5 units per kg. = 12,000 kg.

Ordering Cost (Handling & freight cost) (O) = ₹ 400 + ₹ 350 = ₹ 750

Carrying cost per unit per annum i.e. inventory carrying cost + working capital cost (c × i)

= (₹ 0.25 × 12 months) + ₹ 15 = = ₹ 18 per kg.

i. E.O.Q.= $= \sqrt{\frac{2 \times 12{,}000 kgs. \times Rs. 750}{Rs. 18}}$ = 1,000 kg.

ii. Frequency of orders for procurement:

Annual consumption (A) = 12,000 kg.

Quantity per order (EOQ) = 1,000 kg.

No. of orders per annum A ÷ EOQ = 12,000kg ÷ 1,000kg. = 12

Frequency of placing orders (in months) = 12months ÷ 12orders = 1 months

Or, (in days) = 360days ÷ 12orders = 30 days

iii. Calculation of total ordering cost and total inventory carrying cost as per EOQ:

	Amount/Quantity
Size of the order	1,000 kg.
No. of orders	12
Cost of placing orders	**₹ 9,000** (12 orders × ₹ 750)
Inventory carrying cost	**₹ 9,000** (1,000 kg. × ½ × ₹ 18)

Total Cost	₹ 18,000

4.

i. Calculation of Inventory Turnover ratios and number of days:

	Material A (₹)	**Material B (₹)**
Opening stock	30,000	32,000
Add: Purchases	90,000	51,000
	1,20,000	83,000
Less: Closing stock	20,000	14,000
Materials consumed	1,00,000	69,000
Average inventory: (Opening Stock + Closing Stock) ÷ 2	25,000	23,000
(a) Inventory Turnover ratio: (Consumption ÷ Average inventory)	4 times	3 times
(b) Number of days for which the average inventory held (Number of Days in a year/IT ratio)	90 days	120 days

ii. Comments: Material A is moving faster than Material B. Or Material A has a less holding period.

5.

(i) Statement of Total Inventory Cost and Ranking of items

Item code no.	**Units**	**% Of Total units**	**Unit cost (₹)**	**Total Inventory cost (₹)**	**% Of Total Inventory cost**	**Ranking**
101	25	3.33	50	1,250	16.67	**2**
102	300	40.00	1	300	4.00	**6**
103	50	6.67	80	4,000	53.33	**1**
104	75	10.00	8	600	8.00	**4**
105	225	30.00	2	450	6.00	**5**
106	75	10.00	12	900	12.00	**3**
	750	100	153	7,500	100	

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

Basis for ABC Classification as % of Total Inventory Cost

15% & above - 'A' items

7% to 14% - 'B' items

6% & Less - 'C' items

Ranking	Item code No.	% Of Total units	Total Inventory cost (₹)	% Of Total Inventory Cost	Category
1	103	6.67	4,000	53.33	
2	101	3.33	1,250	16.67	
Total	2	10.00	5,250	70.00	A
3	106	10.00	900	12.00	
4	104	10.00	600	8.00	
Total	2	20.00	1,500	20.00	B
5	105	30.00	450	6.00	
6	102	40.00	300	4.00	
Total	2	70.00	750	10.00	C
Grand Total	6	100	7,500	100	

6.

Working Notes:

Annual requirement (A) = 27,000 units

Cost per order (O) = ₹ 240

Inventory carrying cost (i) = 12.5%

Cost per unit of spare (c) = ₹ 50

Carrying cost per unit (i × c) = ₹ 50 × 12.5% = ₹ 6.25

Economic Order Quantity (EOQ) $= \sqrt{\frac{2 \times A \times O}{i \times c}}$

$= \sqrt{\frac{2 \times 27{,}000 \times 240}{6.25}}$ = 1,440 units

(i) Calculation of saving by opting EOQ:

	Existing Order policy	EOQ Model
No. of orders	9 (27,000/3,000)	18.75 or 19 (27000/1,440)
A. Ordering Cost (₹)	2,160 (₹ 240 × 9)	4,500 (₹ 240 × 27,000/1,440)
B. Carrying cost (₹)	9,375 (3,000 × ₹ 6.25/2)	4,500 (1,440 × ₹ 6.25/2)
Total cost (A+B) (₹)	11,535	9,000

Savings of Cost by opting EOQ Model = ₹ 11,535 – ₹ 9,000 = ₹ 2,535

(ii) Re-order point under EOQ:

Re-order point/ Re-order level = Maximum consumption × Maximum lead time

Consumption per day = 27.000 units/360 days = 75 units

Re-order point/ Re-order level = 75 units × 12 days = 900 units

(iii) Frequency of Orders (in days):

360days/No. of orders a year = 360/19 days = 18.95 days or 19 days

7.

Working:

Calculation of Annual demand of raw material

= 4,000 Litres (per quarter) x 4 (No. of Quarter in a year) x 2 kg. (raw material required for each Litre of paint)

= 32,000 kg.

Calculation of Carrying cost

Storage rate = 2%

Interest Rate = 6%

Total = 8% per annum

Carrying cost per unit per annum = 8% of ₹ 50 = ₹ 4 per unit per annum

(i) EOQ = $\sqrt{\frac{2 \times \text{Annual demand (A)} \times \text{Ordering Cost per order(O)}}{\text{Carrying cost per unit per annum (C)}}}$

= $\sqrt{\frac{2 \times 32{,}000\text{kg} \times \text{Rs.}40}{\text{Rs.}4}}$ = 800 Kg

(ii) Total Annual Inventory Cost

Purchasing cost of 32,000 kg @ ₹ 50 per kg	₹ 16,00,000
Ordering Cost (32,000 kg/800 kg x ₹ 40)	₹ 1600
Carrying Cost of Inventory (15 days/ 30 days x 800 kg x ₹ 4)	₹ 1600
	₹ 16,03,200

8.

(i)

(a) Stores Ledger Account for the month of April, 2019 (Weighted Average Method)

	Receipt			Issue			Balance		
Date	**Qty Units**	**Rate (₹)**	**Amount (₹)**	**Qty Units**	**Rate (₹)**	**Amount (₹)**	**Qty Units**	**Rate (₹)**	**Amount (₹)**
01-04-2019	-	-	-	-	-	-	1,000	15	15,000

04-04-2019	3,000	16	48,000	-	-	-	4,000	15.75	63,000
08-04-2019	-	-	-	1,000	15.75	15,750	3,000	15.75	47,250
15-04-2019	1,500	18	27,000	-	-	-	4,500	16.5	74,250
20-04-2019	-	-	-	1,200	16.5	19,800	3,300	16.5	54,450
25-04-2019	-	-	-	300	18	5,400	3,000	16.35	49,050
26-04-2019	-	-	-	1,000	16.35	16,350	2,000	16.35	32,700
28-04-2019	500	17	8,500	-	-	-	2,500	16.48	41,200
30-04-2019	-	-	-	50	16.48	824	2,450	16.48	40,376

(b) Stores Ledger Account for the month of April, 2019 (LIFO)

	Receipt			Issue			Balance		
Date	**Qty Units**	**Rate (₹)**	**Amount (₹)**	**Qty Units**	**Rate (₹)**	**Amount (₹)**	**Qty Units**	**Rate (₹)**	**Amount (₹)**
01-04-2019	-	-	-	-	-	-	1,000	15	15,000
04-04-2019	3,000	16	48,000	-	-	-	1,000	15	15,000
							3,000	16	48,000
08-04-2019	-	-	-	1,000	16	16,000	1,000	15	15,000
							2,000	16	32,000
15-04-2019	1,500	18	27,000	-	-	-	1,000	15	15,000
							2,000	16	32,000
							1,500	18	27,000
20-04-2019	-	-	-	1,200	18	21,600	1,000	15	15,000
							2,000	16	32,000
							300	18	5,400
25-04-2019	-	-	-	300	18	5,400	1,000	15	15,000
							2,000	16	32,000
26-04-2019	-	-	-	1,000	16	16,000	1,000	15	15,000
							1,000	16	16,000
28-04-2019	500	17	8,500	-	-	-	1,000	15	15,000
							1,000	16	16,000
							500	17	8,500
30-04-2019	-	-	-	50	17	850	1,000	15	15,000
							1,000	16	16,000
							450	17	7,650

(ii) Value of Material Consumed and Closing Stock

	Weighted Average method (₹)	**LIFO method (₹)**
Opening stock as on 01-04-2019	15,000	15,000

Add: Purchases	83,500	83,500
	98,500	98,500
Less: Return to supplier	5,400	5,400
Less: Abnormal loss	824	850
Less: Closing Stock as on 30-04-2019	40,376	38,650
Value of Material Consumed	51,900	53,600

9.

(a) Annual consumption 250 kg × 52 weeks = 13,000 kg.

(i) Re-order Quantity or EOQ = $\sqrt{\frac{2 \times A \times O}{c \times i}}$

A = Annual Consumption = 13,000 kg

O = Ordering Cost = ₹. 1,500

C = Cost per kg = ₹. 100

i = carrying cost rate = 9.75%

Carrying cost per kg per annum (c × i) = 100 × 9.75% = ₹ 9.75

$\therefore$ EOQ = $\sqrt{\frac{2 \times 13{,}000 \times 1{,}500}{9.75}}$

= $\sqrt{\frac{39000000}{9.75}}$ = 2000 kg.

(ii) Re-order level = Max. re-order period × Max, Consumption

= 7 weeks × 300 kg = 2,100 kg

(iii) Maximum level = Re-order level + Re-order Qty – (Min re-order Period × Min. Consumption)

= 2100 kg + 2000 kg – (5 × 200) kg = 3100 kg.

(iv) Minimum level = Re-order level – (Avg. re-order period × Avg. Consumption)

= 2,100 kg – (6 × 250) kg = 600 kg.

(v) Avg. stock level = ½ (Max. level +Min. level)

= ½ (3100 + 600) = 1850 kg

OR

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

= 600 kg. + $\frac{1}{2}$ × 2000 kg. = 1600 kg.

10.

(a) (i) Calculation of Economic Order Quantity

EOQ = $= \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 12{,}000 \text{ units} \times \text{Rs.}1{,}800}{\text{Rs.}640 \times 18.75/100}}$ = 600 units

(ii) Evaluation of Profitability of Different Options of Order Quantity

When EOQ is ordered

	(₹)
Purchase Cost (12,000 units x ₹ 640)	76,80,000
Ordering Cost [A/Q × O - (12,000 units/ 600 units) x ₹ 1,800]	36,000
Carrying Cost (Q/2 × C × i - 600 units x ₹ 640 x ½ x 18.75/100)	36,000
Total Cost	77,52,000

(b) When Quantity Discount is accepted

	(₹)
Purchase Cost (12,000 units x ₹ 608)	72,96,000
Ordering Cost [A/Q × O (12,000 units/3,000 units) x ₹ 1,800]	7,200
Carrying Cost [Q/C × C x i (3,000 units x ₹ 608 x ½ x 18.75/100)]	1,71,000
Total Cost	74,74,200

Advise – The total cost of inventory is higher if EOQ is adopted. If M/s. X Private Limited gets a discount of 5% on the purchases of "SKY BLUE" (if order size is 3,000 components at a time), there will be financial benefit of ₹ 2,77,800 (77,52,000 - 74,74,200). However, order size of big quantity will increase volume of average inventory to 5 times. There may be risk of shrinkage, pilferage and obsolescence etc., of inventory due to increase in the average volume of inventory holding. This aspect also has to be taken into consideration before opting the discount offer and taking final decision.

11.

i)

Material M	**Material N**
Turnover ratio	**Turnover ratio**
$= \frac{\text{Cost of stock of raw material consumed}}{\text{Average stock of raw material}}$	$= \frac{\text{Cost of stock of raw material consumed}}{\text{Average stock of raw material}}$
$= \frac{\text{Rs. } 6,00,000 + \text{Rs. } 9,50,000 - \text{Rs. } 4,50,000 = 2.09}{(6,00,000 + 4,50,000) / 2}$	$= \frac{\text{Rs. } 10,00,000 + \text{Rs. } 18,40,000 - \text{Rs. } 7,25,000}{(10,00,000 + 7,25,000)/ 2} 2$
Average number of days for which the average inventory is held	Average number of days for which the average inventory is held
= 360/Inventory turnover ratio	= 360/Inventory turnover ratio
= 360 days/2.09	= 360 days/2.45
= 172.25 days	= 146.94 days

ii) Advice

Comparatively Material M is slower than Material N since Inventory holding period of 'M' is 172.25 days in Comparison to 'N' i.e., 146.94 days. Infact, both materials have slow inventory turnover. Though, different business has their own expected rates for inventory turnover like food shops have fast inventory turnover, shop selling furniture etc. will have slower inventory turnover while manufacturers of large items of plant will have very long inventory turnover. If it is not as per the Industry Standard, then a slow turnover may indicate that excessive inventory is held and risk of obsolete or spoiled inventory will increase. Large quantity of slow-moving material means that capital is locked up in business and not earning revenue. It is advisable to make proper investigations into slow moving materials and take steps to minimize the loss arises therefrom as it may impact overall financial health of the organisation.

12.

Difference between Minimum lead time Maximum lead time = 4 days

Max. lead time – Min. lead time = 4 days

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

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

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

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

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

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

Or, 2 Min. lead time = 8 days

Or, Minimum lead time = 8days /2 = 4 days

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

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

i. **Maximum consumption per day:**

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

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

Or, Maximum Consumption per day 1,60,000units ÷ 8days = 20000 units

ii. **Minimum Consumption per day:**

Maximum Stock Level =

Re-order level + Re-order Quantity – (Min. lead time × Min. Consumption per day) Or,

1,90,000 units = 1,60,000 units + 90,000 units – (4 days × Min. Consumption per day) Or, 4 days × Min. Consumption per day = 2,50,000 units – 1,90,000 units

Or, Minimum Consumption per day = 60000 units ÷ 4 days = 15000 units

13.

1. Calculation of Economic Order Quantity (E.O.Q)

Annual requirement (usage) of raw material in kg. (A) = 150000 ÷ 3per unit = 50000Kg

Ordering Cost (Handling & freight cost) (O) = ₹ 1,470 + ₹ 770 = ₹ 2,240

Carrying cost per unit per annum (C) i.e. inventory carrying cost + working capital cost= (₹ 3 × 12 months) + ₹ 20 = ₹ 56 per kg

$$E.O.Q = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 50{,}000\ kg. \times Rs.2{,}240}{Rs.56}} = 2000\ kg$$

2. Frequency of placing orders for procurement:

Annual consumption (A) = 50,000 kg.

Quantity per order (E.O.Q) = 2,000 kg.

No. of orders per annum A ÷ EOQ = 50000 Kg ÷ 2000 Kg = 25 orders

Frequency of placing orders (in days) = 360days ÷ 25 orders = 14.4 Days

3. Percentage of discount in the price of raw materials to be negotiated

Particulars	On Quarterly Basis	On E.O.Q Basis
1. Annual Usage (in Kg.)	50,000 kg.	50,000 kg.
2. Size of the order	12,500 kg.	2,000 kg.
3. No. of orders (1 ÷ 2)	4	25
4. Cost of placing orders or Ordering cost (No. of orders × Cost per order)	₹ 8,960 (4 order × ₹ 2,240)	₹ 56,000 (25 orders × ₹ 2,240)
5. Inventory carrying cost (Average inventory × Carrying cost per unit)	₹ 3,50,000 (12,500 kg. × ½ × ₹ 56)	₹ 56,000 (2,000 kg. × ½ × ₹ 56)
6. Total Cost (4 + 5)	₹ 3,58,960	₹ 1,12,000

When order is placed on quarterly basis the ordering cost and carrying cost increased by ₹2,46,960 (₹ 3,58,960 - ₹ 1,12,000). So, discount required = ₹ 2,46,960

Total annual purchase = 50,000 kg. × ₹ 190 = ₹ 95,00,000 So, Percentage of discount to be negotiated = 240900 ÷ 9500000 =2.60%

14.

As procurement time is given in days, consumption should also be calculated in days:

Maximum Consumption per Day: 350 ÷ 70 = 50 days

Minimum Consumption per Day: 210 ÷ 7 = 30days

Average Consumption per Day: 50 + 30 ÷ 2 = 40 days

a. Calculation of Economic Order Quantity (EOQ)

Annual consumption of Raw Materials (A): 40 Kgs x 365 days = 14,600 Kgs Storage or Carrying Cost per unit per annum (C):(₹ 100 x 1% x 12 months) + ₹ 2 = ₹ 14

Ordering Cost (O): ₹ 200 per Order

$$EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 14{,}600 \times 200}{Rs.14}} = 646 \text{ kgs}$$

b. Re-Order Level (ROL) **=** (Maximum consumption Rate × Maximum Procurement Time)

= 50 kgs per day × 9 days

= 450 kgs

c. Maximum Stock Level = Recorder Level + Recorder Quantity (Minimum Consumption Rate × Minimum Procurement Time)

= 450 kgs + 646 kgs - (30 kgs X 5 days)

= 946 kgs

d. Minimum Stock Level **=** Recorder Level – (Average consumption Rate × Average Procurement Time)

= 450 kgs – (40 kgs X 7 days) =170 kgs

e. Average Stock Level = 946 kgs + 170 kgs ÷ 2 = 558 Kgs

f. Number of Orders to be placed per year

= Annual Consumption of Raw Materials ÷ EOQ

= 14600 Kgs ÷ 646 kgs = 23 orders

g. Total Inventory Cost

Cost of Materials (A x Purchase Price) (14600 kgs x ₹ 100)	=	14,60,000
Total Ordering Cost (No. of Orders x O) (23 Orders x 200)	=	₹ 4,600
TotalCarrying Cost (EOQ / 2 x C) (646 kgs / 2 x ₹ 14)	=	₹ 4,522
Total Inventory Cost		₹ 14,69,122

h. If the supplier is willing to offer 1% discount on purchase of total annual quantity in two orders:

Offer Price = ₹ 100 x 99%	= ₹ 99
Revised Carrying Cost = (₹ 99 x 1% x 12 months) + ₹ 2	= ₹ 13.88
Revised Order Quantity = 14600 kgs / 2 Orders	= 7300 kgs
Total Inventory Cost at Offer Price	
Cost of Materials (A x Purchase Price) (14600 kgs x ₹ 99)	= ₹ 14,45,400
Total Ordering Cost (No. of Orders x O) (2 Orders x 200)	= ₹ 400
Total Carrying Cost (EOQ / 2 x C) (7300 kgs / 2 x ₹ 13.88)	= ₹ 50,662
Total Inventory Cost	₹ 14,96,462

Advice: As total inventory cost at offer price is ₹ 27,340 (14,96,462 – 14,69,122) higher, offer should not be accepted.

i. Counter-offer:

Let Discount Rate = z%

Counter-Offer Price = ₹ 100 – z% = ₹ 100 – z

Revised Carrying Cost = [(₹ 100 – z) x 1% x 12 months] + ₹ 2 = ₹ 12 -0.12z + ₹ 2

= ₹ 14 – 0.12z

Total Inventory Cost at Counter-Offer Price

Cost of Materials (A x Purchase Price) [14600 kgs x (₹ 100 – z)] = ₹ 14,60,000 – 14,600z

Total Ordering Cost (No. of Orders x O) (2 Orders x 200) = ₹ 400

Total Carrying Cost (EOQ / 2 x C) [7300 kgs / 2 x (₹ 14 – 0.12z)] = ₹ 51,100 – 438z

Total Inventory Cost ₹ 15,11,500 – 15038z₹ 14,69,122 = ₹ 15,11,500 – 15038z

₹ 14,69,122 = ₹ 15,11,500 – 15038z

Or 15038z = 42,378

Or z = 2.82

Therefore, discount should be at least 2.82% in offer price.

15.

Calculation of cost per unit:

Particulars		**Units**	**(₹)**
Listed Price of Materials		5,000	2,50,000
Less: Trade discount @ 10% on invoice price			(25,000)
			2,25,000
Add: CGST @ 6% of ₹ 2,25,000			13,500
Add: SGST @ 6% of ₹ 2,25,000			13,500
			2,52,000
Add: Toll Tax			5,000
Freight and Insurance			17,000
Commission and Brokerage Paid			10,000
Add: Cost of returnable containers:			
Amount deposited	₹ 30,000		
Less: Amount refunded	₹ 20,000		10,000
			2,94,000
Add: Other Expenses @ 2% of Total Cost (₹ 2,94,000/ 98 ×2)			6,000
Total cost of material			3,00,000
Less: Shortage material due to normal reasons @ 20%		1,000	-
Total cost of material of good units		4,000	3,00,000
Cost per unit (₹ 3,00,000/4,000 units)			75

Note:

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

16.

(i) (a)Inventory turnover ratio (Refer to working note)

= Cost of stock of raw material/consumed Average stock of raw material

= ₹ 1,68,00,000/₹ 10,00,000 = 16.8

(b) Average number of days for which the average inventory is held

= 365/Inventory turnover ratio = 365days/16.8 = 21.73 days

Working Note:

Particulars	**(₹)**
Opening stock of raw material	9,00,000
Add: Material purchases during the year	1,70,00,000
Less: Closing stock of raw material	11,00,000
	1,68,00,000

(ii) The Inventory turnover ratio for material X is 16.8 which mean an inventory item takes only 21.73 or 22 days to issue from stores for production process. The rate is better than the industry rate which is 10 time or 36.5 days. This inventory turnover ratio indicates better inventory management system and good demand for the final product in market.

17. (RTP MAY 21, RTP MAY 19, MTP APR 19, PM)

Working Notes:

(i) Computation of Annual consumption & Annual Demand for raw material 'D':

Sales forecast of the product 'X'	20,000 units
Less: Opening stock of 'X'	1,800 units
Fresh units of 'X' to be produced	18,200 units
Raw material required producing 18,200 units of 'X' (18,200 unit's × 4 kg.)	72,800 kg.
Less: Opening Stock of 'D'	2,000 kg.
Annual demand for raw material 'D'	70,800 kg.

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

$$EOQ = \sqrt{\frac{2 \times \text{Annual demand of 'D'} \times \text{ordering cost}}{\text{Carrying cost per unit per annum}}}$$

$$= \sqrt{\frac{2 \times 70{,}800\text{kg.} \times \text{Rs.}1{,}340}{\text{Rs.}250 \times 14\%}} = \sqrt{\frac{2 \times 70{,}800\text{kg.} \times \text{Rs.}1{,}340}{\text{Rs.}35}} = 2{,}328\text{kg.}$$

(iii) Re- Order level:

= (Maximum consumption per day × Maximum lead time)

= {(Annual Consumption of 'D'/300days + 40kg.) x 8 days}

= {(70,800kg. /300 days x 40kg) x 8 days) = 2,208 kg.

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

Average Consumption per day = 236 Kg.

Hence, Maximum Consumption per day = 236 kg. + 40 kg. = 276 kg.

So Minimum consumption per day will be

Average Consumption = Min. consumption + Max. consumption/2

Or, 236 kg. = Min. consumption + 276 kg. /2

Or, Min. consumption = 472 kg – 276 kg. = 196 kg.

(a) Re-order Quantity:

EOQ – 400 kg. = 2,328 kg. – 400 kg. = 1,928 kg.

(b) Maximum Stock level:

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

= 2,208 kg. + 1,928 kg. – (196 kg. × 4 days) = 4,136 kg. – 784 kg. = 3,352 kg.

(c) Minimum Stock level:

= Re-order level – (Average consumption per day × Average lead time)

= 2,208 kg. – (236 kg. × 6 days) = 792 kg.

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

		When purchasing the ROQ	When purchasing the EOQ
I	Order quantity	1,928 kg.	2,328 kg.
II	No. of orders a year	70,800kg. /1,928kg. = 36.72or 37orders	70,800kg. /2,328 kg = 30.41or 31orders
III	Ordering Cost	37 orders × ₹ 1,340 = ₹ 49,580	31 orders × ₹ 1,340 = ₹ 41,540
IV	Average Inventory	1,928kg. /2 = 964kg.	2,328kg. /2 =1,164kg.
V	Carrying Cost	964 kg. × ₹ 35 = ₹ 33,740	1,164 kg. × ₹ 35 = ₹ 40,740
VI	Total Cost	₹ 83,320	₹ 82,280

18 : (RTP NOV 20, MTP MAY 21, PM)

(i) Minimum stock of A

Re-order level – (Average consumption × Average time required to obtain delivery)

= 60,000 kg. – (900 units × 12 kg. × 3 weeks) = 27,600 kg.

(ii) Maximum stock of B

Re-order level + Re-order quantity– (Min. Consumption × Min. Re-order period)

= 70,000 kg. + 8,000 kg – (550units ×8 kg. × 5 weeks).

=78,000–22,000 = 56,000 kg.

(iii) Re-order level of C

Maximum re-order period × Maximum Usage

= 7 weeks × (1,250units × 6 kg.) = 52,500 kg.

OR

= Minimum stock of C+ (Average consumption × Average delivery time)

= 25,500 kg. + [(900 units ×6 kg.) ×5 weeks] =52,500 kg.

(iv) Average stock level of A

= Minimum stock + Maximum stock/2(Refer to Working Note)

= 27,600 + 58,800/2 = 43,200 kg.

Working note

Maximum stock of A = ROL + ROQ – (Minimum consumption × Minimum re-order period)

= 60,000 kg. + 12,000 kg. – [(550units × 12 kg.) × 2 weeks] = 58,800 kg.

(v) Re-order level of D

Maximum re-order period × Maximum Usage

= 3 weeks × (1,250 units × 5 kg.) = 18,750 kg

(vi) Minimum stock of D

Re-order level – (Average consumption × Average time required to obtain delivery)

= 18,750 kg. – (900units × 5 kg. × 2 weeks) = 9,750 kg.

19. : (RTP MAY 20)

Workings:

Consumption is calculated on the basis of material requisitions: Maximum component usage = 4,500 units (Material requisition on 10-01-20) Minimum component usage = 1,500 units (Material requisition on 24 -01-20)

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

Maximum lead time = 21 days (15-12-2019 to 05-01-2020)

Minimum lead time = 14 days (30-12-2019 to 12-01-2020)

Calculations:

(i) Re-order level

= Maximum usage × Maximum lead time

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

(ii) Maximum stock level

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

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

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

(iii) Minimum stock level

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

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

= 94,500 units – 52,500 units

= 42,000 units

(iv) Store Ledger for the month of January 2020:

Date	Receipts				Issue				Balance		
	GRN/ MRN	Units	Rate	Amt. (₹ '000)	MRN/ MR	Units	Rate	Amt. (₹ '000)	Units	Rate	Amt. (₹ '000)
01-01-2020	-	-	-	-	-	-	-	-	3,500	9,810	34,335
05-01-2020	8	10,000	9,930	99,300	3	500	9,930	4,965	13,000	9,898	1,28,670
06-01-2020	-	-	-	-	11	3,000	9,898	29,694	10,000	9,898	98,980
10-01-2020	-	-	-	-	12	4,500	9,898	44,541	5,500	9,898	54,439
12-01-2020	9	10,000	9,780	97,800	4	400	9,780	3,912	15,100	9,823	1,48,327
15-01-2020	-	-	-	-	13	2,200	9,823	21,611	12,900	9,823	1,26,716
24-01-2020	-	-	-	-	14	1,500	9,823	14,734	11,400	9,823	1,11,982
25-01-2020	10	10,000	9,750	97,500	-	-	-	-	21,400	9,789	2,09,482
28-01-2020	-	-	-	-	15	4,000	9,789	39,156	17,400	9,789	1,70,326
31-01-2020	-	-	-	-	16	3,200	9,789	31,325	14,200	9,789	1,39,001

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

Value of stock as on 31 01-2020 ('000) = ₹ 1,39,001

(v) Value of components used during the month of January 2020:

Sum of material requisitions 011 to 016 ('000)

= ₹ 29,694 + ₹ 44,541 + ₹ 21,611 + ₹ 14,734 + ₹ 39,156 + ₹ 31,325 = ₹ 1,81,061

(vi) Inventory Turnover Ratio

= Value of materials used/ Average stock value

=₹ 1,81,061/₹ (1,39,001+ 34,335) / 2 = ₹ 1,81,061/₹ 86,668 = 2.09

20 : (RTP NOV 19)

Working Notes:

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

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

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

Add: Loss in process	10,000 kg.	17,204 kg.
Purchase quantity	2,50,000 kg.	3,44,085 kg.

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

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

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

*No. of trucks = 3,44,085kg./10 ton x 1,000 = 34.40 trucks or 35 trucks

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

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

EOQ = √2 x Annual Requirement x Order cost/Carrying cost per unit p.a.

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

CHAPTER 8: EMPLOYEE COST

PART – A: ICAI PAST EXAM QUESTIONS

PROBLEM – 1: (MAY 23 – 5 Marks)

SMC Company Limited is producing a particular design of toys under the following existing incentive system:

Normal working hours in the week	48 hours
Late shift hours in the week	12 hours
Rate of payment Normal working:	₹ 150 per hour
Late shift:	₹ 300 per hour

Average output per operator for 60 hours per week (including late shift hours): 80 toys.

The company's management has now decided to implement a system of labour cost payment with either the Rowan Premium Plan or the Halsey Premium Plan in order to increase output, eliminate late shift overtime, and reduce the labour cost.

The following information is obtained:

The standard time allotted for ten toys is seven and half hours. Time rate: ₹ 150 per hour (as usual).

Assuming that the operator works for 48-hours in a week and produces 100 toys, you are required to calculate the weekly earnings for one operator under

(i) The existing Time Rate,

(ii) Rowan Premium Plan and,

(iii) Halsey Premium Plan (50%).

PROBLEM – 2 : (NOV 22 – 6 Marks)

A skilled worker, in PK Ltd., is paid a guaranteed wage rate of ₹ 15.00 per hour in a 48- hour week. The standard time to produce a unit is 18 minutes. During a week, a skilled worker -Mr. 'A' has produced 200 units of the product. The Company has taken a drive for cost reduction and wants to reduce its labour cost.

You are required to:

(i) Calculate wages of Mr. 'A' under each of the following methods:

- **(A)** Time rate,
- **(B)** Piece -rete with a guaranteed weekly wage,
- **(C)** Halsey Premium Plan
- **(D)** Rowan Premium Plan

(ii) Suggest which bonus plan i.e. Halsey Premium Plan or Rowan Premium Plan, the company should follow.

PROBLEM – 3 : (MAY 22 – 5 Marks)

PQR Limited has replaced 72 workers during the quarter ended 31st March 2022. The labour rates for the quarter are as follows:

Flux method	16%
Replacement method	8%
Separation method	5%

You are required to ascertain:

(i) Average number of workers on roll (for the quarter),

(ii) Number of workers left and discharged during the quarter,

(iii) Number of workers recruited and joined during the quarter,

(iv) Equivalent employee turnover rates for the year.

PROBLEM – 4: (DEC 21 – 5 Marks & RTP NOV 23)

A skilled worker is paid a guaranteed wage rate of ₹ 150 per hour. The standard time allowed for a job is 10 hours. He took 8 hours to complete the job. He has been paid the wages under Rowan Incentive Plan.

You are required to:

(i) Calculate an effective hourly rate of earnings under Rowan Incentive Plan.

(ii) Calculate the time in which he should complete the job, if the worker is placed under Halsey Incentive Scheme (50%) and he wants to maintain the same effective hourly rate of earnings.

PROBLEM – 5: (JUL 21 – 5 Marks)

Following information is given of a newly setup organization for the year ended on 31st March, 2021.

Number of workers replaced during the period	50
Number of workers left and discharged during the period	25
Average number of workers on the roll during the period	500

You are required to:

(i) Compute the Employee Turnover Rates using Separation Method and Flux Method.

(ii) Equivalent Employee Turnover Rates for (i) above, given that the organization was setup on 31st January, 2021.

PROBLEM – 6: (JAN 21, PM – 10 Marks)

Z Ltd is working by employing 50 skilled workers. It is considering the introduction of an incentive scheme - either Halsey Scheme (with 50% Bonus) or Rowan Scheme - of wage payment for increasing the labour productivity to adjust with the increasing demand for its products by 40%. The company feels that if the proposed incentive scheme could bring about an average 20% increase over the

present earnings of the workers, it could act as sufficient incentive for them to produce more and the company has accordingly given assurance to the workers.

Because of this assurance, an increase in productivity has been observed as revealed by the figures for the month of April, 2020:

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

Required:

(i) Calculate the effective increase in earnings of workers in percentage terms under Halsey and Rowan scheme.

(ii) Calculate the savings to Z Ltd in terms of direct labour cost per unit under both the schemes.

(iii) Advise Z Ltd about the selection of the scheme that would fulfil its assurance of incentivising workers and also to adjust with the increase in demand.

PROBLEM – 7: (NOV 20 – 6 Marks)

Following are the particulars of two workers 'R' and 'S' for a month:

Particulars	R	S
(i) Basic Wages (₹)	15,000	30,000
(ii) Dearness Allowance	50%	50%
(iii) Contribution to EPF (on basic wages)	7%	7.50%
(iv) Contribution to ESI (on basic wages)	2%	2%
(v) Overtime (hours)	20	-

The normal working hours for the month are 200 hrs. 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.

Both workers were employed on jobs A, B and C in the following proportions:

Jobs	A	B	C
R	75%	10%	15%
S	40%	20%	40%

Overtime was done on job 'A'.

You are required to:

(i) Calculate ordinary wage rate per hour of 'R' and 'S'.

(ii) Allocate the worker's cost to each job 'A', 'B' and 'C'.

PROBLEM – 8: (NOV 19 – 10 Marks)

Zico Ltd. has its factory at two locations viz Nasik and Satara. Rowan plan is used at Nasik factory and Halsey plan at Satara factory.

Standard time and basic rate of wages are same for a job which is similar and is carried out on similar machinery. Normal working hours is 8 hours per day in a 5-day week.

Job at Nasik factory is completed in 32 hours while at Satara factory it has taken 30 hours. Conversion costs at Nasik and Satara are ₹ 5,408 and ₹ 4,950 respectively. Overheads account for ₹ 25 per hour.

Required:

(i) To find out the normal wage; and

(ii) To compare the respective conversion costs.

PROBLEM – 9 : (MAY 19 – 5 Marks)

M/s Zeba Private Limited allotted a standard time of 40 hours for a job and the rate per hour is ₹ 75. The actual time taken by a worker is 30 hours.

You are **required** to calculate the total earnings under the following plans:

(i) Halsey Premium Plan (Rate 50%)

(ii) Rowan Plan

(iii) Time Wage System

(iv) Piece Rate System

PROBLEM – 10 : (NOV 18 – 5 Marks)

Following data have been extracted from the books of M/s. ABC Private Limited:

(i)	Salary (each employee, per month)	₹ 30,000
(ii)	Bonus	25% of salary
(iii)	Employer's contribution to PF, ESI etc.	15% of salary
(iv)	Total cost at employees' welfare activities	₹ 6,61,500 per annum
(v)	Total leave permitted during the year	30 days
(v)	No. of employees	175
(vii)	Normal idle time	70 hours per annum
(viii)	Abnormal idle time (due to failure of power supply)	50 hours
(ix)	Working days per annum	310 days of 8 hours

You are required to calculate:

1. Annual cost of each employee

2. Employee cost per hour

3. Cost of abnormal idle time, per employee

PROBLEM – 11: (MAY 18 – 5 Marks)

A worker takes 15 hours to complete a piece of work for which time allowed is 20 hours. His wage rate is ₹ 5 per hour. Following additional information are also available:

Material cost of work ₹ 50

Factory overheads100% of wages

Calculate the factory cost of work under the following methods of wage payments:

(i) Rowan Plan

(ii) Halsey Plan

PROBLEM – 12: (MAY 18 – 10 Marks)

The information regarding number of employees on roll in a shopping mall for the month of December 2017 are given below:

Number of employees as on 01-12-2017	900
Number of employees as on 31-12-2017	1100

During December, 2017, 40 employees resigned and 60 employees were discharged. 300 employees were recruited during the month. Out of these 300 employees, 225 employees were recruited for an expansion project of the mall and rest were recruited due to exit of employees.

Assuming 365 days in a year, calculate Employee Turnover Rate and Equivalent Annual' Employee Turnover Rate by applying the following:

(i) Replacement Method

(ii) Separation Method

(iii) Flux Method

PART – B: (REVISION TEST PAPERS)

PROBLEM – 13: (RTP NOV 22)

HR Ltd. is progressing in its legal industry. One of its trainee executives, Mr. H, in the Personnel department has calculated labour turnover rate 24.92% for the last year using Flux method.

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

Employees	At the beginning	Joined	Left	At the end
Records clerk	810	1,620	90	2,340
Human Resource Manager	?	30	90	60
Legal Secretary	?	90	---	?
Staff Attorney	?	30	30	?
Associate Attorney	?	30	---	45
Senior Staff Attorney	6	---	---	18
Senior Records clerk	12	---	---	51
Litigation attorney	?	---	---	?
Employees transferred from the Subsidiary Company				
Senior Staff Attorney	---	12	---	---
Senior Records clerk	---	39	---	---
Employees transferred to the Subsidiary Company				
Litigation attorney	---	---	90	---
Associate Attorney	---	---	15	---

At the beginning of the year there were total 1,158 employees on the payroll of the company. The opening strength of the Legal Secretary, Staff Attorney and Associate Attorney were in the ratio of 3:3:2.

The company has decided to abandon the post of Litigation attorney and consequently all the Litigation attorneys were transferred to the subsidiary company.

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

You are required to:

(a) CALCULATE Labour Turnover rate using Replacement method and Separation method.

(b) VERIFY the Labour turnover rate calculated under Flux method by Mr. H

PROBLEM – 14 : (RTP MAY 22)

A total of 108 labour hours have been put in a particular job card for repair work engaging a semi-skilled and skilled labour (Mr. Deep and Mr. Sam respectively).

The hours devoted by both the workers individually on daily basis for this particular job are given below:

Monday	Tuesday	Wednesday	Thursday	Friday
10.5	8.0	10.5	9.5	10.5

The skilled labour also worked on Saturday for 10 hours. Sunday is a weekly holiday and each worker has to work for 8 hours on all week days and 5 hours on Saturdays; the workers are however paid full wages for Saturday (8 hours for 5 hours worked).

Semi-skilled and skilled worker is paid ordinary wage @ ₹ 400 and ₹ 600 respectively per day of 8 hours labour. Further, the workers are also paid dearness allowance @ 20%.

Extra hours worked over and above 8 hours are also paid at ordinary wage rate however, overtime premium of 100% of ordinary wage rate is paid if a worker works for more than 9 hours in a day AND 48 hours in a week.

You are required to COMPUTE the wages payable to Mr. Deep (Semi-skilled) and Mr. Sam (Skilled).

PROBLEM – 15 : (RTP NOV 21)

Textile Ltd. pays following overtime premium for its labour beside normal wages of ₹ 100 per hour:

Before and after normal working hours	80% of basic wage rate
Sundays and holidays	150% of basic wage rate

During the previous year 2019-20, the following hours were worked:

Normal time	3,00,000 hours
Overtime before and after normal working hours	60,000 hours
Overtime on Sundays and holidays	15,000 hours
Total	3,75,000 hours

During the current year 2020-21, the following hours have been worked on job 'Spinning':

Normal	4,000 hours
Overtime before and after normal working hours	400 hours
Overtime on Sundays and holidays	100 hours
Total	4,500 hours

You are required to:

CALCULATE the labour cost chargeable to job 'Spinning' 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.

PROBLEM – 16: (RTP MAY 21)

JBL Sisters operates a boutique which works for various fashion houses and retail stores. It has employed 26 workers and pays them on time rate basis. On an average an employee is allowed 8

hours for boutique work on a piece of garment. In the month of December 2020, two workers M and J were given 15 pieces and 21 pieces of garments respectively for boutique work. The following are the details of their work:

	M	J
Work assigned	15 pcs.	21 pcs.
Time taken	100 hours	140 hours

Workers are paid bonus as per Halsey System. The existing rate of wages is ₹ 60 per hour. As per the new wages agreement the workers will be paid ₹ 72 per hour w.e.f. 1st January 2021. At the end of the month December 2020, the accountant of the company has wrongly calculated wages to these two workers taking ₹ 72 per hour.

Required:

(i) CALCULATE the loss incurred due to incorrect rate selection.

(ii) CALCULATE the loss incurred due to incorrect rate selection, had Rowan scheme of bonus payment followed.

(iii) CALCULATE the loss/ savings if Rowan scheme of bonus payment had followed.

(iv) DISCUSS the suitability of Rowan scheme of bonus payment for JBL Sisters?

PROBLEM – 17 : (RTP NOV 20)

GZ Ld. pays the following to a skilled worker engaged in production works. The following are the employee benefits paid to the employee:

(a) Basic salary per day	₹ 1,000
(b) Dearness allowance (DA)	20% of basic salary
(c) House rent allowance	16% of basic salary
(d) Transport allowance	₹ 50 per day of actual work
(e) Overtime	Twice the hourly rate (considers basic and DA), only if works more than 9 hours a day otherwise no overtime allowance. If works for more than 9 hours a day then overtime is considered after 8th hours.
(f) Work of holiday and Sunday	Double of per day basic rate provided works at least 4 hours. The holiday and Sunday basic is eligible for all allowances and statutory deductions.
(h) Earned leave & Casual leave	These are paid leave.
(h) Employer's contribution to Provident fund	12% of basic and DA
(i) Employer's contribution to Pension fund	7% of basic and DA

The company normally works 8-hour a day and 26-day in a month. The company provides 30 minutes lunch break in between.

During the month of August 2020, Mr. Z works for 23 days including 15th August and a Sunday and applied for 3 days of casual leave. On 15th August and Sunday, he worked for 5 and 6 hours respectively without lunch break.

On 5th and 13th August, he worked for 10 and 9 hours respectively. During the month Mr. Z worked for 100 hours on Job no.HT200.

You are required to CALCULATE:

(i) Earnings per day

(ii) Effective wages rate per hour of Mr. Z.

(iii) Wages to be charged to Job no.HT 200.

PROBLEM – 18 : (RTP MAY 20, MAY 18 – 10 Marks, MTP MAY 21 & MAY 23)

From the following information, CALCULATE employee turnover rate using –

(i) Separation Method,

(ii) Replacement Method,

(iii) New Recruitment Method, and

(iv) Flux Method:

No. of workers as on 01.01.2019 = 3,600 No. of workers as on 31.12.2019 = 3,790

During the year, 40 workers left while 120 workers were discharged. 350 workers were recruited during the year, of these 150 workers were recruited because of exits and the rest were recruited in accordance with expansion plans.

PROBLEM – 19 : (RTP NOV 19)

ADV Pvt. Ltd. manufactures a product which requires skill and precision in work to get quality products. The company has been experiencing high labour cost due to slow speed of work. The management of the company wants to reduce the labour cost but without compromising with the quality of work. It wants to introduce a bonus scheme but is indifferent between the Halsey and Rowan scheme of bonus.

For the month of November 2019, the company budgeted for 24,960 hours of work. The workers are paid ₹ 80 per hour.

Required:

CALCULATE and suggest the bonus scheme where the time taken (in %) to time allowed to complete the works is (a) 100% (b) 75% (c) 50% & (d) 25% of budgeted hours.

PROBLEM – 20 : (RTP MAY 19, MTP MAY 20)

A Company is undecided as to what kind of wage scheme should be introduced. 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 A	210	-	600
- Product B	360	-	1350
- Product C	460	250	-
Standard time allowed per unit of each product is:			
	A	**B**	**C**
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:

(i) Guaranteed hourly rate basis

(ii) Piece work earning basis, but guaranteed at 75% of basic pay (Guaranteed hourly rate if his earnings are less than 50% of basic pay.)

(iii) Premium bonus basis where the worker received bonus based on Rowan scheme.

ANSWERS

1.

Working Notes:

i. Effective rate per hour:

Incentive for 60 hours = (₹ 150 × 48 hours + ₹ 300 × 12 hours)

= 7,200 + 3,600 = ₹ 10,800

= ₹ 10,800 ÷ 60 hours = ₹ 180 per hour

ii. Time taken/ Allowed to produce 100 toys:

= (60 hours ÷ 80 toys) × 100 toys = 75 hours

iii. Time saved = Time Allowed – Time Taken

= 75 hours – 48 hours = 27 hours

Calculation of weekly earnings for one operator under the existing time rate:

= (48 hours x ₹ 150) + (12 hours x ₹ 300) = ₹ 10,800 Alternative solution

= Effective rate per hour (WN-1) × Time required for 100 toys (WN-2)

= ₹ 180 × 75 hours = ₹ 13,500

Calculation of weekly earnings for one operator under Rowan Premium plan:

(Time taken × Rate per hour) + (Time Saved/ Time Allowed × Time taken × Rate per hour)

= (48 hours × ₹ 150) + [(27 ÷ 75) × 48 × ₹ 150]

= 7,200 + 2,592 = ₹ 9,792

Calculation of weekly earnings for one operator under Halsey Premium plan:

(Time taken × Rate per hour) + (50% of Time Saved × Rate per hour)

= (48 hours × ₹ 150) + (50% of 27 hours × ₹ 150)

= ₹ 7,200 + ₹ 2,025 = ₹ 9,225

2.

Calculation of wages of Mr. 'A' under different wage schemes:

A. Time rate

Wages = Time Worked × Rate for the time

= 48 hours x ₹ 15

= ₹ 720

B. Piece rate with a guaranteed weekly wage

Wage = Number of units produced × Rate per unit

= 200 units x ₹ 4.50*

= ₹ 900

*(₹ 15 / 60 minutes) x 18 minutes = ₹ 4.50

C. Halsey Premium Plan

Wages = Time taken × Time rate + 50% of time saved × Time rate

Wages = Time taken × Time rate + 50% (Standard time – Actual time) × Time rate

= (48 hours x ₹ 15) + 50% of (60 hours# – 48 hours) x ₹ 15

= ₹ 720 + ₹ 90 = ₹ 810

#(200 units x 18 minutes) / 60 minutes = 60 hours

D. Rowan Premium Plan

Wages = Time taken × Rate per hour + Time taken ÷ Time Allowed x Time Saved x Time Rate

$$=(48\text{hours}\times\text{Rs.}15)+\frac{60-48\text{hours}}{60\text{hours}}\times 48\text{hours}\times\text{Rs.}15)$$

= 720 + 144 = 864

The company may follow Halsey Premium Plan over Rowan Premium Bonus Plan as the total wages paid is lower than that of Rowan Premium Bonus Plan.

3.

Working Note:

i. Average number of workers on roll (for the quarter):

Employee Turnover rate using Replacement method

$$=\frac{\text{No. of replacements}}{\text{Average number of workers on roll}}\times 100$$

100

Or, $\frac{8}{100}=\frac{72}{\text{Average number of workers on roll}}$

Or, Average number of workers on roll $=\frac{72\times 100}{8}=900$

ii. Number of workers left and discharged:

Employee turnover rate (Separation method)

$$=\frac{\text{No. of Separations(S)}}{\text{Average number of workers on roll}}\times 100=\frac{5}{100}=\frac{S}{900}\text{or},S=45$$

Hence, number of workers left and discharged comes to 45

iii. Number of workers recruited and joined:

Employee turnover rate (Flux method)

No of Separations + No of Accessions ÷ Average Number of Workers

16 ÷ 100 = 45 + A ÷ 900 = 99

No. of workers recruited and joined 99

iv. Calculation of Equivalent employee turnover rates:

Employee Turnover rate for the Quarter ÷ Number of Quarters x 4 quarters

Flux = 16 % * 4 = 64%

Replacement = 8% x 4 = 32%

Separation = 5% x 4 = 20%

4.

i. Calculation of Effective hourly rate of earnings under Rowan Incentive Plan:

Standard time allowed = 10 hours

Time taken = 8 hours; Time saved = 2 hours

	Particulars	Amount (₹)
A	Basic guaranteed wages (₹ 150×8 hours)	1,200
B	Add: Bonus for time saved (2 ÷ 10 × 8 × ₹ 150)	240
C	Total earnings (A+B)	1,440
D	Hours worked	8 hours
E	Effective hourly rate (C÷D)	180

ii. Let the time taken to complete the job is "T" and the time saved is 10-T

Effective hourly rate under the Halsey Incentive scheme

$$= \frac{(\text{Rate} \times \text{Hours Worked}) + (\text{Rate} \times 50\% \text{ of Time Saved})}{\text{Hours Worked}} = \text{Rs.}180$$

$$\frac{(\text{Rs.}150 \times T) + \text{Rs.}150 \times 50\% \,(10 - T)}{T} = \text{Rs.}180$$

(₹ 150 × T) + ₹ 150 × 50% (10 - T) = ₹ 180

T

150T + 750 -75T = 180T

180T-75T = 750

T = **750 / 105** = 7.14 hours

5.

i. Employee Turnover rate

Using Separation method:

Number of employees Separated during the period/ Average number of employees during the period on roll x 100

= 25/500 x 100 = 5%

Using Flux method:

Number of employees Separated +

Number of employees Replaced during the period/ Average number of employees during the period on roll x 100

= 5 + 25/ 500 x 100 = 15%

ii. Equivalent Employee Turnover rate:

Employee Turnover rate for the period/ Number of days in the period x 365

Using Separation method = 5/60 x 365 = 30.42%

Or, 5/60 x 360 = 30%

Or, 5/2 x 12 = 30%

Using Flux method = 15/60 x 360 = 91.25%

Or, = 15/60 x 360 = 90%

Or, = 15/2 x 12 = 90%

6:

a) Working Notes:

1. Total time wages of 50 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

= 24 days × 8 hrs. × ₹ 50 × 50 workers = ₹ 4,80,000

2. Time saved per month:

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

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

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

= 50/100 × 2,487 hours × ₹ 50 = ₹ 62,175

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

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

Bonus = Time taken/ Time allowed × Time saved × hourly rate

= 9,600 hours/= 12,087 hours × 2,487 hours × ₹ 50 = ₹ 98,764

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

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

(Refer to Working Notes 1, 2 and 3)

= Total time wages of 50 workers + Total bonus under /Halsey scheme Total hours worked

= ₹ 4,80,000 + ₹ 62,175/9,600 hours = ₹ 56.48

Effective increase in earnings of worker (in %) = ₹ 56.48 - ₹ 50/₹ 50 x 100 = 2.96%

b) Effective hourly rate of earnings under Rowan scheme:

(Refer to Working Notes 1, 2 and 4)

= Total time wages of 50 workers + Total bonus under Rowan scheme/ Total hours worked

= ₹ 4,80,000 +₹ 96,875/9,600 hours = **₹ 60.29**

Effective increase in earnings of worker (in %) = ₹ 60.29 -₹ 50/₹ 50 x 100 = **20.58%**

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

(Refer to Working Note 3)

Labour cost per unit (under time wage scheme)

= 1.975 hours × ₹ 50 = ₹ 98.75

Labour cost per unit (under Halsey scheme)

Total wages paid under the scheme/Total number of units produced

= ₹ 5, 42,175/6,120= s₹ 88.60

Saving per unit = ₹ 98.75 – ₹ 88.60 = **₹ 10.15**

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

(Refer to Working Note 4)

Labour cost per unit under Rowan scheme = ₹ 5,78,764/6,120 units= **₹ 94.57**

Saving per unit = ₹ 98.75 – ₹ 94.57 = **₹ 4.18**

(iii) Calculation of Productivity:

Normal Production Hours worked/Unit per Hour (9,600/1.975)	4,861
Actual Production Units	6,120
Increase in labour productivity	1,259
% Productivity i.e., increase in production/Normal production	**25.90%**

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

7:

(i) Calculation of Net Wages paid to Worker 'R' and 'S'

Particulars	R (₹)	S (₹)
Basic Wages	15,000.00	30,000.00
Dearness Allowance (DA) (50% of Basic Wages)	7,500.00	15,000.00
Overtime Wages (Refer to Working Note 1)	4,500.00	----
Gross Wages earned	27,000.00	45,000.00
Less: Provident Fund (7% × ₹ 15,000); (7.5% × ₹ 30,000)	-1,050.00	-2,250.00
Less: ESI (2% × ₹ 15,000); (2% × ₹ 30,000)	-300	-600

Net Wages paid	25,650.00	42,150.00

Calculation of ordinary wage rate per hour of Worker 'R' and 'S'

	R (₹)	S (₹)
Gross Wages (Basic Wages + DA), (excluding overtime)	22,500.00	45,000.00
Employer's contribution to P.F. and E.S.I.	1,350.00	2,850.00
	23,850.00	47,850.00
Ordinary wages Labour Rate per hour (₹ 23,850 ÷ 200 hours); (₹ 47,850 ÷ 200 hours)	119.25	239.25

(ii) Statement Showing Allocation of workers cost to each Job

	Total Wages	Jobs		
		A	B	C
Worker R				
Ordinary Wages (15:2:3)	23,850.00	17,887.50	2,385.00	3577.5
Overtime	4500	4500	-	--
Worker S				
Ordinary Wages (2:1:2)	47,850.00	19,140.00	9,570.00	19,140.00
	76,200.00	**41,527.50**	**11,955.00**	**22,717.50**

Working Note:

Normal Wages are considered as basic wages.

Over time = 2 x (Basic wage +D.A.) x 20hours/ 200hours

= 2 x ₹22,500/200 x 20hours = ₹ 4,500

8:

(a)

Particulars	Nasik	Satara
Hours worked	32 hr.	30 hr.
Conversion Costs	₹5,408	₹4,950
Less: Overheads	₹800 (₹25×32 hr.)	₹750 (₹25×30 hr.)
Labour Cost	₹4,608	₹4,200

(i) Finding of Normal wage rate:

Let Wage rate be ₹R per hour, this is same for both the Nasik and Satara factory. Normal wage rate can be found out taking total cost of either factory.

Nasik: Rowan Plan

Total Labour Cost = Wages for hours worked + Bonus as per Rowan plan ₹ 4,608 = Hours worked × Rate per hour + (Time saved/ Time allowed ×Hours worked × Rate per hour)

Or, ₹ 4,608 = 32 hr. × R + (40 – 32/40 ×32 × R)

Or, ₹ 4,608 = 32R + 6.4R

R = ₹ 120

Normal wage = 32 hrs × ₹ 120 = ₹ 3,840

OR

Satara: Halsey Plan

Total Labour Cost = Wages for hours worked + Bonus as per Halsey plan

₹ 4,200 = Hours worked × Rate per hour + (50%×Hours saved × Rate per hour)

₹ 4,200 = 30 hr. × R + 50% × (40 hr. – 30 hr.) × R

₹ 4,200 = 35 R

Or R = ₹ 120

Normal Wage = 30 hrs × ₹ 120 = ₹ 3,600

(ii) Comparison of conversion costs:

Particulars		Nasik (₹)	Satara (₹)
Normal Wages	(32 x 120)	3,840	
	(30x120)		3,600
Bonus	(6.4 x 120)	768	
	(5 x 120)		600
Overhead		800	750
		5,408	4,950

9:

(i) Halsey Premium plan:

= 1(Time taken × Rate per hour) + (1/2 × Time saved × Rate per hour)

= (30hours ×₹ 75) + (1/2 × 10hours × ₹ 75)

= ₹ 2,250 + ₹ 375 = ₹ 2,625

(ii) Rowan Premium plan:

= (Time taken × Rate per hour) + (Time saved/ Time allowed ×Time taken × Rate per hour)

= (30hours×₹ 75) + (10/40 ×30×₹ 75)

= ₹ 2,250 + ₹ 562.5 = ₹ 2,812.5 or ₹ 2,813

(iii) Time wage system:

= Time taken × Rate per hour

= 30 × ₹ 75 = ₹ 2,250

(iv) Piece Rate System:

= Std. Time × Rate per hour

= 40 × ₹ 75 = ₹ 3,000

10:

1.

	Annual cost of each employee	**₹**
1	Salary (30,000×12)	3,60,000
2	Bonus (25% of Salary)	90,000
3	Employees Contribution to PF (15% of Salary)	54,000
4	Employers' welfare (661500/175)	3,780
	Total Annual Cost	5,07,780

2.

Effective Working hours (310 days × 8 hours)	2480 hours
Less: Leave days (30 days × 8 hours)	240 hours*
Available Working hours	2240 hours
Less: Normal Loss @	70 hours
	2170 hours

Employee Cost Per Hour = 5,07,780/2170 = ' 234

*It is assumed 310 working days are without taking leave permitted into consideration

3. Cost of abnormal idle time per employee = ₹ 234× 50 hours = ₹ 11700

Alternative solution for Part (2) and (3)

(2) Calculation of Employee cost per hour:	
Working hours per annum	2,480 *
Less: Normal Idle time hours	70
Effective hours	2,410
Employee cost	5,07,780
Employee cost per hour	210.7

***It is assumed 310 working days are after adjusting leave permitted during the year.**

(3) Cost of Abnormal idle time per employee:	
Abnormal Idle time hours	50
Employee cost per hour	210.7
Cost of Abnormal idle time (210.70 ×50)	10,534.85

11:

	₹
(i) Rowan Plan: Normal time wage = 15 hours @ ₹ 5=	75
Bonus = Time saved /Time allowed × (Time taken × Time rate)	18.75
= 5/20 × (15× 5) =	
	93.75

	₹
(ii) Halsey Plan: Normal time wage = 15 hours @ ₹ 5 =	75
Bonus = 50% of (Time saved x Time rate) = 50% of (5x5) =	12.5
	87.5

Statement of Comparative Factory cost of work

	Rowan Plan	Halsey Plan
	₹	₹
Materials	50	50
Direct Wages	93.75	87.5
Prime Cost	143.75	137.5
Factory Overhead (100% of Direct wages)	93.75	87.5
Factory Cost	237.5	225

12:

Labour turnover rate:

It comprises of computation of labour turnover by using following methods:

(i) Replacement Method:

Labour turnover rate = No. of workers replaced/ Average number of workers x100

= 75/1,000 x 100 = 7.5%

Equivalent Annual Turnover Rate =7.5 x 365/31 = 88.31%

(ii) Separation Method:

Labour turnover rate = No. of workers left + No. of workers discharged/ Average number of workers × 100

= (40 + 60)**/** (900 + 1100)/2 x 100 = 100/1,000 x 100 = 10%

Equivalent Annual Turnover Rate = 10 x 365/31= 117.74%

(iii) Flux Method:

Labour turnover rate = No. of separations + No. of accessions/ Average number of workers ×100

(100 + 300)/ (900 + 1,100) ÷ 2 x 100 = 400/1,000 x 100 = 40%

Equivalent Annual Turnover Rate = 40 x 365/ 31 = 470.97%

OR

(iii) Flux Method:

Labour turnover rate = No. of separation + No. of replaced/ Average number of workers ×100

100 + 75/1000 x 100 = 17.5%

Equivalent Annual Turnover Rate = 17.5 x 365/31 = 206.05%

13.

Working Notes:

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

	At the Beginning of the year	At the end of the year
Records clerk	810	2,340
Human Resource Manager [Left- 90 + Closing- 60 – Joined- 30]	120	60
Legal Secretary*	45	135
Staff Attorney*	45	45
Associate Attorney*	30	45
Senior Staff Attorney	6	18
Senior Records clerk	12	51
Litigation attorney	90	0
Total	1,158	2,694

(*) At the beginning of the year:

Strength of Legal Secretary, Staff Attorney and Associate Attorney =

[1158 – {810 + 120 + 6 + 12 + 90} employees] or [1158 – 1038 = 120 employees]

[{Legal Secretary - 120 × 3/8 = 45, Staff Attorney - 120 × 3/8 = 45 & Associate Attorney - 120 × 2/8 = 30} employees]

At the end of the year:

[Legal Secretary -(Opening 45 + 90 Joining) = 135; Staff Attorney - (Opening 45 + 30 Joined – 30 Left) = 45]

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

Particulars	Separations	New Recruitment	Replacement	Total Joining
Records clerk	90	1,530	90	1,620
Human Resource Manager	90	--	30	30
Legal Secretary	--	90	--	90
Staff Attorney	30	--	30	30
Associate Attorney	15	15	15	30
Senior Staff Attorney	--	12	--	12
Senior Records clerk	--	39	--	39
Litigation attorney	90	--	--	--
Total	315	1,686	165	1,851

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

a. Calculation of Labour Turnover rate:

Replacement Method = No. of employees replaced during the year / Average no. of

employees on roll x 100

= 165/ (1,158+2,694)/2 ×100 = 165/ 1,926 ×100= 8.57%

Separation Method = No. of employees separated during the year / Average no. of employees on roll x 100

= 315 / 1,926 ×100= 16.36%

b. Labour Turnover rate under Flux Method: =

No. of employees(Joined Separated)during the year / Average no. of employees on roll x 10

= No. of employees (Replaced + New recruited + Separated) during the year / Average no. of employees on roll ×100

= 1,851+315/ 1,926 ×100= 112.46%

Labour Turnover rate calculated by Mr. H is incorrect as it seems he has not taken the No. of new recruitment while calculating the labour turnover rate under Flux method.

CHAPTER 9: PROCESS AND OPERATING COSTING

PART – A: ICAI PAST EXAM QUESTIONS

PROBLEM – 1 [NOV 22 – 10 Marks]

N Ltd. produces a product which passes through two processes – Process – I and Process-II. The company has provided following information related to the Financial Year 2021-22:

	Process-I	Process -II
Raw Material @₹ 65 per unit	6,500 units	-
Direct Wages	₹ 1,40,000	₹ 1,30,000
Direct Expenses	30% of Direct Wages	35% of Direct Wages
Manufacturing Overheads	₹ 21,500	₹ 24,500
Realisable value of scrap per unit	₹ 4.00	₹ 16.00
Normal Loss	250 units	500 units
Units transferred to Process-II / finished stock	6,000 units	5,500 units
Sales	-	5,000 units

There was no opening or closing stock of work-in progress. You are required to prepare:

(i) Process-I Account

(ii) Process -II Account

(iii) Finished Stock Account

PROBLEM – 2 [MAY 22 – 10 Marks]

STG Limited is a manufacturer of Chemical 'GK', which is required for industrial use. The complete production operation requires two processes. The raw material first passes through Process I, where Chemical 'G' is produced. Following data is furnished for the month April 2022:

Particulars	(in kgs.)
Opening work-in-progress quantity (Material 100% and conversion 50% complete)	9,500
Material input quantity	1,05,000
Work Completed quantity	83,000
Closing work-in-progress quantity (Material 100% and conversion 60% complete)	16,500

You are further provided that:

Particulars	(in ₹)
Opening work-in-progress cost	
Material cost	29,500
Processing cost	14,750

Material input cost	3,34,500
Processing cost	2,53,100

Normal process loss may be estimated to be 10% of material input. It has no realizable value. Any loss over and above normal loss is considered to be 100% complete in material and processing.

The Company transfers 60,000 kgs. of output (Chemical G) from Process I to Process II for producing Chemical 'GK'. Further materials are added in Process II which yield 1.20 kg. of Chemical 'GK' for every kg. of Chemical 'G' introduced. The chemicals transferred to Process II for further processing are then sold as Chemical 'GK' for ₹ 10 per kg. Any quantity of output completed in Process I, are sold as Chemical 'G' @ ₹ 9 per kg.

The monthly costs incurred in Process II (other than the cost of Chemical 'G') are: Input 60,000 kg. of Chemical 'G'

Materials Cost ₹ 85,000

Processing Costs ₹ 50,000

You are required:

(i) Prepare Statement of Equivalent production and determine the cost per kg. of Chemical 'G' in Process I using the weighted average cost method.

(ii) Prepare a statement showing cost of Chemical 'G' transferred to Process II, cost of abnormal loss and cost of closing work-in progress.

(iii) STG is considering the option to sell 60,000 kg. of Chemical 'G' of Process I without processing it further in Process-II. Will it be beneficial for the company over the current pattern of processing 60,000 kg in process-II?

(Note: You are not required to prepare Process Accounts)

PROBLEM – 3 [DEC 21 5 marks]

A product passes through Process-I and Process-II. Particulars pertaining to the Process-I are:

Materials issued to Process-I amounted to ₹ 80,000, Wages ₹ 60,000 and manufacturing overheads were ₹ 52,500. Normal Loss anticipated was 5% of input, 9,650 units of output were produced and transferred out from Process-I to Process-II. Input raw materials issued to Process-I were 10,000 units. There were no opening stocks. Scrap has realizable value of ₹ 5 per unit. You are required to prepare:

(i) Process-I Account

(ii) Abnormal Gain/Loss Account

PROBLEM – 4 (JUL 21 – 10 Marks)

A Manufacturing unit manufactures a product 'XYZ' which passes through three distinct Processes - X, Y and Z. The following data is given:

	Process X	**Process Y**	**Process Z**
Material consumed (in ₹)	2,600	2,250	2,000

Direct wages (in ₹)	4,000	3,500	3,000

- The total Production Overhead of ₹ 15,750 was recovered @ 150% of Direct wages.
- 15,000 units at ₹ 2 each were introduced to Process 'X'.
- The output of each process passes to the next process and finally, 12,000 units were transferred to Finished Stock Account from Process 'Z'.
- No stock of materials or work in progress was left at the end. The following additional information is given:

Process	% of wastage to normal input	Value of Scrap per unit (₹)
X	6%	1.1
Y	?	2
Z	5%	1

You are required to:

(i) Find out the percentage of wastage in process 'Y', given that the output of Process 'Y' is transferred to Process 'Z' at ₹ 4 per unit.

(ii) Prepare Process accounts for all the three processes X, Y and Z.

PROBLEM – 5 (JAN 21 – 5 Marks)

MNO Ltd has provided following details:

- Opening work in progress is 10,000 units at ₹ 50,000 (Material 100%, Labour and overheads 70% complete).
- Input of materials is 55,000 units at ₹ 2,20,000. Amount spent on Labour and Overheads is ₹ 26,500 and ₹ 61,500 respectively.
- 9,500 units were scrapped; degree of completion for material 100% and for labour & overheads 60%.
- Closing work in progress is 12,000 units; degree of completion for material 100% and for labour & overheads 90%.
- Finished units transferred to next process are 43,500 units.

Normal loss is 5% of total input including opening work in progress. Scrapped units would fetch ₹ 8.50 per unit.

You are required to prepare using FIFO method:

(i) Statement of Equivalent production

(ii) Abnormal Loss Account

PROBLEM – 6 (NOV 20 – 10 Marks)

Following details are related to the work done in Process-I by ABC Ltd. during the month of May 2019:

	(₹)
Opening work in process (3,000 units)	
Materials	1,80,500
Labour	32,400
Overheads	90,000
Materials introduced in Process-I (42,000 units)	36,04,000
Labour	4,50,000
Overheads	15,18,000
Units Scrapped	4,800 units
Degree of completion	
Materials	100%
Labour & overhead	70%
Closing Work-in-process	4,200 units
Degree of completion	
Materials	100%
Labour & overhead	50%

Units finished and transferred to Process-II: 36,000 units Normal loss:

4% of total input including opening work-in process

Scrapped units fetch ₹ 62.50 per piece.

Prepare:

(i) Statement of equivalent production.

(ii) Statement of cost per equivalent unit.

(iii) Process-I A/c

(iv) Normal Loss Account and

(v) Abnormal Loss Account

PROBLEM – 7 (NOV 19 – 10 Marks)

A product passes through two distinct processes before completion. Following information are available in this respect:

	Process-1	Process-2
Raw materials used	10,000 units	-
Raw material cost (per unit)	₹ 75	-
Transfer to next process/Finished good	9,000 units	8,200 units
Normal loss (on inputs)	10%	5%
Direct wages	₹ 3,00,000	₹ 5,60,000
Direct expenses	50% of direct wages	65% of direct wages

Manufacturing overheads	25% of direct wages	15% of direct wages
Realisable value of scrap (per unit)	₹ 13.50	₹ 145

8,000 units of finished goods were sold at a profit of 15% on cost. There was no opening and closing stock of work-in-progress.

Prepare:

(i) Process-1 and Process-2 Account

(ii) Finished goods Account

(iii) Normal Loss Account

(iv) Abnormal Loss Account

(v) Abnormal Gain Account.

PROBLEM – 8 (MAY 19 – 10 Marks)

KT Ltd. produces a product EMM which passes through two processes before it is completed and transferred to finished stock. The following data relate to May 2019:

Particulars	Process		Finished stock
	A	B	
	(₹)	(₹)	(₹)
Opening Stock	5,000	5,500	10,000
Direct Materials	9,000	9,500	
Direct Wages	5,000	6,000	
Factory Overheads	4,600	2,030	
Closing Stock	2,000	2,490	5,000
Inter-process profit included in opening stock		1,000	4,000

Output of Process A is transferred to Process B at 25% profit on the transfer price and output of Process B is transferred to finished stock at 20% profit on the transfer price. Stock in process is valued at prime cost. Finished stock is valued at the price at which it is received from Process B. Sales during the period are ₹ 75,000.

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

PROBLEM – 9 (NOV 18 – 5 Marks)

Following details have been provided by M/s AR Enterprises:

(i) Opening works-in-progress - 3000 units (70% complete)

(ii) Units introduced during the year - 17000 units

(iii) Cost of the process (for the period) - ₹ 33,12,720

(iv) Transferred to next process - 15000 units

(v) Closing works-in-progress - 2200 units (80% complete)

(vi) Normal loss is estimated at 12% of total input (including units in process in the beginning). Scraps realise ₹ 50 per unit. Scraps are 100% complete.

Using FIFO method, compute:

(i) Equivalent production

(ii) Cost per equivalent unit

PROBLEM – 10 (MAY 18 – 10 Marks)

Alpha Ltd. is engaged in the production of a product A which passes through 3 different process - Process P, Process Q and Process R. The following data relating to cost and output is obtained from the books of accounts for the month of April 2017:

Particulars	Process P	Process Q	Process R
Direct Material	38,000	42,500	42,880
Direct Labour	30,000	40,000	50,000

Production overheads of ₹ 90,000 were recovered as percentage of direct labour.

10,000 kg of raw material @ ₹ 5 per kg. was issued to Process P. There was no stock of materials or work in process. The entire output of each process passes directly to the next process and finally to warehouse. There is normal wastage, in processing, of 10 %. The scrap value of wastage is ₹ 1 per kg.

The output of each process transferred to next process and finally to warehouse are as under:

Process P = 9,000 kg

Process Q = 8,200 kg

Process R = 7,300 kg

The company fixes selling price of the end product in such a way so as to yield a profit of 25% selling price.

Prepare Process P, Q and R accounts. Also calculate selling price per unit of end product.

PART – B: (REVISION TEST PAPERS)

PROBLEM – 11 [NOV 22]

SM Pvt. Ltd. manufactures their products in three consecutive processes. The details are as below:

	Process A	Process B	Process C
Transferred to next Process	60%	50%	
Transferred to warehouse for sale	40%	50%	100%

In each process, there is a weight loss of 2% and scrap of 8% of input of each process. The realizable value of scrap of each process is as below:

Process A @ ₹ 2 per ton

Process B @ ₹ 4 per ton

Process C @ ₹ 6 per ton.

The following particulars relate to April, 2022:

	Process A	Process B	Process C
Materials used (in Tons)	1,000	260	140
Rate per ton	₹ 20	₹ 15	₹ 10
Direct Wages	₹ 4,000	₹ 3,000	₹ 2,000
Direct Expenses	₹ 3,160	₹ 2,356	₹ 1,340

PREPARE Process Accounts- A, B and C & calculate cost per ton at each process

PROBLEM – 12 [MAY 22 & MAY 21 & NOV 23]

A company produces a component, which passes through two processes. During the month of December, 2021, 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 Materials	₹ 6,00,000
Direct Wages	₹ 7,00,000
Factory Overheads	₹ 4,90,000

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.

Costs incurred in Process-II are as follows:

Packing Materials	₹ 1,60,000
Direct Wages	₹ 1,42,250
Factory Overheads	₹ 1,70,700

Packing material cost is incurred at the end of the second process as protective packing to the

completed units of production.

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.

PROBLEM – 13 (NOV 21 & MAY 23)

Following information is available regarding Process-I of a manufacturing company for the month of February:

Production Record:	
Units in process as on 1st February	8,000
(All materials used, 1/4th complete for labour and overhead)	
New units introduced	32,000
Units completed	28,000
Units in process as on 28th February (All materials used, 1/3rd complete for labour and overhead)	12,000
Cost Records:	**(₹)**
Work-in-process as on 1st February	
Materials	1,20,000
Labour	20,000
Overhead	20,000
	1,60,000
Cost during the month:	
Materials	5,12,000
Labour	3,00,000
Overhead	3,00,000
	11,12,000

Presuming that average method of inventory is used, PREPARE the following:

(i) Statement of equivalent production.

(ii) Statement showing cost for each element.

(iii) Statement of apportionment of cost.

(iv) Process cost account for Process-I.

PROBLEM – 14 (NOV 20)

M Ltd. produces a product-X, which passes through three processes, I, II and III. In Process-III a by-product arises, which after further processing at a cost of ₹85 per unit, product Z is produced. The information related for the month of August 2020 is as follows:

	Process-I	Process-II	Process-III
Normal loss	5%	10%	5%
Materials introduced (7,000 units)	1,40,000	-	-
Other materials added	62,000	1,36,000	84,200
Direct wages	42,000	54,000	48,000
Direct expenses	14,000	16,000	14,000

Production overhead for the month is ₹2,88,000, which is absorbed as a percentage of direct wages.

The scrapes are sold at ₹10 per unit

Product-Z can be sold at ₹135 per unit with a selling cost of ₹15 per unit No. of units produced:

Process-I- 6,600; Process-II- 5,200, Process-III- 4,800 and Product-Z- 600

There is not stock at the beginning and end of the month.

You are required to PREPARE accounts for:

(i) Process-I, II and III

(ii) By-product process.

PROBLEM – 15 (MAY 20, PM)

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

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

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

	(₹)
Raw Material	46

Labour	14
Overheads	18
	78

Required:

i. CALCULATE the quantity (in litres) of raw material inputs during the month.

ii. CALCULATE the quantity (in litres) of normal loss expected from the process and the quantity (in litres) of abnormal loss / gain experienced in the month.

iii. CALCULATE the values of raw material, labour and overheads added to the process during the month.

iv. PREPARE the process account for the month.

PROBLEM – 16 (NOV 19)

A product is manufactured in two sequential processes, namely Process-1 and Process-2. The following information relates to Process-1. At the beginning of June 2019, there were 1,000 WIP goods (60% completed in terms of conversion cost) in the inventory, which are valued at ₹2,86,020 (Material cost: ₹2,55,000 and Conversion cost: ₹31,020). Other information relating to Process-1 for the month of June 2019 is as follows;

Cost of materials introduced- 40,000 units (₹)	96,80,000
Conversion cost added (₹)	18,42,000
Transferred to Process-2 (Units)	35,000
Closing WIP (Units) (60% completed in terms of conversion cost)	1,500

100% of materials are introduced to Process-1 at the beginning. Normal loss is estimated at 10% of input materials (excluding opening WIP).

Required:

(i) PREPARE a statement of equivalent units using the weighted average cost method and thereby calculate the following:

(ii) CALCULATE the value of output transferred to Process-2 and closing WIP.

PROBLEM – 17 (MAY 19)

Following information is available regarding process A for the month of February, 20X9: Production Record:

Units in process as on 01.02.20X9 4,000

(All materials used, 25% complete for labour and overhead)

New units introduced	16,000
Units completed	14,000

Units in process as on 28.02.20X9	6,000
(All materials used, 33-1/3% complete for labour and overhead)	
Cost Records:	
Work-in-process as on 01.02.20X9	(₹)
Materials	6,00,000
Labour	1,00,000
Overhead	1,00,000
	8,00,000
Cost during the month	
Materials	25,60,000
Labour	15,00,000
Overhead	15,00,000
	55,60,000

Presuming that average method of inventory is used, PREPARE:

(i) Statement of Equivalent Production.

(ii) Statement showing Cost for each element.

(iii) Statement of Apportionment of cost.

(iv) Process Cost Account for Process A.

ANSWERS

1.

Process-I A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Raw material used (₹ 65 × 6,500 units)	6,500	4,22,500	By Normal loss (250 units × ₹ 4)	250	1,000
To Direct wages	--	1,40,000	By Process- II A/c (₹ 100 × 6,000 units)	6,000	6,00,000
To Direct expenses (30% of ₹1,40,000)	--	42,000	By Abnormal loss (₹ 100 × 250 units)	250	25,000
To Manufacturing overhead		21,500			
	6,500	6,26,000		6,500	6,26,000

Cost per unit of completed units and abnormal loss:

Total Cost - Realisable value from normal loss ÷ Inputs – Normal Loss

₹ 6,26,000 - ₹ 1,000 ÷ 6,500units - 250 units = ₹ 6,25,000 ÷ 6,250 units = ₹ 100 ÷

Process- II A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process - I A/c	6,000	6,00,000	By Normal loss (500 units × ₹16)	500	8,000
To Direct wages	--	1,30,000	By Finished Stock A/c (₹144 × 5,500 units)	5,500	7,92,000
To Direct expenses (35% of ₹ 1,30,000)	--	45,500			
To Manufacturing overhead	--	24,500			
	6,000	8,00,000		6,000	8,00,000

Total Cost - Realisable value from normal loss ÷ Inputs – Normal Loss

800000 – 8000 ÷ 6000 units – 500 units = 792000 ÷ 5500 units = 144

Finished Goods Stock A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process II A/c	5,500	7,92,000	By Cost of Sales (₹144 × 5,000 units)	5,000	7,20,000
			By Balance c/d	500	72,000
	5,500	7,92,000		5,500	7,92,000

2.

(i) Statement of Equivalent Production

Particulars	Input quantity	Particulars	Total	Material		Processing Cost	
				%	Units	%	Units
Opening WIP	9,500	Units completed	83,000	100%	83,000	100%	83,000
Material Input	1,05,000	Normal loss (10% of 1,05,000)	10,500	-	-	-	-
		Abnormal loss (Bal. fig.)	4,500	100%	4,500	100%	4,500
		Closing WIP	16,500	100%	16,500	60%	9,900
	1,14,500		1,14,500		1,04,000		97,400

Statement of Cost for each element

Particulars	Material	Processing	Total cost
	(₹)	(₹)	(₹)
Cost of opening WIP	29,500	14,750	44,250
Cost incurred during the month	3,34,500	2,53,100	5,87,600
Total cost (A)	3,64,000	2,67,850	6,31,850
Equivalent production (B)	1,04,000	97,400	
Cost per kg of Chemical 'G' (A/B)	3.5	2.75	6.25

Alternative Presentation

Statement showing cost per kg of each statement

	(₹)	(₹)
Material	29,500 + 3,34,500/ 1,04,000	3.5
Processing cost	14,750 + 2,53,100 / 97,400	2.75
Total Cost per kg		6.25

(ii) Statement showing cost of Chemical 'G' transferred to Process II, cost of abnormal loss and cost of closing work-in- progress

	(₹)
Units transferred (60,000 × 6.25)	3,75,000
Abnormal loss (4,500 × 6.25)	28,125
Closing work in progress:	
Material (16,500 × 3.5)	57,750
Processing cost (9,900 × 2.75)	27,225

	84,975

(iii) Calculation of Incremental Profit / Loss after further processing

Particulars	(₹)	(₹)
Sales if further processed (A) (60,000 x 1.20 x ₹ 10)	7,20,000	
Calculation of cost in Process II		
Chemical transferred from Process I	3,75,000	
Add: Material cost	85,000	
Add: Process cost	50,000	
Total cost of finished stock (B)	5,10,000	
Profit, if further processed (C = A – B)		2,10,000
If sold without further processing then,		
Sales (60,000 x ₹ 9)	5,40,000	
Less: Cost of input without further processing	3,75,000	
Profit without further processing (D)		1,65,000
Incremental Profit after further processing (C – D)		45,000
Additional net profit on further processing in Process II is 45,000. Therefore, it is advisable to process further chemical 'G'.		

Alternative Presentation

Calculation of Incremental Profit / Loss after further processing

	(₹)
If 60,000 units are sold @ ₹ 9	5,40,000
If 60,000 units are processed in process II (60,000 × 1.2 × ₹ 10)	7,20,000
Incremental Revenue (A)	1,80,000
Incremental Cost: (B)	
Material Cost	85,000
Processing Cost	50,000
	1,35,000
Incremental Profit (A-B)	45,000

Additional net profit on further processing in Process II is 45,000. Therefore, it is advisable to process further chemical 'G'.

3.

Process - I Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Materials	10,000	80,000	By Normal loss (5%of 10,000)	500	2,500

To Wages	-	60,000	By Process-II A/c (₹20*×9,650units)	9,650	1,93,000
To Manufacturing OH		52,500			
To Abnormal Gain A/c (₹20*×150units)	150	3,000			
	10,150	1,95,500		10,150	1,95,500

(80000 + 60000 + 52500) – 2500 ÷ 10000 – 500 = 20

Abnormal Gain - Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Normal loss A/c	150	750	By Process-I A/c	150	3,000
To Costing P&L A/c	-	2,250			
	150	3,000		150	3,000

4.

Process-X Account

Dr. **Cr.**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Material introduced	15,000	30,000	By Normal Loss A/c [(6% of 15,000 units) x ₹ 1.1]	900	990
To Additional material	--	2,600	By Process-Y A/c (₹ 2.951* × 14,100 units)	14,100	41,610
To Direct wages	--	4,000			
To Production OH	--	6,000			
	15,000	42,600		15,000	42,600

***Cost per unit of completed units**

= Total Cost - Realisable value from normal loss/ Inputs units - Normal loss units

= ₹ 42,600 - ₹ 990/ 15,000 units - 900 units = ₹ 2.951

Dr. **Process-Y Account** **Cr.**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-X A/c	14,100	41,610	By Normal Loss A/c [(#13.44% of 14,100 units) x ₹ 2]	1,895	3,790
To Additional material	--	2,250	By Process-Z A/c (₹ 4 × 12,205 units)	12,205	48,820
To Direct wages	--	3,500			
To Production OH	--	5,250			
	14,100	52,610		14,100	52,610

#Calculation for % of wastage in process 'Y':

Let's consider number of units lost under process 'Y' = A

Now, Total Cost - Realisable value from normal loss/ Inputs units - Normal loss units = 4

₹ 52,610 - ₹ 2A/14,100 units - A = ₹ 4

₹ 52,610 - ₹ 2A = ₹ 56,400 - ₹ 4A

2A = ₹ 3,790 => A = 1,895 units

% Of wastage = 1,895 units/ 14,100 units = **13.44%**

Dr. **Process-Z Account** **Cr.**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-Y A/c	12,205	48,820	By Normal Loss A/c [(5% of 12,205 units) x ₹ 1]	610	610
To Additional material	--	2,000	By Finished Stock A/c (₹ 4.9771$ × 12,000 units)	12,000	59,726
To Direct wages	--	3,000			
To Production OH	--	4,500			
To Abnormal gain (₹ 4.9771$ × 405 units)	405	2,016			
	12,610	60,336		12,610	60,336

$Cost per unit of completed units

= Total Cost - Realisable value from normal loss/ Inputs units - Normal loss units

=₹ 58,320 - ₹ 610/12,205 units - 610 units = ₹ 4.9771

Alternative Solution

Dr. **Process-X Account** **Cr.**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Material introduced	15,000	30,000	By Normal Loss A/c [(6% of 15,000 units) x ₹ 1.1]	900	990
To Additional material	--	2,600	By Process-Y A/c (₹ 2.951* × 14,100 units)	14,100	41,610
To Direct wages	--	4,000			
To Production OH	--	6,000			
	15,000	**42,600**		**15,000**	**42,600**

***Cost per unit of completed units**

= Total Cost - Realisable value from normal loss/ Inputs units - Normal loss units

= ₹ 42,600 - ₹ 990/ 15,000 units - 900 units = ₹ 2.951

Dr. **Process-Y Account** **Cr.**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-X A/c	14,100	41,610	By Normal Loss A/c [(#13.44% of 14,100 units) x ₹ 2]	1,895	3,790
To Additional material	--	2,250	By Process-Z A/c (₹ 4 × 12,631 units)	12,631	50,524
To Direct wages	--	3,500			
To Production OH	--	5,250			
To Abnormal gain (₹ 4 × 426 units)	426	1,704			
	14,526	54,314		14,526	54,314

Working Notes:

1. Units Transferred from Process Z Account to Finished Stock = 12,000 Units i.e 95% of Inputs.

So, Input of Z or Output of Y is 12,000 x 100/95 = 12,631 Units and Normal Loss (5%) is 631 units.

2. Let's consider number of units lost under process 'Y' as:

For Normal loss = A

For Abnormal loss = B

Now, A + B = 1,469 [i.e., 14,100 – 12,631] **…(I)**

(A x ₹ 2 per unit) + (B x ₹ 4 per unit) = [52,610 – 50,524]

2A + 4B = 2,086 **…(II)**

Now, putting the values of (I) in (II),

we get, 2(1,469 – B) + 4B = 2,086

2938 – 2B + 4B = 2,086

2B = - 852 => B = - 426 units

Since, the figure of B is in negative, it is an abnormal gain of 426 units. Further,

A (i.e., normal loss) = 1,469 + 426 = 1,895 units

3. % Of wastage in Process Y Account = 1,895 units/14,100 units = **13.44%**

Dr. **Process-Z Account** **Cr.**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-Y A/c	12,631	50,524	By Normal Loss A/c [(5% of 12,631 units) x ₹ 1]	631	631
To Additional material	--	2,000	By Finished Stock A/c (₹ 4.9494$ × 12,000 units)	12,000	59,393
To Direct wages	--	3,000			
To Production OH	--	4,500			

	12,631	60,024		12,631	60,024

$Cost per unit of completed units

= Total Cost - Realisable value from normal loss/ Inputs units - Normal loss units

=₹ 60,024 - ₹ 631/12,631 units - 631 units = ₹ 4.9494

5.

i. Statement of Equivalent Production (Using FIFO method)

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & O.H.	
				%	Units	%	Units
Opening WIP	10,000	Completed and transferred to Process-II					
		- From opening WIP					
		- From fresh inputs					
Units introduced	55,000	Normal Loss	10,000	-		30	3,000
		{5% (10,000 +	33,500	100	33,500	100	33,500
		55,000 units)}	43,500		33,500		36,500
		Abnormal loss (9,500 – 3,250)	3,250	-			-
			6,250	100	6,250	60	3,750
		Closing WIP	12,000	100	12,000	90	10,800
	65,000		**65,000**		**51,750**		**51,050**

ii. Abnormal Loss A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	6,250	29,698	By Cost Ledger Control A/c	6,250	53,125
(Refer Working Note-2)			(6,250 units × ₹ 8.5)		
To Costing Profit & Loss A/c	-	23,427			
	6,250	**53,125**		**6,250**	**53,125**

Working Notes:

1. Computation of Cost per unit

Particulars	Materials	Labour	Overhead
	(₹)	(₹)	(₹)
Input costs	2,20,000	26,500	61,500
Less: Realizable value of normal	-27,625	--	--
scrap (3,250 units x ₹ 8.5)			
Net cost	1,92,375	26,500	61,500
Equivalent Units	51,750	51,050	51,050

Cost Per Unit	**3.7174**	**0.5191**	**1.2047**

Total cost per unit = ₹ (3.7174 + 0.5191 + 1.2047) = ₹ 5.4412

2. Valuation of Abnormal Loss

	(₹)
Materials (6,250 units × ₹ 3.7174)	23,233.75
Labour (3,750 units × ₹ 0.5191)	1,946.63
Overheads (3,750 units × ₹ 1.2047)	4,517.62
	29,698

6.

i) Statement of Equivalent Production (Weighted Average method)

Particulars	**Input Units**	**Particulars**	**Output Units**	**Equivalent Production**			
				Material		**Labour & O.H.**	
				%	**Units**	**%**	**Units**
Opening WIP	3,000	Completed and transferred to Process-II	36,000	100	36,000	100	36,000
Units introduced	42,000	Normal Loss (4% of 45,000 units)	1,800	--	--	--	--
		Abnormal loss (Balancing figure)	3,000	100	3,000	70	2,100
		Closing WIP	4,200	100	4,200	50	2,100
	45,000		**45,000**		**43,200**		**40,200**

ii) Statement showing cost for each element

Particulars	**Materials (₹)**	**Labour (₹)**	**Overhead (₹)**	**Total (₹)**
Cost of opening work- in-process	1,80,500	32,400	90,000	3,02,900
Cost incurred during the month	36,04,000	4,50,000	15,18,000	55,72,000
Less: Realizable Value of normal scrap (₹ 62.50 × 1,800 units)	-1,12,500	--	--	-1,12,500
Total cost: (A)	**36,72,000**	**4,82,400**	**16,08,000**	57,62,400
Equivalent units: (B)	43,200	40,200	40,200	
Cost per equivalent unit: (C) = (A ÷ B)	**85**	**12**	**40**	137

Statement of Distribution of cost

Particulars	**Amount (₹)**	**Amount (₹)**
1.Value of units completed and transferred: (36,000 units × ₹ 137)		49,32,000
2.Value of Abnormal Loss:		
- Materials (3,000 units × ₹ 85)	2,55,000	
- Labour (2,100 units × ₹ 12)	25,200	

- Overheads (2,100 units × ₹ 40)	84,000	3,64,200
3. Value of Closing W-I-P:		
- Materials (4,200 units × ₹ 85)	3,57,000	
- Labour (2,100 units × ₹ 12)	25,200	
- Overheads (2,100 units × ₹ 40)	84,000	4,66,200

iii) Process-I A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W.I.P:					
- Materials	3,000	1,80,500	By Normal Loss (₹ 62.5 × 1,800 units)	1,800	1,12,500
- Labour	--	32,400			
- Overheads	--	90,000			
To Materials introduced	42,000	36,04,000	By Abnormal loss	3,000	**3,64,200**
To Labour		4,50,000	By Process-I A/c	36,000	49,32,000
To Overheads		15,18,000	By Closing WIP	4,200	**4,66,200**
	45,000	**58,74,900**		45,000	**58,74,900**

iv) Normal Loss A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	1,800	1,12,500	By Cost Ledger Control A/c	1,800	1,12,500
	1,800	**1,12,500**		1,800	**1,12,500**

v) Abnormal Loss A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	3,000	3,64,200	By Cost Ledger Control A/c (₹ 62.5 × 3,000 units)	3,000	**1,87,500**
			By Costing Profit & Loss A/c (Bal. Figure)		**1,76,700**
	3,000	**3,64,200**		3,000	**3,64,200**

7.

Process-1 Account

Particulars	Units	Total (₹)	Particulars	Units	Total (₹)
To Raw Material Consumed	10,000	7,50,000	By Normal Loss A/c @ 13.5	500	6,750
To Direct Wages	--	3,00,000	By Process 2 @ 133.5	9,000	12,01,500

To Direct Expenses	--	1,50,000	By Abnormal Loss @ 133.5	500	66,750
Manufacturing Overheads		75,000			
	10,000	12,75,000		10,000	12,75,000

Cost per unit of completed units and abnormal loss:

= ₹12,75,000 - ₹ 6,750/10,000units - 500units = ₹ 133.5

Process-2 Account

Particulars	Units	Total (₹)	Particulars	Units	Total (₹)
To Process-I A/c	9,000	12,01,500	By Normal Loss A/c @ 145	900	1,30,500
To Direct Wages	--	5,60,000	By Finished Stock A/c [bal fig]	8,200	21,04,667
To Direct Expenses	--	3,64,000			
To Manufacturing Overheads	--	84,000			
To Abnormal gain (₹ 256.67 × 100 units	100	25,667			
	9,100	22,35,167		9,100	22,35,167

Cost per unit of completed units and abnormal gain:

= ₹ 22,09,500 - ₹130500/8,100units = ₹ 256.67

Finished Goods A/c

Particulars	Units	Total (₹)	Particulars	Units	Total (₹)
To Process II A/c	8,200	21,04,667	By Cost of Sales	8,000	20,53,333
			By Balance c/d	200	51,334
	8,200	**21,04,667**		**8,200**	**21,04,667**

Normal Loss A/c

Particulars	Units	Total (₹)	Particulars	Units	Total (₹)
To Process I	500	6,750	By abnormal Gain II	100	14,500
To Process II	900	1,30,500	By Cash	500	6,750
			By Cash	800	1,16,000
	1400	1,37,250		1400	1,37,250

Abnormal Loss A/c

Particulars	Units	Total (₹)	Particulars	Units	Total (₹)
To Process I	500	66,750	By Cost Ledger Control A/c	500	6,750

			By Costing P& L A/C (Abnormal Loss)		60,000
		66,750			66,750

Abnormal Gain A/c

Particulars	Units	Total (₹)	Particulars	Units	Total (₹)
Normal Loss A/c @ 145	100	14,500	Process II	100	25,667
Costing P & L A/C		11,167			
	100	25,667		100	25,667

8.

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	5,000	5,000	_	Process B A/c	**28,800**	**21,600**	**7,200**
Direct materials	9,000	9,000	_				
Direct wages	5,000	5,000	_				
	19,000	19,000	_				
Less: Closing stock	-2,000	-2,000	_				
Prime Cost	17,000	17,000	_				
Overheads	4,600	4,600	_				
Process Cost	**21,600**	**21,600**	**_**				
Profit (33.33% of total cost)	**7,200**	**-**	**7,200**				
	28,800	21,600	7,200		28,800	21,600	7,200

Process-B A/c

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	5,500	4,500	1,000	Finished stock A/c	**61,675**	**41,550**	**20,125**
Process A A/c	28,800	21,600	7,200				
Direct materials	9,500	9,500	_				
Direct wages	6,000	6,000	_				
	49,800	41,600	8,200				
Less: Closing stock	**-2,490**	**-2,080**	**-410**				
Prime Cost	**47,310**	**39,520**	7,790				
Overheads	2,030	2,030	_				
Process Cost	49,340	41,550	7,790				
Profit (25% of total cost)	**12,335**	**-**	**12,335**				

	61,675	41,550	20,125		61,675	41,550	20,125

Finished Stock A/c

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	10,000	6,000	4,000	Costing P&L A/c	**75,000**	**44,181**	**30,819**
Process B A/c	61,675	41,550	20,125				
	71,675	47,550	24,125				
Less: Closing stock	**-5,000**	**-3,369**	**-1,631**				
COGS	66,675	44,181	22,494				
Profit	**8,325**	-	**8,325**				
	75,000	44,181	30,819		75,000	44,181	30,819

9.

Statement of Equivalent Production Units (Under FIFO Method)

Particulars	Input units	Particulars	Output units	Equivalent Production	
				(%)	Equivalent units
Opening W-I-P	3,000	From opening W-I-P	3,000	30	900
Units introduced	17,000	From fresh inputs	12,000	100	12,000
		Units completed (Transferred to next process)	15,000		
		Normal Loss {12% (3,000 + 17,000 units)}	2,400	--	--
		Closing W-I-P	2,200	80	1760
		Abnormal loss (Balancing figure)	400	100	400
	20,000		11,000		15,060

Computation of cost per equivalent production unit:

Cost of the Process (for the period)	₹ 33,12,720
Less: Scrap value of normal loss (₹ 50 × 2,400 units)	(₹ 1,20,000)
Total process cost	**₹ 31,92,720**

10.

Process- P Account

Particulars	Kg.	Amount (₹)	Particulars	Kg.	Amount (₹)

To Input	10,000	50,000	By Normal wastage (1,000 kg. × ₹ 1)	1,000	1,000
To Direct Material	---	38,000	By Process- Q (9,000 kg. × ₹ 15.50)	9,000	1,39,500
To Direct Labour	---	30,000			
To Production OH (₹ 90,000 × 3/12)	---	22,500			
	10,000	1,40,500		10,000	1,40,500

Cost per unit = ₹1,40,500 -₹1,000/ 10,000kg.-1,000kg. = ₹ 15.50

Process- Q Account

Particulars	Kg.	Amount (₹)	Particulars	Kg.	Amount (₹)
To Process-P A/c	9,000	1,39,500	By Normal wastage (900 kg. × ₹ 1)	900	900
To Direct Material	---	42,500	By Process- Q (8,200 kg. × ₹ 31)	8,200	2,54,200
To Direct Labour	---	40,000			
To Production OH (₹ 90,000 × 4/12)	---	30,000			
To Abnormal Gain (100 kg. × ₹ 31)	100	3,100			
	9,100	2,55,100		9,100	2,55,100

Cost per unit = ₹ 2,52,000 -₹ 900/9,000kg.- 900kg. = ₹ 31

Process- R Account

Particulars	Kg.	Amount (₹)	Particulars	Kg.	Amount (₹)
To Process-Q A/c	8,200	2,54,200	By Normal wastage (820 kg. × ₹ 1)	820	820
To Direct Material	---	42,880	By Abnormal loss (80 kg. × ₹ 52)	80	4,160
To Direct Labour	---	50,000	By Finished Goods (7,300 kg. × ₹52)	7,300	3,79,600
To Production OH (₹ 90,000 × 5/12)	---	37,500			
	8,200	3,84,580		8,200	3,84,580

Cost per unit = ₹3,84,580 -₹ 820/8,200kg.- 820kg. = ₹ 52

Calculation of selling price per unit of end product:

Cost per unit ₹ 52.00

Add: Profit 25% on selling price i.e., 1/3rd of cost ₹ 17.33

Selling price per unit **₹ 69.33**

11.

Process A Account

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Materials To Wages	1,000	20,000	By Weight Loss By	20	--- 160
To Direct Expenses		4,000	Scrap	80	16,200
		3,160	By Process B	540	10,800
			By Warehouse	360	
Total	**1,000**	**27,160**	**Total**	**1,000**	**27,160**

Cost per Tonne = 27160 – 160 ÷ 1000 – 20 – 80 = 30 per ton

Process B Account

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Process A To	540	16,200	By Weight Loss By	16	--- 256
Materials To Wages	260	3,900	Scrap	64	12,600
To Direct Expenses		3,000	By Process C	360	12,600
		2,356	By Warehouse	360	
Total	800	25,456	Total	800	25,456

Cost per Tonne = 25456 – 256 ÷ 800 – 16 – 64 = 35 per ton

Process C Account

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Process B To	360	12,600	By Weight Loss By	10	--- 240
Materials To Wages	140	1,400	Scrap	40	17,100
To Direct Expenses		2,000	By Warehouse	450	
		1,340			
Total	500	17,340	Total	500	17,340

12.

i. Statement of equivalent production (Average cost method)

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & O.H.	
				%	Units	%	Units
Opening WIP	8,000	Completed and transferred	28,000	100	28,000	100	28,000
Units introduced	32,000	Closing WIP	12,000	100	12,000	1/3rd	4,000
	40,000		40,000		40,000		32,000

ii. Statement showing cost for each element

Particulars	Materials	Labour	Overhead	Total
	(₹)	(₹)	(₹)	(₹)
Cost of opening work-in- process	1,20,000	20,000	20,000	1,60,000
Cost incurred during the month	5,12,000	3,00,000	3,00,000	11,12,000
Total cost: (A)	6,32,000	3,20,000	3,20,000	12,72,000
Equivalent units: (B)	40,000	32,000	32,000	
Cost per equivalent unit: (C) = (A ÷ B)	15.8	10	10	35.8

iii. Statement of apportionment of cost

Particulars	Amount (₹)	Amount (₹)
1. Value of units completed and transferred (28,000 units × ₹ 35.8)		10,02,400
2. Value of Closing W-I-P:		
- Materials (12,000 units × ₹ 15.8)	1,89,600	
- Labour (4,000 units × ₹ 10)	40,000	
- Overheads (4,000 units × ₹ 10)	40,000	2,69,600

iv. Process-I Cost Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W-I-P	8,000	1,60,000	By Completed units	28,000	10,02,400
To Materials	32,000	5,12,000	By Closing W-I-P	12,000	2,69,600
To Labour	--	3,00,000			
To Overhead	--	3,00,000			
	40,000	12,72,000		40,000	12,72,000

13.

Process I

Statement of Equivalent Production and Cost

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%)	Units	(%)	Units	(%)	Units
40,000	Completed	30,000	100	30,000	100	30,000	100	30,000
	Closing WIP	10,000	100	10,000	50	5,000	50	5,000
40,000		40,000		40,000		35,000		35,000

Particulars	Materials	Labour	Overhead	Total
Cost incurred (₹)	3,00,000	3,50,000	2,45,000	8,95,000
Equivalent units	40,000	35,000	35,000	

Cost per equivalent unit (₹)	7.5	10	7	24.5

Process-I Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Materials	40,000	3,00,000	By Process-II A/c (30,000 units × ₹24.5)	30,000	7,35,000
To Labour		3,50,000	By Closing WIP*	10,000	1,60,000
To Overhead		2,45,000			
	40,000	8,95,000		40,000	8,95,000

* (Material 10,000 units × ₹ 7.5) + (Labour 5,000 units × ₹ 10) + (Overheads 5,000 units × ₹7)

= ₹ 75,000 + ₹ 50,000 + ₹ 35,000 = ₹ 1,60,000

Process II

Statement of Equivalent Production and Cost

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%)	Units	(%)	Units	(%)	Units
30,000	Completed	28,000	100	28,000	100	28,000	100	28,000
	Normal loss	200		--		--		--
	Closing WIP	1,800	100	1,800	25	450	25	450
30,000		30,000		29,800		28,450		28,450

Particulars	Materials	Labour	Overhead	Total
Process-I Cost	7,35,000	--	--	7,35,000
Cost incurred (₹)	--	71,125	85,350	1,56,475
Equivalent units	29,800	28,450	28,450	--
Cost per equivalent unit (₹)	24.6644	2.5	3	30.1644

Process-II Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	30,000	7,35,000	By Normal loss A/c	200	--
To Packing Material	--	80,000	By Finished Goods Stock A/c	28,000*	9,24,604
To Direct Wages	--	71,125	By Closing WIP	1,800**	46,871
To Factory Overhead	--	85,350			
	30,000	9,71,475		30,000	9,71,475

* 28,000 × ₹ 30.1644 = ₹ 8,44,603 + ₹ 80,000 (Packing Material Cost) = ₹ 9,24,604

** 1,800 units × ₹ 24.6644 + 450 units × (₹ 2.5 + ₹3) = ₹ 46,871

14.

Process-I A/c

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Materials	7,000	1,40,000	By Normal loss (5% of 7,000)	350	3,500
To Other materials	-	62,000	By Process-II*	6,600	3,35,955
To Direct wages	-	42,000	By Abnormal loss*	50	2,545
To Direct expenses	-	14,000			
To Production OH (200% of ₹42,000)	-	84,000			
	7,000	3,42,000		7,000	3,42,000

* ₹(3,42,000 - 3,500)/(7,000 - 350)units = ₹50.9022

Process-II A/c

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Process-I A/c	6,600	3,35,955	By Normal loss (10% of 6,600)	660	6,600
To Other materials	-	1,36,000	By Process-III**	5,200	5,63,206
To Direct wages	-	54,000	By Abnormal loss**	740	80,149
To Direct expenses	-	16,000			
To Production OH (200% of ₹54,000)	-	1,08,000			
	6,600	6,49,955		6,600	6,49,955

₹ (6,49,955 - 6,600)/(6,600 - 660) units = ₹108.3089

Process-III A/c

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Process-I A/c	5,200	5,63,206	By Normal loss (5% of 5,200)	260	2,600
To Other materials	-	84,200	By Product-X***	4,800	8,64,670
To Direct wages	-	48,000			
To Direct expenses	-	14,000	By Product-Z# (₹35×600)	600	21,000
To Production OH (200% of ₹48,000)	-	96,000			
To Abnormal gain***	460	82,864			
	5,660	8,88,270		5,660	8,88,270

*** ₹ (8,05,406 - 2,600 / 21,000)/(5,200 / 260 - 600) units = ₹180.1396

Realisable value = ₹135 – (85+15) = ₹35

By-Product Process A/c

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Process-III A/c	600	21,000	By Product-Z	600	81,000
To Processing cost	-	51,000			
To Selling expenses	-	9,000			
	600	81,000		600	81,000

15.

i) Calculation of Raw Material inputs during the month:

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

ii) Calculation of Normal Loss and Abnormal Loss/Gain

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

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

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

Workings:

Statement of Equivalent Units (litre):

				Equivalent Production					
Input Details	Units	Output details	Units	Material		Labour		Overheads	
				Units	(%)	Units	(%)	Units	(%)
Opening WIP	1,600	Units completed:							
Units introduced	8,320	- Opening WIP	1,600	--	--	480	30	640	40
		- Fresh inputs	6,800	6,800	100	6,800	100	6,800	100
		Normal loss	832	--	--	--	--	--	--
		Abnormal loss	368	368	100	368	100	368	100

		Closing WIP	320	320	100	96	30	64	20
	9,920		9,920	7,488		7,744		7,872	

iv) Process Account for the month

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

16.

i. Statement of Equivalent Production

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Conversion cost	
				%	Units	%	Units
Opening WIP	1,000	Completed and transferred to Process-2	35,000	100	35,000	100	35,000
Units introduced	40,000	Normal Loss (10% of 40,000)	4,000	--	--	--	--
		Abnormal loss (Balancing figure)	500	100	500	60	300
		Closing WIP	1,500	100	1,500	60	900
	41,000		41,000		37,000		36,200

ii. Calculation of value of output transferred to Process-2 & Closing WIP

	Amount (₹)	Amount (₹)
1Value of units completed and transferred		1,12,08,750
(35,000 units × ₹ 320.25) (Refer working note)		
3.Value of Closing W-I-P:		
- Materials (1,500 units × ₹ 268.51)	4,02,765	
- Conversion cost (900 units × ₹ 51.74)	46,566	4,49,331

Workings:

Cost for each element

Particulars	Materials (₹)	Conversion (₹)	Total (₹)
Cost of opening work-in-process	2,55,000	31,020	2,86,020
Cost incurred during the month	96,80,000	18,42,000	1,15,22,000
Total cost: (A)	99,35,000	18,73,020	1,18,08,020

Equivalent units: (B)	37,000	36,200	
Cost per equivalent unit: (C) = (A ÷ B)	268.51	51.74	320.25

17.

i. Statement of Equivalent Production (Average cost method)

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%*)	Units**	(%)*	Units**	(%)*	Units**
20,000	Completed	14,000	100	14,000	100	14,000	100	14,000
	WIP	6,000	100	6,000	33-1/3	2,000	33-1/3	2,000
20,000		20,000		20,000		16,000		16,000

***Percentage of completion ** Equivalent units**

ii. Statement showing Cost for each element

Particulars	Materials	Labour	Overhead	Total
Cost of opening work-in- progress (₹)	6,00,000	1,00,000	1,00,000	8,00,000
Cost incurred during the month (₹)	25,60,000	15,00,000	15,00,000	55,60,000
Total cost (₹) : (A)	31,60,000	16,00,000	16,00,000	63,60,000
Equivalent units : (B)	20,000	16,000	16,000	
Cost per equivalent unit (₹) : C= (A ÷ B)	158	100	100	358

iii. Statement of Apportionment of cost

	(₹)	(₹)
Value of output transferred: (A) (14,000 units × ₹ 358)		50,12,000
Value of closing work-in-progress: (B)		
Material (6,000 units × ₹158)	9,48,000	
Labour (2,000 units × ₹ 100)	2,00,000	
Overhead (2,000 units × ₹ 100)	2,00,000	13,48,000
Total cost : (A + B)		63,60,000

iv. Process - A Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening WIP	4,000	8,00,000	By Completed units	14,000	50,12,000
To Materials	16,000	25,60,000	By Closing WIP	6,000	13,48,000
To Labour		15,00,000			
To Overhead		15,00,000			
	20,000	63,60,000		20,000	63,60,000

CHAPTER 10: JOINT AND BY PRODUCT

PART – A: ICAI PAST EXAM QUESTIONS

PROBLEM – 1 [MAY 23 – 10 Marks]

ABC Company produces a Product 'X' that passes through three processes: R, S and T. Three types of raw materials, viz., J, K, and L are used in the ratio of 40:40:20 in process R. The output of each process is transferred to next process. Process loss is 10% of total input in each process. At the stage of output in process T, a by-product 'Z' is emerging and the ratio of the main product 'X' to the by-product 'Z' is 80:20. The selling price of product 'X' is ₹ 60 per kg.

The company produced 14,580 kgs of product 'X'

Material price : Material J @ ₹ 15 per kg; Material K @ ₹ 9 per kg. Material L@ ₹ 7per kg

Process costs are as follows:

Process	Variable cost per kg (₹)	Fixed cost of Input (₹)
R	5.00	42,000
S	4.50	5,000
T	3.40	4,800

The by-product 'Z' cannot be processed further and can be sold at ₹ 30 per kg at the split- off stage. There is no realizable value of process losses at any stage.

Required:

Present a statement showing the apportionment of joint costs on the basis of the sales value of product 'X' and by-product 'Z' at the split- off point and the profitability of product 'X' and by-product 'Z.

PROBLEM – 2 [NOV 22 – 5 Marks]

ASR Ltd mainly produces Product 'L' and gets a by-Product 'M' out of a joint process. 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 product. During the month of October 2022, company incurred joint production costs of ₹ 4,00,000. The main Product 'L' is not marketable at the split off point. Thus, it has to be processed further. Details of company's operation are as under:

Particulars	Product L	By- Product M
Production (units) Selling price per kg Further processing cost	10,000 ₹ 45 ₹ 1,01,000	200 ₹ 5 -

You are required to find out:

(i) Profit earned from Product 'L'.

(ii) Selling price per kg of product 'L', if the company wishes to earn a profit of ₹ 1,00,000 from the above production.

PROBLEM – 3 [MAY 22 – 5 Marks]

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 the month of April, 2022.

Cost incurred up to separation point: ₹ 10,000

	Product X	Product Y	Product Z
Output (in Litre)	100	70	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:

(iii) 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.

(iv) Advise the management whether, on purely financial consideration, the three products are to be processed further or not.

PROBLEM – 4 (JUL 21 – 5 Marks)

OPR Ltd. purchases crude vegetable oil. It does refine 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. 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.

PROBLEM – 5 (JAN 21 – 10 Marks)

Mayura Chemicals Ltd buys a particular raw material at ₹ 8 per litre. At the end of the processing in Department-1, this raw material splits off into products X, Y and Z. Product X is sold at the split-off point, with no further processing. Products Y and Z require further processing before they can be sold.

Product Y is processed in Department-2, and Product Z is processed in Department-3. Following is a summary of the costs and other related data for the year 2019-20:

Particulars	**Department**		
	1	**2**	**3**
Cost of Raw Material	₹ 4,80,000	–	–
Direct Labour	₹ 70,000	₹ 4,50,000	₹ 6,50,000
Manufacturing Overhead	₹ 48,000	₹ 2,10,000	₹ 4,50,000
Products	**X**	**Y**	**Z**
Sales (litres)	10,000	15,000	22,500
Closing inventory (litres)	5,000	–	7,500
Sale price per litre (₹)	30	64	50

There were no opening and closing inventories of basic raw materials at the beginning as well as at the end of the year. All finished goods inventory in litres was complete as to processing. The company uses the Net- realisable value method of allocating joint costs.

You are required to prepare:

i. Schedule showing the allocation of joint costs.

ii. Calculate the Cost of goods sold of each product and the cost of each item in Inventory.

iii. A comparative statement of Gross profit.

PROBLEM – 6 (Nov 20 – 5 Marks)

A company's plant processes 6,750 units of a raw material in a month to produce two products 'M' and 'N'.

The process yield is as under:

Product M	80%
Product N	12%
Process Loss	8%

The cost of raw material is ₹ 80 per unit.

Processing cost is ₹ 2,25,000 of which labour cost is accounted for 66%. Labour is chargeable to products 'M' and 'N' in the ratio of 100: 80.

Prepare a Comprehensive Cost Statement for each product showing:

(i) Apportionment of joint cost among products 'M' and 'N' and

(ii) Total cost of the products 'M' and 'N'.

PROBLEM – 7 (Nov 19 – 5 Marks)

A Factory produces two products, 'A' and 'B' from a single process. The joint processing costs during a particular month are:

Direct Material	₹ 30,000

Direct Labour	₹ 9,600
Variable Overheads	₹ 12,000
Fixed Overheads	₹ 32,000

Sales: A- 100 units@ ₹ 600 per unit; B – 120 units @ ₹ 200 per unit.

Required:

i. Apportion joints costs on the basis of:

a. Physical Quantity of each product.

b. Contribution Margin method, and

ii. Determine Profit or Loss under both the methods.

PROBLEM – 8 (May 19 – 5 Marks)

A Factory is engaged in the production of chemical Bomex and in the course of its manufacture a by-product Cromex is produced which after further processing has a commercial value. For the month of April 2019, the following are the summarised cost data:

	Joint Expenses (₹)	**Separate Expenses (₹)**	
		Bomex	**Cromex**
Materials	1,00,000	6,000	4,000
Labour	50,000	20,000	18,000
Overheads	30,000	10,000	6,000
Selling Price per unit		100	40
Estimated profit per unit on sale of Cromex			5
Number of units produced		2,000 units	2,000 units

The factory uses net realisable value method for apportionment of joint cost to by-products. You are required to prepare statements showing:

i. Joint cost allocable to Cromex

ii. Product wise and overall profitability of the factory for April 2019.

PART – B: (REVISION TEST PAPERS)

PROBLEM – 9 [NOV 23]

A factory producing article A also produces a by-product B which is further processed into finished product. The joint cost of manufacture is given below:

Material	₹ 5,000
Labour	₹ 3,000
Overhead	₹ 2,000
	₹ 10,000

Subsequent cost in ₹ are given below:

	A	B
Material	3,000	1,500
Labour	1,400	1,000
Overhead	600	500
	5,000	3,000

Selling prices are A - ₹ 16,000; B ₹ 8,000

Estimated profit on selling prices is 25% for A and 20% for B.

Assume that selling and distribution expenses are in proportion of sales prices. Show how you would apportion joint costs of manufacture and prepare a statement showing cost of production of A and B.

PROBLEM – 10 [MAY 23]

Key Pee Limited produces and sells the following products:

Products	Units	Selling price at split-off point (₹)	Selling price after further processing (₹)
A	500000	42.5	62.5
B	75000	32.5	42.5
C	62500	20	30
D	50000	25	-
E	187500	35	50

Cost of raw material ₹ 89,75,000 and other manufacturing ex-penses cost ₹ 13,67,500 in the manufacturing process which are absorbed on the products on the basis of their 'Net realisable value'. The further processing costs of A, B, C and E are ₹ 31,25,000;

₹ 3,75,000; ₹ 1,25,000 and ₹ 3,75,000 respectively. Fixed costs are ₹ 11,82,500. You are required to PREPARE the following in respect of the coming year:

(a) Statement showing income forecast of the company assuming that none of its products are to be further processed.

(b) Statement showing income forecast of the company assuming that products A, B, C and E are to be processed further.

PROBLEM – 11 [NOV 22]

JP Ltd. uses joint production process that produces three products at the split -off point. Joint production costs during the month of July, 2022 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.

PROBLEM – 12 [NOV 21]

A company produces two joint products A and B from the same basic materials. The processing is completed in three departments.

Materials are mixed in Department I. At the end of this process, A and B get separated.

After separation, A is completed in the Department II and B in Department III. During a period, 4,00,000 kg of raw material was processed in Department I at a total cost of ₹ 17,50,000, and the resultant 50% becomes A and 40% becomes B and 10% normally lost in processing.

In Department II, 1/5th of the quantity received from Department I is lost in processing. A is further processed in Department II at a cost of ₹ 2,60,000.

In Department III, further new material is added to the material received from Department I and weight mixture is doubled, there is no quantity loss in the department III. Further processing cost (with material cost) in Department III is ₹ 3,00,000.

The details of sales during the said period are:

	Product A	Product B
Quantity sold (kg)	1,50,000	3,00,000
Sales price per kg (₹)	10	4

There were no opening stocks. If these products sold at split -off-point, the selling price of A and B would be ₹ 8 and ₹ 4 per kg respectively.

Required:

i. PREPARE a statement showing the apportionment of joint cost to A and B in proportion of sales value at split off point.

ii. PREPARE a statement showing the cost per kg of each product indicating joint cost, processing cost and total cost separately.

iii. PREPARE a statement showing the product wise profit for the year.

iv. On the basis of profits before and after further processing of product A and B, give your COMMENT that products should be further processed or not.

PROBLEM – 13: (NOV 20)

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

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

The selling prices quoted here are expected to remain the same in the coming year. During 2019-20, the selling prices of the items and the total amounts sold were:

X – 186 tons sold for ₹ 3,000 per ton

Y – 527 tons sold for ₹ 2,250 per ton

Z – 736 tons sold for ₹ 1,500 per ton

The total joint manufacturing costs for the year were ₹ 12,50,000. An additional ₹ 6,20,000 was spent to finish product Z.

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

X	180 tons
Y	60 Tons
Z	25 tons

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

Required:

COMPUTE the cost of inventories of X, Y and Z and cost of goods sold for year ended March 31, 2020, using Net realizable value (NRV) method of joint cost allocation.

PROBLEM – 14 (MAY 19)

A company processes a raw material in its department 1 to produce three products, viz. A, B and X at the same split-off stage. During a period 1,80,000 kgs of raw materials were processed in Department 1 at a total cost of ₹ 12,88,000 and the resultant output of A, B and X were 18,000 kgs, 10,000 kgs and 54,000 kgs respectively. A and B were further processed in Department 2 at a cost of ₹ 1,80,000 and ₹ 1,50,000 respectively. X was further processed in Department 3 at a cost of

₹1,08,000. There is no waste in further processing. The details of sales affected during the period were as under:

Quantity Sold (kgs.)	17,000	5,000	44,000
Sales Value (₹)	12,24,000	2,50,000	7,92,000

There were no opening stocks. If these products were sold at split-off stage, the selling prices of A, B and X would have been ₹ 50, ₹ 40 and ₹ 10 per kg respectively.

Required:

i. PREPARE a statement showing the apportionment of joint costs to A, B and X.

ii. PREPARE a statement showing the cost per kg of each product indicating joint cost and further processing cost and total cost separately.

iii. PREPARE a statement showing the product wise and total profit for the period.

iv. DECIDE with supporting calculations as to whether any or all the products should be further processed or not

ANSWERS

1.

Working Notes:

1. Calculation of Input of Raw Material

Let assume total raw material in Process R be	100%
∴ Output of Process T will be equal to:	
Input R	100%
- 10% Normal Loss	₹ 10
Input S	₹ 90%
- 10% Normal loss	₹ 9
Input T	81%
- 10% Normal loss	₹ 8.1
Output of T	72.9
Actual output of X	14,580 units
Which is 80% of the total output	

∴ Output of Process T

= 14580 / 80% = 18,225

∴ Input of Process R = 18225 /72.9% = 25,000 kgs

Alternative presentation for Calculation of Input in Process R, S and T Working notes:

Process T (Kg.)			
To Input (Transfer from process S)	20,250	By Normal loss	2,025
		By Output Product X	14,580
		By output of by-product Z	3,645
	20,250		20,250

Process S (kg.)			
To Input (Transfer from process S)	22,500	By Normal loss (10%)	2,250
		By Transfer to process T	20,250
	22,500		22,500

Process R (kg.)			
To Input	25,000	By Normal loss (10%)	2,500
		By Transfer to process S	22,500
	25,000		25,000

2. Calculation of Joint Cost

Process	Inputs	Variable cost per kg	Variable cost	Fixed Cost	Total Cost

		₹	₹	₹	₹
R	25,000	5	1,25,000	42,000	1,67,000
S	22,500	4.5	1,01,250	5,000	1,06,250
T	20,250	3.4	68,850	4,800	73,650
					3,46,900

Raw material J 10000 x 15 ₹ 1,50,000
K 10000 x 9 ₹ 90,000
L 5000 x 7 ₹ 35,000
2,75,000

Add: Processing cost (as above) ₹ 3,46,900

Total Joint Cost 6,21,900

(i) Statement showing apportionment of Joint Cost

Particulars	Product X	By-Product Z	Total
Units	14,580	3,645	
Selling price (₹)	60	30	
Sales Value (₹)	8,74,800	1,09,350	9,84,150
(₹ 6,21,900 to apportioned in ratio of sales value at split off point)	5,52,800	69,100	6,21,900

(ii) Statement of Profitability

Particulars	Product X	By-Product Z	Total
Sales Value	8,74,800	1,09,350	9,84,150
Joint Cost (As apportioned above)	(5,52,800)	(69,100)	(6,21,900)
Profit	3,22,000	40,250	3,62,250

2.

(a) Calculation of profit on product 'L'

Particular	₹
Sales	4,50,000
Less: Further processing cost	(1,01,000)
	3,49,000
Less: Joint Production Cost*	(3,99,000)
loss	(50,000)

*Joint Production Cost = [4,00,000 – (200 × 5)] = 3,99,000

(b) Calculation of desired selling price of product 'L'

Desired selling price= Desired Profit + Total Cost ÷ units measured

1,00,000+1,01,000+3,99,000 ÷ 10000 units = ₹ 60 per kg.

3.

(a) 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	

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.

4.

	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 "Profits if further processing", one observes that OPR Ltd. is earning more after further processing of Product S only i.e., ₹ 20,000. Hence, for maximizing profits, only Product S should be further processed and Product P, N and A should be sold at split-off point.

Working Note:

Apportionment of joint costs on the basis of Sales Value at split -off point

Apportioned joint cost

= Total joint cost/ Total Sales value at split-off point x 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

Share of S in joint cost = ₹ 40,000/₹ 80,000 x ₹ 20,000 = ₹ 10,000

Share of P in joint cost = ₹ 40,000/₹ 80,000 x ₹ 12,000 = ₹ 6,000

Share of N in joint cost = ₹ 40,000/₹ 80,000 x ₹ 28,000 = ₹ 14,000

Share of A in joint cost = ₹ 40,000/₹ 80,000 x ₹ 20,000 = ₹ 10,000

Alternative Solution

Decision for further processing of Product S, P and N

Products	**S (₹)**	**P (₹)**	**N (₹)**
Sales revenue after further processing	1,20,000	40,000	48,000
Less: sales value at split-off point	20,000	12,000	28,000
Incremental Sales Revenue	**1,00,000**	**28,000**	**20,000**
Less: Further Processing cost	80,000	32,000	36,000
Profit/ loss arising due to further processing	**20,000**	**(-)4,000**	**(-)16,000**

Suggested Product to be further processed for maximising profits:

On comparing the figures of "Profit if no further processing" and "Profits if further processing", one observes that OPR Ltd. is earning more after further processing of Product S only i.e., ₹ 20,000. Hence, for maximizing profits, only Product S should be further processed and Product P, N and A should be sold at split-off point.

5.

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

	Products			Total (₹)
	X (₹)	Y (₹)	Z (₹)	
Final sales value of total production (Working Note 1)	4,50,000 (15,000 x ₹ 30)	9,60,000 (15,000 x ₹ 64)	15,00,000 (30,000 x ₹ 50)	29,10,000
Less: Additional cost	--	6,60,000	11,00,000	17,60,000
Net realisable value (at split-off point)	4,50,000	3,00,000	4,00,000	11,50,000
Joint cost allocated (Working Note 2)	2,34,000	1,56,000	2,08,000	5,98,000

(ii) Calculation of Cost of goods sold and Closing inventory

	Products			Total (₹)
	X (₹)	Y (₹)	Z (₹)	
Allocated joint cost	2,34,000	1,56,000	2,08,000	5,98,000
Add: Additional costs	--	6,60,000	11,00,000	17,60,000
Cost of goods sold (COGS)	2,34,000	8,16,000	13,08,000	23,58,000
Less: Cost of closing inventory (Working Note 1)	78,000 (COGS × 100/3%)	--	3,27,000 (COGS × 25%)	4,05,000
Cost of goods sold	1,56,000	8,16,000	9,81,000	19,53,000

(iii) Comparative Statement of Gross Profit

	Products			Total (₹)
	X (₹)	Y (₹)	Z (₹)	
Sales revenue	3,00,000 (10,000 x ₹ 30)	9,60,000 (15,000 x ₹ 64)	11,25,000 (22,500 x ₹ 50)	23,85,000
Less: Cost of goods sold	1,56,000	8,16,000	9,81,000	19,53,000
Gross Profit	1,44,000	1,44,000	1,44,000	4,32,000

Working Notes:

1. Total production of three products for the year 2019-2020

Products	Quantity sold in litres	Quantity of closing inventory in litres	Total production	Closing inventory percentage (%)
(1)	(2)	(3)	(4) = [(2) + (3)}	(5) = (3)/ (4)
X	10,000	5,000	15,000	100/3

Y	15,000	--	15,000	--
Z	22,500	7,500	30,000	25

2. Joint cost apportioned to each product:

= Total Joint cost / Total Net Realisable Value x Net Realisable Value of each product

Joint cost of product X = ₹ 5,98,000/₹ 11,50,000 x ₹ 4,50,000 = ₹ 2,34,000

Joint cost of product Y = ₹ 5,98,000/₹ 11,50,000 x ₹ 3,00,000 = ₹ 1,56,000

Joint cost of product Y = ₹ 5,98,000/₹ 11,50,000 x ₹ 4,00,000 = ₹ 2,08,000

6.

Comprehensive Cost Statement

Particulars	**Total Cost (₹)**	**Product-M (₹)**	**Product-N (₹)**
No. of units produced		5,400 units	810 units
Cost of raw material (₹ 80 × 6,750 units)	5,40,000		
Processing cost:			
- Labour cost (₹ 2,25,000 × 66%)	1,48,500		
- Other costs (₹ 2,25,000 – 1,48,500)	76,500		
Total joint cost	**7,65,000**		
(i) **Apportionment of joint costs between the joint products**			
Labour cost in the ratio of 100:80	1,48,500	82,500 (1,48,500 x 100)/180	66,000 (1,48,500 x 80)/180
Other joint costs (including material) in the ratio of output (5,400:810)	6,16,500	5,36,087 (6,16,500 x 5,400)/6210	80,413 (6,16,500 x 810)/6210
(ii) Total product cost	7,65,000	6,18,587	1,46,413

* No. of units produced of Product M = 6750 units x 80% = 5400 units

No. of units produced of Product N = 6750 units x 12% = 810 units

7.

Total Joint Cost

	Amount (₹)
Direct Material	30,000
Direct Labour	9,600

Variable Overheads	12,000
Total Variable Cost	51,600
Fixed Overheads	32,000
Total joint cost	83,600

Amount (₹)

Apportionment of Joint Costs:

			Product-A	**Product-B**
I.	**(i)**	Apportionment of Joint Cost on the basis of 'Physical Quantity'	₹ 38,000 (₹ 83,600/100 +120 units x 100)	₹ 45,600 (₹ 83,600/100 +120 units x 120)
	(ii)	Apportionment of Joint Cost on the basis of 'Contribution Margin Method':		
		- Variable Costs (on basis of physical units)	₹ 23,455 (₹ 51,600/100 +120 units x 100)	₹ 23,455 (₹ 51,600/100 +120 units x 120)
		Contribution Margin	36,545 (₹ 600×100 – 23,455)	– 4,145 (₹ 200×120 – 28,145)
		Fixed Costs*	₹ 32,000	
		Total apportioned cost	₹ 55,455	₹ 28,145
II.	**(iii)**	Profit or Loss: When Joint cost apportioned on basis of physical units		
	A.	Sales Value	₹ 60,000	₹ 24,000
	B.	Apportioned Joint Cost on basis of 'Physical Quantity':	₹ 38,000	₹ 45,600
	A-B	Profit or (Loss)	22,000	(21,600)
		When Joint cost apportioned on basis of 'Contribution Margin Method'		
	C.	Apportioned Joint Cost on basis of 'Contribution Margin Method'	₹ 55,455	₹ 28,145
	A-C	Profit or (Loss)	₹ 4,545	₹ (4,145)

* The fixed cost of ₹ 32,000 is to be apportioned over the joint products A and B in the ratio of their contribution margin but contribution margin of Product B is negative so fixed cost will be charged to Product A only.

8.

(i) Statement Showing Joint Cost Allocation to 'Cromex'

Particulars	**Cromex (₹)**
Sales (₹ 40 × 2,000 units)	80,000

Less: Post Split Off Costs (4,000+18,000+6,000)	(28,000)
Less: Estimated Profit (₹ 5 × 2,000 units)	(10,000)
Joint cost allocable	42,000

(ii) Statement Showing Product Wise and Overall Profitability

Particulars	Bomex (₹)	Cromex (₹)	Total (₹)
Sales	2,00,000	80,000	2,80,000
Less: Share in Joint Expenses	(1,38,000) *	(42,000)	(1,80,000)
Less: Post Split Off Costs	(36,000)	(28,000)	(64,000)
Profit	26,000	10,000	36,000

(*) 1,80,000 – 42,000

9.

1. Apportionment of Joint Costs

Particulars	A (₹)	B (₹)
Selling Price	16,000	8,000
Less: Estimated profit	4,000 (25% of ₹ 16,000)	1,600 (20% of ₹ 8,000)
Cost of sales	12,000	6,400
Less: Selling & Distribution exp. (Refer working note)	267 (₹ 400 × 2/3)	133 (₹ 400 × 1/3)
Less: Subsequent cost	5,000	3,000
Share of Joint cost	6,733	3,267

So, Joint cost of manufacture is to be distributed to A & B in the ratio of 6733 : 3267

Statement showing Cost of Production of A and B

Elements of cost	Joint Cost		Subsequent Cost		Total Cost	
	A	B	A	B	A	B
Material	3,367	1,633	3,000	1,500	6,367	3,133
Labour	2,020	980	1,400	1,000	3,420	1,980
Overheads	1,346	654	600	500	1,946	1,154
				Cost of production	11,733	6,267

Working Note:

Calculation of Selling and Distribution Expenses

Particulars	(₹)
Total Sales Revenue (₹ 16,000 + ₹ 8,000)	24,000
Less: Estimated Profit (₹ 4,000 + ₹ 1,600)	(5,600)
Cost of Sales	18,400

Less: Cost of production:	
- Joint Costs	(10,000)
- Subsequent costs (₹ 5,000 + ₹ 3,000)	(8,000)
Selling and Distribution expenses (Balancing figure)	400

10.

1. 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	3,12,50,000 (5,00,000 units x ₹ 62.50)	31,25,000	2,81,25,000	67,74,563
B	31,87,500 (75,000 units x ₹ 42.5)	3,75,000	28,12,500	6,77,456
C	18,75,000 (62,500 units x ₹ 30)	1,25,000	17,50,000	4,21,528
D	12,50,000 (50,000 units x ₹ 25)	---	12,50,000	3,01,092
E	93,75,000 (1,87,500 units x ₹ 50)	3,75,000	90,00,000	21,67,860
			4,29,37,500	1,03,42,500

Total joint cost =Raw material costs + Manufacturing expenses = ₹ 89,75,000 + ₹ 13,67,500 = ₹ 1,03,42,500

Apportioned joint cost = (Total Joint Cost/ Total Net Realisable value of each X Net Realisable value of each product)

Apportioned joint cost for Product A = (1,03,42,500 / 4,29,37,500 X 2,81,25,000) = ₹ 67,74,563.32

Similarly, the apportioned joint cost for products B, C, D and E are ₹ 6,77,456, ₹ 4,21,528, ₹ 3,01,092 and ₹ 21,67,860 respectively.

(a) Statement showing income forecast of the company assum-ing that none of its products are further processed.

	Products					
	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)	Total (₹)
Sales revenue	2,12,50,000	24,37,500	12,50,000	12,50,000	65,62,500	3,27,50,000
	(₹ 42.5 ×	(₹ 32.5 ×	(₹ 20 ×	(₹ 25 ×	(₹ 35 ×	

	5,00,000)	75,000)	62,500)	50,000)	1,87,500)	
Less: Apportioned						
Costs (Refer Working note)	67,74,563	6,77,456	4,21,528	3,01,092	21,67,860	1,03,42,500
	1,44,75,437	17,60,044	8,28,472	9,48,908	43,94,640	2,24,07,500
Less: Fixed Cost						11,82,500
Profit						2,12,25,000

(b) Statement showing income forecast of the company: assuming that products A, B, C and E are further processed (Refer to working note)

	Products					
	A (₹)	**B (₹)**	**C (₹)**	**D (₹)**	**E (₹)**	**Total (₹)**
A. Sales revenue	3,12,50,000	31,87,500	18,75,000	12,50,000	93,75,000	4,69,37,500
B. Apportioned Costs	67,74,563	6,77,456	4,21,528	3,01,092	21,67,860	1,03,42,500
C. Further processing cost	31,25,000	3,75,000	1,25,000	-	3,75,000	40,00,000
D. Total processing cost (B+ C)	98,99,563	10,52,456	5,46,528	3,01,092	25,42,860	1,43,42,500
E. Excess of sales revenue (A-D)	2,13,50,437	21,35,044	13,28,472	9,48,908	68,32,140	3,25,95,000
F. Fixed Cost						11,82,500
G. Profit (E - F)						3,14,12,500

11.

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 = ₹ 3,00,00

(₹ 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 × 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 × 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 × 9,000 units) – ₹ 6,00,000 in 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₹ 6,00,000 ÷ 2100000 = Rs.8,74,286

12.

Calculation of quantity produced

	Dept I (kg)	**Dept II (kg)**	**Dept III (kg)**
Input	4,00,000	2,00,000 (50% of 4,00,000 kg.)	1,60,000 (40% of 4,00,000 kg.)
Weight (lost) or added	(40,000) (10% of 4,00,000 kg.)	(40,000) (1/5th of 2,00,000 kg.)	1,60,000
	3,60,000	1,60,000	3,20,000
Production of A	2,00,000	1,60,000	--
Production of B	1,60,000	--	3,20,000

(i) Statement of apportionment of joint cost of dept I

	Product A	**Product B**
Output (kg)	2,00,000	1,60,000
Selling price per kg (₹)	8	4
Sales value (₹)	16,00,000	6,40,000
Share in Joint cost (5:2)	12,50,000 (₹ 17,50,000 × 5 ÷ 7)	5,00,000 (₹ 17,50,000 × 2 ÷ 7)

(ii) Statement of cost per kg

	Product A	Product B
Output (kg)	1,60,000	3,20,000
Share in joint cost (₹)	12,50,000	5,00,000
Joint Cost per kg (₹) (A)	7.8125	1.5625
Further processing cost (₹)	2,60,000	3,00,000
Further processing cost per kg (₹) (B)	1.625	0.9375
Total cost per kg (₹) {(A)+(B)}	9.4375	2.5000

(iii) Statement of profit

	Product A	Product B
Output (kg)	1,60,000	3,20,000
Sales (kg)	(1,50,000)	(3,00,000)
Closing stock (kg)	10,000	20,000
	(₹)	**(₹)**
Sales	15,00,000 (1,50,000 kg × ₹ 10)	12,00,000 (3,00,000 kg × ₹ 4)
Add: closing stock (at full cost)	94,375 (10,000 kg × ₹ 9.4375)	50,000 (20,000 kg × ₹ 2.5)
Value of production	15,94,375	12,50,000
Less: Share in joint cost	12,50,000	5,00,000
Further processing cost	2,60,000	3,00,000
Profit	84,375	4,50,000

(iv) Profitability statement before and after processing

	Product A		Product B	
	Before (₹)	**After (₹)**	**Before (₹)**	**After (₹)**
Sales Value	16,00,000		6,40,000	
Share in joint costs	12,50,000		5,00,000	
Profit	3,50,000	84,375 (As per iii above)	1,40,000	4,50,000 (As per iii above)

Product A should be sold at split off point and product B after processing because of higher profitability.

13.

Statement of Joint Cost allocation of inventories of X, Y and Z

(By using Net Realisable Value Method)

	Products			Total
	X (₹)	**Y (₹)**	**Z (₹)**	**(₹)**
Final sales value of total production (Working Note 1)	10,98,000 (366 ×₹ 3,000)	13,20,750 (587 × ₹ 2,250)	11,41,500 (761 × ₹ 1,500)	11,41,500 (761 × ₹ 1,500)
Less: Additional cost	--	--	(6,20,000)	(6,20,000)
Net realisable value (at split-off point)	10,98,000	13,20,750	5,21,500	29,40,250
Joint cost allocated (Working Note 2)	4,66,797	5,61,496	2,21,707	12,50,000

Cost of goods sold as on March 31, 2020

(By using Net Realisable Value Method)

	Products			Total
	X (₹)	**Y (₹)**	**Z (₹)**	**(₹)**
Allocated joint cost	4,66,797	5,61,496	2,21,707	12,50,000
Additional costs	--	--	6,20,000	6,20,000
Cost of goods available for sale (CGAS)	4,66,797	5,61,496	8,41,707	18,70,000
Less: Cost of ending inventory (Working Note 1)	2,29,571 (CGAS×49.18%)	57,385 (CGAS × 10.22%)	27,692 (CGAS × 3.29%)	3,14,648
Cost of goods sold	2,37,226	5,04,111	8,14,015	15,55,352

Working Notes

1. Total production of three products for the year 2019-2020

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

2. Joint cost apportioned to each product:

Total Joint Cost/ Total Net Realisable Value x Net Realisable Value of each product

Total cost of Product X = ₹ 12,50,000/ ₹ 29,40,250 x ₹ 10,98,000 = ₹ 4,66,797

Total cost of Product Y = ₹ 12,50,000/ ₹ 29,40,250 x ₹ 13,20,750 = ₹ 5,61,496

Total cost of Product Z = ₹ 12,50,000/ ₹ 29,40,250 x ₹ 5,21,500= ₹ 2,21,707

14.

i. Statement showing the apportionment of joint costs to A, B and X

Products	A	B	X	Total
Output (kg)	18,000	10,000	54,000	
Sales value at the point of split off (₹)	9,00,000 (₹ 50 x 18,000)	4,00,000 (₹ 40 x 10,000)	5,40,000 (₹ 10 x 54,000)	18,40,000
Joint cost apportions- ment on the basis of sales value at the point of split off (₹)	6,30,000 (₹ 12,88,000/₹ 18,40,000 x ₹ 9,00,000	2,80,000 (₹ 12,88,000/₹ 18,40,000 x ₹ 4,00,000	3,78,000 (₹ 12,88,000/₹ 18,40,000 x ₹ 5,40,000	12,88,000

ii. Statement showing the cost per kg. of each product

(Indicating joint cost; further processing cost and total cost separately)

Products	A	B	X
Joint costs apportioned (₹): (I)	6,30,000	2,80,000	3,78,000
Production (kg): (II)	18,000	10,000	54,000
Joint cost per kg (₹): (I ÷ II)	35	28	7
Further processing Cost per kg. (₹)	10 ₹ 1,80,000/ 18,000 kg	15 ₹ 1,50,000/ 10,000 kg	2 ₹ 1,08,000 x 54,000kg
Total cost per kg (₹)	45	43	9

iii. Statement showing the product wise and total profit for the period

Products	A	B	X	Total
Sales value (₹)	12,24,000	2,50,000	7,92,000	
Add: Closing stock value (₹)				
(Refer to Working note 2)	45,000	2,15,000	90,000	
Value of production (₹)	12,69,000	4,65,000	8,82,000	26,16,000
Apportionment of joint cost (₹)	6,30,000	2,80,000	3,78,000	
Add: Further processing cost (₹)	1,80,000	1,50,000	1,08,000	
Total cost (₹)	8,10,000	4,30,000	4,86,000	17,26,000
Profit (₹)	4,59,000	35,000	3,96,000	8,90,000

Working Notes

1.

Products	A	B	X
Sales value (₹)	12,24,000	2,50,000	7,92,000
Quantity sold (Kgs.)	17,000	5,000	44,000
Selling price ₹ /kg	72	50	18
	₹ 12,24,000/17,000kg	₹ 2,50,000/5,000kg	₹ 7,92,000/44,000kg

2. Valuation of closing stock:

Since the selling price per kg of products A, B and X is more than their total costs, therefore closing stock will be valued at cost.

Products	A	B	X	Total
Closing stock (kgs.)	1,000	5,000	10,000	
Cost per kg (₹)	45	43	9	
Closing stock value (₹)	45,000	2,15,000	90,000	3,50,000
	(₹ 45 x 1,000 kg)	(₹ 43 x 5,000 kg)	(₹ 9x10,000 kg)	

iv. Calculations for processing decision

Products	A	B	X
Selling price per kg at the point of split off (₹)	50	40	10
Selling price per kg after further processing (₹) (Refer to working Note 1)	72	50	18
Incremental selling price per kg (₹)	22	10	8
Less: Further processing cost per kg (₹)	-10	-15	-2
Incremental profit (loss) per kg (₹)	12	-5	6

Product A and X has an incremental profit per unit after further processing, hence, these two products may be further processed. However, further processing of product B is not profitable hence, product B shall be sold at split off point.

CHAPTER 11: MARGINAL COSTING

PART – A: ICAI PAST EXAM QUESTIONS

PROBLEM 1: (MAY 23 – 5 Marks)

The following information pertains to ZB Limited for the year:

Profit volume ratio	30%
Margin of Safety (as % of total sales	25%
Fixed cost	₹ 12,60,000

You are required to calculate:

(i) Break even sales value (₹).

(ii) Total sales value (₹) at present,

(iii) Proposed sales value (₹) if company wants to earn the present profit after reduction of 10% in fixed cost,

(iv) Sales in value (₹) to be made to earn a profit of 20% on sales assuming fixed cost remains unchanged,

(v) New Margin of Safety if the sales value at present as computed in (ii) decreased by 12.5%.

PROBLEM 2: (NOV 22 – 5 Marks)

ABC Ltd sells its Product 'Y' at a price of ₹ 300 per unit and its variable cost is ₹ 180 per unit. The fixed costs are ₹ 16,80,000 per year uniformly incurred throughout the year. The Profit for the year is ₹ 7,20,000.

You are required to calculate:

iii. BEP in value (₹) and units.

iv. Margin of Safety

v. Profits made when sales are 24,000 units.

vi. Sales in value (₹) to be made to earn a net profit of ₹ 10,00,000 for the year.

PROBLEM 3: (MAY 22 – 5 Marks)

Top-tech a manufacturing company is presently evaluating two possible machines for the manufacture of superior Pen-drives. The following information is available:

Particulars	Machine A	Machine B
Selling price per unit	₹ 400.00	₹ 400.00
Variable cost per unit	₹ 240.00	₹ 260.00
Total fixed costs per year	₹ 350 lakhs	₹ 200 lakhs
Capacity (in units)	8,00,000	10,00,000

Required:

i. Recommend which machine should be chosen?

ii. Would you change your answer, if you were informed that in near future demand will be unlimited and the capacities of the two machines are as follows?

Machine A - 12,00,000 units

Machine B - 12,00,000 units

Why?

PROBLEM 4: (MAY 22 – 5 Marks)

UV Limited started a manufacturing unit from 1st October 2021. It produces designer lamps and sells its lamps at ₹ 450 per unit.

During the quarter ending on 31st December, 2021, it produced and sold 12,000 units and suffered a loss of ₹ 35 per unit.

During the quarter ending on 31st March, 2022, it produced and sold 30,000 units and earned a profit of ₹ 40 per unit.

You are required to calculate:

Total fixed cost incurred by UV ltd. per quarter.

Break Even sales value (in rupees)

Calculate Profit, if the sale volume reaches 50,000 units in the next quarter (i.e., quarter ending on 30th June, 2022).

PROBLEM 5: (DEC 21 – 10 Marks)

AZ company has prepared its budget for the production of 2,00,000 units. The variable cost per unit is ₹ 16 and fixed cost is ₹ 4 per unit. The company fixes its selling price to fetch a profit of 20% on total cost.

You are required to calculate:

(i) Present break-even sales (in ₹ and in quantity).

(ii) Present profit-volume ratio.

(iii) Revised break-even sales in ₹ and the revised profit-volume ratio, if it reduces its selling price by 10%.

(iv) What would be revised sales- in quantity and the amount, if a company desires a profit increase of 20% more than the budgeted profit and selling price is reduced by 10% as above in point (iii).

PROBLEM 6: (JUL 21 – 5 Marks)

LR Ltd. is considering two alternative methods to manufacture a new product it intends to market. The two methods have a maximum output of 50,000 units each and produce identical items with a selling price of ₹ 25 each.

The costs are:

	Method-1 Semi-Automatic (₹)	Method-2 Fully-Automatic (₹)
Variable cost per unit	15	10
Fixed costs	1,00,000	3,00,000

You are required to calculate:

1. Cost Indifference Point in units. Interpret your results.

2. The Break-even Point of each method in terms of units.

PROBLEM 7: (JAN 21 – 5 Marks)

During a particular period, ABC Ltd has furnished the following data:

Sales ₹10,00,000

Contribution to sales ratio 37% and

Margin of safety is 25% of sales.

A decrease in selling price and decrease in the fixed cost could change the "contribution to sales ratio" to 30% and "margin of safety" to 40% of the revised sales. Calculate:

i. Revised Fixed Cost.

ii. Revised Sales and

iii. New Break-Even Point.

PROBLEM 8 : (JAN 21 – 10 Marks)

Two manufacturing companies A and B are planning to merge. The details are as follows:

	A	B
Capacity utilisation (%)	90	60
Sales (₹)	63,00,000	48,00,000
Variable Cost (₹)	39,60,000	22,50,000
Fixed Cost (₹)	13,00,000	15,00,000

Assuming that the proposal is implemented, calculate:

(i) Break-Even sales of the merged plant and the capacity utilization at that stage.

(ii) Profitability of the merged plant at 80% capacity utilization.

(iii) Sales Turnover of the merged plant to earn a profit of ₹ 60,00,000.

(iv) When the merged plant is working at a capacity to earn a profit of ₹ 60,00,000, what percentage of increase in selling price is required to sustain an increase of 5% in fixed overheads.

PROBLEM 9: (NOV 20 – 5 Marks)

Moon Ltd. produces products 'X', 'Y' and 'Z' and has decided to analyse its production mix in respect of these three products - 'X', 'Y' and 'Z'.

You have the following information

	X	Y	Z
Direct Materials ₹ (per unit)	160	120	80
Variable Overheads ₹ (per unit)	8	20	12
Direct labour:			

Departments:	Rate per Hour (₹)	Hours per unit	Hours per unit	Hours per unit
		X	Y	Z
Department-A	4	6	10	5
Department-B	8	6	15	11

From the current budget, further details are as below:

	X	Y	Z
Annual Production at present (in units)	10,000	12,000	20,000
Estimated Selling Price per unit (₹)	312	400	240
Sales departments estimate of possible sales in the coming year (in units)	12,000	16,000	24,000

There is a constraint on supply of labour in Department-A and its manpower cannot be increased beyond its present level.

Required:

i. Identify the best possible product mix of Moon Ltd.

ii. Calculate the total contribution from the best possible product mix.

PROBLEM 10: (NOV 19 – 5 Marks)

When volume is 4,000 units; average cost is ₹ 3.75 per unit. When volume is 5,000 units, average cost is ₹ 3.50 per unit. The Break-Even point is 6,000 units.

Calculate:

(i) Variable Cost per unit

(ii) Fixed Cost and

(iii) Profit Volume Ratio.

PROBLEM 11 : (NOV 19 – 10 Marks)

PJ Ltd manufactures hockey sticks. It sells the products at ₹ 500 each and makes a profit of ₹ 125 on each stick. The Company is producing 5,000 sticks annually by using 50% of its machinery capacity. The cost of each stick is as under:

Direct Material	₹ 150
Direct Wages	₹ 50
Works Overhead	₹ 125 (50% fixed)

Selling Expenses	₹ 50 (25% variable)

The anticipation for the next year is that cost will go up as under:

Fixed Charges	10%
Direct Wages	20%
Direct Material	5%

There will not be any change in selling price.

There is an additional order for 2,000 sticks in the next year.

Calculate the lowest price that can be quoted so that the Company can earn the same profit as it has earned in the current year?

PROBLEM 12: (MAY 19 – 5 Marks)

M/s Gaurav Private Limited is manufacturing and selling two products: 'BLACK' and 'WHITE' at selling price of ₹ 20 and ₹ 30 respectively.

The following sales strategy has been outlined for the financial year 2019-20:

i. Sales planned for the year will be ₹ 81,00,000 in the case of 'BLACK' and ₹ 54,00,000 in the case of 'WHITE'.

ii. The selling price of 'BLACK' will be reduced by 10% and that of 'WHITE' by 20%.

iii. Break-even is planned at 70% of the total sales of each product.

iv. Profit for the year to be maintained at ₹ 8,26,200 in the case of 'BLACK' and ₹ 7,45,200 in the case of 'WHITE'. This would be possible by reducing the present annual fixed cost of ₹ 42,00,000 allocated as ₹ 22,00,000 to 'BLACK' and ₹ 20,00,000 to 'WHITE'.

You are required to calculate:

1) Number of units to be sold of 'BLACK' and 'WHITE' to Break even during the financial year 2019-20.

2) Amount of reduction in fixed cost product-wise to achieve desired profit mentioned at (iv) above.

PROBLEM 13: (NOV 18 – 10 Marks)

A manufacturing company is producing a product 'A' which is sold in the market at ₹ 45 per unit. The company has the capacity to produce 40000 units per year. The budget for the year 2018-19 projects a sale of 30000 units.

The costs of each unit are expected as under:

	₹
Materials	12
Wages	9
Overheads	6

Margin of safety is ₹ 4,12,500.

You are required to:

i. calculate fixed cost and break-even point.

ii. calculate the volume of sales to earn profit of 20% on sales.

iii. if management is willing to invest ₹ 10,00,000 with an expected return of 20%, calculate units to be sold to earn this profit.

iv. Management expects additional sales if the selling price is reduced to ₹ 44. Calculate units to be sold to achieve the same profit as desired in above (iii).

PROBLEM 14: (MAY 18 – 5 Marks)

Following figures have been extracted from the books of M/s. RST Private Limited:

FINANCIAL YEAR	SALES (₹)	PROFIT/LOSS (₹)
2016-17	4,00,000	15,000(loss)
2017-18	5,00,000	15,000 (Profit)

You are required to calculate:

i. Profit Volume Ratio

ii. Fixed Costs

iii. Break Even Point

iv. Sales required to earn a profit of ₹ 45,000.

v. Margin of Safety in Financial Year 2017-18.

PROBLEM 15: (MAY 18 – 10 Marks)

PH Gems Ltd. is manufacturing readymade suits. It has annual production capacity of 2,000 pieces. The Cost Accountant has presented following information for the year to the management:

Particulars	Amount (₹)	Amount (₹)
Sales 1,500 pieces @ ₹ 1,800 per piece		27,00,000
Direct Material	5,94,200	
Direct Labour	4,42,600	
Overheads (40% Fixed)	11,97,000	22,33,800
Net Profit		4,66,300

Evaluate following options:

i. If selling price is increased by ₹ 200, the sales will come down to 60% of the total annual capacity. Should the company increase its selling price?

ii. The company can earn a profit of 20% on sales if the company provide TIEPIN with ready-made suit. The cost of each TIEPIN is ₹ 18. Calculate the sales to earn a profit of 20% on sales.

PART – B: (REVISION TEST PAPERS)

PROBLEM 16: (NOV 23)

A dairy product company manufacturing baby food with a shelf life of one year furnishes the following information:

(i) On 1st April, 2023, the company has an opening stock of 20,000 packets whose variable cost is ₹ 180 per packet.

(ii) In 2022-23, production was 1,20,000 packets and the expected production in 2023-24 is 1,50,000 packets. Expected sales for 2023-24 is 1,60,000 packets.

(iii) In 2022-23, fixed cost per unit was ₹ 60 and it is expected to increase by 10% in 2023-24. The variable cost is expected to increase by 25%. Selling price for 2023-24 has been fixed at ₹ 300 per packet.

You are required to calculate the Break-even volume in units for 2023-24.

PROBLEM 17: (MAY 23)

The following data are available from the budget records of Finesign Women's Handbag Company for the forthcoming budget period.

	₹
Selling Price per unit	1000
Variable cost per unit:	
Cost of Material used	750.00
Sales commission	50.00
Total Variable Cost	800.00
Annual fixed expenses:	
Rent	7,00,000
Salaries	11,00,000
Other fixed expenses	5,00,000
Total Fixed Cost	23,00,000

Although the firm manufactures Bags with different styles, they have identical purchase costs and selling price.

Requirement:

(a) What is the annual break-even point both in terms of units and value?

(b) If the store manager is paid 1 per cent commission on sales, what would be the annual break-even point both in terms of units and value?

(c) If the firm decides to pay a fixed salary of ₹ 9,00,000 in lieu of sales commission, what would be the annual break-even point in terms of units and value.

Considering break-even point in requirement (a), If the stores manager is paid 2 per cent commission on each bag sold in excess of the break-even point, what would be the profit if

20000 bags were sold.

PROBLEM 18 : (NOV 22)

RPP Manufacturers is approached by an international customer for one-time special order similar to one offered to its domestic customers. Per unit data for sales to regular customers is provided below:

Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Fixed manufacturing support	₹ 1092
Total manufacturing costs	₹ 2604
Markup (50%)	₹ 1302
Targeted selling price	₹ 3906

It is provided that RPP Manufacturers has excess capacity. Required:

(i) WHAT is the full cost of the product per unit?

(ii) WHAT is the contribution margin per unit?

(iii) WHICH costs are relevant for making the decision regarding this one-time special order? WHY?

(iv) For RPP Manufacturers, WHAT is the minimum acceptable price of this one- time-special order only

(v) For this one-time-only special order, SHOULD RPP Manufacturers consider a price of ₹ 2100 per unit? WHY or why not?

PROBLEM 19 : (MAY 22)

A Limited manufactures three different products and the following information has been collected from the books of accounts:

	Products		
	S	**T**	**U**
Sales Mix	25%	35%	40%
Selling Price	₹ 600	₹ 800	₹ 400
Variable Cost	₹ 300	₹ 400	₹ 240
Total Fixed Costs			₹36,00,000
Total Sales			₹1,20,00,000

The company has currently under discussion, a proposal to discontinue the manufacture of Product U and replace it with Product M, when the following results are anticipated:

	Products		
	S	**T**	**M**
Sales Mix	40%	35%	25%

Selling Price	₹600	₹ 800	₹ 600
Variable Cost	₹300	₹ 400	₹ 300
Total Fixed Costs			₹36,00,000
Total Sales			₹1,28,00,000

Required:

(i) COMPUTE the PV ratio, total contribution, profit and Break-even sales for the existing product mix.

(ii) COMPUTE the PV ratio, total contribution, profit and Break-even sales for the proposed product mix

PROBLEM 20: (NOV 21)

A company has three factories situated in North, East and South with its Head Office in Mumbai. The Management has received the following summary report on the operations of each factory for a period:

(₹ in '000)

Factory	Sales		Profit	
	Actual	Over / (Under) Budget	Actual	Over / (Under) Budget
North	1,100	(400)	135	(180)
East	1,450	150	210	90
South	1,200	(200)	330	(110)

CALCULATE the following for each factory and for the company as a whole for the period:

(i) Fixed Cost

(ii) Break-even Sales

PROBLEM 21 : (RTP MAY 21)

Aditya Limited manufactures three different products and the following information has been collected from the books of accounts:

	Products		
	S	T	U
Sales Mix	35%	35%	30%
Selling Price	₹ 300	₹400	₹ 200
Variable Cost	₹ 150	₹200	₹ 120
Total Fixed Costs			₹ 18,00,000
Total Sales			₹ 60,00,000

The company has currently under discussion, a proposal to discontinue the manufacture of Product U and replace it with Product M, when the following results are anticipated:

	Products		
	S	**T**	**M**
Sales Mix	50%	25%	25%
Selling Price	₹ 300	₹ 400	₹ 300
Variable Cost	₹ 150	₹ 200	₹ 150
Total Fixed Costs			₹ 18,00,000
Total Sales			₹ 64,00,000

Required

i. COMPUTE the PV ratio, total contribution, profit and Break-even sales for the existing product mix.

ii. COMPUTE the PV ratio, total contribution, profit and Break-even sales for the proposed product mix.

PROBLEM 22 : (RTP NOV 20)

J Ltd. manufactures a Product-Y. Analysis of income statement indicated a profit of ₹ 250 lakhs on a sales volume of 5,00,000 units. Fixed costs are ₹ 1,000 lakhs which appears to be high. Existing selling price is ₹ 680 per unit. The company is considering revising the profit target to ₹ 700 lakhs. You are required to COMPUTE –

i. Break- even point at existing levels in units and in rupees.

ii. The number of units required to be sold to earn the target profit.

iii. Profit with 10% increase in selling price and drop in sales volume by 10%.

iv. Volume to be achieved to earn target profit at the revised selling price as calculated in (ii) above, if a reduction of 10% in the variable costs and ₹ 170 lakhs in the fixed cost is envisaged.

PROBLEM 23 : (RTP MAY 20)

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

Elements of Cost	Variable Cost portion	Fixed Cost
Direct Material	30% of Cost of Goods Sold	--
Direct Labour	15% of Cost of Goods Sold	--
Factory Overhead	10% of Cost of Goods Sold	₹ 2,30,000
Administration Overhead	2% of Cost of Goods Sold	₹ 71,000
Selling & Distribution Overhead	4% of Cost of Sales	₹ 68,000

Last Year 5,000 units were sold at ₹ 185 per unit. From the given DETERMINE the followings:

i. Break-even Sales (in rupees)

ii. Profit earned during last year

iii. Margin of safety (in %)

iv. Profit if the sales were 10% less than the actual sales.

(Assume that Administration Overhead is related with production activity)

PROBLEM 24: (RTP NOV 19)

PVC Ltd sold 55,000 units of its product at ₹ 375 per unit. Variable costs are ₹ 175 per unit (manufacturing costs of ₹ 140 and selling cost ₹ 35 per unit). Fixed costs are incurred uniformly throughout the year and amount to ₹ 65,00,000 (including depreciation of ₹ 15,00,000). There is no beginning or ending inventories.

Required:

i. COMPUTE breakeven sales level quantity and cash breakeven sales level quantity.

ii. COMPUTE the P/V ratio.

iii. COMPUTE the number of units that must be sold to earn an income (EBIT) of ₹ 5,00,000.

iv. COMPUTE the sales level achieve an after-tax income (PAT) of ₹ 5,00,000, assume 40% corporate tax rate.

ANSWERS

1.

i. Calculation of Break-even sales in value:

= Fixed Cost ÷ P/V Ratio

= ₹ 12,60,000 ÷ 30% = ₹ 42,00,000

ii. Calculation of Total Sales value:

Sales value (S) = Break-even Sales + Margin of Safety Or, S = 42,00,000 + 0.25 S

Or, 0.75 S = 42,00,000

Or, S = 42,00,000 ÷ 0.75

Or, Sales = ₹ 56,00,000

iii. Calculation of proposed sales value to earn present profit:

Present profit = Sales – Variable cost – Fixed Cost

= ₹ 56,00,000 – 70% of 56,00,000 – ₹ 12,60,000

= ₹ 56,00,000 – ₹ 39,20,000 – ₹ 12,60,000

= ₹ 4,20,000

Proposed Sales value (S) = 0.7S + (90% of ₹ 12,60,000) + 4,20,000 S = 0.7S + 11,34,000 + 4,20,000

S = 15,54,000 ÷ 0.3 = ₹ 51,80,000

Calculation of sales value to earn 20% on sales:

Sales Value (S) = 0.7 S + 12,60,000 + 0.2S S = 12,60,0000 ÷ 0.10 = ₹ 1,26,00,000

New Margin of Safety:

= (Sales – BES) ÷ Sales

= (87.5% of 56,00,000 – 42,00,000) ÷ (87.5% of 56,00,000)

= (49,00,000 – 42,00,000) ÷ 49,00,000

= 7,00,000 ÷ 49,00,000 = 14.29%

Or

= (Sales – BES)

= (87.5% of 56,00,000 – 42,00,000)

= ₹ 7,00,000

2.

i. Calculation of BEP in value

P / V ratio Sales price - Variable Cost / Sales = 300 – 180 / 300 = 40%

Break Even Point in Value ( ) = Fixed Cost / P/V ratio = 16,80,000 / 40% = Rs.42,00,000

Break Even Point in Units = Fixed Cost / contribution = 16,80,000/ 120 = 14,000 Units

(Alternatively,Rs.42,00,000 / 300 = 14000 units)

300 = 14000 units)

ii. Margin of safety (In Amount) = Profit / P/V ratio = 7,20,000 / 40% = Rs.18,00,000

= = = 18,00,000

Margin of safety may also be calculated by deducting BEP sales from present sale.

Present sale is ₹ 60,00,000 i.e. (16,80,000 + 7,20,000)/40%.

Margin of safety (In units) = Profit / Contribution per unit = 7,20,000 / 120 = 6,000 units

iii. Profit when sales are 24,000 units

Particular	(Rs.)
Contribution (24,000 □ 120)	28,80,000
Less: Fixed cost	16,80,000
Profit	12,00,000

iv. Sales in value to earn a net profit of ₹10,00,000

$$\frac{\text{Fixed Cost} + \text{Desired profit}}{\text{P/V ratio}} = \frac{16,80,000 + 10,00,000}{40\%} = \text{Rs.}67,00,000$$

3.

		Machine-A	Machine-B	Total
A	Selling price per unit (₹)	400	400	
B	Variable cost per cost (₹)	240	260	
C	Contribution per unit (₹) [A-B]	160	140	
D	Units	8,00,000	10,00,000	
E	Total contribution (₹ [C×D]	12,80,00,000	14,00,00,000	26,80,00,000
F	Fixed Cost (₹)	3,50,00,000	2,00,00,000	5,50,00,000
G	Profit [E-F] (₹)	9,30,00,000	12,00,00,000	21,30,00,000
H	Profit per unit [G÷D] (₹)	116.25	120.00	

i. Machine B has the higher profit of ₹ 2,70,00,000 than the Machine-A. Further, Machine-B's fixed cost is less than the fixed cost of Machine-A and higher capacity. Hence, Machine B be recommended.

Note: This question can also be solved as below:

Indifferent point = Difference in fixed cost / difference in variable cost per unit

= 1,50,00,000 / 20 = 7,50,000 units

At the level of demand 7,50,000 units both machine options equally profitable.

If demand below 7,50,000 units, select machine B (with lower FC).

If demand above 7,50,000 units, select machine A (with lower VC).

ii. When the capacities of both the machines are same and demand for the product is unlimited, calculation of profit will be as follows:

		Machine-A	Machine-B	Total
A	Contribution per unit (₹)	160	140	
B	Units	12,00,000	12,00,000	
C	Total contribution (₹) [A×B]	19,20,00,000	16,80,00,000	36,00,00,000
D	Fixed Cost (₹)	3,50,00,000	2,00,00,000	5,50,00,000
E	Profit [C-E] (₹)	15,70,00,000	14,80,00,000	30,50,00,000
F	Profit per unit [E÷B] (₹)	130.83	123.33	

Yes, the preference for the machine would change because now, Machine A is having higher contribution and higher profit, hence recommended.

4.

	Quarter ending 31st December, 2021 (₹)	**Quarter ending 31st March, 2022 (₹)**
Sales (No. of units sold x ₹ 450 per unit)	54,00,000	1,35,00,000
Profit (Loss)	(4,20,000) [12,000 × 35]	12,00,000 [30,000 × 40]

PV ratio = Change in profit ÷ Change in sales = 1620000 ÷ 8100000 = 20%

i. Fixed Cost = Sales × P/V ratio – profit

= ₹ 1,35,00,000 × 20% – 12,00,000

= ₹ 15,00,000

Alternative Presentation for the calculation of Fixed cost

	Quarter ending 31st December, 2021 (₹)	Quarter ending 31st March, 2022 (₹)
Sales (No. of units sold x ₹ 450 per unit)	54,00,000	1,35,00,000
Profit (Loss)	(4,20,000) [12,000 × 35]	12,00,000 [30,000 × 40]
Total cost	58,20,000	1,23,00,000

VC per unit = (1,23,00,000 – 58,20,000) / (30,000 – 12,000)

= 64,80,000 / 18,000 =₹ 360 per unit

Fixed cost = TC – VC , 58,20,000 (360 x12,000 units) ₹ 15,00,000

ii. Break even sales value (in Rupees) = Fixed cost ÷ PV ratio x 100

= 1500000 ÷ 20% = 7500000

iii. Profit, if sales reach 50,000 units for the quarter ending 30th June, 2022

	(₹)

Sales (50,000 × ₹ 450)	2,25,00,000
Less: Variable cost	1,80,00,000
Contribution	45,00,000
Less: Fixed cost	15,00,000
Profit	30,00,000

5.

Variable Cost per Unit=₹ 16

Fixed Cost per Unit =₹ 4, Total Fixed Cost= 2,00,000 units x ₹ 4 = ₹ 8,00,000

Total Cost per Unit =₹ 20

Selling Price per Unit=Total Cost+ Profit =₹ 20+₹ 4 =₹ 24

Contribution per Unit=₹ 24-₹ 16=₹ 8

i. Present Break even sales (Quantity) = Fixed Cost ÷ Contribution margin per unit

= 800000 ÷ 8 = 100000 units

Present Break-even Sales (₹) = 1,00,000 units ₹ 24 = ₹ 24,00,000

ii. Present P/V Ratio = 8 / 24 = 33.333%

Revised Selling Price per Unit = ₹ 24 – 10% of ₹ 24 = ₹ 21.60

Revised Contribution per Unit = ₹ 21.60-₹ 16 = ₹ 5.60

Revised P/V Ratio = 5.60 / 21.60 = 25.926%

Break even sales (Quantity) = Fixed Cost ÷ PV ratio

= 800000 / 25.926% = 3085705

iii. Present profit = ₹ 8,00,000

Desired Profit = 120% of ₹ 8,00,000 =₹ 9,60,000

Sales to earn a profit of ₹ 9,60,000

Total contribution required = 8.00.000 + 9,60,000 = ₹ 17,60,000

Fixed cost + Desired profit / Contribution per unit = 8,00,000 + 9,60,000 / 5.60 = 3,14,286 units

6.

i) Cost Indifference Point

	Method-1 and Method-2 (₹)
Differential Fixed Cost (I)	₹ 2,00,000
	(₹ 3,00,000 – ₹ 1,00,000)
Differential Variable Costs (II)	₹ 5
	(₹ 15 – ₹ 10)
Cost Indifference Point (I/II)	40,000

(Differential Fixed Cost / Differential Variable Costs per unit)	

Interpretation of Results

At activity level below the indifference points, the alternative with lower fixed costs and higher variable costs should be used. At activity level above the indifference point, alternative with higher fixed costs and lower variable costs should be used.

No. of Product	Alternative to be Chosen
Product ≤ 40,000 units	Method-1, Semi-Automatic
Product ≥ 40,000 units	Method-2, Automatic

ii) Break Even point (in units)

	Method-1	**Method-2**
BEP (in units) = Fixed cost	1,00,000	3,00,000 = 20,000
Contribution per unit	(25-15) = 10,000	(25-10)

7.

Contribution to sales ratio (P/V ratio) = 37%

Variable cost ratio = 100% - 37% = 63%

Variable cost = ₹ 10,00,000 x 63% = ₹ 6,30,000

After decrease in selling price and fixed cost, sales quantity has not changed. Thus, variable cost is ₹ 6,30,000.

Revised Contribution to sales = 30%

Thus, Variable cost ratio = 100% - 30% = 70%

Thus, Revised sales = ₹ 6,30,000 / 70% = ₹ 9,00,000

Revised, Break-even sales ratio = 100% - 40% (revised Margin of safety) = 60%

Revised fixed cost = revised breakeven sales x revised contribution to sales ratio

= ₹ 5,40,000 (₹ 9,00,000 x 60%) x 30%

= ₹ 1,62,000

Revised sales = ₹ 9,00,000 (as calculated above)

Revised Break-even point = Revised sales x Revised break-even sales ratio

= ₹ 9,00,000 x 60%

= ₹ 5,40,000

8.

Workings:

1. Statement showing computation of Breakeven of merged plant and other required information

S. No.	Particulars	Plan A		Plant B		Merged Plant (100%)
		Before (90%)	After (100%)	Before (60%)	After (100%)	
		(₹)	(₹)	(₹)	(₹)	(₹)
(i)	Sales	63,00,000	70,00,000	48,00,000	80,00,000	1,50,00,000
(ii)	Variable cost	39,60,000	44,00,000	22,50,000	37,50,000	81,50,000
(iii)	Contribution (i - ii)	23,40,000	26,00,000	25,50,000	42,50,000	68,50,000
(iv)	Fixed Cost	13,00,000	13,00,000	15,00,000	15,00,000	28,00,000
(v)	Profit (iii - iv)	10,40,000	13,00,000	10,50,000	27,50,000	40,50,000

2. PV ratio of merged plant = Contribution/ Sales x 100

= ₹ 68,50,000/₹ 1,50,00,000 x 100 = 45.67 %

(i) Break even sales of merged plant = Fixed Cost/ P/V Ratio

= ₹ 28,00,000/45.67% = ₹ 61,30,939.34 (approx.)

Capacity utilization = ₹ 61,30,939.34/₹ 1,50,00,000 x 100 = 40.88%

(ii) Profitability of the merged plant at 80% capacity utilization

= (₹ 1,50,00,000 x 80%) x P/v ratio – fixed cost

= ₹ 1,20,00,000 x 45.67% – ₹ 28,00,000 = ₹ 26,80,400

(iii) Sales to earn a profit of ₹ 60,00,000

Desired sales = Fixed Cost + desired profit/P/V Ratio

= ₹ 28,00,000 +₹ 60,00,00/45.67%

= ₹ 1,92,68,666 (approx.)

(iv) Increase in fixed cost

= ₹ 28,00,000 x 5% = ₹ 1,40,000

Therefore, percentage increase in sales price

= ₹ 1,40,000/₹ 1,92,68,666 x 100 = 0.726% (approx.)

9.

(i) Statement Showing "Calculation of Contribution/ unit"

Particulars	X (₹)	Y (₹)	Z (₹)
Selling Price (A)	312	400	240
Variable Cost:			

Direct Material	160	120	80
Direct Labour			
Dept. A (Rate x Hours)	24	40	20
Dept. B (Rate x Hours)	48	120	88
Variable Overheads	8	20	12
Total Variable Cost (B)	240	300	200
Contribution per unit (A - B)	72	100	40
Hours in Dept. A	6	10	5
Contribution per hour	12	10	8
Rank	I	II	III

Existing Hours = 10,000 × 6hrs. + 12,000 × 10 hrs. + 20,000 × 5 hrs. = 2,80,000 hrs.

Best possible product mix (Allocation of Hours on the basis of ranking)

Produce 'X' = 12,000 units

Hours Required = 72,000 hrs (12,000 units × 6 hrs.)

Balance Hours Available = 2,08,000 hrs (2,80,000 hrs. – 72,000 hrs.)

Produce 'Y' (the Next Best) = 16,000 units

Hours Required = 1,60,000 hrs (16,000 units × 10 hrs.)

Balance Hours Available = 48,000 hrs (2,08,000 hrs. – 1,60,000 hrs.)

Produce 'Z' (balance) = 9,600 units (48,000 hrs./ 5 hrs.)

(ii) Statement Showing "Contribution"

Product	Units	Contribution/ Unit (₹)	Total Contribution (₹)
X	12,000	72	8,64,000
Y	16,000	100	16,00,000
Z	9,600	40	3,84,000
Total			28,48,000

10.

(i) Variable cost per unit = Change in Total cost/ Change in units

(3.50 x 5,000 units) - (3.75 x 4,000 units)/ 5,000 - 4,000

17,500 - 15,000/ 1,000 = ₹ 2,500/1000 = ₹ 2.5

(ii) Fixed cost = Total Cost – Variable Cost (at 5,000 units level)

= ₹ 17,500 – 2.5 x 5,000 = 5,000

(iii) Contribution Per Unit = Fixed cost/ BEP (in units)

= ₹ 5,000/6₹ 000 units = 0.833

P/v Ratio = Contribution per Unit/ Sale price Per unit

= 0.833/2.5 + 0.833 = 25%

11.

Selling Price = ₹ 500

Profit = ₹ 125

No of Sticks = 5,000

Particular	Current Year (₹)	Next Year (₹)
Direct Material	150	157.50 (150 + 5%)
Direct Wages	50	60 (50+20%)
Works Overheads	62.50 (125 × 50%)	62.5
Selling Expenses	12.50 (50 × 25%)	12.5
Total Variable Cost	275	292.50
Fixed Cost (62.5 × 5,000) = 3,12,500; (37.5 × 5,000) = 1,87,500	5,00,000	5,50,000

Let: Lowest Price Quoted = K

Now, Sales = Target Profit (5,000 units × ₹ 125) + Variable Cost + Fixed Cost

Or, = (5,000 × 500) + (2,000 × K) = 6,25,000 + 20,47,500 + 5,50,000

Or, K = ₹ 361.25

So, Lowest Price that can be quoted to earn the profit of ₹ 6,25,000 (same as current year) is ₹ 361.25

12.

(i) Statement showing Break Even Sales

Particulars	Black	White
Sales Planned	81,00,000	54,00,000
Selling Price (₹)	18	24
Number of Units to be sold	4,50,000	2,25,000
Break Even sales (in Units),70% of total sales	3,15,000	1,57,500
Or		
Break Even sales (in ₹),70% of total sales	56,70,000	37,80,000

(ii) Statement Showing Fixed Cost Reduction

Profit to be maintained (₹)	8,26,200	7,45,200
Margin of Safety (70% of Sales) (₹)	24,30,000	16,20,000
PVR (Profit/ Margin of Safety) x 100	34%	46%

Contribution (Sales x 34% or 46%) (₹)	27,54,000	24,84,000
Less: Profit (₹)	8,26,200	7,45,200
Revised Fixed Cost (₹)	19,27,800	17,38,800
Present Fixed Cost (₹)	22,00,000	20,00,000
Reduction in Fixed Cost	2,72,200	2,61,200

13.

Margin of Safety = Profit / P/V Ratio = ₹ 4,12,500

= (Profit/ 45 - (12 + 9 + 6)/45) = ₹ 4,12,500

= (Profit / (18/45)) = 4,12,500

Profit/ (18/45) = ₹ 4,12,500

Profit = 1,65,000 OR P/V = (18/45) × 100 =40%

(i) Fixed Cost

Profit = (Sales × P/V Ratio) – Fixed Cost

$$1,65,000 = \left((30,000 \times 45) \times \frac{18}{45}\right) - \text{Fixed Cost}$$

Or Fixed Cost = 5,40,000 – 1,65,000

= ₹ 3,75,000 OR

Profit = Contribution – Fixed Cost = ₹ 5,40,000 – ₹ 3,75,000 = ₹ 1,65,000

P/V Ratio = 18/45=40%

Break-even Point = Total Sales – Margin of Safety

= ₹ (30,000 × 45) – 4,12,500

= 13,50,000 – 4,12,500 = ₹ 9,37,500

Or

BEP = Fixed Cost / P/V ratio = 3,75,000/ (18/45) = 3,75,000/40% = ₹ 9,37,500 **or 20833.33** Units

(ii) Let's assume, Sales Volume = S unit so total sales value is 45 S and Contribution is 45 S - 27 S =18 S

Now, Contribution = Fixed Cost + Desired Profit

18 S = 3,75,000 + 9 S (20% of 45 S)

Or, 9S = 3,75,000

So, S = 3,75,000 Units

Volume of sales = 3,75,000 x 45 / 9 = ₹ 18,75,000 OR 41666.67 Units

So, ₹ 18,75,000 sales are required to earn profit on 20% of sales

(iii) Contribution = Fixed Cost + Desired Profit

18S = 3,75,000 + Return on Investment

18S = 3,75,000 + 2,00,000

S = 5,75,000 / 18 = 31,945 Units (Approx.)

So, 31,945 Units to be sold to earn a return of ₹ 2,00,000.

(iv) Revised Contribution = Fixed Cost + Desired Profit

17S = 3,75,000 + 2,00,000

S = 5,75,000 / 17 units

S = **33,824 units** (approx.)

Additional Sales to be sold to achieve the same profit is 33,824 Units.

14.

	Sales (₹)	**Profit (₹)**
Year 2016	4,00,000	15,000 (loss)
Year 2017	5,00,000	15,000 (profit)
Difference	1,00,000	30,000

(i) P/V Ratio = (Difference in Profit/ Difference in Sales) x 100 = 30,000/ 1,00,000 x 100 =30%

(ii)

	(₹)
Contribution in 2016 (4,00,000 × 30%)	1,20,000
Add: Loss	15,000
Fixed Cost	* 1,35,000

*Contribution = Fixed cost + Profit

∴ Fixed cost = Contribution – Profit

(iii) Break-even point = Fixed Cost/ P/V Ratio = 1,35,000/30% = ₹ 4,50,000

(iv) Sales to earn a profit of ₹ 45,000

Fixed Cost Desired profit / P/V Ratio = 1,35,000 + 45,000 / 30% = ₹ 6,00,000

(v) Margin of safety in 2017 –18

Margin of safety = Actual sales – Break-even sales

= 5,00,000 – 4,50,000 = ₹ 50,000.

15.

(i) Evaluation of Option (i)

Selling Price = ₹ 1800 + ₹ 200 = ₹ 2,000

Sales = 2000 × 60% = 1200 Pieces

	₹
Sales (1,200 pieces @ ₹ 2,000)	24,00,000
Less: Direct Material (₹ 5,94,200 / 1500 units x 1200)	4,75,360
Direct Labour (₹ 4,42,600 / 1,500 units x 1200)	3,54,080

Variable Overhead (₹ 11,97,000 x 60% / 1500 units)	5,74,560
Contribution	9,96,000
Less: Fixed cost (₹11,97,000 × 40%)	4,78,800
Profit	5,17,200

If price has been increased by 11.11% (increases by 200 on 1,800) sales goes down by 20% (decreased by 300 on 1,500). Change in demand is greater than change in price. Since the variable costs are still same profit has been arose to ₹5,17,200 in-spite of high elasticity of demand. PH gems would not be able to sustain this policy on account of change if any in variable costs.

(ii) Evaluation of Option (ii)

	(₹)
Sales	1,800.00
Less: Direct Material (₹ 5,94,200 / 1500)	396.13
Cost of Tie PIN	18.00
Direct Labour (₹ 4,42,600/1500)	295.07
Variable Overheads (₹ 11,97,000 x 60% / 5000)	478.80
Contribution	612.00
P/V Ratio (₹ 612/1800x100)	34.0%

Sales to required earn a profit of 20%

Sales = ₹ 4,78,800 + 0.20 of sales / 34.00%

Sales = ₹ 34,20,000 or 1,900 units (₹ 34,20,000/1800)

To earn profit 20% on sales of readymade suit (along with TIE PIN) company has to sold 1,900 units i.e., 95% of the full capacity. This sales level of 1,900 units is justified only if variable cost is constant. Any upside in variable cost would impact profitability, to achieve the desired profitability. Production has to be increased but the scope is limited to 5% only.

PART – B: (REVISION TEST PAPERS)

16.

(a) Working Notes:

Particulars	2022-23 (₹)	2023-24 (₹)
Fixed Cost	72,00,000 (₹ 60 × 1,20,000 units)	79,20,000 (110% of ₹ 72,00,000)
Variable Cost	180	225 (125% of ₹ 180)

Calculation of Break-even Point (in units):

Since, shelf life of the product is one year only, hence, opening stock is to be sold first.

	(₹)
Total Contribution required to recover total fixed cost in 2023- 24 and to reach break-even volume.	79,20,000
Less: Contribution from opening stock {20,000 units × (₹ 300 – ₹ 180)}	24,00,000
Balance Contribution to be recovered	55,20,000

Units to be produced to get balance contribution

= ₹ 55,20,000 / ₹ 300 - ₹ 225 = 73,600 packets.

Break-even volume in units for 2023-24

	Packets
From 2023-24 production	73,600
Add: Opening stock from 2022-23	20,000
	93,600

17.

a) P/V ratio: Sales per unit - Variable Cost per unit / Selling price per unit x 100

= 1000 – 800 / 1000 x 100

= 200/ 1000 x 100 =20%

Annual BEP in units: Annual fixed cost / Contribution per unit

= 23,00,000 / 200 = 11,500 units

Annual BEP in value: Annual fixed cost / P/V ratio

= 23,00,000 / 20% = ₹1,15,00,000

b) Revised P/V ratio and BEP :

Commission on sales per unit= 1% of 1,000= ₹ 10

So, P/V ratio : 1000 – (750 + 50 + 10) / 1000

= 190 / 1000 x 100 = 19%

BEP in terms of units: Annual fixed cost / Contribution per unit

= 23,00,000 / 190 = 12,106 units

BEP in terms of value: Annual fixed cost P / V

= 23,00,000 / 19% = ₹1,21,05,263

(c) Break-even point under fixed salary plan:

P/V ratio = Contribution per unit / Selling price per unit = 1000 - 750 / 1000 x 100 = 250 / 1000 × 100

Revised fixed cost : Original fixed cost	₹ 23,00,000
Proposed fixed salary	₹ 9,00,000
Total	₹ 32,00,000

BEP in terms of units: Annual fixed cost / Contribution per unit = 32,00,000 / 250 = 12,800 units

BEP in terms of value: = Annual fixed cost / P / v ratio = 32,00,000 / 25% = 1,28,00,000

(d) Annual break-even point under requirement (a) is 11,500 units.

Margin of safety at sales volume of 20,000 unit of bags (20,000 – 11,500) = 8500 units

Contribution on sales beyond break-even sales:

Revised contribution per unit: 200 – (2% of 1000) = 180

Profit = Margin of safety (in units) × Contribution per unit

= 8500 × 180 = ₹ 15,30,000

18.

(a) (i) Full cost of the product per unit

Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Fixed manufacturing support	₹ 1092
Total manufacturing costs	₹ 2604

(ii) Contribution margin per unit

Selling price	₹ 3906
Less: Variable costs	
Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Contribution margin per unit	₹ 2394

(iii) Costs for decision making are those costs that differ between alternatives, which in this situation are the incremental costs.

Direct material	₹ 693
Direct labour	₹ 315

Variable manufacturing support	₹ 504
Total incremental costs	₹ 1512

(iv) Minimum acceptable price would be the incremental costs in the short term i.e. ₹ 1512

(v) Yes, RPP Manufacturers may consider a price of ₹ 2100 per unit because this price is greater than the minimum acceptable price.

(b) (i)

Particulars	(₹)
Variable cost per running hour of Machine MR10 (₹ 68,750/1100 hours)	62.50
Fixed cost (₹ 50,000/1100 hours)	45.46
Cost of brain scan on Machine MR10:	(₹)
Variable machine cost (4 hours × ₹ 62.50)	250.00
Special technology	100.00
Total variable cost	350.00
Fixed machine cost (4 hours × ₹ 45.46)	181.84
Total cost of a scan	531.84
Total cost of a satisfactory scan (₹ 531.84/0.9)	590.93

(ii) It is given that fixed cost will remain unchanged and thus they are not relevant for the decision. The relevant costs would be the incremental costs of an additional scan:

Machine MR10:	**(₹)**
Variable cost per scan	350.00
Variable cost per satisfactory scan (₹ 350/0.9)	388.89
Machine MR59:	**(₹)**
Variable machine cost per scan (₹ 1,60,000 / 2000 hours × 1.8 hours)	144.00
Special technology	137.50
Variable cost per scan	281.50
Variable cost per satisfactory scan (₹ 281.50/0.94)	299.47

The relevant costs per satisfactory scan are cheaper on Machine MR59 and therefore brain scans should be undertaken on said machine.

19.

(i) Computation of PV ratio, contribution, profit and break-even sales for existing product mix

	Products			Total
	S	T	U	
Selling Price (₹)	600	800	400	
Less: Variable Cost (₹)	300	400	240	

Contribution per unit (₹)	300	400	160	
P/V Ratio (Contribution/Selling price)	50%	50%	40%	
Sales Mix	25%	35%	40%	
Contribution per rupee of sales (P/V Ratio × Sales Mix)	12.5%	17.5%	16%	46%
Present Total Contribution (₹ 1,20,00,000 × 46%)			₹ 55,20,000	
Less: Fixed Costs			₹ 36,00,000	
Present Profit			₹ 19,20,000	
Present Break Even Sales (₹ 36,00,000/0.46) ₹ 78,26,087				

(ii) Computation of PV ratio, contribution, profit and break-even sale for proposed product mix

	Products			Total
	S	T	M	
Selling Price (₹)	600	800	600	
Less: Variable Cost (₹)	300	400	300	
Contribution per unit (₹)	300	400	300	
P/V Ratio (Contribution/Selling price)	50%	50%	50%	
Sales Mix	40%	35%	25%	
Contribution per rupee of sales (P/V Ratio x Sales Mix)	20%	17.5%	12.5%	50%
Proposed Total Contribution (₹1,28,00,000 x 50%)				₹ 64,00,000
Less: Fixed Costs				₹ 36,00,000
Proposed Profit				₹ 28,00,000
Proposed Break- Even Sales (₹ 36,00,000/0.50)				₹ 72,00,000

20.

Computation of Profit Volume Ratio

(₹ in '000)

Factory	Sales			Profit			P/V Ratio (Change in Profit/ Change in Sales)
	Actual	Over / (Under) Budget	Budgeted Sales	Actual	Over / (Under) Budget	Budget Profit	
North	1,100	(400)	1,500	135	(180)	315	45%
East	1,450	150	1,300	210	90	120	60%
South	1,200	(200)	1,400	330	(110)	440	55%

(i) **Computation of Fixed Costs** **(₹ in '000)**

Factory	Actual Sales	P/V Ratio	Contribution	Actual Profit	Fixed Cost
	(1)	(2)	(3) = (1) × (2)	(4)	(5) = (3) - (4)
North	1,100	45%	495	135	360

East	1,450	60%	870	210	660
South	1,200	55%	660	330	330
Total	3,750		2,025	675	1,350

(ii) Computation of Break-Even Sales

Factory	Fixed Cost (a)	P/V Ratio (b)	Break-even Sales (a) / (b)
North	360	45%	800
East	660	60%	1,100
South	330	55%	600
			2,500

Break-even Sales (Company as Whole) = Fixed Cost/ Composite P/V Ratio*

= ₹ 13,50,000 / 54%

= ₹ 25,00,000

*Composite P/V Ratio = Total Contribution/Total Actual sales = 2,025/3,750 = 54%

21.

(i) Computation of PV ratio, contribution and break-even sales for existing product mix

	Products			Total
	S	T	U	
Selling Price (₹)	300	400	200	
Less: Variable Cost (₹)	150	200	120	
Contribution per unit (₹)	150	200	80	
P/V Ratio (Contribution/Selling price)	50%	50%	40%	
Sales Mix	35%	35%	30%	
Contribution per rupee of sales (P/V Ratio × Sales Mix)	17.5%	17.5%	12%	47%
Present Total Contribution (₹ 60,00,000 × 47%)				₹ 28,20,000
Less: Fixed Costs				₹ 18,00,000
Present Profit				₹ 10,20,000
Present Break-Even Sales (₹ 18,00,000/0.47)				₹ 38,29,787

(ii) Computation of PV ratio, contribution and break-even sale for proposed product mix

	Products			
	S	T	M	Total
Selling Price (₹)	300	400	300	
Less: Variable Cost (₹)	150	200	150	
Contribution per unit (₹)	150	200	150	

P/V Ratio (Contribution/Selling price)	50%	50%	50%	
Sales Mix	50%	25%	25%	
Contribution per rupee of sales (P/V Ratio x Sales Mix)	25%	12.5%	12.5%	50%
Proposed Total Contribution (₹ 64,00,000 x 50%)			₹ 32,00,000	
Less: Fixed Costs			₹ 18,00,000	
Proposed Profit			₹ 14,00,000	
Proposed Break-Even Sales (₹ 18,00,000/0.50)			₹ 36,00,000	

22.

Sales Volume 50,000 Units

Computation of existing contribution

Particulars	Per unit (₹)	Total (₹ In lakhs)
Sales	680	3,400
Fixed Cost	200	1,000
Profit	50	250
Contribution	250	1,250
Variable Cost (Sales – Contribution)	430	2,150

(i) Break even sales in units = Fixed Cost / Contribution per unit = 10,00,00,000/250 = 4,00,000 units

Break even sales in rupees = 4,00,000 units × ₹ 680 = ₹ 2,720 lakhs

OR

P/V Ratio = 250/680 x 100 = 36.76%

B.E.P (in rupees) = Fixed Cost / P/V Ratio = 10,00,00,000 / 36.76% = ₹ 2.720 lakhs (Approx.)

(ii) Number of units sold to achieve a target profit of ₹ 700 lakhs:

Desired Contribution = Fixed Cost + Target Profit

= 1,000 L + 700 L = 1,700 L

Number of units to be sold = Desired Contribution= 17,00,00,000/250 = 6,80,000 units

Number of units to be sold = Desired Contribution/Contribution per unit = 12,00,00,000 / 2,000 = 60,000 units

(iii) Profit if selling price is increased by 10% and sales volume drops by 10%:

Existing Selling Price per unit = ₹ 680

Revised selling price per unit = ₹ 680 × 110% = ₹ 748

Existing Sales Volume = 5,00,000 units

Revised sales volume = 5,00,000 units – 10% of 5,00,000 = 4,50,000 units.

Statement of profit at sales volume of 4,50,000 units @ ₹ 748 per unit

Particulars	Per unit (₹)	Total (₹ In lakhs)

Sales	748	3,366
Less: Variable Costs	430	1,935
Contribution	318	1,431
Less: Fixed Cost		1,000
Profit		431

(iv) Volume to be achieved to earn target profit of ₹ 700 lakhs with revised selling price and reduction of 10% in variable costs and ₹ 170 lakhs in fixed cost:

Revised selling price per unit = ₹ 748

Variable costs per unit existing = ₹ 430

Revised Variable Costs

Reduction of 10% in variable costs = ₹ 430 – 10% of 430

= ₹ 430 – ₹ 43

= ₹ 387

Total Fixed Cost (existing) = ₹ 1,000 lakhs

Reduction in fixed cost = ₹ 170 lakhs

Revised fixed cost = ₹ 1,000 lakhs – ₹ 170 lakhs = ₹ 830 lakhs

Revised Contribution (unit) = Revised selling price per unit – Revised Variable Costs per units

Revised Contribution per unit = ₹ 748 – ₹ 387 = ₹ 361

Desired Contribution = Revised Fixed Cost + Target Profit

= ₹ 830 lakhs + ₹ 700 lakhs = ₹ 1,530 lakhs

No. of units to be sold = Desired Contribution/ Contribution per unit

= ₹ 15,30,00,000/₹ 361 = 4,23,823 units

23.

Working Notes:

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

COGS = DM + DL + FOH + AOH

COGS = {0.3 COGS + 0.15 COGS + (0.10 COGS + ₹ 2,30,000) + (0.02 COGS + ₹ 71,000)}

Or, COGS = 0.57 COGS + ₹ 3,01,000

Or, COGS = ₹ 3,01,000 / 0.43 = ₹ 7,00,000

(2) Calculation of Cost of Sales (COS):

COS = COGS + S&DOH

COS = COGS + (0.04 COS + ₹ 68,000)

Or, COS = ₹ 7,00,000 + (0.04 COS + ₹ 68,000)

Or, COS = ₹ 7,68,000 / 0.96 = ₹ 8,00,000

(3) Calculation of Variable Costs:

Direct Material	-(0.30 × ₹ 7,00,000)	₹ 2,10,000
Direct Labour	-(0.15 × ₹ 7,00,000)	₹ 1,05,000
Factory Overhead	-(0.10 × ₹ 7,00,000)	₹ 70,000
Administration OH	-(0.02 × ₹ 7,00,000)	₹ 14,000
Selling & Distribution OH	(0.04 × ₹ 8,00,000)	₹ 32,000
		₹ 4,31,000

(4) Calculation of total Fixed Costs:

Factory Overhead-	₹ 2,30,000
Administration OH-	₹ 71,000
Selling & Distribution OH	₹ 68,000
	₹ 3,69,000

(5) Calculation of P/V Ratio:

P/V Ratio = Contribution/Sales x 100 = Sales – variable costs / Sales x 100

= (₹ 185 x 5,000 units) - ₹ 4,31,000 / ₹ 185 x 5,000 units x 100 = 53.41%

(i) Break-Even Sales

= Fixed Costs / P/V Ratio = ₹ 3,69,000 / 53.41% = ₹ 6,90,882

(ii) Profit earned during the last year

= (Sales – Total Variable Costs) – Total Fixed Costs

= (₹ 9,25,000 - ₹ 4,31,000) - ₹ 3,69,000

= ₹ 1,25,000

(iii) Margin of Safety (%)

= Sales – Breakeven sales / Sales x 100

= ₹ 9,25,000 - ₹ 6,90,882 / ₹ 9,25,000 x 100 = 25.31%

(iv) Profit if the sales were 10% less than the actual sales:

Profit = 90% (₹ 9,25,000 - ₹ 4,31,000) - ₹ 3,69,000

= ₹ 4,44,600 - ₹ 3,69,000 = ₹ 75,600

24.

(i) Contribution = ₹ 375 - ₹ 175 = ₹ 200 per unit.

Break even Sales Quantity = Fixed cost/contribution margin per unit = ₹ 65,00,000/₹ 200 = 32,500 units

Cash Break even Sales Qty = Cash Fixed Cost / contribution margin per unit

= ₹ 50,00,000/ ₹ 200 = 25,000 unit

(ii) P/V ratio = Contribution/unit x 100 = ₹ 200/₹ 375 x 100 = 53.33%

(iii) No. of units that must be sold to earn an Income (EBIT) of ₹ 5,00,000

Fixed cost + Desired EBIT/ Contribution margin per unit

= 65,00,000 + 5,00,000 / 200 = 35,000 units

(iv) After Tax Income (PAT) = ₹ 5,00,000

Tax rate = 40%

Desired level of Profit before tax = ₹ 5,00,000 / 60 x 100 = ₹ 8,33,333

Estimate Sales Level = Fixed Cost + Desired profit / P/V ratio

Or, (Fixed Cost + Desired Profit/Contribution per unit x Selling price per unit)

= ₹ 65,00,000 + ₹ 8,33,333 / 53.33% = ₹ 1,37,50,859

CHAPTER 12: STANDARD COSTING

PART – A: ICAI PAST EXAM QUESTIONS

PROBLEM – 1: (MAY 23 – 10 Marks)

NC Limited uses a standard costing system for the manufacturing of its product 'X'. The following information is available for the last week of the month:

- 25,000 kg of raw material were actually purchased for ₹ 3,12,500. The expected output is 8 units of product 'X' from each one kg of raw material. There is no opening and closing inventories. The material price variance and material cost variance, as per cost records, are ₹ 12,500 (F) and ₹ 1800 (A), respectively.
- The standard time to produce a batch of 10 units of product 'X' is 15 minutes. The standard wage rate per labour hour is 50. The company employs 125 workers in two categories, skilled and semi-skilled, in a ratio of 60:40. The hourly wages actually paid were ₹ 50 per hour for skilled workers and ₹ 40 per hour for semi- skilled workers. The weekly working hours are 40 hours per worker. Standard wage rate is the same for skilled and semi- skilled workers.
- The monthly fixed overheads are budgeted at ₹ 76,480 Overheads are evenly distributed throughout the month and assume 4 weeks in a month. In the last week of the month, the actual fixed overhead expenses were ₹ 19,500.

Required:

(i) Calculate the standard price per kg and the standard quantity of raw material.

(ii) Calculate the material usage variance, labour cost variance, and labour efficiency variance.

(iii) Calculate the fixed overhead cost variance, the fixed overhead expenditure variance and the fixed overhead volume variance.

Note: Indicate the nature of variance i.e Favourable or Adverse

PROBLEM – 2: (NOV 22 & NOV 23 RTP – 10 Marks)

Y Lid manufactures "Product M" which requires three types of raw materials - "A", "B" & "C". Following information related to 1st quarter of the F.Y. 2022-23 has been collected from its books of accounts. The standard material input required for 1,000 kg of finished product 'M' are as under:

Material	Quantity (Kg.)	Std. Rate per Kg. (₹)
A	500	25
B	350	45
C	250	55
	1100	
Standard Loss	100	
Standard Output	1000	

During the period, the company produced 20,000 kg of product "M" for which the actual quantity of

materials consumed and purchase prices are as under:

Material	Quantity (Kg.)	Purchase price per Kg. (₹)
A	11,000	23
B	7,500	48
C	4,500	60

You are required to calculate:

(i) Material Cost Variance

(ii) Material Price Variance for each raw material and Product 'M'

(iii) Material Usage Variance for each raw material and Product 'M'

(iv) Material Yield Variance

Note: Indicate the nature of variance i.e. Favourable or Adverse.

PROBLEM – 3: (MAY 22 – 5 Marks)

A manufacturing department of a company has employed 120 workers. The standard output of product ''NPX" is 20 units per hour and the standard wage rate is ₹ 25 per labour hour.

In a 48 hours week, the department produced 1,000 units of 'NPX' despite 5% of the time paid being lost due to an abnormal reason. The hourly wages actually paid were ₹ 25.70 per hour.

Calculate:

i. Labour Cost Variance

ii. Labour Rate Variance

iii. Labour Efficiency Variance

iv. Labour Idle time Variance

PROBLEM – 4: (NOV 21 – 10 Marks)

In a manufacturing company the standard units of production for the year were fixed at 1,20,000 units and overhead expenditures were estimated to be as follows:

Particulars	Amount (₹)
Fixed	12,00,000
Semi-variable (60% expenses are of fixed nature and 40% are of variable nature)	1,80,000
Variable	6,00,000

Actual production during the month of April, 2021 was 8,000 units. Each month has 20 working days. During the month there was one public holiday. The actual overheads were as follows:

Particulars	Amount (₹)
Fixed	1,10,000
Semi-variable (60% expenses are of fixed nature and 40% are of variable)	19,200
Variable	48,000

You are required to calculate the following variances for the month of April 2021:

i. Overhead Cost variance

ii. Fixed Overhead Cost variance

iii. Variable Overhead Cost variance

iv. Fixed Overhead Volume variance

v. Fixed Overhead Expenditure Variance

vi. Calendar Variance

PROBLEM – 5: (JUL 21 – 10 Marks)

The standard output of a Product 'DJ' is 25 units per hour in manufacturing department of a Company employing 100 workers. In a 40 hours week, the department produced 960 units of product 'DJ' despite 5% of the time paid was lost due to an abnormal reason. The hourly wage rates actually paid were ₹ 6.20, ₹ 6.00 and ₹ 5.70 respectively to Group 'A' consisting 10 workers, Group 'B' consisting 30 workers and Group 'C' consisting 60 workers. The standard wage rate per labour is same for all the workers. Labour Efficiency Variance is given ₹ 240 (F).

You are required to compute:

(i) Total Labour Cost Variance.

(ii) Total Labour Rate Variance.

(iii) Total Labour Gang Variance.

(iv) Total Labour Yield Variance, and

(v) Total Labour Idle Time Variance.

PROBLEM – 6: (JAN 21 – 10 Marks)

Premier Industries has a small factory where 52 workers are employed on an average for 25 days a month and they work 8 hours per day. The normal down time is 15%. The firm has introduced standard costing for cost control. Its monthly budget for November, 2020 shows that the budgeted variable and fixed overhead are ₹ 1,06,080 and ₹ 2,21,000 respectively.

The firm reports the following details of actual performance for November, 2020, after the end of the month:

Actual hours worked	8,100 hrs.
Actual production expressed in standard hours	8,800 hrs.
Actual Variable Overheads	₹ 1,02,000
Actual Fixed Overheads	₹ 2,00,000

You are required to calculate:

(i) Variable Overhead Variances:

- **(a)** Variable overhead expenditure variance.
- **(b)** Variable overhead efficiency variance.

(ii) Fixed Overhead Variances:

(a) Fixed overhead budget variance.

(b) Fixed overhead capacity variance.

(c) Fixed overhead efficiency variance.

(iii) Control Ratios:

(a) Capacity ratio.

(b) Efficiency ratio.

(c) Activity ratio.

PROBLEM – 7: (NOV 20 – 10 Marks)

ABC Ltd. has furnished the following information regarding the overheads for the month of June 2020:

(i)	Fixed Overhead Cost Variance	₹ 2,800 (Adverse)
(ii)	Fixed Overhead Volume Variance	₹ 2,000 (Adverse)
(iii)	Budgeted Hours for June, 2020	2,400 hours
(iv)	Budgeted Overheads for June,2020	₹ 12,000
(v)	Actual rate of recovery of overheads	₹ 8 Per Hour

From the above given information Calculate:

1) Fixed Overhead Expenditure Variance

2) Actual Overheads Incurred

3) Actual Hours for Actual Production

4) Fixed Overhead Capacity Variance

5) Standard hours for Actual Production

6) Fixed Overhead Efficiency Variance

PROBLEM – 8: (NOV 19 – 10 Marks)

The standard cost of a chemical mixture is as follows:

60% of Material A @ ₹ 50 per kg

40% Material B @ ₹ 60 per kg

A standard loss of 25% on output is expected in production. The cost records for a period has shown the following usage.

540 kg of Material A @ ₹ 60 per kg

260 kg of Material B @ ₹ 50 per kg

The quantity processed was 680 kilograms of good product. From the above given information Calculate:

i. Material Cost Variance

ii. Material Price Variance

iii. Material Usage Variance

iv. Material Mix Variance

v. Material Yield Variance.

PROBLEM – 9: (NOV 18 – 5 Marks)

A manufacturing concern has provided following information related to fixed overheads:

	Standard	**Actual**
Output in a month	5000 units	4800 units
Working days in a month	25 days	23 days
Fixed overheads	₹ 5,00,000	₹ 4,90,000

Compute:

i. Fixed overhead variance

ii. Fixed overhead expenditure variance

iii. Fixed overhead volume variance

iv. Fixed overhead efficiency variance

PROBLEM – 10: (MAY 19 – 10 Marks)

A gang of workers normally consists of 30 skilled workers, 15 semi-skilled workers and 10 unskilled workers. They are paid at standard rate per hour as under:

Skilled ₹ 70

Semi-skilled ₹ 65

Unskilled ₹ 50

In a normal working week of 40 hours, the gang is expected to produce 2,000 units of output. During the week ended 31st March, 2019, the gang consisted of 40 skilled, 10 semi-skilled and 5 unskilled workers. The actual wages paid were at the rate of ₹ 75, ₹ 60 and ₹ 52 per hour respectively. Four hours were lost due to machine breakdown and 1,600 units were produced.Calculate the following variances showing clearly adverse (A) or favourable (F)

i. Labour Cost Variance

ii. Labour Rate Variance

iii. Labour Efficiency Variance

iv. Labour Mix Variance

v. Labour Idle Time Variance

PROBLEM – 11: (May 18 – 5 Marks)

Beta Ltd. is manufacturing Product N. This is manufactured by mixing two materials namely Material P and Material Q. The Standard Cost of Mixture is as under:

Material P 150 ltrs. @ ₹ 40 per ltr.

Material Q 100 ltrs. @ ₹ 60 per ltr.

Standard loss @ 20 of total input is expected during production.

The cost records for the period exhibit following consumption:

Material P 140 ltrs. @ ₹ 42 per ltr,

Material Q 110 ltrs. @ ₹ 56 per ltr,

Quantity produced was 195 ltrs.

Calculate:

i. Material Cost Variance

ii. Material Usage Variance.

iii. Material Price Variance

PART – B: (REVISION TEST PAPERS)

PROBLEM – 12 : (NOV 22)

Ahaan Limited operates a system of standard costing in respect of one of its products 'AH1' which is manufactured within a single cost centre. Details of standard per unit are as follows:

- The standard material input is 20 kilograms at a standard price of ₹ 24 per kilogram.
- The standard wage rate is ₹ 72 per hour and 5 hours are allowed to produce one unit.
- Fixed production overhead is absorbed at the rate of 100% of wages cost. During the month of April 2022, the following was incurred:
- Actual price paid for material purchased @ ₹ 22 per kilogram.
- Total direct wages cost was ₹ 43,92,000
- Fixed production overhead cost incurred was ₹ 45,00,000 Analysis of variances was as follows:

Variances	Favourable	Adverse
Direct material price	₹ 4,80,000	-
Direct material usage	₹ 48,000	
Direct labour rate	-	₹ 69,120
Direct labour efficiency	₹ 33,120	-
Fixed production overhead expenditure		₹ 1,80,000

You are required to CALCULATE the following for the month of April, 2022

(i) Material cost variance

(ii) Budgeted output (in units)

(iii) Quantity of raw materials purchased (in kilograms)

(iv) Actual output (in units)

(v) Actual hours worked

(vi) Actual wage rate per labour hour

(vii) Labour cost variance

(viii) Production overhead cost variance

PROBLEM – 13 : (MAY 22)

The standard output of a Product 'D' is 50 units per hour in manufacturing department of a Company employing 100 workers. In a 40 hours week, the department produced 1,920 units of product 'D' despite 5% of the time paid was lost due to an abnormal reason. The hourly wage rates actually paid were ₹ 12.40, ₹ 12.00 and ₹ 11.40 respectively to Group 'A' consisting 10 workers, Group 'B' consisting 30 workers and Group 'C' consisting 60 workers. The standard wage rate per labour is same for all the workers. Labour Efficiency Variance is given ₹ 480 (F).

You are required to COMPUTE:

(i) Total Labour Cost Variance.

(ii) Total Labour Rate Variance.

(iii) Total Labour Gang Variance.

(iv) Total Labour Yield Variance, and

(v) Total Labour Idle Time Variance

PROBLEM – 14: (RTP MAY 21)

LM Limited produces a product 'SX4' which is sold in a 10 Kg. packet. The standard cost card per packet of 'SX4' is as follows:

	(₹)
Direct materials 10 kg @ ₹ 90 per kg	900
Direct labour 8 hours @ ₹ 80 per hour	640
Variable Overhead 8 hours @ ₹ 20 per hour	160
Fixed Overhead	250
	1,950

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

	(₹)
Direct Materials 8,900 Kg @ ₹ 92 per Kg.	8,18,800
Direct Labour 7,000 hours @ ₹ 84 per hour	5,88,000
Variable Overhead incurred	1,40,000
Fixed Overhead incurred	2,60,000

You are required to CALCULATE:

i. Material Usage Variance

ii. Material Price Variance

iii. Material Cost Variance

iv. Labour Efficiency Variance

v. Labour Rate Variance

vi. Labour Cost Variance

vii. Variable Overhead Cost Variance

viii. Fixed Overhead Cost Variance

PROBLEM – 15: (RTP NOV 20)

Following are the standard cost for a product-X:

	(₹)
Direct materials 10 kg @ ₹ 90 per kg	900
Direct labour 8 hours @ ₹ 100 per hour	800
Variable Overhead 8 hours @ ₹ 15 per hour	120
Fixed Overhead	400
	2,220

Budgeted output for the year was 2,000 units. Actual output is 1,800 units. Actual cost for year is as follows:

	(₹)
Direct Materials 17,800 Kg @ ₹ 92 per Kg.	16,37,600
Direct Labour 14,000 hours @ ₹ 104 per hour	14,56,000
Variable Overhead incurred	2,17,500
Fixed Overhead incurred	7,68,000

You are required to CALCULATE:

i. Material Usage Variance

ii. Material Price Variance

iii. Material Cost Variance

iv. Labour Efficiency Variance

v. Labour Rate Variance

vi. Labour Cost Variance

vii. Variable Overhead Cost Variance

viii. Fixed Overhead Cost Variance.

PROBLEM – 16: (RTP MAY 20)

ABC Ltd. had prepared the following estimation for the month of January:

	Quantity	**Rate (₹)**	**Amount (₹)**
Material-A	800 kg.	90.00	72,000
Material-B	600 kg.	60.00	36,000
Skilled labour	1,000 hours	75.00	75,000
Unskilled labour	800 hours	44.00	35,200

Normal loss was expected to be 10% of total input materials and an idle labour time of 5% of expected

labour hours was also estimated.

At the end of the month the following information has been collected from the cost accounting department:

The company has produced 1,480 kg. finished product by using the followings:

	Quantity	Rate (₹)	Amount (₹)
Material-A	900 kg.	86.00	77,400
Material-B	650 kg.	65.00	42,250
Skilled labour	1,200 hours	71.00	85,200
Unskilled labour	860 hours	46.00	39,560

You are required to CALCULATE:

a) Material Cost Variance;

b) Material Price Variance;

c) Material Mix Variance;

d) Material Yield Variance;

e) Labour Cost Variance;

f) Labour Efficiency Variance and

g) Labour Yield Variance.

PROBLEM – 17: (RTP NOV 19)

JVG Ltd. produces a product and operates a standard costing system and value material and finished goods inventories at standard cost. The information related with the product is as follows:

Particulars	Cost per unit (₹)
Direct materials (30 kg at ₹ 350 per kg)	10,500
Direct labour (5 hours at ₹ 80 per hour)	400

The actual information for the month just ended is as follows:

a) The budgeted and actual production for the month of September 2019 is 1,000 units.

b) Direct materials –5,000 kg at the beginning of the month. The closing balance of direct materials for the month was 10,000 kg. Purchases during the month were made at ₹ 365 per kg. The actual utilization of direct materials was 7,200 kg more than the budgeted quantity.

c) Direct labour – 5,300 hours were utilised at a cost of ₹ 4,34,600.

Required:

CALCULATE

(i) Direct material price and usage variances

(ii) Direct labour rate and efficiency variances.

ANSWERS

1.

i. Calculation of Standard price per kg and the standard quantity of raw material:

Standard Price

(a) Material Price Variance = Standard Cost of Actual Quantity – Actual Cost

12,500 (F) = (SP × AQ) – ₹ 3,12,500

12,500 (F) = (SP × 25,000) – ₹ 3,12,500

SP = ₹ 13

Standard Quantity

(b) Material Cost Variance = Standard Cost – Actual Cost

1,800 (A) = SQ × ₹ 13 – ₹ 3,12,500

SQ = 23,900 kg.

ii. Calculation of Material Usage Variance, Labour Cost Variance and Labour Efficiency Variance

(a) Material Usage Variance = Standard Cost of Standard Quantity for Actual Output – Standard Cost of Actual Quantity

= SQ × SP – AQ × SP

Or

= SP × (SQ – AQ)

= ₹ 13 × (23,900 kg. – 25,000 kg.)

= ₹ 14,300 (A)

(b) Labour Cost Variance = Standard Cost – Actual Cost

= (SH × SR) – (AH × AR)

= ₹ 2,39,000 – ₹ 2,30,000

= ₹ 9,000 (F)

(c) Labour Efficiency Variance= Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time

= (SH × SR) – (AH × SR)

Or

= (SH – AH) × SR

= ₹ 50 × [4,780 hrs. – 5,000 hrs.]

= ₹ 11,000 (A)

iii. Calculation of Fixed Overhead Cost Variance, Fixed Overhead Expenditure Variance and Fixed Overhead Volume Variance:

(a) Fixed overhead cost variance = Standard Fixed Overheads – Actual Fixed Overheads

= 18,279 – 19,500

= ₹ 1,221(A)

(b) Fixed Overhead Expenditure Variance = Budgeted Fixed Overheads – Actual Fixed Overheads

= ₹ 19,120 – ₹ 19,500

= ₹ 380 (A)

(c) Fixed overhead volume variance = (Budgeted output – Actual Output) x Budgeted rate per unit

= (2,00,000 – 1,91,200) 0.0956

= ₹ 8,800 x 0.0956

= ₹ 841 (A)

Alternative presentation to part (iii) (a) and (b)

(i) Fixed Overhead Cost Variance:

= Overhead absorbed for actual production – Actual overhead incurred

= ₹19,120 / 2, 00,000 x 1,91,200 – 19,500 = ₹ 1,221(A)

(iii) Fixed Overhead Volume Variance:

= Absorbed overhead – Budgeted overhead

= ₹19,120 / 2,00,000 x 1,91,200 – 19,120 = ₹ 841(A)

Working Notes:

1. Standard time to produce 10 units of product X is 15 minutes. Therefore we can manufacture 40 units in an hour.

Hours available in a week

125 Workers x 40 Hours = 5,000 hours

Therefore budgeted output = 5,000 x 40 units per hour = 2,00,000 units

Alternatively

Budgeted time per unit = 15 units / 10 units = 1.5 minutes

So, Budgeted output = 5, 000 Hours × 60 Minutes /1.5 Minutes

= 2,00,000 units

Actual output = 23,900 x 8 units = 1,91,200 units

Standard hour for actual output = 1, 91, 200 × 0.25 Hrs / 10 units = 4, 780 Hrs

2.

Labour									
Budget			**Revised standard**			**Actual**			
Hours	**Rate**	**₹**	**Hours**	**Rate**	**₹**		**Hours**	**Rate**	**₹**
5,000	50	2,50,000	4,780	50	2,39,000	Skilled	3000	50	1,50,000
						Semi-Skilled	2000	40	80,000
							5000		2,30,000

3.

	Budget	Actual
Units	2,00,000	1,91,200
Fixed Overheads	19,120	19,500

4. Standard Fixed overheads:

19,120 ÷ 2,00,000 × 1,91,200 = ₹ 18,279

Budgeted rate per unit:

19,120 ÷ 2,00,000 = ₹ 0.0956

2.

Basic Calculations:

	Standard for 20,000 kg.			Actual for 20,000 kg.		
	Qty.	Rate	Amount	Qty.	Rate	Amount
	Kg.	(₹)	(₹)	Kg.	(₹)	(₹)
A	10,000	25	2,50,000	11,000	23	2,53,000
B	7,000	45	3,15,000	7,500	48	3,60,000
C	5,000	55	2,75,000	4,500	60	2,70,000
Total	22,000		8,40,000	23,000		8,83,000

Calculation of Variances:

(i) Material Cost Variance = Std. Cost for actual output–Actual cost MCV=8,40,000– 8,83,000 = ₹ 43,000(A)

(ii) Material Price Variance = (SP–AP) × AQ

A = (25 - 23) x 11,000 = 22,000 (F)

B = (45 – 48) x 7,500 = 22,500 (A)

C = (55 – 60) x 4,500 = 22,500 (A)

= 23000 (A)

(iii) Material Usages Variance = (SQ–AQ) × SP

A = (10,000 – 11,000) x 25 = 25,000 (A)

B = (7,000 – 7,500) x 45 = 22,500 (A)

C = (5,000 – 4,500) x 55 = 27,500 (F)

20,000 (A)

(iv) Material Yield Variance = (SQ–RSQ*) × SP

A = (10,000 – 10,454.54) x 25 = 11,363.5(A)

B = (7,000 – 7,318.18) x 45 = 14,318.1(A)

C = (5,000 – 5,227.27) x 55 = 12,500(A)

38,181.6(A)

*Revised Standard Quantity (RSQ)

A = 10000 / 22000 * 23000 = 10454.54

B = 7000 / 22000 * 23000 = 7318.18

C= 5000 / 22000 * 23000 = 5227.27

Material Yield Variance can also be Calculated as below

Material yield variance = Standard cost per unit (Actual yield – Standard yield)

Standard cost per unit = Rs.8,40,000 / 20000 = Rs.42

New Standard Yield = 20,000 / 22,000 × 23,000 = 20,909

22,000

Material yield variance = ₹ 42 (20,000 – 20,909)

= ₹ 38,178 (A)

3.

Working Notes:

1. Calculation of standard man hours

When 120 worker works for 1 hr., then the std. output is 20 units.

120 hrs.

Std. man hour per unit =120 hrs./ 20 units= 6 hrs.

2. Calculation of std. man hours for actual output

Total std. man hours = 1,000 units × 6 hrs. = 6,000 hrs.

Standard for actual			Actual				
Hours	**Rate (₹)**	**Amount (₹)**	**Actual hrs. paid**	**Idle time hrs.**	**Production hrs.**	**Rate (₹)**	**Amount paid (₹)**
6,000	25	1,50,000	5,760 (48 hrs. x 120 workers)	288	5,472	25.70	1,48,032

(i) Labour cost variance

= Std. labour cost – Actual labour cost

= 1,50,000 – 1,48,032 = ₹ 1,968 F

(ii) Labour rate variance

= (SR – AR) × AHPaid

= (25 - 25.70) × 5,760= ₹ 4,032 A

(iii) Labour efficiency variance

= (SH – AH) × SR

= (6,000 – 5,472) × 25 = ₹ 13,200 F

(iv) Labour Idle time variance

= Idle Hours × SR

= 288 × 25 = ₹ 7,200 A

Note: Variances can also be calculated for one worker instead of 120.

4.

Working Notes

Fixed Overheads =Budgeted Fixed Overheads ÷ Budgeted Output = 12,00,000 / 1,20,000 units	₹10
Fixed Overheads element in Semi-Variable Overheads i.e. 60% of Rs.1,80,000	₹ 1,08,000
Fixed Overheads = Budgeted Fixed Overheads ÷ Budgeted Output = ₹ 1,08,000 / 1,20,000 units	₹ 0.90
Standard Rate of Absorption of Fixed Overheads per unit (₹ 10 + ₹ 0.90)	₹ 10.90
Fixed Overheads Absorbed on 8,000 units @ ₹ 10.90	₹ 87,200
Budgeted Variable Overheads	₹ 6,00,000
Add: Variable element in Semi-Variable Overheads 40% of ₹ 1,80,000	₹ 72,000
Total Budgeted Variable Overheads	₹ 6,72,000
Standard Variable Cost per unit = Budgeted Variable Overheads ÷ Budgeted Output = ₹ 6,72,000 ÷1,20,000 units	₹ 5.60
Standard Variable Overheads for 8,000 units @ ₹ 5.60	₹ 44,800
Budgeted Annual Fixed Overheads (₹ 12,00,000 + 60% of ₹ 1,80,000)	₹ 13,08,000
Possible Fixed Overheads = Budgeted Fixed Overheads / Budgeted Days ×Actual Days $= \left[\frac{Rs.1,09,000}{20\,days} \times 19\,days \right]$	₹ 1,03,550
Actual Fixed Overheads (₹ 1,10,000 + 60% of ₹ 19,200)	₹ 1,21,520
Actual Variable Overheads (₹ 48,000 + 40% of ₹ 19,200)	₹ 55,680

COMPUTATION OF VARIANCES

i. Overhead Cost Variance = Absorbed Overheads – Actual Overheads
= (₹ 87,200 + ₹ 44,800) – (₹ 1,21,520 + ₹ 55,680)
= ₹ 45,200 (A)

ii. Fixed Overhead Cost Variance = Absorbed Fixed Overheads – Actual Fixed Overheads
= ₹ 87,200 – ₹ 1,21,520
= ₹ 34,320 (A)

iii. Variable Overhead Cost Variance = Standard Variable Overheads for Production– Actual Variable Overheads
= ₹ 44,800 – ₹ 55,680
= ₹ 10,880 (A)

iv. Fixed Overhead Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads

= ₹ 87,200 – ₹ 1,09,000

= ₹ 21,800 (A)

v. Fixed Overhead Expenditure Variance = Budgeted Fixed Overheads – Actual Fixed Overheads

= ₹ 10.90 × 10,000 units – ₹ 1,21,520

= ₹ 12,520 (A)

vi. Calendar Variance = Possible Fixed Overheads – Budgeted Fixed Overheads

= ₹ 1,03,550 – ₹ 1,09,000

= ₹ 5,450 (A)

OR

Calendar Variance = (Actual days – Budgeted days) x Standard fixed overhead rate per day

Standard fixed overhead rate per day = 1308000/20*12 = ₹ 5450

Fixed Overhead Calendar Variance = (19-20) x 5450 = 5450(A)

5.

Working Notes:

1. Calculation of Standard Man hours

When 100 workers work for 1 hour, the standard output is 25 units.

Standard man hours per unit = 100 hours/ 25 units = 4 hours per unit

2. Calculation of standard man hours for actual output:

= 960 units x 4 hours = 3,840 hours.

3. Calculation of actual cost

Type of Workers	No of Workers	Actual Hours Paid	Rate (₹)	Amount (₹)	Idle Hours (5% of hours paid)	Actual hours Worked
Group 'A'	10	400	6.2	2,480	20	380
Group 'B'	30	1,200	6	7,200	60	1,140
Group 'C'	60	2,400	5.7	13,680	120	2,280
	100	4,000		23,360	200	3,800

4. Calculation of Standard wage Rate:

Labour Efficiency Variance = 240F

(Standard hours for Actual production – Actual Hours) x SR = 240F

(3,840 – 3,800) x SR = 240

Standard Rate (SR) = ₹ 6 per hour

(i) Total Labour Cost Variance

= (Standard hours x Standard Rate) – (Actual Hours x Actual rate)

= (3,840 x 6) – 23,360 = 320A

(ii) Total Labour Rate Variance

= (Standard Rate – Actual Rate) x Actual Hours

Group 'A' = (6- 6.2) 400 = 80A

Group 'B' = (6- 6) 1,200 = 0

Group 'C' = (6 – 5.7) 2,400 = 720F

640F

(iii) Total Labour Gang Variance

= Total Actual Time Worked (hours) × {Average Standard Rate per hour of Standard Gang -Average Standard Rate per hour of Actual Gang@}

@ On the basis of hours worked

= 3,840 × (6 - 3,800 × 6/ 3,800 = 0

(iv) Total Labour Yield Variance

= Average Standard Rate per hour of Standard Gang × {Total Standard Time (hours) - Total Actual Time worked (hours)}

= 6 x (3,840 – 3,800

= 240F

(v) Total Labour idle time variance

= Total Idle hours x standard rate per hour

= 200 hours x 6

= 1,200A

6.

(a) Workings:

Calculation of budgeted hours

Budgeted hours = (52 x 25 x 8) x 85% = 8,840 hours

(i) Variable overheads variance

(a) Variable overhead expenditure variance

= Std. overhead for Actual hours – Actual variable Overhead

= (₹ 1,06,080/8,840 × 8,100) - ₹ 1,02,000

= 4800 A

(b) Variable overhead efficiency variance

= Std. rate per hour × (Std. hours for actual production – Actual hours)

=₹ 1,06,080/8,840 (8,800 hours – 8,100 hours)

= 8400 F

(ii) Fixed overhead variances

(a) Fixed overhead budget variance

= Budgeted overhead – Actual overhead

= ₹ 2,21,000 – ₹ 2,00,000

= 21,000 F

(b) Fixed overhead capacity variance

= Std rate x (Actual hours – budgeted hours)

= ₹ 2,21,000/8,840 × (8,100 – 8,840)

= 18,500 A

(c) Fixed overhead efficiency variance

= Std rate x (Std hours for actual production – Actual hours)

=₹ 2,21,000/8840 x (8,800 – 8,100)

= **17,500 F**

(iii) Control Ratios

(a) Capacity Ratio

= Actual hours/Budgeted hours × 100

= 8,100/8,840 × $100 = 91.63\%$

(b) Efficiency Ratio

= Standard hours/ Actual hours x 100

= 8,800/8,100 x 100 = 108.64 %

(c) Activity Ratio

= Standard hours/ Budgeted hours x 100

= 8,800/8,840 x 100 = 99.55%

7.

1) Fixed Overhead Expenditure Variance

= Budgeted Fixed Overheads – Actual Fixed Overheads

= ₹ 12,000 – ₹ 12,800 (as calculated below) **= ₹ 800 (A)**

2) Fixed Overhead Cost Variance= Absorbed Fixed Overheads – Actual Fixed Overheads

2,800 (A) = ₹ 10,000 – Actual Overheads

Actual Overheads = **₹ 12,800**

3) Actual Hours for Actual Production = ₹ 12,800/ ₹ 8 **= 1,600 hrs**.

4) Fixed Overhead capacity Variance

= Budgeted Fixed Overheads for Actual Hours– Budgeted Fixed Overheads

= ₹ 5 x 1600 hrs. – ₹ 12,000 = **₹ 4,000 (A)**

5) Standard Hours for Actual Production

= Absorbed Overheads/ Std. Rate

= ₹ 10,000/ ₹ 5 **= 2,000 hrs.**

6) Fixed Overhead Efficiency Variance

= Absorbed Fixed Overheads – Budgeted Fixed Overheads for Actual Hours

= ₹ 10,000 – ₹ 5 x 1,600 hrs. **= ₹ 2,000 (F)**

Working Note:

(i) Fixed Overhead Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads

2,000 (A) = Absorbed Fixed Overheads – ₹ 12,000

Absorbed Fixed Overheads = ₹ 10,000

(ii) Standard Rate/ Hour = ₹ 5 (₹ 12,000/2,400 hrs.)

8.

Basic Calculation

Material	Standard for 640 kg. output			Actual for 680 kg. output		
	Qty. Kg.	Rate (₹)	Amount (₹)	Qty Kg.	Rate (₹)	Amount (₹)
A	480	50	24,000	540	60	32,400
B	320	60	19,200	260	50	13,000
Total	800		43,200	800		45,400
Less: Loss	160	-	-	120	-	-
	640		43,200	680		45,400

Std. cost of actual output = ₹ 43,200 x 680/640 = ₹ 45,900

Calculation of Variances

(i) Material Cost Variance = (Std. cost of actual output – Actual cost)

= (45,900– 45,400)

= ₹ 500 (F)

(ii) Material Price Variance = (SP – AP) x AQ

Material A = (50 – 60) x 540 = ₹ 5400 (A)

Material B = (60 – 50) x 260 = ₹ 2600 (F)

MPV = ₹ 2800 (A)

(iii) Material Usage Variance (MUV) = (Std. Quantity for actual output – Actual Quantity) x Std. Price

Material A = (480x680/640– 540) x 50 = ₹ 1,500 (A)

Material B= (320x680/640– 260) x 60 = ₹ 4,800 (F)

MUV = ₹ 3,300 (F)

(iv) Material Mix Variance = SP x (RAQ – AQ)

A = ₹ 50 x (480 Kg – 540 Kg) = ₹ 3,000 (A)

B = ₹ 60 x (320 Kg. – 260 Kg.) = ₹ 3,600 (F)

Total = ₹ 3,000 (A) + ₹ 3,600 (F) = ₹ 600 (F)

(v) Material Yield Variance = SP x (SQ – RAQ)

A = ₹ 50 x (510 Kg. – 480 Kg) = ₹ 1,500 (F)

B = ₹ 60 x (340 Kg. – 320 Kg.) = ₹ 1,200 (F)

Total = ₹ 1,500 (F) + ₹ 1,200 (F) = ₹ 2,700 (F)

9.

Calculation of Variances:

(i) Fixed Overhead Variance: Standard fixed overhead – Actual fixed overhead

= ₹ [(5,00,000÷5000) ×4800] – ₹ 4,90,000 = ₹ 10,000 (A)

(ii) Fixed Overhead Expenditure Variances:

Budgeted fixed overhead – Actual fixed overhead

= ₹ 5,00, 000 – ₹ 4,90, 000 = ₹ 10,000 (F)

(iii) Fixed Overhead Volume Variance: Standard fixed overhead – Budgeted fixed overhead

= ₹ 4,80, 000 – ₹ 5,00, 000 = ₹ 20,000 (A)

(iv) Fixed Overhead efficiency Variance: Standard fixed overhead – Budgeted fixed overhead for Actual days

= ₹4,80, 000 – [(₹ 5,00, 000÷25) ×23] = ₹ 20,000 (F)

10.

(i) Labour Cost Variance = Standard Cost – Actual Cost

=₹ 1,14,400 – ₹ 1,54,400 = 40,000 (A)

(1,600*75+400*60+200*52= ₹ 1,54,400)

Or

Types of workers	Standard Cost – Actual Cost	Amount (₹)
Skilled Workers	(30x40x70/2,000x1,600)- (40x40x75) 67,200-1,20,000	52,800 (A)
Semi- Skilled	(15x40x65/2,000x1,600)- (10x40x60) 31,200-24,000	7,200 (F)
Un-Skilled Workers	(10x40x50/2,000x1,600)- (5x40x52) 16,000-10,400	5,600 (F)
Total	1,14,400-1,54,400	40,000 (A)

(ii) Labour Rate Variance

Types of workers	Actual Hours × (Standard Rate - Actual Rate)	Amount (₹)
Skilled Workers	1,600 hours × (₹ 70.00 – ₹ 75.00)	8,000 (A)
Semi- Skilled	400 hours × (₹ 65.00 – ₹ 60.00)	2,000 (F)
Un-Skilled Workers	200 hours × (₹ 50.00 – ₹ 52.00)	400 (A)
Total	₹ 8,000 (A) + ₹ 2,000 (F) + ₹ 400 (A)	6,400 (A)

(iii) Labour Efficiency Variance

Types of workers	Standard Rate × (Standard Hours – Actual Hours)	Amount

Skilled Workers	₹ 70.00 × (960 hours – 1,440 hours)	33,600 (A)
Semi- Skilled	₹ 65.00 × (480 hours – 360 hours)	7,800 (F)
Un-Skilled Workers	₹ 50.00 × (320 hours – 180 hours)	7,000 (F)
Total	33,600 (A) + 7,800 (F) + 7,000 (F)	18,800 (A)

Alternatively labour efficiency can be calculated on basis of labour hours paid

Types of workers	Standard Rate × (Standard Hours – Actual Hours)	Amount
Skilled Workers	70.00 × (960 hours – 1600 hours)	44,800 (A)
Semi- Skilled	65.00 × (480 hours – 400 hours)	5,200 (F)
Un-Skilled Workers	50.00 × (320 hours – 200 hours)	6,000 (F)
Total	33,600 (A) + 7,800 (F) + 7,000 (F)	33,600 (A)

(iv) Labour Mix Variance

= Total Actual Time Worked (hours) × {Average Standard Rate per hour of Standard Gang Less Average Standard Rate per hour of Actual Gang} @ On the basis of hours worked

= 1,980 hours x (₹ 1,14,400 / 1,760 hrs – 1,440hrs x ₹ 70 + 360hrs x ₹ 65 + 180 hrs x ₹ 50/1980hrs)

= 4,500 (A)

Labour Mix Variance

Types of workers	Std. Rate ´ (Revised Actual Hours Worked- Actual Hours Worked)	Amount (₹)
Skilled Workers	₹ 70 × (1,080 hrs. – 1440 hrs.)	25,200 (A)
Semi- Skilled	₹ 65 × (540 hrs. – 360 hrs.)	11,700 (F)
Un Skilled Workers	₹ 50 × (360 hrs. – 180 hrs.)	9,000 (F)
Total	₹ 25,200 (A) + ₹ 11,700 (F) + ₹ 9,000 (F)	4,500 (A)

(v) Labour Idle Time Variance

Types of workers	Standard Rate × (Hours Paid – Hours Worked)	Amount (₹)
Skilled Workers	₹ 70.00 × (1,600 hours – 1,440 hours)	11,200 (A)
Semi- Skilled	₹ 65.00 × (400 hours – 360 hours)	2,600 (A)
Un-Skilled Workers	₹ 50.00 × (200 hours – 180 hours)	1,000 (A)
Total	11,200 (A) + 2,600 (A) + 1,000 (A)	14,800 (A)

Verification:

Labour Cost Variance

= Labour Rate Variance + Labour Efficiency Variance + Labour Idle Time Variance

= 6,400 (A) + 18,800 (A) + 14,800 (A) = ₹ 40,000 (A)

Labour Cost Variance

= Labour Rate Variance + Labour Efficiency Variance

= 6400(A) + 33600(A)= ₹ 40000(A)

In this case, labour idle time variance is a part of labour efficiency variance.

Working Notes:

Category	Standard Cost			Actual (1600 units)			Revised Actual Hours
	Hrs.	Rate	Amt. (₹)	Hrs.	Rate	Amt. (₹)	
Skilled	960 (30Wx40x1,600/ 2, 000)	70	67,200	1440 (40Wx36)	75	1,08,000	1080 (1,980x6/11)
Semi-Skilled	480 (15Wx40 x1,600/2,000)	65	31,200	360 (10Wx36)	60	21,600	540 (1,980x3/11)
Unskilled	320 (10Wx40 x1,600/2,000)	50	16,000	180 (5Wx36)	52	9,360	360 (1,980x2/11)
Total		65	1,14,400	1980		1,38,960	1980

11.

Workings:

Take the good output of 195 ltr. The standard quantity of material required for 195 ltr. Of output is 195/ 80 × 100 = 243.75 ltr.

Statement showing computation of Standard Cost/Actual Cost/ Revised Actual Quantity

Material	Standard Cost			Actual Cost		
	Quantity [SQ] (Kg.)	Rate [SP] (₹)	Amount [SQ × SP] (₹)	Quantity [AQ] (Kg.)	Rate [AP] (₹)	Amount [AQ × AP] (₹)
A (60% of 243.75 ltr.)	146.25	40	5,850.00	140	42	5,880
B (40% of. 243.75 Kg.)	97.50	60	5,850.00	110	56	6,160
	243.75		11,700.00	200		12,040

Note: SQ = Standard Quantity = Expected Consumption for Actual Output

AQ = Actual Quantity of Material Consumed

SP = Standard Price Per Unit

AP = Actual Price Per Unit

Computation of Variances:

Material Cost Variance = SQ × SP – AQ × AP

A = ₹ 146.25 ltr. × ₹ 40– 140 ltr. × ₹ 42 = ₹ 30.00 (A)

B = ₹ 97.50 ltr. × ₹ 60 – 110 ltr. × ₹ 56 = ₹ 310.00 (A)

Total = ₹ 30.00 (A) + ₹ 310.00 (A)

= ₹ 340.00 (A)

Material Usage Variance = SP × (SQ – AQ)

A = ₹ 40 × (146.25 ltr. –140 ltr.) = ₹ 250.00 (F)

B = ₹ 60 × (97.50 ltr. – 110 ltr.) = ₹ 750.00 (A)

Total = ₹ 250.00 (F) + ₹ 750.00 (A)

= ₹ 500.00 (A)

Material Price Variance = AQ × (SP – AP)

A = 140 Kg. × (₹ 40 – ₹ 42) = ₹ 280 (A)

B = 110 Kg. × (₹ 60 – ₹ 56) = ₹ 440 (F)

Total = ₹ 280 (A) + ₹ 440 (F)

= ₹ 160 (F)

12.

(i) Direct Material Cost Variance = Direct Material Price Variance + Direct Material Usage Variance

= ₹ 4,80,000 F + ₹ 48,000 F = ₹ 5,28,000 F

(ii) Budgeted Output (units)

Fixed Production Overhead Expenditure Variance

= Budgeted Fixed Overhead - Actual Fixed Overheads

= Budgeted Output x Standard Overhead Rate - Actual Fixed Overheads

₹ 1,80,000 A = Budgeted Output x ₹ 360 (5 hrs @₹ 72) - ₹ 45,00,000

Budgeted Output = ₹ 45,00,000 -₹ 1,80,000 ÷₹ 360 = 12,000 units

(iii) Quantity of Materials purchased (in kilograms)

Material Price Variance = Actual Usage (Standard Price per kg – Actual price per kg)

₹ 4,80,000 F = Actual Usage (₹ 24 -₹ 22)

Actual usage in kgs = ₹ 4,80,000 -₹ 1,80,000 / 2 =240000 Kgs

(iv) Actual Output (units)

Actual Direct Wages	₹ 43,92,000
Direct labour rate variance	₹ 69,120 A
Direct labour efficiency variance	₹ 33,120 F
Standard labour cost for actual output	₹ 43,56,000

Actual Output = Standard labour cost for actual output / Standard wage rate per unit

= 43560000 ÷ 360 (72 * 5) = 12100 units

Alternatively, let X be the actual quantity of output

Then, Standard Quantity of input for actual output 'X'

20X = SQ

Material cost variance = (SQ x SP) - (AQ x AP)

₹ 5,28,000= (20 X x ₹ 24) - (2,40,000 kgs x ₹ 22)

480X = ₹ 52,80,000 + ₹ 5,28,000

480X = ₹ 58,08,000

X = ₹ 58,08,000 ÷ 480 = 12,100 Units

(v) Actual hours worked

Labour Efficiency Variance = Standard Labour Rate (Standard time for actual output - Actual time)

₹ 33,120 F= ₹ 72 (5 hours x 12100 units - Actual time) 460 hours = 60,500 hours - Actual time

Actual time = 60,500 - 460 = 60,040 hours

(vi) Actual wage rate per hour

Actual Wages paid = ₹ 43,92,000

Actual hours worked = 60,040 hours

Actual Wage rate per hour = ₹ 43,92,000 ÷ 60040 Hours = ₹ 73.15 per hour

(vii) Labour cost variance

= Labour rate variance + Labour efficiency variance

=₹ 69,120 A + ₹ 33,120 F

= ₹ 36,000 A

(viii)Production Overhead Cost Variance

= Actual Output x Standard overhead rate - Actual Overheads Incurred

= 12,100 units x₹ 360 - ₹ 45,00,000

= ₹ 43,56,000 - ₹ 45,00,000

= ₹ 1,44,000 A

13.

Working Notes:

1. **Calculation of Standard Man hours**

When 100 workers work for 1 hour, the standard output is 50 units.

Standard man hours per unit = 100 hours / 50 units = 2 hours per unit

2. **Calculation of standard man hours for actual output:**

= 1,920units x 2 hours = 3,840 hours.

3. **Calculation of actual cost**

Type of Workers	No of Workers	Actual Hours Paid	Rate (₹)	Amount (₹)	Idle Hours (5% of hours paid)	Actual hours Worked
Group 'A'	10	400	12.40	4,960	20	380
Group 'B'	30	1,200	12	14,400	60	1,140
Group 'C'	60	2,400	11.40	27,360	120	2,280

	100	4,000		46,720	200	3,800

4. Calculation of Standard wage Rate:

Labour Efficiency Variance = 480F

(Standard hours for Actual production – Actual Hours) x SR = 480F

(3,840 – 3,800) x SR = 480

Standard Rate (SR) = ₹ 12 per hour

i. Total Labour Cost Variance

= (Standard hours x Standard Rate) – (Actual Hours x Actual rate)

= (3,840 x 12) – 46,720 = 640A

ii. Total Labour Rate Variance

= (Standard Rate – Actual Rate) x Actual Hours

Group 'A' = (12 - 12.40) 400	=	160A
Group 'B' = (12 - 12) 1,200	=	0
Group 'C' = (12 – 11.40) 2,400	=	1,440F
		1,280F

iii. Total Labour Gang Variance

= Total Actual Time Worked (hours) × {Average Standard Rate per hour of Standard Gang -Average Standard Rate per hour of Actual Gang@} @ on the basis of hours worked

= 3,800 × (12- 3,840×12 / 3800)

= 0

[Note: As the number of workers in standard and actual is the same, there is no difference in mix ratio, so labour gang variance will be NIL]

iv. Total Labour Yield Variance

= Average Standard Rate per hour of Standard Gang × {Total Standard Time (hours) - Total Actual Time worked (hours)}

= 12 x (3,840 – 3,800)

= 480F

v. Total Labour idle time variance

= Total Idle hours x standard rate per hour

= 200 hours x 12

= 2,400A

14.

i. Material Usage Variance = Std. Price (Std. Quantity – Actual Quantity)

= ₹ 90 (9,000 kg. – 8,900 kg.)

= ₹ 9,000 (Favourable)

ii. Material Price Variance = Actual Quantity (Std. Price – Actual Price)

= 8,900 kg. (₹ 90 – ₹ 92) = ₹ 17,800 (Adverse)

iii. Material Cost Variance = Std. Material Cost – Actual Material Cost

= (SQ × SP) – (AQ × AP)

= (9,000 kg. × ₹ 90) – (8,900 kg. × ₹ 92)

= ₹ 8,10,000 – ₹ 8,18,800

= ₹ 8,800 (Adverse)

iv. Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)

= ₹ 80 (9,000/10 × 8 hours – 7,000 hrs.)

= ₹ 80 (7,200 hrs. – 7,000 hrs.)

= ₹ 16,000 (Favourable)

v. Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)

= 7,000 hrs. (₹ 80 – ₹ 84)

= ₹ 28,000 (Adverse)

vi. Labour Cost Variance = Std. Labour Cost – Actual Labour Cost

= (SH × SR) – (AH × AR)

= (7,200 hrs. × ₹ 80) – (7,000 hrs. × ₹ 84)

= ₹ 5,76,000 – ₹ 5,88,000

= ₹ 12,000 (Adverse)

vii. Variable Cost Variance = Std. Variable Cost – Actual Variable Cost

= (7,200 hrs. × ₹ 20) – ₹ 1,40,000

= ₹ 4,000 (Adverse)

viii. Fixed Overhead Cost Variance= Absorbed Fixed Overhead – Actual Fixed Overhead

=₹ 250/10 kgs × 9,000 kgs - ₹ 2,60,000

= ₹ 2,25,000 - ₹ 2,60,000 = ₹ 35,000 (Adverse)

15.

i. Material Usage Variance = Std. Price (Std. Quantity – Actual Quantity)

= ₹ 90 (18,000 kg. – 17,800 kg.)

= ₹ 18,000 (Favourable)

ii. Material Price Variance = Actual Quantity (Std. Price – Actual Price)

= 17,800 kg. (₹ 90 – ₹ 92) = ₹ 35,600 (Adverse)

iii. Material Cost Variance = Std. Material Cost – Actual Material Cost

= (SQ × SP) – (AQ × AP)

= (18,000 kg. × ₹ 90) – (17,800 kg. × ₹ 92)

= ₹ 16,20,000 – ₹ 16,37,600

= ₹ 17,600 (Adverse)

iv. Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)

= ₹ 100 (1,800 units × 8 – 14,000 hrs.)

= ₹ 100 (14,400 hrs. – 14,000 hrs.)

= ₹ 40,000 (Favourable)

v. Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)

= 14,000 hrs. (₹ 100 – ₹ 104)

= ₹ 56,000 (Adverse)

vi. Labour Cost Variance = Std. Labour Cost – Actual Labour Cost

= (SH × SR) – (AH × AR)

= (14,400 hrs. × ₹ 100) – (14,000 hrs. × ₹ 104)

= ₹ 14,40,000 – ₹ 14,56,000

= ₹ 16,000 (Adverse)

vii. Variable Cost Variance = Std. Variable Cost – Actual Variable Cost

= (14,400 hrs. × ₹ 15) – ₹ 2,17,500

= ₹ 1,500 (Adverse)

viii. Fixed Overhead Cost Variance = Absorbed Fixed Overhead – Actual Fixed overhead

= (1,800 units × ₹ 400) - ₹ 7,68,000

= ₹ 7,20,000 – ₹ 7,68,000 = ₹ 48,000 (Adverse)

16.

Material Variances:

Material	SQ (WN-1)	SP (₹)	SQ × SP (₹)	RSQ (WN-2)	RSQ × SP (₹)	AQ	AQ × SP (₹)	AP (₹)	AQ × AP (₹)
A	940 kg.	90.00	84,600	886 kg.	79,740	900 kg.	81,000	86.00	77,400
B	705 kg.	60.00	42,300	664 kg.	39,840	650 kg.	39,000	65.00	42,250
	1645 kg		1,26,900	1550 kg	1,19,580	1550 kg	1,20,000		1,19,650

WN – 1: Standard Quantity (SQ):

Material A - [(800kg/ 0.9 x 1400kg.) x 1480 kg.] = 939.68 or 940 kg.

Material B- [(600kg/ 0.9 x 1400kg.) x 1480 kg.] = 704.76 or 705 kg.

WN – 2: Revised Standard Quantity (RSQ):

Material A - [(800kg / 1400kg.) x 1550 kg.] = 885.71 or 886 kg.

Material B- [(600kg / 1400kg.) x 1550 kg.] = 664.28 or 664 kg.

(a) Material Cost Variance (A + B) = {(SQ × SP) – (AQ × AP)}

= {1,26,900 – 1,19,650} = 7,250 (F)

(b) Material Price Variance (A + B) = {(AQ × SP) – (AQ × AP)

= {1,20,000 – 1,19,650} = 350 (F)

(c) Material Mix Variance (A + B)= {(RSQ × SP) – (AQ × SP)}

= {1,19,580 – 1,20,000} = 420 (A)

(d) Material Yield Variance (A + B)= {(SQ × SP) – (RSQ × SP)}

= {1,26,900 – 1,19,580} = 7,320 (F)

Labour Variances

Labour	SH (WN-3)	SR (₹)	SH × SR (₹)	RSH (WN-4)	RSH × SR (₹)	AH	AH × SR (₹)	AR (₹)	AH × AR (₹)
Skilled	1,116 hrs	75.00	83,700	1144	85,800	1,200	90,000	71.00	85,200
Unskilled	893 hrs	44.00	39,292	916	40,304	860	37,840	46.00	39,560
	2,009 hrs		1,22,992	2,060	1,26,104	2,060	1,27,840		1,24,760

WN – 3: Standard Hours (SH):

Skilled Labour – [(0.95 x 1,000hr / 0.90 x 1,400 kg.) x 1,480 kg.] = 1,115.87 or 1,116 hrs.

Unskilled Labour – [(0.95 x 800hr / 0.90 x 1,400 kg.) x 1,480 kg.] = 892.69 or 893 hrs.

WN – 4: Revised Standard Hours (RSH):

Skilled Labour – [(1,000hr / 1,800 kg.) x 2,060hr.] = 1,144.44 or 1,144 hrs.

Unskilled Labour – [(800hr / 1,800 kg.) x 2,060hr.] = 915.56 or 916 hrs.

a) Labour Cost Variance (Skilled + Unskilled) = {(SH × SR) – (AH × AR)}

= {1,22,992 – 1,24,760} = 1,768 (A)

b) Labour Efficiency Variance (Skilled + Unskilled) = {(SH × SR) – (AH × SR)}

= {1,22,992 – 1,27,840} = 4,848 (A)

c) Labour Yield Variance (Skilled + Unskilled) = {(SH × SR) – (RSH × SR)}

= {1,22,992 – 1,26,104} = 3,112 (A)

17.

Working:

Quantity of material purchased and used.

No. of units produced	1,000 units
Std. input per unit	30kg.
Std. quantity (Kg.)	30,000 kg.
Add: Excess usage	7,200 kg.
Actual Quantity	37,200 kg.
Add: Closing Stock	10,000 kg.
Less: Opening stock	5,000 kg.
Quantity of Material purchased	42,200 kg.

i. **Direct Material Price Variance:**

= Actual Quantity purchased (Std. Price – Actual Price)

= 42,200 kg. (₹ 350 – ₹ 365) = 6,33,000 (Adverse)

Direct Material Usage Variance:

= Std. Price (Std. Quantity – Actual Quantity)

= ₹ 350 (30,000 kg. – 37,200 kg.) = ₹ 25,20,000 (Adverse)

ii. **Direct Labour Rate Variance:**

= Actual hours (Std. Rate – Actual Rate)

= 5,300 hours (₹ 80 – ₹ 82) = ₹ 10,600 (Adverse) Direct Labour Efficiency Variance:

= Std. Rate (Std. hours – Actual hours)

= ₹ 80 (1,000 units × 5 hours – 5,300 hours) = ₹ 24,000 (Adverse)

CHAPTER 13: BUDGET AND BUDGETARY CONTROL

PART – A: ICAI PAST EXAM QUESTIONS

PROBLEM – 1: (MAY 23 – 10 Marks)

PQR Limited manufactures three products - Product X, Product Y and Product Z. The output for the current year is 2,50,000 units of Product X, 2,80,000 units of Product Y and 3,20,000 units of Product Z respectively.

Selling price of Product X is 1.25 times of Product Z whereas Product Y can be sold at double the price at which product Z can be sold. Product Z can be sold at a profit of 20% on its marginal cost.

Other information are as follows:

	Product X	Product Y	Product Z
Direct Material Cost (Per unit)	₹ 20	₹ 20	₹ 20
Direct Wages Cost (per unit)	₹ 16	₹ 24	₹ 16

Raw material used for manufacturing all the three products is the same. Direct Wages are paid @ ₹ 4 per labour hour,

Total overhead cost of the company is ₹ 52,80,000 for the year, out of which ₹ 1 per labour hour is variable and the rest is fixed.

In the next year it is expected that sales of product X and product Z will increase by 12% and 15% respectively and sale of product Y will decline by 5%. The total overhead cost of the company for the next year is estimated at ₹ 55,08,000. The variable cost of ₹ 1 per labour hour remains unchanged.

It is anticipated that all other costs will remain same for the next year and there is opening and closing stock. Selling Price per unit of each product will remain unchanged in the next year.

Required:

Prepare a budget showing the current position and the position for the next year clearly indicating the total product-wise contribution and profit for the company as a whole.

PROBLEM – 2: (MAY 22 – 10 Marks)

SR Ltd. is a manufacturer of Garments. For the first three months of financial year 2022-23 commencing on 1st April 2022, production will be constrained by direct labour. It is estimated that only 12,000 hours of direct labour hours will be available in each month.

For market reasons, production of either of the two garments must be at least 25% of the production of the other. Estimated cost and revenue per garment are as follows:

	Shirt (₹)	**Short (₹)**
Sales price	60	44
Raw Materials		
Fabric @12 per metre	24	12
Dyes and cotton	6	4

Direct labour @ 8 per hour	8	4
Fixed Overhead @ 4 per hour	4	2
Profit	18	22

From the month of July 2022 direct labour will no longer be a constraint. The company expects to be able to sell 15,000 shirts and 20,000 shorts in July, 2022. There will be no opening stock at the beginning of July 2022.

Sales volumes are expected to grow at 10% per month cumulatively thereafter throughout the year. Following additional information is available:

- The company intends to carry stock of finished garments sufficient to meet 40% of the next month's sale from July 2022 onwards.
- The estimated selling price will be same as above.

Required:

I. Calculate the number of shirts and shorts to be produced per month in the first quarter of financial year 2022-2023 to maximize company's profit.

II. Prepare the following budgets on a monthly basis for July, August and September 2022:

III. Sales budget showing sales units and sales revenue for each product.

IV. Production budget (in units) for each product.

PROBLEM – 3: (DEC 21 – 10 Marks)

The Accountant of KPMR Ltd. has prepared the following budget for the coming year 2022 for its two products 'AYE' and 'ZYE':

Particulars	Product 'AYE'	Product 'ZYE'
Production and Sales (in Units)	4,000	3,000
	Amount (in ₹)	Amount (in ₹)
Selling Price per unit	200	180
Direct Material per unit	80	70
Direct Labour per unit	40	35
Variable Overhead per unit	20	25
Fixed Overhead per unit	10	10

After reviewing the above budget, the management has called the marketing team has suggested that by promoting the products on social media, the sales quantity of both the products can be increased by 5%. Also, the selling price per unit will go up by 10%. But this will result in increase in expenditure on variable overhead and fixed overhead by 20% and 5% respectively for both the products.

You are required to prepare flexible budget for both the products:

(i) Before promotion on social media,

(ii) After promotion on social media.

PROBLEM – 4: (JUL 21 – 10 Marks)

PSV Ltd. manufactures and sells a single product and estimated the following related information for the period November, 2020 to March, 2021.

Particulars	November, 2020	December, 2020	January, 2021	February, 2021	March, 2021
Opening Stock of Finished Goods (in Units)	7,500	3,000	9,000	8,000	6,000
Sales (in Units)	30,000	35,000	38,000	25,000	40,000
Selling Price per unit (in ₹)	10	12	15	15	20

Additional Information:

- Closing stock of finished goods at the end of March, 2021 is 10,000 units.
- Each unit of finished output requires 2 kg of Raw Material 'A' and 3 kg of Raw Material 'B'.

You are required to:

Prepare the following budgets for the period November, 2020 to March, 2021 on monthly basis:

(i) Sales Budget (in ₹)

(ii) Production budget (in units) and

(iii) Raw material Budget for Raw material 'A' and 'B' separately (in units)

PROBLEM – 5: (JAN 21 – 10 Marks)

XYZ Ltd. is engaged in the manufacturing of toys. It can produce 4,20,000 toys at its 70% capacity on per annum basis. Company is in the process of determining sales price for the financial year 2020-21. It has provided the following information:

Direct Material	₹ 60 per unit
Direct Labour	₹ 30 per unit

Indirect Overheads:

Fixed ₹ 65,50,000 per annum

Variable ₹ 15 per unit

Semi-variable ₹ 5,00,000 per annum up to 60% capacity and ₹ 50,000 for every 5% increase in capacity or part thereof up to 80% capacity and thereafter ₹ 75,000 for every 10% increase in capacity or part thereof.

Company desires to earn a profit of ₹ 25,00,000 for the year. Company has planned that the factory will operate at 50% of capacity for first six months of the year and at 75% of capacity for further three months and for the balance three months, factory will operate at full capacity.

You are required to:

1) Determine the average selling price at which each of the toy should be sold to earn the desired profit.

2) Given the above scenario, advise whether company should accept an offer to sell each Toy at:

a) ₹ 130 per Toy

b) ₹ 129 per Toy

PROBLEM – 6: (NOV 20 – 5 Marks)

G Ltd. manufactures a single product for which market demand exists for additional quantity. Present sales of ₹ 6,00,000 utilises only 60% capacity of the plant. The following data are available:

Selling price : ₹ 100 per unit

Variable cost : ₹ 30 per unit

Semi-variable expenses : ₹ 60,000 fixed + ₹ 5 per unit

Fixed expenses : ₹ 1,00,000 at present level, estimated to increase by 25% at and above 80% capacity.

You are required to prepare a flexible budget so as to arrive at the operating profit at 60%, 80% and 100% levels.

PROBLEM – 7: (MAY 19 – 5 Marks)

Following data is available for ABC Ltd.:

Standard working hours	8 hours per day of 5 days per week
Maximum Capacity	60 employees
Actual working	50 employees
Actual hours expected to be worked per four weeks	8,000 hours
Standard hours expected to be earned per four weeks	9,600·hours
Actual hours worked in the four-week period	7,500 hours
Standard hours earned in the four-week period	8,800 hours

The related period is of four weeks. Calculate the following Ratios:

(i) Efficiency Ratio

(ii) Activity Ratio

(iii) Standard Capacity Usage Ratio

(iv) Actual Capacity Usage Ratio

(v) Actual Usage of Budgeted Capacity Ratio

PROBLEM – 8: (NOV 18 – 10 Marks)

An electronic gadget manufacturer has prepared sales budget for the next few months. In this respect, following figures are available:

Months	Electronic gadgets' sales
January	5000 units
February	6000 units
March	7000 units

April	7500 units
May	8000 units

To manufacture an electronic gadget, a standard cost of ₹ 1,500 is incurred and it is sold through dealers at a uniform price of ₹ 2,000 per gadget to customers. Dealers are given a discount of 15% on selling price.

Apart from other materials, two units of batteries are required to manufacture a gadget. The company wants to hold stock of batteries at the end of each month to cover 30% of next month's production and to hold stock of manufactured gadgets to cover 25% of the next month's sale.

3250 units of batteries and 1200 units of manufactured gadgets were in stock on 1st January.

Required:

i. Prepare production budget (in units) for the month of January, February, March and April.

ii. Prepare purchase budget for batteries (in units) for the month of January, February and March and calculate profit for the quarter ending on March.

PART – B: (REVISION TEST PAPERS)

PROBLEM – 9: (NOV 23 & MAY 22)

XY Co. Ltd manufactures two products viz., X and Y and sells them through two divisions, East and West. For the purpose of Sales Budget to the Budget Committee, following information has been made available for the year 2014-15:

Product	Budgeted Sales		Actual Sales	
	East Division	West Division	East Division	West Division
X	400 units at ₹ 9	600 units at ₹ 9	500 units at ₹ 9	700 units at ₹ 9
Y	300 units at ₹ 21	500 units at ₹ 21	200 units at ₹ 21	400 units at ₹ 21

Adequate market studies reveal that product X is popular but under priced. It is expected that if the price of X is increased by ₹ 1, it will, find a ready market. On the other hand, Y is overpriced and if the price of Y is reduced by ₹ 1 it will have more demand in the market. The company management has agreed for the aforesaid price changes. On the basis of these price changes and the reports of salesmen, following estimates have been prepared by the Divisional Managers:

Percentage increase in sales over budgeted sales

Product	East Division	West Division
X	+ 10%	+5%
Y	+ 20%	+10%

With the help of intensive advertisement campaign, following additional sales (over and above the above-mentioned estimated sales by Divisional Mangers) are possible:

Percentage increase in sales over budgeted sales

Product	East Division	West Division

X	+ 10%	+ 5%
Y	+ 20%	+ 10%

With the help of intensive advertisement campaign, following additional sales (over and above the above-mentioned estimated sales by Divisional Mangers) are possible:

Product	East Division	West Division
X	60 units	70 units
Y	40 units	50 units

You are required to prepare Sales Budget for 2023-24 after incorporating above estimates and also show the Budgeted Sales and Actual Sales of 2022-23.

PROBLEM – 10: (RTP NOV 20)

The information of Z Ltd. for the year ended 31st March 2020 is as below:

	Amount (₹)
Direct materials	17,50,000
Direct wages	12,50,000
Variable factory overhead	9,50,000
Fixed factory overhead	12,00,000
Other variable costs	6,00,000
Other fixed costs	4,00,000
Profit	8,50,000
Sales	70,00,000

During the year, the company manufactured two products, X and Y, and the output and cost were:

	X	**Y**
Output (units)	8,000	4,000
Selling price per unit (₹)	600	550
Direct material per unit (₹)	140	157.50
Direct wages per unit (₹)	90	132.50

Variable factory overheads are absorbed as a percentage of direct wages and other variable costs are computed as:

	Finished Stock	**Material A**	**Material B**
Opening Stock	2,500 units	7,500 kg	4,000 kg
Closing Stock	3,000 units	8,000 kg	5,500 kg

Required:

a) CALCULATE number of units of product proposed to be sold and selling price per unit,

b) PREPARE Production Budget in units, and

c) PREPARE Material Purchase Budget in units.

PROBLEM – 11: (RTP NOV 19)

KLM Limited has prepared its expense budget for 50,000 units in its factory for the year 2019-20 as detailed below:

	(₹ per unit)
Direct Materials	125
Direct Labour	50
Variable Overhead	40
Direct Expenses	15
Selling Expenses (20% fixed)	25
Factory Expenses (100% fixed)	15
Administration expenses (100% fixed)	8
Distribution expenses (85% variable)	20
Total	298

PREPARE an expense budget for the production of 35,000 units and 70,000 units.

PROBLEM – 12: (RTP MAY 19)

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

	Product A (₹)	**Product B (₹)**
Production & Sales unit	6,000 units	9,000 units
Raw material cost per unit	60.00	42.00
Direct labour cost per unit	30.00	18.00
Variable overhead per unit	12.00	6.00
Fixed overhead per unit	8.00	4.00
Selling price per unit	120.00	78.00

After some marketing efforts, the sales quantity of the Product A & B can be increased by 1,500 units and 500 units respectively but for this purpose the variable overhead and fixed overhead will be increased by 10% and 5% respectively for the both products.

You are required to PREPARE flexible budget for both the products:

a) Before marketing efforts

b) After marketing efforts.

ANSWERS

1.

(a) (i) Budget showing current position of total product wise contribution and profitability

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)
A	Direct material cost (per unit)	20	20	20	
B	Direct wages cost (per unit)	16	24	16	
C	Variable overhead per unit (Refer WN-1)	4	6	4	
D	Total variable cost/ Marginal cost per unit [A+B+C]	40	50	40	
E	Add: Profit [20% of D]	-	-	8	
F	Selling price unit [D+E]	-	-	48	
G	Price weight	1.25	2	1	
H	Selling price per unit [Selling price of Product Z × G]	60	96	48	
I	Contribution per unit [H-D]	20	46	8	
J	Quantity to be sold	2,50,000	2,80,000	3,20,000	
K	Total Contribution [J×I]	50,00,000	1,28,80,000	25,60,000	2,04,40,000
L	Fixed Overheads [Refer WN-1]				13,20,000
M	Profit				1,91,20,000

Working Notes:

Segregation of Overheads into variable and fixed in current year

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)
A	Total overhead cost	-	-	-	52,80,000
B	Labour hour per unit [Direct wages Cost ÷ Re.1]	4	6	4	
C	Quantity produced	2,50,000	2,80,000	3,20,000	
D	Total variable overhead cost [B×C]	10,00,000	16,80,000	12,80,000	39,60,000
E	Fixed overhead cost [A-D]				13,20,000

ii) Budget showing next year's position of total product wise contribution and Profitability

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)

A	Selling price per unit	60	96	48	
B	Contribution per unit	20	46	8	
C	Quantity to be sold	2,80,000 [112% of 2,50,000]	2,66,000 [95% of 2,80,000]	3,68,000 [115% of 3,20,000]	
D	Total Contribution [B×C]	56,00,000	1,22,36,000	29,44,000	2,07,80,000
	Fixed Overheads [Refer WN-2]				13,20,000
	Profit				1,94,60,000

Working Notes:

1. Segregation of Overheads into variable and fixed in next year

	Particulars	**Product X (₹)**	**Product Y (₹)**	**Product Z (₹)**	**Total (₹)**
A	Total overhead cost	-	-	-	55,08,000
B	Labour hour per unit [Direct wages Cost ÷ Re.1]	4	6	4	
C	Quantity produced	2,80,000	2,66,000	3,68,000	
D	Total variable overhead cost [B×C]	11,20,000	15,96,000	14,72,000	41,88,000
E	Fixed overhead cost [A-D]				13,20,000

2.

(a)

I. Calculation of number of shirts & shorts to be produced per month:

Contribution per labour hour:

		Shirts (₹)	**Shorts (₹)**
A	Sales Price per unit	60	44
B	Variable Cost:		
	- Raw materials	30	16
	- Direct labour	8	4
		38	20
C	Contribution per unit [A-B]	22	24
D	Labour hour per unit	1 hour	0.5 hour
E	Contribution per labour hour [C÷D]	22	48

Production plan for the first three months:

Since, Shorts has the higher Contribution per labour hour, it will be made first. Shirts will be 25% of Shorts. The quantity will be determined as below:

Let the Quantity of Shorts be X and Shirts will be 0.25 X, then

(Qty. of Shorts × labour hour per unit) + (Qty. of Shirts × labour hour per unit) = Total labour hours available

Or, (X × 0.5 hour) + (0.25X × 1 hour) = 12,000 hours

Or, 0.5X + 0.25X = 12,000 Or,

0.75X = 12,000

Or, X = 12,000 ÷ 0.75

= 16,000 units of Shorts

Therefore, for Shirts = 25% of 16,000 units = 4,000 units

Production per month for the first quarter will be:

Shorts- 16,000 units & Shirts- 4,000 units

II.

(i) Sales Budget for the month of July, August & September 2022:

		July 2022		August 2022		September 2022	
		Shirts	Shorts	Shirts	Shorts	Shirts	Shorts
A	Sales demand	15,000	20,000	16,500	22,000	18,150	24,200
B	Selling price per unit (₹)	60	44	60	44	60	44
C	Sales Revenue (₹)	9,00,000	8,80,000	9,90,000	9,68,000	10,89,000	10,64,800

(ii) Production budget for the month of July, August & September 2022:

		July 2022		August 2022		September 2022		October 2022	
		Shirts	Shorts	Shirts	Shorts	Shirts	Shorts	Shirts	Shorts
A	Opening stock	0	0	6,600	8,800	7,260	9,680		
B	Sales demand	15,000	20,000	16,500	22,000	18,150	24,200	19,965	26,620
C	Closing stock	6,600	8,800	7,260	9,680	7,986	10,648		
D	Production [B+C-A]	21,600	28,800	17,160	22,880	18,876	25,168		

3.

(i) Flexible Budget (before promotion)

	Particulars	Product 'AYE'	Product 'ZYE'	Total
	Production & Sales (units)	4,000	3,000	
		Amount (₹)	Amount (₹)	Amount (₹)
A.	Sales Value	8,00,000 (₹ 200×4,000)	5,40,000 (₹ 180×3,000)	13,40,000

B.	Direct Materials	3,20,000 (₹ 80 × 4,000)	2,10,000 (₹ 70 × 3,000)	5,30,000
C.	Direct labour	1,60,000 (₹ 40 × 4,000)	1,05,000 (₹ 35 × 3,000)	2,65,000
D.	Variable Overheads	80,000 (₹ 20 × 4,000)	75,000 (₹ 25 × 3,000)	1,55,000
E.	Total Variable Cost (B+C+D)	5,60,000	3,90,000	9,50,000
F.	Contribution (A-E)	2,40,000	1,50,000	3,90,000
G.	Fixed Overhead	40,000 (₹ 10 × 4,000)	30,000 (₹ 10 × 3,000)	70,000
H.	Profit (F-G)	2,00,000	1,20,000	3,20,000
	Profit per unit	50	40	

(ii) Flexible Budget (after promotion)

	Particulars	**Product 'AYE'**	**Product 'ZYE'**	**Total**
	Production & Sales (units)	4,200 (4,000×105%)	3,150 (3,000×105%)	
		Amount (₹)	**Amount (₹)**	**Amount (₹)**
A.	Sales Value	9,24,000 (₹ 220 × 4,200)	6,23,700 (₹ 198 × 3,150)	15,47,700
B.	Direct Materials	3,36,000 (₹ 80 × 4,200)	2,20,500 (₹ 70 × 3,150)	5,56,500
C.	Direct labour	1,68,000 (₹ 40 × 4,200)	1,10,250 (₹ 35 × 3,150)	2,78,250
D.	Variable Overheads	1,00,800 (₹ 24 × 4,200)	94,500 (₹ 30 × 3,150)	1,95,300
E.	Total Variable Cost (B+C+D)	6,04,800	4,25,250	10,30,050
F.	Contribution (A-E)	3,19,200	1,98,450	5,17,650
G.	Fixed Overhead	42,000 (₹ 40,000 × 105%)	31,500 (₹ 30,000 × 105%)	73,500
H.	Profit (F-G)	2,77,200	1,66,950	4,44,150
	Profit per unit	66	53	

4.

Sales Budget

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Sales (in Units)	30,000	35,000	38,000	25,000	40,000	1,68,000
Selling Price per unit (₹)	10	12	15	15	20	-
Total Sales (₹)	3,00,000	4,20,000	5,70,000	3,75,000	8,00,000	24,65,000

Production Budget (in units)

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Sales	30,000	35,000	38,000	25,000	40,000	1,68,000
Add: Closing stock of finished goods	3,000	9,000	8,000	6,000	10,000	36,000
Total quantity required	33,000	44,000	46,000	31,000	50,000	2,04,000
Less: Opening stock of finished goods	7,500	3,000	9,000	8,000	6,000	33,500
Units to be produced	**25,500**	**41,000**	**37,000**	**23,000**	**44,000**	1,70,500

Raw material budget (in units)

For Raw material 'A'

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Units to be produced: (a)	25,500	41,000	37,000	23,000	44,000	1,70,500
Raw material consumption p.u. (kg.): (b)	2	2	2	2	2	-
Total raw material consumption (Kg.): (a × b)	**51,000**	**82,000**	**74,000**	**46,000**	**88,000**	3,41,000

For Raw material 'B'

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Units to be produced: (a)	25,500	41,000	37,000	23,000	44,000	1,70,500
Raw material consumption p.u. (kg.): (b)	3	3	3	3	3	-
Total raw material consumption (Kg.): (a × b)	**76,500**	**1,23,000**	**1,11,000**	**69,000**	**1,32,000**	5,11,500

5.

(1) Statement of Cost

	For first 6 months	For further 3 months	For remaining 3 months	Total
	6,00,000 x 6/12 x 50% = 1,50,000 units	6,00,000 x 3/12 x 75% = 1,12,500 units	6,00,000 x 03-Dec = 1,50,000 units	412500 units

Direct Material	90,00,000	67,50,000	90,00,000	2,47,50,000
Direct labour	45,00,000	33,75,000	45,00,000	1,23,75,000
Indirect – Variable Expenses	22,50,000	16,87,500	22,50,000	61,87,500
Indirect – Fixed Expenses	32,75,000	16,37,500	16,37,500	65,50,000
Indirect Semi-variable expenses				
- For first six months @ 5,00,000 per annum	2,50,000			
- For further three months @ 6,50,000* per annum		1,62,500		
- For further three months @ 8,50,000** per annum			2,12,500	6,25,000
Total Cost	1,92,75,000	1,36,12,500	1,76,00,000	5,04,87,500
Desired Profit				25,00,000
Sales value				5,29,87,500
Average Sales price per Toy				128.45

* ₹ 5,00,000+ [3 times (from 60% to 75%) x 50,000] = ₹ 6,50,000

** ₹ 6,50,000+ [1 time (from 75% to 80%) x 50,000] + [2 times (from 80% to 100%) × 75,000] = ₹ 8,50,000

a) Company Should accept the offer as it is above its targeted sales price of ₹ 128.45 per toy.

b) Company Should accept the offer as it is above its targeted sales price of ₹ 128.45 per toy.

6.

Flexible Budget

Activity Level	**60%**	**80%**	**100%**
Production (units)	**6,000**	**8,000**	**10,000**
	(₹)	**(₹)**	**(₹)**
Sales @ ₹ 100 per unit	6,00,000	**8,00,000**	**10,00,000**
Variable Cost (@ ₹ 35 (₹ 30 + ₹ 5) per unit)	2,10,000	2,80,000	3,50,000
Contribution (A)	3,90,000	5,20,000	6,50,000
Fixed Cost (part of semi-variable cost)	60,000	60,000	60,000
Other Fixed Cost	1,00,000	**1,25,000**	**1,25,000**
Total Fixed Cost (B)	1,60,000	1,85,000	1,85,000
Operating Profit (A – B)	**2,30,000**	**3,35,000**	**4,65,000**

7.

(i) Efficiency Ratio:

= Standard Hrs/ Actual Hrs x 100

= 8,800 hours / 7,500 hours x 100

= 117.33%

(ii) Activity Ratio

= Standard Hrs / Budgeted Hrs x 100

= 8,800 hours / 8,000 hours x 100

=110%

(iii) Standard Capacity Usage Ratio:

= Budgeted Hours / Max. possible hours in the budgeted period x 100

= 8,000 hours / 9,600 hours x 100%

= 83.33%

(iv) Actual Capacity Usage Ratio:

= Actual Hours worked / Max. possible hours in a period x 100

= 7,500 hours / 9,600 hours x 100

= 78.125%

(v) Actual Usage of Budgeted Capacity Ratio

= Actual working hours / Budgeted hours x 100

=7,500 hours / 8,000 hours x 100

= 93.75%

Working Notes:

1. Maximum Capacity in a budget period

= 60 Employees x 8 Hrs. x 5 Days x 4 Weeks = 9,600 Hrs.

2. Budgeted Hours

= 50 Employees x 8 hrs. x 5 Days x 4 Weeks = 8,000 Hrs.

3. Actual Hrs. = 7,500 Hrs. (given)

4. Standard Hrs. for Actual Output = 8,800 Hrs.

8.

i. Preparation of Production Budget (in Units)

	January	**February**	**March**	**April**	**May**
Sales	5,000	6,000	7,000	7,500	8,000
Add: Closing stock (25% of next month's sales)	1,500	1,750	1,875	2,000	
Less: Opening Stock	(1200)	(1500)	(1750)	(1875)	
Production of electronic Gadgets	5,300	6,250	7,125	7,625	

ii. Preparation of Purchase budget

	January	February	March	April
Consumption/production of Batteries (@ 2 per Gadget)	10,600	12,500	14,250	15,250
Add: Closing Stock (30% of next month's production)	3750	4275	4575	
Less: Opening Stock	3,250	3,750	4275	
Purchase of Batteries	11,100	13,025	14,550	

Statement Showing Profit

	Jan.	Feb.	March	Total
Sales (A)	5,000	6,000	7,000	18,000
Selling Price per unit*	₹ . 2,000	₹ . 2,000	₹ . 2,000	₹ . 2,000
Less: Discount @15% of selling price	300	300	300	300
Less: Standard cost of Manufacturing per gadget Cost	1500	1500	1500	1500
Profit (B) (selling Price-discount- cost)	200	200	200	200
Total Profit (A × B)	₹ .10,00,000	₹ .12,00,000	₹ .14,00,000	₹ .36,00,000

9.

Statement Showing Sales Budget for 2023-24

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	5001	10	5,000	4003	20	8,000	13,000
West	7002	10	7,000	6004	20	12,000	19,000
Total	1,200		12,000	1,000		20,000	32,000

Workings

1. 400 × 110% + 60 = 500 units

2. 600 × 105% + 70 = 700 units

3. 300 × 120% + 40 = 400 units

4. 500 × 110% + 50 = 600 units

Statement Showing Sales Budget for 2022-23

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	400	9	3,600	300	21	6,300	9,900
	600	9	5,400	500	21	10,500	15,900

Total							
West	600	9	5,400	500	21	10,500	15,900
Total	1,000		9,000	800		16,800	25,800

Statement Showing Actual Sales for 2022-23

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	500	9	4,500	200	21	4,200	8,700
West	700	9	6,300	400	21	8,400	14,700
Total	1,200		10,800	600		12,600	23,400

10.

I. Product-wise Profitability Statement for the FY 2019-20:

Particulars	Product-X (₹)	Product-Y (₹)	Total (₹)
Output (units)	8,000	4,000	
Selling price per unit	600	550	
Sales value	48,00,000	22,00,000	70,00,000
Direct material	11,20,000 (₹ 140×8,000)	6,30,000 (₹ 157.50×4,000)	17,50,000
Direct wages	7,20,000 (₹ 90×8,000)	5,30,000 (₹ 132.5×4,000)	12,50,000
Variable factory overheads	5,47,200 (76%of 7,20,000)	4,02,800 (76%of 5,30,000)	9,50,000
Other variable costs	3,20,000 (₹ 40×8,000)	2,80,000 (₹ 70×4,000)	6,00,000
Contribution	20,92,800	3,57,200	24,50,000
Fixed factory overheads	-	-	12,00,000
Other fixed costs	-	-	4,00,000
Profit			8,50,000

II. Preparation of Budget for the FY 2020-21:

Particulars	Product-X (₹)	Product-Y (₹)	Total (₹)
Output (units)	6,400 (8,000×80%)	3,600 (4,000×90%)	
Selling price per unit	480 (600×80%)	440 (550×80%)	
Sales value	30,72,000	15,84,000	46,56,000

Direct material	8,96,000 (₹ 140×6,400)	5,67,000 (₹ 157.50×3,600)	14,63,000
Direct wages per unit	6,91,200 (₹ 108×6,400)	5,72,400 (₹ 159×3,600)	12,63,600
Variable factory overheads	5,25,312 (76% of 6,91,200)	4,35,024 (76%of 5,72,400)	9,60,336
Other variable costs	2,56,000 (₹ 40×6,400)	2,52,000 (₹ 70×3,600)	5,08,000
Contribution	7,03,488	(2,42,424)	4,61,064
Fixed factory overheads	-	-	12,00,000
Other fixed costs (110%of ₹ 4,00,000)	-	-	4,40,000
Profit/ (Loss)			**(11,78,936)**

11.

Expense Budget of KLM Ltd.

Particulars	**50,000 Units (₹)**	**35,000 Units (₹)**	**70,000 Units (₹)**
Direct Material	62,50,000 (50,000 x 125)	43,75,000 (35,000 x 125)	87,50,000 (70,000 x 125)
Direct Labour	25,00,000 (50,000 x 50)	17,50,000 (35,000 x 50)	35,00,000 (70,000 x 50)
Variable Overhead	20,00,000 (50,000 x 40)	14,00,000 (35,000 x 40)	28,00,000 (70,000 x 40)
Direct Expenses	7,50,000 (50,000 x 15)	5,25,000 (35,000 x 15)	10,50,000 (70,000 x 15)
Selling Expenses (Variable)*	10,00,000 (50,000 x 20)	7,00,000 (35,000 x 20)	14,00,000 (70,000 x 20)
Selling Expenses (Fixed)* (5 x 50,000)	2,50,000	2,50,000	2,50,000
Factory Expenses (Fixed) (15 x 50,000)	7,50,000	7,50,000	7,50,000
Administration Expenses (Fixed) (8 x 50,000)	4,00,000	4,00,000	4,00,000
Distribution Expenses (Variable)**	8,50,000 (17 x 50,000)	5,95,000 (17 x 35,000)	11,90,000 (17 x 70,000)

Distribution Expenses (Fixed)** (3 x 50,000)	1,50,000	1,50,000	1,50,000
	1,49,00,000	1,08,95,000	2,02,40,000

*Selling Expenses: Fixed cost per unit = ₹ 25 x 20% = ₹ 5 Fixed Cost = ₹ 5 x 50,000 units = ₹ 2,50,000

Variable Cost Per unit = ₹ 25 – ₹ 5 = ₹ 20

**Distribution Expenses:

Fixed cost per unit = ₹ 20 x 15% = ₹ 3

Fixed Cost = ₹ 3 x 50,000 units = ₹ 1,50,000

Variable cost per unit = ₹ 20 – ₹ 3 = ₹ 17

12.

a) Flexible Budget before marketing efforts:

	Product A (₹)		**Product B (₹)**	
	6,000 units		**9,000 units**	
	Per unit	**Total**	**Per unit**	**Total**
Sales	120.00	7,20,000	78.00	7,02,000
Raw material cost	60.00	3,60,000	42.00	3,78,000
Direct labour cost per unit	30.00	1,80,000	18.00	1,62,000
Variable overhead per unit	12.00	72,000	6.00	54,000
Fixed overhead per unit	8.00	48,000	4.00	36,000
Total cost	110.00	6,60,000	70.00	6,30,000
Profit	10.00	60,000	8.00	72,000

b) Flexible Budget after marketing efforts:

	Product A (₹) **7,500 units**		**Product B (₹)** **9,500 units**	
	Per unit	**Total**	**Per unit**	**Total**
Sales	120.00	9,00,000	78.00	7,41,000
Raw material cost	60.00	4,50,000	42.00	3,99,000
Direct labour cost per unit	30.00	2,25,000	18.00	1,71,000
Variable overhead per unit	13.20	99,000	6.60	62,700
Fixed overhead per unit	6.72	50,400	3.98	37,800
Total cost	109.92	8,24,400	70.58	6,70,500
Profit	10.08	75,600	7.42	70,500

CHAPTER 14: SERVICE COSTING

PART – A: ICAI PAST EXAM QUESTIONS

PROBLEM – 1: (MAY 23 – 5 Marks)

RST Toll Plaza Limited built an 80-kilometre-long highway between two cities and operates a toll plaza to collect tolls from passing vehicles using the highway. The company has estimated that 50,000 light weight, 12,000 medium weight and 10,000 heavy weight vehicles will be using the highway in one month in outward journey and the same number for return journey.

As per government notification, vehicles used for medical emergencies, Members of Parliament, and essential services are exempt from toll charges. It is estimated that 10% of light weight vehicles will pass the highway for such use.

It is the policy of the company that if vehicles return within 24 hours of their outward journey, the toll fare will be reduced by 25 percent automatically. It is estimated that 30% of chargeable light weight vehicles return within the specified time frame.

The toll charges for medium weight vehicles is to be fixed as 2.5 times of the light weight vehicles and that of heavy weight vehicles as 2 times of the medium weight vehicles.

The toll and maintenance cost for a month is ₹ 59,09,090, The company requires a profit of 10% over the total cost to cover interest and other costs.

Required:

(i) Calculate the toll rate for each type of vehicle if concession facilities are not available on the return journey.

(ii) Calculate the toll rate that will be charged from light weight vehicles if a return journey concession facility is available, assuming that the revenue earned from light weight vehicles calculated in option (i) remains the same.

PROBLEM – 2: (NOV 22 – 5 Marks)

ABC Bank is having a branch which is engaged in processing of 'Vehicle Loan' and 'Education Loan' applications in addition to other services to customers. 30% of the overhead costs for the branch are estimated to be applicable to the processing of 'Vehicle Loan' applications and 'Education Loan' applications each.

Branch is having four employees at a monthly salary of ₹ 50,000 each, exclusively for processing of Vehicle Loan applications and two employees at a monthly salary of ₹ 70,000 each, exclusively for processing of Education Loan applications.

In addition to above, following expense are incurred by the Branch:

- Branch Manager who supervises all the activities of branch, is paid at ₹ 90,000 per month.
- Legal charges, Printing & stationery and Advertising Expenses are incurred at ₹ 30,000, ₹ 12,000 and ₹ 18,000 respectively for a month.

- Other expenses are ₹ 10,000 per month.

You are required to:

(i) Compute the cost of processing a Vehicle Loan application on the assumption that 496 Vehicle Loan applications are processed each month.

(ii) Find out the number of Education Loan Applications processed, if the total processing cost per Education Loan Application is same as in the Vehicle Loan Application as computed in (i) above.

PROBLEM – 3: (DEC 21 – 10 Marks)

Paras Travels provides mini buses to an IT company for carrying its employees from home to office and dropping back after office hours. It runs a fleet of 8 mini buses for this purpose. The buses are parked in a garage adjoining the company's premises. Company is operating in two shifts (one shift in the morning and one shift in the afternoon). The distance travelled by each mini bus one way is 30 kms. The company works for 20 days in a month.

The seating capacity of each mini bus is 30 persons. The seating capacity is normally 80% occupied during the year. The details of expenses incurred for a year are as under:

Particulars	
Driver's salary	₹ 20,000 per driver per month
Lady attendant's salary (mandatorily required for each mini bus)	₹ 10,000 per attendant per month
Cleaner's salary (One cleaner for 2 mini buses)	₹ 15,000 per cleaner per month
Diesel (Avg. 8 kms per litre)	₹ 80 per litre
Insurance charges (per annum)	2% of Purchase Price
License fees and taxes	₹ 5,080 per mini bus per month
Garage rent paid	₹ 24,000 per month
Repair & maintenance including engine oil and lubricants (for every 5,760 kms)	₹ 2,856 per mini bus
Purchase Price of mini bus	₹ 15,00,000 each
Residual life of mini bus	8 Years
Scrap value per mini bus at the end of residual life	₹ 3,00,000

Paras Travels charges two types of fare from the employees. Employees coming from a distance of beyond 15 kms away from the office are charged double the fare which is charged from employees coming from a distance of up-to 15 kms. away from the office. 50% of employees travelling in each trip are coming from a distance beyond 15 kms. from the office. The charges are to be based on average cost.

You are required to:

- Prepare a statement showing expenses of operating a single mini bus for a year

- Calculate the average cost per employee per month in respect of:
- Employees coming from a distance upto 15 kms. from the office.
- Employees coming from a distance beyond 15 kms. from the office

PROBLEM – 4: (JUL 21 – 10 Marks)

MRSL Healthcare Ltd. has incurred the following expenditure during the last year for its newly launched 'COVID-19' Insurance policy:

Office administration cost	48,00,000
Claim management cost	3,80,000
Employee's cost	16,20,000
Postage and logistics	32,40,000
Policy issuance cost	29,50,000
Facilities cost	46,75,000
Cost of marketing of the policy	1,38,90,000
Policy development cost	35,00,000
Policy servicing cost	96,45,000
Sales support expenses	32,00,000
I.T. Cost	?

Number of Policy sold: 2,800

Total insured value of policies - ₹ 3,500 Crores Cost per rupee of insured value - ₹ 0.002

You are required to:

(i) Calculate Total Cost for "COVID-19" Insurance policy segregating the costs into four main activities namely

- **a)** Marketing and Sales support
- **b)** Operations
- **c)** I.T. Cost and
- **d)** Support functions.

(ii) Calculate Cost Per Policy.

PROBLEM – 5: (JAN 21 – 10 Marks)

ABC Health care runs an Intensive Medical Care Unit. For this purpose, it has hired a building at a rent of ₹ 50,000 per month with the agreement to bear the repairs and maintenance charges also.

The unit consists of 100 beds and 5 more beds can comfortably be accommodated when the situation demands. Though the unit is open for patients all the 365 days in a year, scrutiny of accounts for the year 2020 reveals that only for 120 days in the year, the unit had the full capacity of 100 patients per day and for another 80 days, it had, on an average only 40 beds occupied per day. But, there were occasions when the beds were full, extra beds were hired at a charge of ₹ 50 per bed per day. This did

not come to more than 5 beds above the normal capacity on any one day. The total hire charges for the extra beds incurred for the whole year amounted to ₹ 20,000.

The unit engaged expert doctors from outside to attend on the patients and the fees were paid on the basis of the number of patients attended and time spent by them which on an average worked out to ₹ 30,000 per month in the year 2020.

The permanent staff expenses and other expenses of the unit were as follows:

	₹
2 Supervisors each at a per month salary of	5,000
4 Nurses each at a per month salary of	3,000
2 Ward boys each at a per month salary of	1,500
Other Expenses for the year were as under:	
Repairs and Maintenance	28,000
Food supplied to patients	4,40,000
Caretaker and Other services for patients	1,25,000
Laundry charges for bed linen	1,40,000
Medicines supplied	2,80,000
Cost of Oxygen etc. other than directly borne for treatment of patients	75,000
General Administration Charges allocated to the unit	71,000

Required:

i. What is the profit per patient day made by the unit in the year 2020, if the unit recovered an overall amount of ₹ 200 per day on an average from each patient.

ii. The unit wants to work on a budget for the year 2021, but the number of patients requiring medical care is a very uncertain factor. Assuming that same revenue and expenses prevail in the year 2021 in the first instance, work out the number of patient days required by the unit to break even.

PROBLEM – 6: (NOV 19 – 10 Marks)

A hotel is being run in a Hill station with 200 single rooms. The hotel offers concessional rates during six off-season months in a year.

During this period, half of the full room rent is charged. The management's profit margin is targeted at 20% of the room rent. The following are the cost estimates and other details for the year ending 31st March ,2019:

i. Occupancy during the season is 80% while in the off-season it is 40%.

ii. Total investment in the hotel is ₹ 300 lakhs of which 80% relates to Buildings and the balance to Furniture and other Equipment.

iii. Room attendants are paid ₹ 15 per room per day on the basis of occupancy of rooms in a month.

iv. Expenses:

- Staff salary (excluding that of room attendants) ₹ 8,00,000
- Repairs to Buildings ₹ 3,00,000
- Laundry Charges ₹ 1,40,000
- Interior Charges ₹ 2,50,000
- Miscellaneous Expenses ₹ 2,00,200

v. Annual Depreciation is to be provided on Buildings @ 5% and 15% on Furniture and other Equipment's on straight line method.

vi. Monthly lighting charges are ₹ 110, except in four months in winter when it is ₹ 30 per room and this cost is on the basis of full occupancy for a month.

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

(Assume a month to be of 30 days and winter season to be considered as part of off-season).

PROBLEM – 7: (May– 19 – 10 Marks)

X Ltd. distributes' its goods to a regional dealer using single lorry. The dealer premises are 40 kms away by road. The capacity of the lorry is 10 tonnes. The lorry makes the journey twice a day fully loaded on the outward journey and empty on return journey. The following information is available:

Diesel Consumption	8 km per litre
Diesel Cost	₹ 60 per litre
Engine Oil	₹ 200 per week
Driver's Wages (fixed)	₹ 2,500 per week
Repairs	₹ 600 per week
Garage Rent	₹ 800 per week
Cost of Lorry (excluding cost of tyres)	₹ 9,50,000
Life of Lorry	1,60,000 kms
Insurance	₹ 18,200 per annum
Cost of Tyres	₹ 52,500
Life of Tyres	25,000 kms
Estimated sale value of the lorry at end of its life is	₹ 1,50,000
Vehicle License Cost	₹ 7,800 per annum
Other Overhead Cost	₹ 41,600 per annum

The lorry operates on a 5-day week.

Required:

i. A statement to show the total cost of operating the vehicle for the four-week period analysed into Running cost and Fixed cost.

ii. Calculate the vehicle operating cost per km and per tonne km. (Assume 52 weeks in a year)

PROBLEM – 8: (NOV 18 – 10 Marks)

M/s XY Travels has been given a 25 km. long route to run an air- conditioner Mini Bus. The cost of bus is ₹ 20,00,000. It has been insured @3% premium per annum while annual road tax amounts to ₹ 36,000. Annual repairs will be ₹ 50,000 and the bus is likely to last for 5 years. The driver's salary will be ₹ 2,40,000 per annum and the conductor's salary will be ₹ 1,80,000 per annum in addition to 10% of the takings as commission (to be shared by the driver and the conductor equally). Office and administration overheads will be ₹ 18,000 per annum. Diesel and oil will be ₹ 1,500 per 100 km. The bus will make 4 round trips carrying on an average 40 passengers on each trip.

Assuming 25% profit on takings and considering that the bus will run on an average 25 days in a month, you are required to:

i. prepare operating cost sheet (for the month).

ii. calculate fare to be charged per passenger km.

PROBLEM – 9: (MAY 18 – 10 Marks)

PQR Pens Ltd. manufactures two products - 'Gel Pen' and 'Ball Pen'. It furnishes the following data for the year 2017:

Product	Annual Output (Units)	Total Machine Hours	Total number of Purchase orders	Total number of set-ups
Gel Pen	5,500	24,000	240	30
Ball Pen	24,000	54,000	448	56

The annual overheads are as under:

Particulars	₹
Volume related activity costs	4,75,020
Set up related costs	5,79,988
Purchase related costs	5,04,992

Calculate the overhead cost per unit of each Product - Gel Pen and Ball Pen on the basis of:

(i) Traditional method of charging overheads

(ii) Activity based costing method and

(iii) Find out the difference in cost per unit between both the methods.

PART – B: (REVISION TEST PAPERS)

PROBLEM – 10: (NOV 23)

P Holiday Resorts offers three types of rooms to its guests, viz deluxe room, super deluxe room and luxury suite. You are required to ascertain the tariff to be charged to the customers for different types of rooms on the basis of following information:

Types of Room	Number of Rooms	Occupancy
Deluxe Room	100	90%
Super Deluxe Room	60	75%
Luxury Suite	40	60%

Rent of 'super deluxe' room is to be fixed at 2 times of 'deluxe room' and that of 'luxury suite' is 3 times of 'deluxe room'. Annual expenses are as follows:

Particulars	Amount (₹ lakhs)
Staff salaries	680.00
Lighting, Heating and Power	300.00
Repairs, Maintenance and Renovation	180.00
Linen	30.00
Laundry charges	24.00
Interior decoration	75.00
Sundries	30.28

An attendant for each room was provided when the room was occupied and he was paid ₹ 500 per day towards wages. Further, depreciation is to be provided on building @ 5% on ₹ 900 lakhs, furniture and fixtures @ 10% on ₹ 90 lakhs and air conditioners @ 10% on ₹ 75 lakhs.

Profit is to be provided @ 25% on total taking and assume 360 days in a year.

PROBLEM – 11: (MAY 23)

PREPARE cost statement of Panipat Thermal Power Station showing the cost of electricity generated per kwh, from the following data.

Total units generated	16,50,000 kWh
	(₹)
Operating labour	21,75,000
Repairs & maintenance	7,25,000
Lubricants, spares and stores	5,80,000
Plant supervision	4,35,000
Administration overheads	29,00,000
Insurance Charges	15,00,000
Fuel Charges	8,00,000

7 kWh. of electricity generated per kg. of coal consumed @ ₹ 4.75 per kg. Depreciation charges @ 5% on capital cost of ₹ 3,10,00,000.

PROBLEM – 12: (MAY 22)

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

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

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

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

Required:

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

PROBLEM – 13: (NOV 21)

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

(i) Delhi to Hisar and back, the same day

Distance covered:	160 km. one way
Number of days run each month:	9
Seating capacity occupied	90%

(ii)	Delhi to Aligarh and back, the same day	
	Distance covered:	160 km. one way
	Number of days run each month:	12
	Seating capacity occupied	95%
(iii)	Delhi to Alwar and back, the same day	
	Distance covered:	170 km. one way
	Number of days run each month:	6
	Seating capacity occupied	100%
(iv)	Following are the other details:	
	Cost of the bus	₹ 15,00,000
	Salary of the Driver	₹ 30,000 p.m.
	Salary of the Conductor	₹ 26,000 p.m.
	Salary of the part-time Accountant	₹ 7,000 p.m.
	Insurance of the bus	₹ 6,000 p.a.
	Diesel consumption 5 km. per litre at	₹ 90 per litre
	Road tax	₹ 21,912 p.a.
	Lubricant oil	₹ 30 per 100 km.
	Permit fee	₹ 500 p.m.
	Repairs and maintenance	₹ 5,000 p.m.
	Depreciation of the bus	@ 30% p.a.
	Seating capacity of the bus	50 persons

Passenger tax is 20% of the total takings.

CALCULATE the bus fare to be charged from each passenger to earn a profit of 30% on total takings. The fares are to be indicated per passenger for the journeys: (i) Delhi to Hisar (ii) Delhi to Aligarh and (iii) Delhi to Alwar.

PROBLEM – 14: (MAY 21)

VPS is a public school having 25 buses each plying in different directions for the transport of its school students. In view of large number of students availing of the bus service, the buses work two shifts daily both in the morning and in the afternoon. The buses are garaged in the school. The workload of the students has been so arranged that in the morning, the first trip picks up senior students and the second trip plying an hour later picks up junior students. Similarly, in the afternoon, the first trip takes the junior students and an hour later the second trip takes the senior students home.

The distance travelled by each bus, one way is 8 km. The school works 22 days in a month and remains closed for vacation in May and June. The bus fee, however, is payable by the students for all the 12 months in a year.

The details of expenses for a year are as under:

Driver's salary – payable for all the 12 in months	₹ 12,000 per month per driver
Cleaner's salary payable for all the 12 months	₹ 8,000 per month per cleaner
License fees, taxes etc.	₹ 8,400 per bus per annum
Insurance Premium	₹ 15,600 per bus per annum
Repairs and Maintenance	₹ 20,500 per bus per annum
Purchase price of the bus	₹ 20,00,000 each
Life of the bus	16 years
Scrap value	₹ 1,60,000
Diesel Cost	₹ 78.50 per litre

Each bus gives an average of 5 km. per litre of diesel. The seating capacity of each bus is 40 students. The school follows differential transportation fees based on distance travelled as under:

Students picked up and dropped within the range of distance from the school	Transportation fee	Percentage of students availing this facility
2 km.	25% of full	15%
4 km.	50% of full	30%
8 km.	Full	55%

Due to a pandemic, lockdown imposed on schools and the school remained closed from April 2020 to December 2020. Drivers and cleaners were paid 75% of their salary during the lockdown period. Repairing cost reduced to 75% for the year 2020.

Ignore the interest cost.

Required:

i. PREPARE a statement showing the expenses of operating a single bus and the fleet of 25 buses for a year.

ii. FIND OUT transportation fee per student per month in respect of:

- **a.** Students coming from a distance of upto 2 km. from the school.
- **b.** Students coming from a distance of upto 4 km. from the school; and
- **c.** Students coming from a distance of upto 8 km. from the school.

iii. CALCULATE the minimum bus fare that has to be recovered from the students for the year 2020.

PROBLEM – 15: (NOV 20)

A transport company has 20 vehicles, the capacities are as follows:

No. of Vehicles	Capacity per vehicle
5	9 MT
6	12 MT
7	15 MT

2 20 MT

The company provides the goods transport service between stations 'A' to station 'B'. Distance between these stations is 100 kilometers. Each vehicle makes one round trip per day on an average. Vehicles are loaded with an average of 90 per cent of capacity at the time of departure from station 'A' to station 'B' and at the time of return back loaded with 70 per cent of capacity. 10 percent of vehicles are laid up for repairs every day. The following information is related to the month of August, 2020:

Salary of Transport Manager	₹ 60,000
Salary of 30 drivers	₹ 20,000 each driver
Wages of 25 Helpers	₹ 12,000 each helper
Loading and unloading charges	₹ 850 each trip
Consumable stores (depends on running of vehicles)	₹ 1,35,000
Insurance (Annual)	₹ 8,40,000
Road Licence (Annual)	₹ 6,00,000
Cost of Diesel per litre	₹ 78
Kilometres run per litre each vehicle	5 Km.
Lubricant, Oil etc.	₹ 1,15,000
Cost of replacement of Tyres, Tubes, other parts etc. (on running basis)	₹ 4,25,000
Garage rent (Annual)	₹ 9,00,000
Routine mechanical services	₹ 3,00,000
Electricity charges (for office, garage and washing station)	₹ 55,000
Depreciation of vehicles (on time basis)	₹ 6,00,000

There is a workshop attached to transport department which repairs these vehicles and other vehicles also. 40 percent of transport manager's salary is debited to the workshop.

The transport department has been apportioned ₹ 88,000 by the workshop during the month. During the month operation was for 25 days.

You are required:

i. CALCULATE per ton-km operating cost.

ii. DETERMINE the freight to be charged per ton-km, if the company earned a profit of 25 per cent on freight.

PROBLEM – 16: (MAY 20)

AD Higher Secondary School (AHSS) offers courses for 11th & 12th standard in three streams i.e. Arts, Commerce and Science. AHSS runs higher secondary classes along with primary and secondary classes but for accounting purpose it treats higher secondary as a separate responsibility centre. The

Managing committee of the school wants to revise its fee structure for higher secondary students. The accountant of the school has provided the following details for a year:

	Amount (₹)
Teachers' salary (15 teachers × ₹ 35,000 × 12 months)	63,00,000
Principal's salary	14,40,000
Lab attendants' salary (2 attendants × ₹ 15,000 × 12 months)	3,60,000
Salary to library staff	1,44,000
Salary to peons (4 peons × ₹ 10,000 × 12 months)	4,80,000
Salary to other staffs	4,80,000
Examination's expenditure	10,80,000
Office & Administration cost	15,20,000
Annual day expenses	4,50,000
Sports expenses	1,20,000

i.

Other Information:

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

ii. One teacher who teaches economics for Arts stream students also teaches commerce stream students. The teacher takes 1,040 classes in a year, it includes 208 classes for commerce students.

iii. There is another teacher who teaches mathematics for science stream students also teaches business mathematics to commerce stream students. She takes 1,100 classes a year, it includes 160 classes for commerce students.

iv. One peon is fully dedicated for higher secondary section. Other peons dedicate their 15% time for higher secondary section.

v. All school students irrespective of section and age participate in annual functions and sports activities.

Requirement:

a) CALCULATE cost per student per annum for all three streams.

b) If the management decides to take uniform fee of ₹1,000 per month from all higher secondary students, CALCULATE stream wise profitability.

c) If management decides to take 10% profit on cost, COMPUTE fee to be charged from the students of all three streams respectively.

PROBLEM – 17: (NOV 19)

A transport company has a fleet of four trucks of 10 tonne capacity each plying in different directions for transport of customer's goods. The trucks run loaded with goods and return empty. The distance travelled, number of trips made and the load carried per day by each truck are as under:

Truck No.	One way Distance Km	No. of trips per day	Load carried per trip / day tonnes
1	48	4	6
2	120	1	9
3	90	2	8
4	60	4	8

The analysis of maintenance cost and the total distance travelled during the last two years is as under

Year	Total distance travelled	Maintenance Cost ₹
1	1,60,200	1,38,150
2	1,56,700	1,35,525

The following are the details of expenses for the year under review:

Diesel	₹ 60 per litre. Each litre gives 4 km per litre of diesel on an average.
Driver's salary	₹ 22,000 per truck per month
Licence and taxes	₹ 15,000 per annum per truck
Insurance	₹ 80,000 per annum for all the four trucks
Purchase Price per truck	₹ 30,00,000, Life 10 years. Scrap value at the end of life is ₹ 1,00,000.
Oil and sundries	₹ 525 per 100 km run
General Overhead	₹ 1,10,840 per annum

The trucks operate 24 days per month on an average.

Required

(i) PREPARE an Annual Cost Statement covering the fleet of four trucks.

(ii) CALCULATE the cost per km. run.

DETERMINE the freight rate per tonne km. to yield a profit of 30% on freight.

PROBLEM – 18: (MAY 19)

A company runs a holiday home. For this purpose, it has hired a building at a rent of ₹ 10,00,000 per month along with 5% of total taking. It has three types of suites for its customers, viz., single room, double rooms and triple rooms.

Following information is given:

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

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

The other expenses for the year 20X9 are as follows:

	(₹)
Staff salaries	14,25,00,000
Room attendants' wages	4,50,00,000
Lighting, heating and power	2,15,00,000
Repairs and renovation	1,23,50,000
Laundry charges	80,50,000
Interior decoration	74,00,000
Sundries	1,53,00,000

Provide profit @ 20% on total taking and assume 360 days in a year.

You are required to CALCULATE the rent to be charged for each type of suite.

ANSWERS

1.

Working Notes:

Calculation of equivalent numbers of Light weight vehicles (when no concession is provided on return journey)

Type of vehicle	Monthly traffic (A)	Return traffic (B)	Ratio (C)	Equivalent light weight [(A + B) × C]
Light weight	45,000*	45,000	1	90,000
Medium weight	12,000	12,000	2.5	60,000
Heavy weight	10,000	10,000	5	1,00,000
				2,50,000

*50,000 light vehicles less 10% exempted vehicles

Calculation of equivalent numbers of Light weight vehicles (when concession is provided on return journey)

Type of vehicle	Monthly traffic (A)	Return traffic (B)	Ratio (C)	Equivalent light weight [(A + B) × C]
Light weight	45,000*	41,625 [45,000- (45,000 × 30% × 25%)]	1	86,625
Medium weight	12,000	12,000	2.5	60,000
Heavy weight	10,000	10,000	5	1,00,000
				2,46,625

(i) Calculation of toll rate for each type of vehicle:

Total cost to cover ÷ Equivalent type of vehicles

(₹ 59,09,090 + 10% of ₹ 59,09,090) ÷ 2,50,000 equivalent vehicles (Refer working note 1)

= 65,00,000 ÷ 2,50,000 = ₹ 26

Toll rate for:

Light weight vehicle = ₹ 26

Medium weight vehicle = ₹ 26 × 2.5 = ₹ 65 Heavy weight vehicle = ₹ 26 × 5 = ₹ 130

(ii) Calculation of toll rate for each type of vehicle:

Revenue earned from Light weight vehicle in (i) above

= 90,000 vehicles × ₹ 26 = ₹ 23,40,000

New toll rate to maintain the same revenue from Light weight vehicle

= ₹ 23,40,000 ÷ 86,625 (Refer working note-2)

= ₹ 27.01 Light weight vehicle = ₹ 27.01

Rate to be charged from 13,500 light weight vehicles = 27.01 × 0.75 = 20.26

Alternative presentation

(iii) Toll rate to be charged from light weight vehicles if concession applicable

Revenue share in light vehicles = 90,000 × 26 = ₹ 23,40,000

Suppose rate is x, then outward journey 45,000 x; return journey (45,000 - 30% of 45,000) + 13,500 (x - 0.25)

45,000x + 31,500x + 13500 (0.75x) = ₹ 23,40,000

Toll rate to be charged from light weight vehicles : 86,625x = ₹ 23,40,000

=₹ 27.01

Rate to be charged from 76,500 light weight vehicles @ 27.01; revenue will be ₹ 20,66,494

Rate to be charged from 13,500 light weight vehicles = 27.01 × 0.75 = 20.26 revenue will be ₹ 2,73,506

2.

Particulars	Vehicle loan Applications (₹)	Education loan Application (₹)	Total (₹)
Employee Cost	2,00,000 (₹ 50,000 × 4)	1,40,000 (₹ 70,000 × 2)	3,40,000
Apportionment of Branch manager's salary	27,000	27,000	54,000
Legal charges, Printing & stationery and Advertising expenses	18,000	18,000	36,000
Other expenses	3,000	3,000	6,000
Total cost	2,48,000	1,88,000	4,36,000

(i) Computation of cost of processing a vehicle loan application:

Total Cost ÷ No. of applications

₹ 2,48,000 ÷ 496 = ₹ 500

(ii) Computation of no. of Education loan Processed

Total Cost = No. of applications × Processing cost per application

₹ 1,88,000 = No. of applications × ₹ 500

No. of education loan applications = ₹ 1,88,000 ÷ ₹ 500 = 376 applications

3.

i. Statement of Expenses of operating a mini bus in a year

Particulars	Rate (₹)	Per Bus per annum (₹)
(A) Standing Charges:		

Driver's salary	20,000 p.m	2,40,000
Lady attendant's salary	10,000 p.m	1,20,000
Average Cleaner's salary (50%)	15,000 p.m	90,000
Insurance charge	30,000 p.a.	30,000
License fee, taxes etc.	5,080 p.m.	60,960
Average Garage Rent	24,000 p.m	36,000
Depreciation {(15,00,000 – 3,00,000) ÷ 8}	1,50,000 p.a.	1,50,000
(B) Maintenance Charges:		
Repairs & maintenance including engine oil and lubricants (Working Note 1)	28,560 p.a.	
(C) Operating Charges:		
Diesel (Working Note 2)		5,76,000
Total Cost (A + B + C)		13,31,520
Cost per month		1,10,960

Average cost per employee per month:

A. Employee coming from distance of upto 15 km

= Total cost per month / Total no.of equivalent employee = 1,10,960 ÷ 72 = 1541.11

B. Employee coming from a distance beyond 15 km

= 1541.11 × 2 = ₹ 3,082.22

* Considering half fare employees as a base Full fare employees (12 × 2)	24 employees
Add: Half fare employees (Working Note 3)	12 employees
Total Equivalent number of employees per month	36 employees
Total Equivalent number of employees per month (morning + afternoon shift of company)	72 employees

Working Notes:

1. **Calculation of Repairs and maintenance cost of a bus :**

   Distance travelled in a year:

   (4 trip × 2 shifts × 30 km. × 20 days × 12 months) Distance travelled p.a.: 57,600 km.

   Repairs and maintenance cost per Bus per annum:

   = 57,600 km /5,760 km × ₹ 2,856 per bus

   = ₹ 28,560 per annum

2. **Calculation of diesel cost per bus per annum:**

   Distance travelled in a year = 57,600 km

   Diesel cost per Bus per annum:

   = 57,600 km./ 8 Km ×₹ 80

= 5,76,000

3. Calculation of equivalent number of employees per bus:

Seating capacity of a bus	30 employees
Occupancy (80% of capacity)	24 employees
Half fare employees (50% of 24 employees)	12 employees
Full fare employees (50% of 24 employees)	12 employee

[Note: Total Equivalent number of employees per month (morning + afternoon shift of company can also be calculated considering full fare employees as a base. In that case the number will be 36. Then fare for employees coming from distance beyond 15km will be 1,10,960 / 36 = ₹ 3,082.22 and employees coming from distance upto 15 km will be 3,082.22 / 2 = ₹ 1,541.11]

4.

i) Calculation of total cost for 'COVID-19' Insurance policy

	Particulars	**Amount (₹)**	**Amount (₹)**
a.	**Marketing and Sales support:**		
	- Policy development cost	35,00,000	
	- Cost of marketing	1,38,90,000	
	- Sales support expenses	32,00,000	**2,05,90,000**
b.	**Operations:**		
	- Policy issuance cost	29,50,000	
	- Policy servicing cost	96,45,000	
	- Claim management cost	3,80,000	**1,29,75,000**
c.	**IT Cost***		**2,21,00,000**
d.	**Support functions**		
	- Postage and logistics	32,40,000	
	- Facilities cost	46,75,000	
	- Employee's cost	16,20,000	
	- Office administration cost	48,00,000	**1,43,35,000**
	Total Cost		**7,00,00,000**

*IT cost

= (₹ 3,500 crores x 0.002) – ₹ 4,79,00,000 = ₹ 2,21,00,000

ii) Calculation of cost per policy = Total cost/No. of policies

= ₹ 7,00,00,000/ 2,800 = ₹ 25,000

5.

Workings:

Calculation of number of patient days

100 Beds x days	12000
40 Beds x 80 days	3,200
Extra beds	400
Total	15,600

(i) Statement of Profitability

Particulars	**Amount (₹)**	**Amount (₹)**
Income for the year (₹ 200 per patient per day x 15,600 patient days)		31,20,000
Variable Costs:		
Doctor Fees (₹ 30,000 per month x 12)	3,60,000	
Food to Patients (Variable)	4,40,000	
Caretaker Other services to patients (Variable)	1,25,000	
Laundry charges (Variable)	1,40,000	
Medicines (Variable)	2,80,000	
Bed Hire Charges (₹ 50 x 400 Beds)	20,000	
Total Variable costs		(13,65,000)
Contribution		17,55,000
Fixed Costs:		
Rent (₹ 50,000 per month x 12)	6,00,000	
Supervisor (2 persons x ₹ 5,000 x 12)	1,20,000	
Nurses (4 persons x ₹ 3,000 x 12)	1,44,000	
Ward Boys (2 persons x ₹ 1500 x12)	36,000	
Repairs (Fixed)	28,000	
Cost of Oxygen	75,000	
Administration expenses allocated	71,000	
Total Fixed Costs		(10,74,000)
Profit		6,81,000

Calculation of Contribution and profit per patient day

Total Contribution = ₹ 17,55,000

Total Patient days = 15,600 days

Contribution per patient Day = ₹ 17,55,000 / 15,600 days = ₹ 112.50

Total Profit = ₹ 6,81,000

Total Patient days = 15,600 days

Profit per patient day = ₹ 6,81,000 / 15,600 days = ₹ 43.65

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

= ₹ 10,74,000 / ₹ 112.50

= 9,547 patient days

6.

Working Notes:

(i) Total Room days in a year

Season	Occupancy (Room-days)	Equivalent Full Room charge days
Season – 80% Occupancy	200 Rooms × 80% × 6 months × 30 days in a month = **28,800** Room Days	28,800 Room Days × 100% = 28,800
Off-season – 40% Occupancy	200 Rooms × 40% × 6 months × 30 days in a month = **14,400** Room Days	14,400 Room Days × 50% = 7,200
Total Room Days	28,800 + 14,400 = **43,200** Room Days	36,000 Full Room days

(ii) Lighting Charges:

It is given in the question that lighting charges for 8 months is ₹ 110 per month and during winter season of 4 months it is ₹ 30 per month. Further it is also given that peak season is 6 months and off season is 6 months.

It should be noted that – being Hill station, winter season is to be considered as part of Off season. Hence, the non-winter season of 8 months include – Peak season of 6 months and Off season of 2 months.

Accordingly, the lighting charges are calculated as follows:

Season	Occupancy (Room-days)
Season & Non-winter – 80% Occupancy	200 Rooms × 80% × 6 months × ₹ 110 per month **= ₹ 1,05,600**
Off- season & non-winter – 40% Occupancy (8 – 6 months)	200 Rooms × 40% × 2 months × ₹ 110 per month = ₹ 17,600
Off- season & -winter – 40% Occupancy months)	200 Rooms × 40% × 4 months × ₹ 30 per month = **₹ 9,600**
Total Lighting charges	₹ 1,05,600+ ₹ 17,600 + ₹ 9,600 = **₹ 132,800**

Statement of total cost:

	(₹)
Staff salary	8,00,000
Repairs to building	3,00,000
Laundry	1,40,000
Interior	2,50,000
Miscellaneous Expenses	2,00,200

Depreciation on Building (₹ 300 lakhs x 80% x 5%)	12,00,000
Depreciation on Furniture & Fixtures (₹ 300 lakhs x 20% x 15%)	9,00,000
Room attendant's wages (₹ 15 per Room Day for 43,200 Room Days)	6,48,000
Lighting charges	1,32,800
Total cost	45,71,000
Add: Profit Margin (20% on Room rent or 25% on Cost)	11,42,750
Total Rent to be charged	57,13,750

Calculation of Room Rent per day:

Total Rent / Equivalent Full Room days = ₹ 57,13,750/ 36,000 = ₹ 158.72

Room Rent during Season – ₹ 158.72

Room Rent during Off season = ₹ 158.72 × 50% = ₹ 79.36

7.

(a) Working Notes:

Particulars	For 4 weeks	For 1 week (by dividing by 4)
Total distance travelled (40 km x 2 x 2 trips x 5 days x 4 weeks)	3,200 km	800 km
Total tonne km (40 km x 10 tonnes x 2 x 5 days x 4 weeks)	16,000 tonne km	4,000 tonne km

i. Statement showing Operating Cost

Amount (₹)

Particulars	For 4 weeks	For 1 week (by dividing by 4)
A. Fixed Charges:		
Drivers' wages (₹ 2,500 x 4 weeks)	10,000	2,500
Garage rent (₹ 800 × 4 weeks)	3,200	800
Insurance {(₹ 18,200 ÷ 52 weeks) × 4 weeks}	1,400	350
Vehicle license {(₹ 7,800 ÷ 52 weeks) × 4 weeks}	600	150
Other overheads cost {(₹ 41,600 ÷ 52 weeks) × 4 weeks}	3,200	800
Total (A)	18,400	4,600
B.Running Cost:		
Cost of diesel {(3,200 / 8 kms) x ₹ 60	24,000	6,000
Engine Oil (₹ 200 × 4 weeks)*	800	200
Repairs (₹ 600 × 4 weeks)*	2,400	600
Depreciation on vehicle	16,000	4,000

[(₹ 9,50,000 - ₹ 1,50,000) / 1,60,000km x 3,200 km]		
Depreciation on tyres [(₹ 52,500 / 25,000 km)x 3,200 km]	6,720	1,680
Total (B)	**49,920**	**12,480**
C. Total Cost (A + B)	**68,320**	**17,080**

*Cost of engine oil & repairs may also be treated as fixed cost, as the question relates these with time i.e., in weeks instead of running of vehicle.

ii. Calculation of vehicle operating cost:

Operating cost per k.m. = ₹ 68,320 / 3,200 kms or ₹ 17,080 / 800 kms = ₹ 21.35

Operating cost per Tonne – k.m. = ₹ 68,320 / 16,000 kms or ₹ 17,080 / 4000 = ₹ 4.27

8.

i. Statement showing the Operating Cost per Passenger-km.

		Yearly (₹)	Monthly (₹)
(A)	**Standing Charges:**		
	Insurance Charge ₹ 20,00,000 × 3%	60,000	5,000
	Road Tax	36,000	3,000
	Depreciation (20,00,000/5)	4,00,000	33,333.33
	Total	4,96,000	41,333.33
(B)	**Maintenance Charges:**		
	Annual Repairs	50,000	4166.67
	Office and administration overheads	3,18,000	26,500
	Total	3,68,000	30666.67
(C)	**Running Cost/Charges:**		
	Driver's Salary	2,40,000	20,000
	Conductor's Salary	1,80,000	15,000
	Diesel & Oil [60,000 x (1,500 / 100)]	9,00,000	75,000
	Total	13,20,000	41,333.33
	Total (A+B+C) Cost before commission and profit	21,84,000	1,82,000
	Commission (33,60,000 × 10%) (working note 2)	3,36,000	28,000
	Profit (33,60,000 × 25%) (working note 2)	8,40,000	70,000
	Takings (working note 1)	33,60,000	2,80,000

ii. Fare per Passenger-km. = Total Collection/Takings / Total Passenger-km (Working note 3) = 33,60,000 / 24,00,000 = ₹ 1.40

OR

Fare per Passenger-km. (monthly) = 2,80,000 / 2,00,000 = ₹ 1.40

Working note:

1. Cost before commission (10%) and profit (25%) is 21,84,000 which is 65% of total takings. So total takings is (21,84000÷65) ×100=₹ 33,60,000
2. Commission is 10% of ₹ 33,60,000=₹ 3,36,000 and Profit is 25% of ₹ 33,60,000=₹ 8,40,000
3. Total Km is (4 Round Trips × Days in a month × Month = (4×2×25 ×25×12) = 60,000 km
4. Passenger km is 60,000 km×40 passenger= 24,00,000

9.

(i) Statement Showing Overhead Cost per unit "Traditional Method"

	Gel Pen (₹)	**Ball Pen (₹)**
Units	5,500	24,000
Overheads (₹) (Refer to W.N.)	4,80,000 (20 x 24,000 hrs.)	10,80,000 (20 x 54,000 hrs)
Overhead Rate per unit (₹)	87.27 (₹ 4,80,000 / 5,500 units)	45 (₹ 10,80,000 / 24,000 units)

Working Notes:

Overhead Rate per Machine Hour

= Total Overhead incurred by the Company / Total Machine Hours

= ₹ 4,75,020+ 5,79,988+ 5,04,992 / 24,000 hours + 54,000 hours

= ₹ 15,60,000 / 78,000 hours

= ₹ 20 per machine hour

(ii) Statement Showing "Activity Based Overhead Cost"

Activity Cost Pool	**Cost Driver**	**Ratio**	**Total Amount (₹)**	**Gel Pen (₹)**	**Ball Pen (₹)**
Volume Related Activity Costs	Machine hours	24:54	4,75,020	1,46,160	3,28,860
Setup Related Costs	No. of Setups	30:56	5,79,988	2,02,321	3,77,667
Purchase Related Costs	No. of Purchase Orders	240:448	5,04,992	1,76,160	3,28,832
Total Cost				5,24,641	10,35,359
Output (units)				5,500	24,000
Unit Cost (Overheads)				95.39	43.13

(iii)

	Gel Pen (₹)	**Ball Pen (₹)**
Overheads Cost per unit (₹) (Traditional Method)	87.27	45
Overheads Cost per unit (₹) (ABC)	95.39	43.13

Difference per unit	-8.12	+1.87

(Volume related activity cost, set up related costs and purchase related cost can also be calculated under Activity Base Costing using Cost driver rate. However, there will be no changes in the final answer.)

10.

Operating cost statement of P Holiday Resorts

Particulars	Cost per annum (₹ In lakhs)
Staff Salaries	680.00
Room Attendant's Wages (Refer WN-3)	286.20
Lighting, Heating & Power	300.00
Repairs, Maintenance & Renovation	180.00
Linen	30.00
Laundry charges	24.00
Interior Decoration	75.00
Sundries	30.28
Depreciation: (Refer WN-4)	
Building	45.00
Furniture & Fixture	9.00
Air Conditioners	7.50
Total cost for the year	**1666.98**

Computation of profit:

Let ₹ x be the rent for deluxe from.

Equivalent deluxe room days are 90,720 (Refer WN-2)

Total takings = ₹ 90,720x

Profit is 25% of total takings.

Profit = 25% of ₹ 90,720x = ₹ 22,680x

Total takings = Total Cost + Profit

₹ 90,720x = ₹ 16,66,98,000 + ₹ 22,680x

₹ 90,720x - ₹ 22,680x = ₹ 16,66,98,000

₹ 68,040x = ₹ 16,66,98,000

X = ₹ 16,66,98,000 / ₹ 68,040 =₹ 2,450

Rent to be charged for deluxe room	₹ 2,450
Rent to be charged for super deluxe room = Rent of deluxe room x 2 = ₹ 2,450 x 2	₹ 4,900
Rent to be charged for luxury suite = Rent of Deluxe room x 3 = ₹ 2,450 x 3	₹ 7,350

Working Notes:

1. Computation of Room Occupancy

Type of Room	No. of rooms x no. of days x occupancy %	Room days
Deluxe Room	100 rooms x 360 days x 90% occupancy	32,400
Super Deluxe Room	60 rooms x 360 days x 75% occupancy	16,200
Luxury Suite	40 x 360 days x 60% occupancy	8,640
	Total	57,240

2. Computation of equivalent deluxe room days

Rent of 'super deluxe' room is to be fixed at 2 times of 'deluxe room' and luxury suite' is 3 times of 'deluxe room'. Therefore, equivalent room days would be:

Type of Room	Room days	Equivalent deluxe room days
Deluxe Room	32,400 x 1	32,400
Super Deluxe Room	16,200 x 2	32,400
Luxury Suite	8,640 x 3	25,920
	Total	90,720

Computation of room attendant's wages:

Room occupancy days @ ₹ 500 per day

= 57,240 days × ₹ 500 per day = ₹ 2,86,20,000

Computation of Depreciation per annum:

Particulars	Cost (₹)	Rate of Depreciation	Depreciation (₹)
Building	900,00,000	5%	45,00,000
Furniture & Fixtures	90,00,000	10%	9,00,000
Air Conditioners	75,00,000	10%	7,50,000

11.

Total units generated 16,50,000 kWh.

Cost Statement of Panipat Thermal Power Station

	Per annum (₹)	Per kWh. (₹)
Fixed costs:		
Plant supervision	4,35,000	
Administration overheads	29,00,000	
Insurance Charges	15,00,000	
Depreciation (5% of ₹ 3,10,00,000 p.a.)	15,50,000	
Total fixed cost: (A)	63,85,000	3.87
Variable costs:		

Operating labour	21,75,000	
Fuel Charges	8,00,000	
Lubricants, spares and stores	5,80,000	
Repairs & maintenance	7,25,000	
Coal cost (Refer to working note)	11,19,643	
Total variable cost: (B)	53,99,643	3.27
Total cost [(A) + (B)]	1,17,84,643	7.14

Working Note:

Coal cost (16,50,000 kWh. ÷ 7 kWh) × ₹ 4.75 per kg. = ₹ 11,19,643

12.

Working Notes:

1. Calculation of Depreciation per month:

	Particulars	CNG Car	EV Car
A	Car purchase price (₹)	9,20,000	15,20,000
B	Less: Govt. subsidy (₹)	--	(1,50,000)
C	Less: Residual value (₹)	(95,000)	(1,70,000)
D	Depreciable value of car (₹) [A-B-C]	8,25,000	12,00,000
E	Life of the car	15 years	10 years
F	Annual depreciation (₹) [D÷E]	55,000	1,20,000
G	**Depreciation per month (₹) [F÷12]**	**4,583.33**	**10,000**

2. Fuel/ Electricity consumption cost per month:

	Particulars	CNG Car	EV Car
A	Average distance covered in a month (KM)	1,500	1,500
B	Mileage (KM)	20	240
C	Qty. of CNG/ Full charge required [A÷B]	75 kg.	6.25
D	Electricity Consumption [C×30kwh]	-	187.5
E	Cost of CNG per kg (₹)	60	-
F	Power cost per Kwh (₹)	-	7.60
G	**CNG Cost per month (₹) [C×E]**	**4,500**	**-**
H	**Power cost per month (₹) [D×F]**	**-**	**1,425**

3. Amortised cost of Tyre replacement:

	Particulars	CNG Car	EV Car
A	Life of vehicle	15 years	10 years
B	Replacement interval	5 years	5 years
C	No. of time replacement required	2 times	1 time

D	Cost of tyres for each replacement (₹)	16,000	16,000
E	Total replacement cost (₹) [C×D]	32,000	16,000
F	Amortised cost per year (₹) [E÷A]	2,133.33	1,600
E	**Cost per month (₹) [F÷12]**	**177.78**	**133.33**

4. Amortised cost of Battery replacement:

	Particulars	**CNG Car**	**EV Car**
A	Life of vehicle	15 years	10 years
B	Replacement interval	8 years	8 years
C	No. of time replacement required	1 time	1 time
D	Cost of battery for each replacement (₹)	12,000	5,40,000
E	Total replacement cost (₹) [C×D]	12,000	5,40,000
F	Amortised cost per year (₹) [E÷A]	800	54,000
E	**Cost per month (₹) [F÷12]**	**66.67**	**4,500**

Calculation of Operating cost per month:

	Particulars	**CNG Car**	**EV Car**
A	**Running cost:**		
	Fuel cost/ Power consumption cost [Refer WN-2]	4500	1425
B	**Maintenance cost:**		
	Annual Maintenance cost [Annual cost ÷12]	666.67	433.33
	Annual Insurance cost [Annual cost ÷12]	633.33	1216.67
	Amortised cost of Tyre replacement [Refer WN-3]	177.78	133.33
	Amortised cost of Battery replacement [Refer WN-4]	1544.45	6283.33
C	**Fixed cost:**		
	Depreciation [Refer WN-1]	4583.33	10000
	Driver's salary	20000	20000
	Garage rent	4500	4500
	Share of Office & Administration cost	1500	1500
		30583.33	36000
D	**Operating cost per month [A+B+C]**	**36,627.78**	**43,708.33**

13.

Working Notes:

1. Total Distance (in km.) covered per month

Bus route	**Km. per trip**	**Trips per day**	**Days per month**	**Km. per month**
Delhi to Hisar	160	2	9	2,880
Delhi to Aligarh	160	2	12	3,840

Delhi to Alwar	170	2	6	2,040
				8,760

2. Passenger- km. per month

	Total seats available per month (at 100% capacity	Capacity utilised (%)		Km. per trip Seats	Passenger- Km. per month
Delhi to Hisar & Back	900 (50 seats x 2 trips x 9 days)	90	810	160	1,29,600 (810 seats x 160 km.)
Delhi to Aligarh & Back	1,200 (50 seats x 2 trips x 12 days)	95	1,140	160	1,82,400 (1,140 seats x 160 km.)
Delhi to Alwar & Back	600 (50 seats x 2 trips x 6 days)	100	600	170	1,20,000 (600 seats x 170 km.)
Total					4,14,000

Monthly Operating Cost Statement

	Particulars	(₹)	(₹)
(i)	Running Costs		
	Diesel {(8,760 km /5 km) x ₹ 90}	1,57,680.00	
	Lubricant oil {(8,760 km /100) x ₹ 30}	2,628.00	1,60,308.00
(ii)	Maintenance Costs		
	Repairs & Maintenance		5,000.00
	Standing charges		
	Salary to driver	30,000.00	
	Salary to conductor	26,000.00	
	Salary of part-time accountant	7,000.00	
	Insurance (₹ 6,000 ÷12)	500.00	
	Road Tax (₹ 21,912 / 12)	1,826.00	
	Permit Fee	500.00	
	Depreciation {(₹ 15,00,000 x 30%) / 12}	37,500.00	1,03,326.00
	Total costs per month before Passenger Tax (i)+(ii)+(iii)		2,68,634.00
	Passenger Tax*		1,07,453.60
	Total Cost		3,76,087.60
	Add: Profit*		1,61,180.40

	Total takings per month		5,37,268.00

*Let total takings be X then,

X = Total costs per month before passenger tax + 0.2 X (passenger tax) + 0.3 X (profit)

X = ₹ 2,68,634 + 0.2 X + 0.3 X

0.5 X = ₹ 2,68,634 or, X = ₹ 5,37,268

Passenger Tax = 20% of ₹ 5,37,268 = ₹ 1,07,453.60

Profit = 30% of ₹ 5,37,268 = ₹ 1,61,180.40

Calculation of Rate per passenger km. and fares to be charged for different routes

Rate per Passenger-Km. = Total takings per month / Total Passenger -Km. per month

= ₹ 5,37,268 / 4,14,000 Passenger-Km. = ₹ 1.30 (approx.)

Bus fare to be charged per passenger:

Delhi to Hisar = ₹ 1.30 x 160 km = ₹ 208.00

Delhi to Aligarh = ₹ 1.30 x160 km = ₹ 208.00

Delhi to Alwar = ₹ 1.30 x 170 km = ₹ 221.00

14.

i. Statement showing the expenses of operating a single bus and the fleet of 25 buses for a year

Particulars	Per bus per annum (₹)	Fleet of 25 buses per annum (₹)
Running costs: (A)		
Diesel (Refer to working note 1)	2,21,056	55,26,400
Repairs & maintenance costs: (B)	20,500	5,12,500
Fixed charges:		
Driver's salary (₹ 12,000 x 12 months)	1,44,000	36,00,000
Cleaners' salary (₹ 8,000 x 12 months)	96,000	24,00,000
Licence fee, taxes etc.	8,400	2,10,000
Insurance	15,600	3,90,000
Depreciation [(₹ 20,00,000 - ₹ 1,60,000) / 16 years]	1,15,000	28,75,000
Total fixed charges: (C)	3,79,000	94,75,000
Total expenses: (A+B+C)	6,20,556	1,55,13,900

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

(a) 2 km. from the school {₹ 6,20,556 / (236 students × 12 months)} (Refer to Working Note 2) ₹ 219.12

(b) 4 km. from the school (₹ 219.12 × 2) ₹ 438.24

(c) 8 km. from the school (₹ 219.12 × 4) ₹ 876.48

iii. Calculation of minimum bus fare to be recovered from the students during the year 2020:

Statement showing the expenses of operating a single bus in year 2020

Particulars	Per bus per annum (₹)
Running costs: (A)	
Diesel (Refer to working note 3)	66,316.80
Repairs & maintenance costs: (B) (₹ 20,500 x 0.75)	15,375
Fixed charges:	
Driver's salary {₹ 12,000 × 3 months + (75% of ₹ 12,000 × 9 months)}	1,17,000
Cleaners' salary {₹ 8,000 × 3 months + (75% of ₹ 8,000 × 9 months)}	78,000
Licence fee, taxes etc.	8,400
Insurance	15,600
Depreciation (₹ 20,00,000 - ₹ 1,60,000 / 16 years)	1,15,000
Total fixed charges: (C)	3,34,000
Total expenses: (A+B+C)	4,15,691.80

Minimum bus fare to be recovered:

(a) 2 km. from the school {₹ 4,15,691.8 / (236 students × 12 months)} (Refer to Working Note 2) ₹ 146.78

(b) 4 km. from the school (₹ 146.78 × 2) ₹ 293.56

(c) 8 km. from the school (₹ 146.78 × 4) ₹ 587.12

Working Notes:

1. Calculation of diesel cost per bus:

No. of trips made by a bus each day	4
Distance travelled in one trip both ways (8 km. × 2 trips)	16 km.
Distance travelled per day by a bus (16 km. × 4 shifts)	64 km.
Distance travelled during a month (64 km. × 22 days)	1,408 km.
Distance travelled per year (1,408 × 10 months)	14,080 km.
No. of litres of diesel required per bus per year (14,080 km. ÷ 5 km.)	2,816 litres
Cost of diesel per bus per year (2,816 litres × ₹ 78.50)	₹ 2,21,056

2. Calculation of equivalent number of students per bus:

Bus capacity of 2 trips (40 students × 2 trips)	80 students
1/4th fare students (15% × 80 students)	12 students
½ fare students (30% × 80 students × 2) (equivalent to 1/4th fare students)	48 students
Full fare students (55% × 80 students × 4) (equivalent to 1/4th fare students)	176 students
Total students equivalent to 1/4th fare students	236 Students

3. Calculation of diesel cost per bus in Year 2020:

Distance travelled during a month (64 km. × 22 days)	1,408 km.
Distance travelled during the year 2020 (1,408 × 3 months)	4,224 km.
No. of litres of diesel required per bus per year (4,224 km. ÷ 5 km.)	844.8 litres
Cost of diesel per bus per year (844.8 litres × ₹ 78.50)	₹ 66,316.80

15.

i. Operating Cost Sheet for the month of August, 2020

	Particulars	Amount (₹)
	Fixed Charges:	
	Manager's salary (₹ 60,000 × 60%)	36,000
	Drivers' Salary (₹ 20,000 x 30 drivers)	6,00,000
	Helpers' wages (₹ 12,000 x 25 helpers)	3,00,000
	Insurance (₹ 8,40,000 ÷ 12 months)	70,000
	Road licence (₹ 6,00,000 ÷ 12 months)	50,000
	Garage rent (₹ 9,00,000 ÷ 12 month)	75,000
	Routine mechanical services	3,00,000
	Electricity charges (for office, garage and washing station)	55,000
	Depreciation of vehicles	6,00,000
	Apportioned workshop expenses	88,000
	Total (A)	21,74,000
	Variable Charges:	
	Loading and unloading charges (Working Note 1)	7,65,000
	Consumable Stores	1,35,000
	Cost of diesel (Working Note 2)	14,04,000
	Lubricant, Oil etc.	1,15,000
	Replacement of Tyres, Tubes & other parts	4,25,000
	Total (B)	28,44,000

C.	**Total Cost (A + B)**	**50,18,000**
D.	Total Ton-kms (Working Note 3)	9,43,200
E.	**Cost per ton-km. (C ÷ D)**	**5.32**

ii. Calculation of Chargeable Freight

Cost per ton-km.	₹ 5.32
Add: Profit @ 25% on freight or 33⅓% on cost	₹ 1.77
Chargeable freight per ton-km.	₹ 7.09

Working Notes:

1. Wages paid to loading and unloading labours

Numbers of vehicles available per day × No. of days × trips × wages per trip

(20 vehicles × 90%) × 25 days × 2 trips × ₹ 850

18 × 25 × 2 × 850 = ₹ 7,65,000

2. Cost of Diesel:

Distance covered by each vehicle during August, 2020

= 100 k.m x 2 x 25 days x 90% = 4,500 km.

Consumption of diesel = 4,500 km x 20 vehicles / 5 k.m. = 18,000 litres

Cost of diesel = 18,000 litres x ₹ 78 = ₹ 14,04,000.

3. Calculation of total ton-km:

Total Ton-Km. = Total Capacity x Distance covered by each vehicle x Average Capacity Utilisation ratio.

= [(5 x 9 MT) + (6 x 12MT) + (7 x 15 MT) + (2 x 20 MT) x 4,500 k.m. x (90% + 70%) / 2

= (45 + 72 + 105 + 40) x 4,500 k.m. x 80%

= 262 x 4,500 x 80%.

= 9,43,200 ton-km.

16.

Calculation of Cost per annum

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

Salary to other staffs (W.N-7)	38,400	1,15,200	57,600	2,11,200
Examination expenses (W.N- 8)	86,400	2,59,200	1,29,600	4,75,200
Office & Administration expenses (W.N-7)	1,21,600	3,64,800	1,82,400	6,68,800
Annual Day expenses (W.N-7)	36,000	1,08,000	54,000	1,98,000
Sports expenses (W.N- 7)	9,600	28,800	14,400	52,800
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400

(a) Calculation of cost per student per annum

Particulars	Arts (₹)	Commerce (₹)	Science (₹)	Total (₹)
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400
No. of students	120	360	180	660
Cost per student per annum	17,397	9,33	19,238	13,610

(b) Calculation of profitability

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

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

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

Working Notes:

(1) Teacher's salary

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

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

Particulars	Economics		Mathematics	
	Arts	Commerce	Science	Commerce
No. of classes	832	208	940	160
Salary re-apportionment (₹)	(84,000)	84,000	(61,091)	61,091

	[(4,20,000 / 1,040) x 208]	[(4,20,000 / 1,100) x 160]

Total addition to Commerce stream = ₹ 84,000 + ₹ 61,091 = ₹ 1,45,091

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

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

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

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

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

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

(6) Examination Expenses has been apportioned taking number of students and number of examinations into account.

17.

(i) Annual Cost Statement of four vehicles

	(₹)
Diesel {(4,21,632 km. ÷ 4 km) × ₹ 60) (Refer to Working Note 1)	63,24,480
Oil & sundries {(4,21,632 km. ÷ 100 km.) × ₹ 525}	22,13,568
Maintenance {(4,21,632 km. × ₹ 0.75) + ₹ 18,000} (Refer to Working Note 2)	3,34,224
Drivers' salary {(₹ 22,000 × 12 months) × 4 trucks}	10,56,000
Licence and taxes (₹ 15,000 × 4 trucks)	60,000
Insurance	80,000
Depreciation {(₹ 29,00,000 ÷ 10 years) × 4 trucks}	11,60,000
General overhead	1,10,840
Total annual cost	**1,13,39,112**

(ii) Cost per km. run

Cost per kilometer run = Total annual cost of vehicles / Total kilometre travelled annually (Refer to Working Note 1)

= ₹ 1,13,39,112 / 4,21,632 kms = ₹ 26.89

(iii) Freight rate per tonne km (to yield a profit of 30% on freight)

Cost per tonne km. = Total annual cost of three vehicles / Total effective tonnes kms. per annum (Refer to Working Note 1)

= ₹ 1,13,39,112 / 16,10,496 kms = ₹ 7.04

Freight rate per tonne km (7.04 / 0.7) x 1 = ₹ 10.06

Working Notes:

1. Total kilometre travelled and tonnes kilometre (load carried) by four trucks in one year

Truck number	One way distance in kms	No. of trips	Total distance covered in km per day	Load carried per trip / day in tonnes	Total effective tonnes km
1	48	4	384	6	1,152
2	120	1	240	9	1,080
3	90	2	360	8	1,440
4	60	4	480	8	1,920
Total			1,464		5,592

Total kilometre travelled by four trucks in one year

(1,464 km. × 24 days × 12 months) = 4,21,632

Total effective tonnes kilometre of load carried by four trucks during one year

(5,592 tonnes km. × 24 days × 12 months) = 16,10,496

2. Fixed and variable component of maintenance cost:

Variable maintenance cost per km = Difference in maintenance cost / Difference in distance travelled

= ₹ 1,38,150 - ₹ 1,35,525 / 1,60,200 kms – 1,56,700 kms

= ₹ 0.75

Fixed maintenance cost = Total maintenance cost–Variable maintenance cost

= ₹ 1,38,150 – 1,60,200 kms × ₹ 0.75 = ₹ 18,000

18.

(i) Total equivalent single room suites

Nature of suite	Occupancy (Room-days)	Equivalent single room suites (Room-days)
Single room suites	36,000 (100 rooms x 360 days x 100%)	36,000 (36,000 x 1)
Double rooms suites	14,400 (50 rooms x 360 days x 80%)	36,000 (14,400 x 2.5)
Triple rooms suites	6,480 (30 rooms x 360 days x 60%)	32,400 (6,480 x 5)
		1,04,400

(ii) Statement of total cost:

		(₹)
S	Staff salaries	14,25,00,000
Ro	Room attendants' wages	4,50,00,000
Lig	Lighting, heating and power	2,15,00,000
Re	Repairs and renovation	1,23,50,000
La	Sundry charges	80,50,000
Int	decoration	74,00,000
Su	Sundries	1,53,00,000
		25,21,00,000
Bui	Building rent	1,20,00,000 + 5% on total takings
	{(₹ 10,00,000 x 12 months) + 5% on total taking}	
	Total cost	26,41,00,000 + 5% on total takings

Profit is 20% of total takings

∴ Total takings = ₹ 26,41,00,000 + 25% (5% +20%) of total takings

Let x be rent for single room suite

Then 1,04,400 x = 26,41,00,000 + 0.25 × 1,04,400 x

Or, 1,04,400 x = 26,41,00,000 + 26,100 x

Or, 78,300 x = 26,41,00,000

Or, x = 3,373

(iii) Rent to be charged for single room suite = ₹ 3,373

Rent for double rooms suites ₹ 3,373 x 2.5 = ₹ 8,432.5

Rent for triple rooms suites ₹ 3,373 x 5 = ₹ 16,865

CHAPTER 15: THEORIES

1. BASIC CONCEPTS

Q1. Why are cost and management accounting information are required by the staff at operational level? Describe. May'18

Answer

Operational level staffs - The operational level staffs like supervisors, foreman, team leaders are requiring information

i. to know the **objectives and performance goals** for them
ii. to know **product and service specifications** like volume, quality and process etc.
iii. to know the **performance parameters** against which their performance is measured and evaluated.
iv. to know **divisional (responsibility centre) profitability** etc.

Q2. Explain Opportunity Cost

Answer

This cost refers to the **value of sacrifice made or benefit of opportunity foregone** in accepting an alternative course of action. For example, a firm financing its expansion plan by withdrawing money from its bank deposits. In such a case the loss of interest on the bank deposit is the opportunity cost for carrying out the expansion plan.

Q3. Discuss on Discretionary Cost Centre and Investment Centre. RTP May'18; RTP Nov 20

Answer

Discretionary Cost Centre: The cost centre whose output **cannot be measured in financial terms,** thus input-output ratio cannot be defined. The cost of input is compared with allocated budget for the activity. Example of discretionary cost centres are Research & Development department, Advertisement department where output of these department cannot be measured with certainty and corelated with cost incurred on inputs.

Investment Centres: These are the responsibility centres which are not only responsible for profitability but also **has the authority to make capital investment decisions.** The performance of these responsibility centres are measured on the basis of Return on Investment (ROI) besides profit. Examples of investment centres are Maharatna, Navratna and Miniratna companies of Public Sector Undertakings of Central Government.

Q4. Discuss the essential features of a good cost accounting system. RTP Nov'18; MTP Oct'19

Answer

The essential features, which a good cost and management accounting system should possess, are as follows:

i. **Informative and simple:** Cost and management accounting system should be tailor-made, practical, simple and capable of meeting the requirements of a business concern. The system of costing should not sacrifice the utility by introducing meticulous and unnecessary details.

ii. **Accurate and authentic:** The data to be used by the cost and management accounting system should be accurate and authenticated; otherwise, it may distort the output of the system and a wrong decision may be taken.

iii. **Uniformity and consistency:** There should be uniformity and consistency in classification, treatment and reporting of cost data and related information. This is required for benchmarking and comparability of the results of the system for both horizontal and vertical analysis.

iv. **Integrated and inclusive:** The cost and management accounting system should be integrated with other systems like financial accounting, taxation, statistics and operational research etc. to have a complete overview and clarity in results.

v. **Flexible and adaptive:** The cost and management accounting system should be flexible enough to make necessary amendments and modification in the system to incorporate changes in technological, reporting, regulatory and other requirements.

vi. **Trust on the system:** Management should have trust on the system and its output. For this, an active role of management is required for the development of such a system that reflects a strong conviction in using information for decision making.

Q5. Distinguish between Cost Control and Cost Reduction. RTP Nov'18; MTP Aug'18; RTP May'19; MTP April'19; May'19

Answer

Cost Control	Cost Reduction
1. Cost control aims at maintaining the costs in accordance with the established standards.	**1.** Cost reduction is concerned with reducing costs. It challenges all standards and endeavours to better them continuously
2. Cost control seeks to attain lowest possible cost under existing conditions.	**2.** Cost reduction recognises no condition as permanent, since a change will result in lower cost.
3. In case of cost control, emphasis is on past and present	**3.** In case of cost reduction, it is on present and future.

4. Cost control is a preventive function	**4.** Cost reduction is a corrective function. It operates even when an efficient cost control system exists.
5. Cost control ends when targets are achieved.	**5.** Cost reduction has no visible end.

Q6. Explain the difference between controllable & uncontrollable costs? RTP Nov'18; MTP Mar'19

Answer:

Controllable costs and Uncontrollable costs:

Cost that can be **controlled**, typically **by** a cost, profit or investment centre **manager** is called **controllable cost**. Controllable costs incurred in a particular responsibility centre can be influenced by the action of the executive heading that responsibility centre.

Costs which **cannot be influenced** by the action of a specified member of an undertaking are known as **uncontrollable costs**.

Q7. Differentiate between Cost Accounting and Management Accounting. RTP Nov'19; RTP May'20

Answer

		Cost Accounting	Management Accounting
(i)	Nature	It records the quantitative aspect only.	It records both qualitative and quantitative aspect.
(ii)	Objective	It records the cost of producing a product and providing a service.	It Provides information to management for planning and co-ordination.
(iii)	Area	It only deals with cost Ascertainment.	It is wider in scope as it includes financial accounting, budgeting, taxation, planning etc.
(iv)	Recording of data	It uses both past and present figures.	It is focused with the projection of figures for future.
(v)	Development	Its development is related to industrial revolution.	It develops in accordance to the need of modern business world.
(vi)	Rules and Regulation	It follows certain principles and procedures for recording costs of different products.	It does not follow any specific rules and regulations.

Q8. Discuss cost classification based on variability. MTP Mar'18

Answer

Cost classification based on variability

i. **Fixed Costs –** These are the costs which are incurred for a period, and which, within certain output and turnover limits, tend to be unaffected by fluctuations in the levels of activity (output or turnover). They do not tend to increase or decrease with the changes in output.
   For example, rent, insurance of factory building etc., remain the same for different levels of production.

ii. **Variable Costs –** These costs tend to vary with the volume of activity. Any increase in the activity results in an increase in the variable cost and vice-versa. For example, cost of direct labour, etc.

iii. **Semi-variable Costs –** These costs contain both fixed and variable components and are thus partly affected by fluctuations in the level of activity. Examples of semi variable costs are telephone bills, gas and electricity etc.

Q9. Discuss the four different methods of costing along with their applicability to concerned industry? MTP Mar'18

Answer:

Four different methods of costing along with their applicability to concerned industry have been discussed as below:

i. **Job Costing:** The objective under this method of costing is to ascertain the cost of each job order. A job card is prepared for each job to accumulate costs. The cost of the job is determined by adding all costs against the job it has incurred. This method of costing is used in printing press, foundries and general engineering workshops, advertising etc.

ii. **Batch Costing:** This system of costing is used where small components/ parts of the same kind are required to be manufactured in **large quantities**. Here batch of similar products is treated as a job and cost of such a job is ascertained as discussed under (1), above. If in a cycle manufacturing unit, rims are produced in batches of 2,500 units each, then the cost will be determined in relation to a batch of 2,500 units.

iii. **Contract Costing:** If a job is very big and takes a long time for its completion, then method used for costing is known as Contract Costing. Here the cost of each contract is ascertained separately. It is suitable for firms engaged in the construction of bridges, roads, buildings etc.

iv. **Operating Costing:** The method of Costing used in service rendering undertakings is known as operating costing. This method of costing is used in undertakings like transport, supply of water, telephone services, hospitals, nursing homes etc.

Q10. Discuss the prerequisite of installing cost accounting system. MTP Aug'18

Answer:

Before setting up a system of cost accounting the under mentioned factors should be studied:

i. **Objective:** The objective of costing system, for example whether it is being introduced for fixing prices or for insisting a system of cost control.

ii. **Nature of Business or Industry:** The Industry in which business is operating. Every business industry has its own peculiarity and objectives. According to its cost information requirement cost accounting methods are followed. For example, an oil refinery maintains process wise cost accounts to find out cost incurred on a particular process say in crude refinement process etc.

iii. **Organisational Hierarchy:** Costing system should fulfil the information requirements of different levels of management. Top management is concerned with the corporate strategy, strategic level management is concerned with marketing strategy, product diversification, product pricing etc. Operational level management needs the information on standard quantity to be consumed, report on idle time etc.

iv. **Knowing the product:** Nature of product determines the type of costing system to be implemented. The product which has **by-products** requires costing system which account for by-products as well. In case of **perishable or short self-life**, marginal costing method is required to know the contribution and minimum price at which it can be sold.

v. **Knowing the production process:** A good costing system can never be established without the complete knowledge of the production process. Cost apportionment can be done on the most appropriate and scientific basis if a cost accountant can **identify degree of effort or resources consumed in a particular process**. This also includes some basic technical know-how and process peculiarity.

vi. **Information synchronisation:** Establishment of a department or a system requires substantial amount of organisational resources. While drafting a costing system, information needs of **various other departments should be taken** into account. For example, in a typical business organisation accounts department needs to submit monthly stock statement to its lender bank, quantity wise stock details at the time of filing returns to tax authorities etc.

vii. **Method of maintenance of cost records:** The manner in which Cost and Financial accounts could be **inter-locked** into a single integral accounting system and how the results of separate sets of accounts i.e. cost and financial, could be **reconciled by** means of control accounts.

viii. **Statutory compliances and audit:** Records are to be maintained to comply with statutory **requirements** and applicable cost accounting standards to be followed.

ix. **Information Attributes:** Information generated from the Costing system should possess all the attributes of information i.e. complete, accurate, timeliness, relevant etc. to have an effective management information system (MIS).

Q11. State the limitations of cost and management accounting.

Answer

Like other branches of accounting, cost and management accounting is also having certain limitations. The **limitations** of cost and management accounting are as follows:

1. **Expensive:** It is expensive because analysis, allocation and absorption of overheads require considerable amount of additional work, and hence additional money.
2. **Requirement of Reconciliation:** The results shown by cost accounts differ from those shown by financial accounts. Thus, Preparation of reconciliation statements is necessary to verify their accuracy.
3. **Duplication of Work:** It involves duplication of work as organization has to maintain two sets of accounts i.e., Financial Account and Cost Account.
4. **Inefficiency:** Costing system itself does not control costs but its usage does.

Q12. Discuss the impact of Information Technology in Cost Accounting.

Answer:

The impact of IT in cost accounting may include the followings:

i. After the introduction of ERPs, different functional activities get integrated and as a consequence a single entry into the accounting system **provides custom made reports** for every purpose and saves an organisation from preparing different sets of documents. **Reconciliation** process of results of both cost and financial accounting systems **become simpler** and less sophisticated.

ii. A move towards **paperless** environment can be seen where documents like **Bill of Material**, **Material Requisition Note**, **Goods Received Note**, labour utilisation report etc. are no longer required to be prepared in multiple copies, the related department can get e-copy from the system.

iii. Information Technology with the help of internet (including intranet and extranet) helps in **resource procurement and mobilisation**. For example, production department can get materials from the **stores without issuing material requisition note** physically. Similarly, purchase orders can be initiated to the suppliers with the help of extranet. This enables an entity to shift towards Just-in-Time (JIT) approach of inventory management and production.

iv. Cost information for a cost centre or cost object is ascertained with **accuracy** in **timely** manner. Each cost centre and cost object is **codified** and all related costs are **assigned** to the cost object or cost centre. This process **automates the cost accumulation and ascertainment process**. The cost information can be customised as per the requirement. For example, when an entity manufacture or provide services, it can know information job-wise, batch-wise, process-wise, cost centre wise etc.

v. **Uniformity** in preparation of report, budgets and standards can be achieved with the help of IT. ERP software plays an important role in bringing uniformity irrespective of location, currency, language and regulations.

vi. Cost and revenue **variance reports** are generated **in real time basis** which enables the management to take control measures immediately.

IT enables an entity to monitor and analyse each process of manufacturing or service activity closely to eliminate non value added activities.

Q13. Explain the difference between product cost and period cost.

Answer:

Product costs are those costs that are identified with the goods purchased or produced for resale. In a manufacturing organisation they are attached to the product and that are included in the inventory valuation for finished goods, or for incomplete goods. Product cost is also known as inventoriable cost. Under absorption costing method it includes direct material, direct labour, direct expenses, directly attributable costs (variable and non-variable) and other production (manufacturing) overheads. Under marginal costing method Product Costs includes all variable production costs and the all-fixed costs are deducted from the contribution.

Periods costs are the costs, which are not assigned to the products but are charged as expense against revenue of the period in which they are incurred. General Administration, marketing, sales and distributor overheads are recognized as period costs.

Q14. Mention and explain types of responsibility centres. Nov'18

Answer:

There are four types of responsibility centres:

i. **Cost Centres:** The responsibility centre which is held accountable for incurrence of costs which are under its control. The performance of this responsibility centre is measured against pre-determined standards or budgets. The cost centres are of two types:
(a) Standard Cost Centre and (b) Discretionary Cost Centre

ii. **Revenue Centres:** The responsibility centres which are accountable for generation of revenue for the entity. Sales Department for example, is the responsible for achievement of sales target and revenue generation. Though, revenue centres does not have control on the all expenditures it incurs but some time expenditures related with selling activities like commission to sales person etc. are incurred by revenue centres.

iii. **Profit Centres:** These are the responsibility centres which have both responsibility of generation of revenue and incurrence of expenditures. Since, managers of profit centres are accountable for

both costs as well as revenue, profitability is the basis for measurement of performance of these responsibility centres. Examples of profit centres are decentralised branches of an organisation.

iv. **Investment Centres:** These are the responsibility centres which are not only responsible for profitability but also has the authority to make capital investment decisions. The performance of these responsibility centres is measured based on Return on Investment (ROI) besides profit.

Q15. Narrate the objectives of cost accounting. RTP Nov23

Answer

The main objectives of introduction of a Cost Accounting System in a manufacturing organization are as follows:

(i) Ascertainment of cost: The main objective of a Cost Accounting system is to ascertain cost for cost objects. Costing may be post completion or continuous but the aim is to arrive at a complete and accurate cost figure to assist the users to compare, control and make various decisions.

(ii) Determination of selling price: Cost Accounting System in a manufacturing organisation enables to determine desired selling price after adding expected profit margin with the cost of the goods manufactured.

(iii) Cost control and Cost reduction: Cost Accounting System equips the cost controller to adhere and control the cost estimate or cost budget and assist them to identify the areas of cost reduction.

(iv) Ascertainment of profit of each activity: Cost Accounting System helps to classify cost on the basis of activity to ascertain activity wise profitability.

(v) Assisting in managerial decision making: Cost Accounting System provides relevant cost information and assists managers to make various decisions.

Q16. Distinguish between cost allocation and cost absorption. RTP Nov 23

Answer

Cost allocation is the allotment of whole item of cost to a cost centre or a cost unit. In other words, it is the process of identifying, assigning or allowing cost to a cost centre or a cost unit.

Cost absorption is the process of absorbing all indirect costs or overhead costs allocated or apportioned over particular cost center or production department by the units produced.

Q17. Health Wealth Hospital is interested in estimating the cost for each patient stay. The hospital offers general health care facility i.e. only basic services. RTP Nov 22

You are required to:

1. CLASSIFY each of the following costs as either direct or indirect with respect to each patient.

2. CLASSIFY each of the following costs as either fixed or variable with respect to hospital costs per day.

	Direct	Indirect	Fixed	Variable
Electronic monitoring				
Meals for patients				
Nurses' salaries				
Parking maintenance				
Security				

Answer

Item	Direct	Indirect	Fixed	Variable
Electronic monitoring	YES			YES
Meals for patients	YES			YES
Nurses' salaries		YES	YES	
Parking maintenance		YES	YES	
Security		YES	YES	

Q18. What are cost units? Write the cost unit basis against each of the following Industry/Product- Automobile, Steel, Cement, Chemicals, Power and Transport. RTP Nov 22

Answer

Cost units are usually the units of physical measurement like number, weight, area, volume, length, time and value.

Industry or Product	Cost Unit Basis
Automobile	Number
Steel	Ton
Cement	Ton/ per bag etc.
Chemicals	Litre, gallon, kilogram, ton etc.
Power	Kilo-watt hour (kWh)
Transport	Passenger- kilometer

Q19. Define cost objects and give examples of any four cost objects May23

Answer

Definition of cost objects

Cost object is anything for which a separate measurement of cost is required. Cost object may be a product, a service, a project, a customer, a brand category, an activity, a department or a programme etc.

Examples of cost objects

Product	Smart phone, Tablet computer, SUV Car, Book etc.
Service	An airline flight from Delhi to Mumbai, Concurrent audit assignment, Utility bill payment facility etc.
Project	Metro Rail project, Road projects etc.
Activity	Quality inspection of materials, Placing of orders etc.
Process	Refinement of crudes in oil refineries, melting of billets or ingots in rolling mills etc.
Department	Production department, Finance & Accounts, Safety etc.

Q20. Suggest any one basis of re-apportionment of service department overheads over production departments in the following instances: May 23

Cost of Service Department	Basis
(i) Maintenance and Repair Shop (ii) Hospital and Dispensary (iii) Fire Protection (iv) Stores Department (v)Transport Department (vi) Computer Section (vii) Power House (Electric Power Cost) (viii) Inspection (ix) Tool Room (x)Time- keeping	

Answer

Basis of re-apportionment of service department overheads over production departments

Cost of the Service Departments:	Basis
(i) Maintenance and Repair shop	Direct labour hours, Machine hours, Direct labour wages, Asset value x Hours worked
(ii) Hospital and Dispensary	No. of employees, No. of direct workers etc.
(iii) Fire Protection	Capital values
(iv) Stores Department	No. of requisitions, Weight or value of Materials issued.
(v) Transport Department	Crane hours, Truck hours, Truck mileage, Truck tonnage, Truck ton- hours, Tonnage handled. No. of packages of Standard size
(vi) Computer Section	Computerhours, Specific allocation to departments
(vii) Power House (Electric Power	Horse power, Kwh, Horse power × Machine hours, Kwh ×

Cost)	Machine hours
(viii) Inspection	Inspection hours, number of inspections.
(ix) Tool room	Direct labour hours, Machine hours, Direct labour wages, Asset value x Hours worked
(x) Time-keeping	No. of card punched, No. of employees

Q21. Mention the cost units (physical measurements) for the following Industry/product ; Nov 22

(i) Automobile

(ii) Gas

(iii) Brick works

(iv) Power

(v) Steel

(vi) Transport (by road)

(vii) Chemical

(viii) Oil

(ix) Brewing

(x) Cement

Answer

Industry or Product	Cost Units
Automobile	Number
Gas	Cubic feet
Brick works	1,000 bricks
Power	Kilo-watt hour (kWh)
Steel	Tonne
Transport (by road)	Passenger- kilometer or Tonne-kilometer
Chemical	Litre, gallon, kilogram, tonne etc.
Oil	Barrel, tonne, litre
Brewing	Barrel
Cement	Ton/ per bag etc.

Q22. Write down the treatment of following items associated with purchase of materials. (May 22)

(i) Cash discount

(ii) IGST

(iii) Demurrage

(iv) Shortage

(v) Basic Custom Duty

Answer

Treatment of items associated with purchase of materials is tabulated as below

S. No.	Items	Treatment
(i)	Cash Discount	Cash discount is not deducted from the purchase price. It is treated as interest and finance charges. It is ignored.
(ii)	Integrated Goods and Service Tax (IGST)	Integrated Goods and Service Tax (IGST) is paid on inter- state supply of goods and provision of services and collected from the buyers. It is excluded from the cost of purchase if credit for the same is available. Unless mentioned specifically it should not form part of cost of purchase.
(iii)	Demurrage	Demurrage is a penalty imposed by the transporter for delay in uploading or offloading of materials. It is an abnormal cost and not included with cost of purchase
(iv)	Shortage	Shortage in materials are treated as follows: Shortage due to normal reasons: Good units absorb the cost of shortage due to normal reasons. Losses due to breaking of bulk, evaporation, or due to any unavoidable conditions etc. are the reasons of normal loss. Shortage due to abnormal reasons: Shortage arises due to abnormal reasons such as material mishandling, pilferage, or due to any avoidable reasons are not absorbed by the good units. Losses due to abnormal reasons are debited to costing profit and loss account.
(v)	Basic Custom Duty	Basic Custom duty is paid on import of goods from outside India. It is added with the purchase cost.

2. MATERIAL COST

Q1. Explain 'Just in Time' (JIT) approach of inventory management. May'18

Answer

Just in Time (JIT) Inventory Management

JIT is a system of inventory management with an approach to have zero inventories in stores. According to this approach material should only be purchased when it is actually required for production.

JIT is based on two principles

i. Produce goods **only when it is required** and

ii. the products should be delivered to customers at the time only when they want.

It is also known as **'Demand pull' or 'Pull through' system** of production. In this system, production process actually starts after the order for the products is received. Based on the demand, production process starts and the requirement for raw materials is sent to the purchase department for purchase. This can be understood with the help of the following diagram:

Q2. Explain obsolescence and circumstances under which materials become obsolete. State the steps to be taken for its treatment. Nov'18

Answer

Obsolescence: Obsolescence is defined as "the loss in the intrinsic value of an asset due to its supersession".

Materials may become obsolete under any of the following circumstances:

i. where it is a **spare part**, or a component of a machinery used in manufacture and **that machinery becomes obsolete**;

ii. where it is used in the manufacture of a **product which has become obsolete**;

iii. where the material itself is replaced by **another material due to either improved quality or fall in price**.

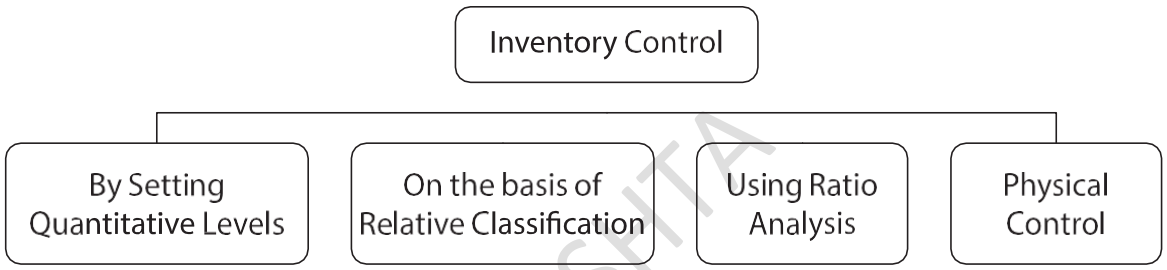
Treatment: In all three cases, the value of the obsolete material held in stock is a total loss and immediate steps should be taken to **dispose it off at the best available price**. The loss arising out of obsolete materials on abnormal loss **does not form part of the cost of manufacture**.

Q3. Define Inventory Control and give its objectives. Nov'19

Answer

Inventory Control: The Chartered Institute of Management Accountants (CIMA) defines Inventory Control as "The function of ensuring that sufficient goods are retained in stock to meet all requirements without carrying unnecessarily large stocks."

The **objective** of inventory control is **to make a balance between sufficient stock and over - stock.** The stock maintained should be sufficient to meet the production requirements so that uninterrupted production flow can be maintained. Insufficient stock not only pause the production but also cause a loss of revenue and goodwill. On the other hand, Inventory requires some funds for purchase, storage, maintenance of materials with a risk of obsolescence, pilferage etc. A trade-off between Stock-out and Over-stocking is required. The management may employ various methods of Inventory control to have a balance. Management may adopt the following **basis** for Inventory control:



Q4. Distinguish between Bill of Materials and Material Requisition Note. MTP Oct'19

Answer:

Bills of Material	Material Requisition Note
1. It is document or list of materials prepared by the engineering/ drawing department.	**1.** It is prepared by the foreman of the consuming department.
2. It is a complete schedule of component parts and raw materials required for a particular job or work order.	**2.** It is a document authorizing Store-Keep- er to issue material to the consuming department.
3. It often serves the purpose of a Store Requisition as it shows the complete schedule of materials required for a particular job i.e., it can replace stores requisition.	**3.** It cannot replace a bill of material.
4. It can be used for the purpose of quotation.	**4.** It is useful in arriving historical cost only.
5. It helps in keeping a quantitative control on materials drawn through Stores Requisition	**5.** It shows the material actually drawn from stores.

3. EMPLOYEE COST

Q1. Discuss the remedial steps to be taken to minimize the labour turnover. MTP Oct'19

Answer

The following steps are useful for minimizing labour turnover:

a) **Exit interview:** An interview to be arranged with each outgoing employee to ascertain the reasons of his leaving the organization.

b) **Job analysis and evaluation:** to ascertain the requirement of each job.

c) Organization should make use of a **scientific system of recruitment, placement and promotion for employees**.

d) Organization should create **healthy atmosphere, providing education, medical and housing facilities** for workers.

e) Committee for **settling workers grievances**.

Q2. How would you account for idle capacity cost in Cost Accounting? RTP Nov23

Answer

Idle capacity costs are treated in the following ways in Cost Accounts:

(i) **If the idle capacity cost is due to unavoidable reasons:** A supplementary overhead rate may be used to recover the idle capacity cost. In this case, the costs are charged to the production capacity utilised.

(ii) **If the idle capacity cost is due to avoidable reasons:** Such as faulty planning, etc. the cost should be charged to Costing Profit and Loss Account.

(iii) **If the idle capacity cost is due to trade depression, etc.:** Being abnormal in nature the cost should also be charged to the Costing Profit and Loss Account.

(iv) **If the idle capacity cost is due to seasonal factors**, then the cost should be charged to cost of production by inflating overhead rate.

Q3. Explain the treatment of Overtime Premium in following situations: May 22

(i) SV & Co. wants to grab some special orders, and overtime is required to meet the same.

(ii) Dept. X has to work overtime to make up a shortfall in production due to some fault of management in dept. Y.

(iii) S Ltd. has to work overtime regularly throughout the year as a policy due to the workers' shortage.

(iv) Due to flood in Odisha, RS Ltd. has to work overtime to complete the job.

(v) A customer requested the company MN Ltd. to expedite the job because of his urgency of work.

Answer

Treatment of Overtime premium in different situations

Situation	Treatment
(i) SV & Co. wants to grab some special orders, and overtime is required to meet the same.	If overtime is required to cope with general production programmes or for meeting urgent orders, the overtime premium should be treated as overhead cost of the particular department or cost centre which works overtime.
(ii) Dept. X has to work overtime to make up a shortfall in production due to some fault of management in dept. Y.	If overtime is worked in a department due to the fault of another department, the overtime premium should be charged to the latter department (Y).
(iii) S Ltd. has to work overtime regularly throughout the year as a policy due to the workers' shortage.	The overtime premium is treated as a part of employee cost and job is charged at an effective average wage rate.
(iv) Due to flood in Odisha, RS Ltd. has to work overtime to complete the job.	Overtime worked on account of abnormal conditions such as flood, earthquake etc., should not be charged to cost, but to Costing Profit and Loss Account.
(v) A customer requested the company MN Ltd. to expedite the job because of his urgency of work.	Where overtime is worked at the request of the customer, overtime premium is also charged to the job/ customer directly.

4. OVERHEADS

Q1. Explain Single and Multiple Overhead Rates. MTP Mar'18

Answer:

Single and Multiple Overhead Rates:

Single overhead rate: It is one single overhead absorption rate for the whole factory. It may be computed as follows:

Single overhead Rate = $\left(\frac{Overhead\ costs\ for\ the\ entire\ factory}{Total\ quantity\ of\ the\ base\ selected}\right)$

The base can be total output, total labour hours, total machine hours, etc.

The single overhead rate may be **applied in factories which produces only one major product on a continuous basis**. It may also be used in factories where the **work performed in each department is fairly uniform and standardized**.

Multiple overhead rate:

It involves computation of separate rates for each production department, service department, cost center and each product for both fixed and variable overheads. It may be computed as follows:

Multiple overhead rate = $\left(\frac{Overhead\ allocated\ /apportioned\ to\ each\ department\ /cost\ centre\ or\ product}{Corresponding\ base}\right)$

Under multiple overheads rate, jobs or products are charged with varying amount of factory overheads depending on the type and number of departments through which they pass. However, the number of overheads rate which a firm may compute would depend upon two opposing factors viz. the degree of accuracy desired and the clerical cost involved.

Q2. Discuss with example the level of activity method of segregating semi-variable costs into fixed and variable costs. MTP Oct'18

Answer

Level of activity method: Under this method, the variable overhead may be determined by comparing two levels of output with the amount of expenses at those levels. Since the fixed element does not change, the **variable element may be ascertained with the help of the following formula.**

$$\frac{\text{Change in the amount of expense}}{\text{Change in the quantity of output}}$$

Suppose the following information is available:

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

The variable cost:

$$\frac{\text{Change in Semi-variable expenses}}{\text{Change in production volume}} = \frac{₹\ 40}{40\ \text{units}} = ₹\ 1/\text{unit}$$

Thus, in January, the variable cost will be 100 × ₹ 1 = ₹ 100 and the fixed cost element will be (₹ 260 – ₹ 100) or ₹ 160. In February, the variable cost will be 140 × ₹ 1 = ₹ 140 whereas the fixed cost element will remain the same, i.e., ₹ 160.

Q3. Explain the difference between Allocation and Apportionment of expenses. MTP Oct₹ 18

Answer

The **difference between the allocation and apportionment is** important to understand because the purpose of these two methods is the identification of the items of cost-to-cost units or centers. However, the main difference between the above methods is given below.

1) Allocation deals with the whole items of cost, which are identifiable with any one department. For example, indirect wages of three departments are separately obtained and hence each department will be charged by the respective amount of wages individually.
On the other hand, apportionment deals with the **proportions of an item of cost** for example; the cost of the benefit of a service department will be divided between those departments which has availed those benefits.

2) Allocation is a **direct process of charging** expenses to different cost centres whereas apportionment is an **indirect process** because there is a need for the identification of the appropriate portion of an expense to be borne by the different departments benefited.

3) The allocation or apportionment of an expense is not dependent on its nature, but the relationship between the expense and the cost centre decides that whether it is to be allocated or apportioned.

4) **Allocation is a much wider** term than apportionment.

Q4. State the bases of apportionment of following overhead costs: Nov'18

i. Air-conditioning

ii. Time keeping

iii. Depreciation of plant and machinery

iv. Power/steam consumption

v. Electric power (Machine operation)

Answer

Overhead Cost	Bases of Apportionment
(i) Air- conditioning	Floor area, or volume of department

(ii) Time keeping	Number of workers
(iii) Depreciation of plant and machinery	Capital values
(iv) Power/steam consumption	Technical estimates
(v) Electric power (machine operation)	Horse power of machines, or Number of machine hour, or value of machines or units consumed. Kilo-watt hours.

Q5. Explain the treatment of over and under absorption of overheads in cost accounts. RTP Nov 23

Answer

Treatment of over and under absorption of overheads are:

i. Writing off to costing P&L A/c: Small difference between the actual and absorbed amount should simply be transferred to costing P&L A/c, if difference is large then investigate the causes and after that abnormal loss/ gain shall be transferred to costing P&L A/c.

ii. Use of supplementary Rate: Under this method the balance of under and over absorbed overheads may be charged to cost of W.I.P., finished stock and cost of sales proportionately with the help of supplementary rate of overhead.

iii. Carry Forward to Subsequent Year: Difference should be carried forward in the expectation that next year the position will be automatically corrected.

ACTIVITY BASED COSTING

Q1. What is meant by Activity Based Management (ABM) and discuss how Activity Based Management can be used in the business? May 23

Answer:

Meaning of Activity Based Management (ABM)

The term Activity based management (ABM) is used to describe the cost management application of ABC. The use of ABC as a costing tool to manage costs at activity level is known as Activity Based Cost Management (ABM). ABM is a discipline that focuses on the efficient and effective management of activities as the route to continuously improving the value received by customers. ABM utilizes cost information gathered through ABC.

Activity based management can be used in the following ways:

(i) Cost Reduction: ABM helps the organisation to identify costs against activities and to find opportunities to streamline or reduce the costs or eliminate the entire activity, especially if there is no value added.

(ii) Business Process Re-engineering: Business process re-engineering involves examining business processes and making substantial changes to how organisation currently operates. ABM is a powerful tool for measuring business performance, determining the cost of business output and is used as a means of identifying opportunities to improve process efficiency and effectiveness.

(iii) Benchmarking: Benchmarking is a process of comparing of ABC-derived activity costs of one segment of company with those of other segments. It requires uniformity in the definition of activities and measurement of their costs.

(iv) Performance Measurement: Many organisations are now focusing on activity performance as a means of facing competitors and managing costs by monitoring the efficiency and effectiveness of activities.

6. COST SHEET

Q1. State Direct Expenses with examples.

Answer:

Expenses other than direct material cost and direct employee cost, which are incurred to manufacture a product or for provision of service and can be directly traced in **an economically feasible manner to a cost object**. The following costs are examples for direct expenses:

a) Royalty paid/ payable for production or provision of service;

b) Hire charges paid for hiring specific equipment;

c) Cost for product/ service specific design or drawing;

d) Cost of product/ service specific software;

e) Other expenses which are directly related with the production of goods or provision of service.

Q2. Explain how Direct Expenses are measured and their treatment in cost accounting. May'19

Answer:

Measurement of Direct Expenses

The direct expenses are measured at invoice or agreed price net of rebate or discount but includes duties and taxes (for which input credit not available), commission and other directly attributable costs.

In case of sub-contracting, where goods are get manufactured by job workers independent of the principal entity, are measured at agreed price. Where the principal supplies some materials to the job workers, the value of such materials and other incidental expenses are added with the job charges paid to the job workers.

Treatment of Direct Expenses

Direct Expenses forms part the prime cost for the product or service to which it can be directly traceable and attributable. In case of lump-sum payment or one-time payment, the cost is amortised over the estimated production volume or benefit derived. If the expenses incurred are of insignificant amount i.e., not material, it can be treated as part of overheads.

Q3. State the advantages of Cost-Sheets MTP Oct'18

Answer:

The main advantages of a Cost Sheet are as follows:

i. It provides the **total cost** figure as well as **cost per unit** of production.

ii. It helps in cost comparison.

iii. It facilitates the **preparation of cost estimate**s required for submitting tenders.

iv. It provides sufficient help in arriving at the figure of **selling price**.

v. It facilitates cost control by disclosing **operational efficiency**.

7. COST ACCOUNTING SYSTEM

Q1. "Is reconciliation of cost accounts and financial accounts necessary in case of integrated accounting system?" Explain. MTP Mar'19

Answer:

In integrated accounting system cost and financial accounts are kept in the same set of books. Such a system will have to afford full information required for Costing as well as for Financial Accounts. In other words, information and data should be recorded in such a way so as to enable the firm to ascertain the cost (together with the necessary analysis) of each product, job, process, operation or any other identifiable activity. It also ensures the ascertainment of marginal cost, variances, abnormal losses and gains. In fact, all information that management requires from a system of Costing for doing its work properly is made available. **The integrated accounts give full information in such a manner so that the profit and loss account and the balance sheet can be prepared** according to the requirements of law and the management maintains full control over the liabilities and assets of its business. Hence, reconciliation is not required.

Q2. Explain integrated accounting system and state its advantages. May'19

Answer:

Integrated Accounting System: Integrated Accounts is the name given to a system of accounting, **whereby cost and financial accounts are kept in the same set of books**. Obviously, then there will be no separate sets of books for Costing and Financial records. Integrated accounts provide or meet out fully the information requirement for Costing as well as for Financial Accounts. For Costing it provides information useful for ascertaining the cost of each product, job, and process, operation of any other identifiable activity and for carrying necessary analysis. Integrated accounts provide relevant information which is necessary for preparing profit and loss account and the balance sheets as per the requirement of law and also helps in exercising effective control over the liabilities and assets of its business.

Advantages of Integrated Accounting System

The main advantages of Integrated Accounts are as follows:

i. **No need for Reconciliation -** The question of reconciling costing profit and finan-cial profit does not arise, as there is only one figure of profit.
ii. **Less efforts -** Due to use of one set of books, there is a significant saving in efforts made
iii. **Less time consuming -** No delay is caused in obtaining information as it is provided from books of original entry.

iv. **Economical process -** It is economical also as it is based on the concept of "Centralisation of Accounting function".

Q3. Indicate, for following items, whether to be shown in the Cost Accounts or Financial Accounts Nov 22

i. Preliminary expenses written off during the year
ii. Interest received on bank deposits
iii. Dividend, interest received on investments
iv. Salary for the proprietor at notional figure though not incurred
v. Charges in lieu of rent where premises are owned
vi. Rent receivables
vii. Loss on sale of Fixed Assets
viii. Interest on capital at notional figure though not incurred
ix. Goodwill written off
x. Notional Depreciation on the assets fully depreciated for which book value is Nil.

Answer

S. No.	Items	Accounts
(i)	Preliminary expenses written off during the year	Financial Accounts
(ii)	Interest received on bank deposits	Financial Accounts
(iii)	Dividend, interest received on investments	Financial Accounts
(iv)	Salary for the proprietor at notional figure though not incurred	Cost Accounts
(v)	Charges in lieu of rent where premises are owned	Cost Accounts
(vi)	Rent receivables	Financial Accounts
(vii)	Loss on the sales of Fixed Assets	Financial Accounts
(viii)	Interest on capital at notional figure though not incurred	Cost Accounts
(ix)	Goodwill written off	Financial Accounts
(x)	Notional Depreciation on the assets fully depreciated for which book value is nil	Cost Accounts

8. UNIT AND BATCH COSTING

Q1. State how Economic Batch Quantity is determined? MTP Mar'18

Answer

In batch costing the most important problem is the determination of 'Economic Batch Quantity' The determination of economic batch quantity involves two types of costs viz, (i) set up cost and (ii) carrying cost. With the increase in the batch size, there is an increase in the carrying cost but the set-up cost per unit of the product is reduced; this situation is reversed when the batch size is reduced. Thus, **there is one particular batch size for which both set up and carrying costs are minimum**. This size of a batch is known as economic or optimum batch quantity.

Economic batch quantity can be determined with the help of a table, graph or mathematical formula. The mathematical formula usually used for its determination is as follows:

9. JOB COSTING

Q1. State the differences between Job costing and Batch costing. May'18; RTP Nov'18; MTP Oct'19; MTP May'20

Answer

Sr.No	Job Costing	Batch Costing
1	Method of costing used for non-standard and non- repetitive products produced as per customer specifications and against specific orders.	Homogeneous products produced in a continuous production flow in lots.
2	Cost determined for each Job.	Cost determined in aggregate for the entire Batch and then arrived at on per unit basis.
3	Jobs are different from each other and independent of each other. Each Job is unique.	Products produced in a batch are homogeneous and lack of individuality.

10. CONTRACT COSTING

Q1. DISCUSS the Escalation Clause in a Contract. (May 20)

Answer

Escalation clause in a contract empowers a contractor to revise the price of the contract in case of increase in the prices of inputs due to some macro-economic or other agreed reasons. A contract takes longer period to complete and the factors based on which price negotiation is done at the time of entering into the contract may change till the contract completes. This protect the contractor from adverse financial impacts and empowers the contractor to recover the increased prices. As per this clause, the contractor increases the contract price if the cost of materials, employees and other expenses increase beyond a certain limit. Inclusion of such a clause in a contract deed is called an "Escalation Clause".

Q2. Discuss briefly the principles to be followed while taking credit for profit on incomplete contracts.

Answer

Principles to be followed while taking credit for profit on incomplete contracts:

The portion of profit to be credited to, costing profit and loss account should depend on the stage of completion of the contract. This stage of completion of the contract should refer to the certified work only. For this purpose, uncertified work should not be considered as far as possible. For determining the credit for profit, all the incomplete contracts should be classified into the following four categories.

i. Contract less than 25% complete

ii. Contracts is 25% or more but less than 50% complete

iii. Contracts is 50% or more but less than 90% complete

iv. Contracts nearing completion, say between 90% and 100% complete.

The transfer of profit to the costing profit and loss account in each of the above cases is done as under:

i. Contract less than 25% complete: If the contract has just started or it is less than 25% complete, no profit should be taken into account.

ii. Contract is 25% or more but less than 50% complete: In this case one third of the notional profit reduced in the ratio of cash received to work certified, may be transferred to the profit and loss account. The amount of profit to be transferred to the profit and loss account may be determined by using the following formula:

1/3 x Notional profit x Cash Received/Work Certified

iii. Contract is 50% or more but less than 90% complete: In this case, two third of the notional profit, reduced by the portion of cash received to work certified may be transferred to the profit and loss account. In this case the formula to be used is as under:

2/3 x Notional profit x Cash Received/Work Certified

iv. Contracts nearing completion, say between 90% and 100% complete: When a contract is nearing completion or 90% or more work has been done on a contract. The amount of profit to be credited to costing profit and loss account may be determined by using any one of the following formula.

a) Estimated profit x Work certified / Contract price

b) Estimated profit x Work certified / Contract price x Cash Received/Work Certified
Or Estimated profit x Cash Received/Contract Price

c) Estimated Profit × Cost of work to date / Estimated Total Cost

d) Estimated profit x Cost of work to date / Estimated Total Cost x Cash received / Work certified

e) Notional Profit x Work certified / Contract price

Q3. Explain the following:
1. Notional profit in Contract costing 2. Retention money in Contract costing

Answer

i. Notional profit in Contract costing: It represents the difference between the value of work certified and cost of work certified. Notional Profit = Value of work certified – (Cost of works to date – Cost of work not yet certified)

ii. Retention Money in Contract Costing: A contractor does not receive the full payment of the work certified by the surveyor. Contractee retains some amount to be paid after some time, when it is ensured that there is no default in the work done by the contractor. If any deficiency or defect is noticed, it is to be rectified by the contractor before the release of the retention money. Thus, the retention money provides a safeguard against the default risk in the contracts.

Q4. Explain the importance of an Escalation Clause in contract cost.

Answer

During the execution of a contract, the prices of materials, or labour etc., may rise beyond a certain limit. In such a case the contract price will be increased by an agreed amount. Inclusion of such a clause in a contract deed is called an Escalation Clause.

Q5. Describe the three advantages of Cost-plus contract. RTP May'18; MTP Mar'19; RTP Nov'20; RTP Nov 23

Answer:

Cost plus contracts have the following advantages:

a) The Contractor is assured of a fixed percentage of profit. There is **no risk of incurring any loss** on the contract.

b) It is useful specially when the **work to be done is not definitely fixed at the time of making the estimate**.

c) Contractee can **ensure himself about 'the cost of the contract'**, as he is empowered to examine the books and documents of the contractor to ascertain the veracity of the cost of the contract

Q6. Write note on cost-plus-contracts. (May 21)

Answer

These contracts provide for the payment by the contractee of the actual cost of construction plus, a stipulated profit, mutually decided between the two parties.

The main features of these contracts are as follows:

i. The practice of cost-plus contracts is adopted in the case of those contracts where the probable cost of the contracts cannot be ascertained in advance with a reasonable accuracy.

ii. These contracts are preferred when the cost of material and labour is not steady and the contract completion may take number of years.

iii. The different costs to be included in the execution of the contract are mutually agreed, so that no dispute may arise in future in this respect. Under such type of contracts, contractee is allowed to check or scrutinize the concerned books, documents and accounts.

iv. Such a contract offers a fair price to the contractee and also a reasonable profit to the contractor. The contract price here is ascertained by adding a fixed and mutually pre-decided component of profit to the total cost of the work.

11. PROCESS COSTING

Q1. Explain the term Equivalent units used in process industries. RTP Nov'19

Answer

Equivalent Units: Equivalent units or equivalent production units, means **converting the incomplete production units into their equivalent completed units**. Under each process, an estimate is made of the percentage completion of work-in-process with regard to different elements of costs, viz., material, labour and overheads. It is important that the estimate of percent- age of completion should be as accurate as possible. The formula for computing equivalent completed units is:

Equivalent completed units = (Actual number of units in the process of manufacture × Percentage of Work completed)

For instance, if 25% of work has been done on the average of units still under process, then 200 such units will be equal to 50 completed units and the cost of work-in process will be equal to the cost of 50 finished units.

Q2. How will you treat normal loss, abnormal loss and abnormal gain in process costing? Explain May 23

Answer

Treatment of normal loss, abnormal loss and abnormal gain in process costing

Treatment of Normal loss in Cost Accounts: The cost of normal process loss in practice is absorbed by good units produced under the process. The amount realised by the sale of normal process loss units should be credited to the process account.

Treatment of Abnormal loss in Cost Accounts: The cost of an abnormal process loss unit is equal to the cost of a good unit. The total cost of abnormal process loss is credited to the process account from which it arises. Cost of abnormal process loss is not treated as a part of the cost of the product. In fact, the total cost of abnormal process loss is debited to costing profit and loss account.

Treatment of Abnormal Gain in Cost Accounts: The process account under which abnormal gain arises is debited with the abnormal gain and credited to abnormal gain account which will be closed by transferring to the Costing Profit and Loss account. The cost of abnormal gain is computed on the basis of normal production.

12. JOINT & BY PRODUCTS

Q1. Describe net realizable value method of apportioning joint costs to by- products MTP Aug'18

Answer:

Net Realisable Value method: The realisation on the disposal of the by-product may be deducted from the total cost of production so as to arrive at the cost of the main product. For example, the amount realised by the sale of molasses in a sugar factory goes to reduce the cost of sugar produced in the factory.

When the by-product requires some additional processing and expenses are incurred in making it saleable to the best advantage of the concern, the expenses so incurred should be deducted from the total value realised from the sale of the by-product and only **the net realisations should be deducted from the total cost of production to arrive at the cost of production of the main product**. Separate accounts should be maintained for collecting additional expenses incurred on:

i. further processing of the by-product, and

ii. selling, distribution and administration expenses attributable to the by-product.

Q2. How are By-products treated in Costing? Nov'18

Answer:

By-product cost can be dealt in cost accounting in the following ways:

a) When they are of small total value: When the by-products are of small total value, the amount realised from their sale may be dealt in any one the following two ways:

1. The sales value of the by-products may be credited to the Costing Profit and Loss Account and no credit be given in the Cost Accounts. The **credit to the Costing Profit and Loss Account** here is treated either as miscellaneous income or as additional sales revenue.

2. The sale proceeds of the by-product may be treated **as deductions from the total costs.** The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.

b) When the by-products are of considerable total value: Where by-products are of consider- able total value, they **may be regarded as joint products** rather than as by-products. To determine exact cost of by-products the costs incurred upto the point of separation, should be apportioned over by-products and joint products by using a logical basis.

c) Where they require further processing: In this case, the net realisable value of the **by-product at the split-off point** may be arrived at by subtracting the further processing cost from the realisable value of by-products and then treated based on small value or large value as above.

Q3. How apportionment of joint costs up to the point of separation amongst the joint products using market value at the point of separation and net realizable value method is done? Discuss (RTP MAY 21)

Answer

Apportionment of Joint Cost amongst Joint Products using:

Market value at the point of separation: This method is used for apportionment of joint costs to joint products up to the split off point. It is difficult to apply if the market value of the product at the point of separation is not available. It is useful method where further processing costs are incurred disproportionately.

Net realizable value Method: From the sales value of joint products (at finished stage) the followings are deducted:

- Estimated profit margins
- Selling & distribution expenses, if any
- Post-split off costs.

The resultant figure so obtained is known as net realizable value of joint products. Joint costs are apportioned in the ratio of net realizable value.

Q4. DISCUSS the treatment of by-product cost in cost accounting. (RTP May 20)

Answer

By-product cost can be dealt in cost accounting in the following ways:

i. **When they are of small total value:** When the by-products are of small total value, the amount realised from their sale may be dealt in any one the following two ways:
   1. The sales value of the by-products may be credited to the Costing Profit and Loss Account and no credit be given in the Cost Accounts. The credit to the Costing Profit and Loss Account here is treated either as miscellaneous income or as additional sales revenue.
   2. The sale proceeds of the by-product may be treated as deductions from the total costs. The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.

ii. **When the by-products are of considerable total value**: Where by-products are of considerable total value, they may be regarded as joint products rather than as by-products. To determine exact cost of by-products the costs incurred up to the point of separation, should be apportioned over by-products and joint products by using a logical basis. In this case, the joint costs may be divided over joint products and by-products by using relative market values; physical output method (at the point of split off) or ultimate selling prices (if sold).

iii. **Where they require further processing:** In this case, the net realisable value of the by-product at

the split-off point may be arrived at by subtracting the further processing cost from the realisable value of by-products.

If total sales value of by-products at split-off point is small, it may be treated as per the provisions discussed above under (i). In the contrary case, the amount realised from the sale of by-products will be considerable and thus it may be treated as discussed under (ii).

Q5. Distinguish between Joint products and By-products.

Answer

i. Joint products and By-products: Joint Products are defined as the products which are
ii. produced simultaneously from same basic raw materials by a common process or processes
iii. but none of the products is relatively of more importance or value as compared with the other.
iv. For example, spirit, kerosene oil, fuel oil, lubricating oil, wax, tar and asphalt are the examples
v. of joint products.
vi. By products, on the other hand, are the products of minor importance jointly produced with
vii. other products of relatively more importance or value by the common process and using the
viii. same basic materials. These products remain inseparable up to the point of split off. For
ix. example in Dairy industries, batter or cheese is the main product, but butter milk is the by-product.

Points of Distinction:

1. Joint products are the products of equal economic importance, while the by-products are of lesser importance.
2. Joint products are produced in the same process, whereas by-products are produced from the scrap or the discarded materials of the main product.
3. Joint products are not produced incidentally, but by-products emerge incidentally also.

Q6. How apportionment of joint costs upto the point of separation amongst the joint products using market value at the point of separation and net realizable value method is done? Discuss.

Answer

Apportionment of Joint Cost amongst Joint Products using:

Market value at the point of separation: This method is used for apportionment of joint costs to joint products up to the split off point. It is difficult to apply if the market value of the product at the point of separation is not available. It is useful method where further processing costs are incurred disproportionately.

Net realizable value Method: From the sales value of joint products (at finished stage) the followings are deducted:

- Estimated profit margins
- Selling & distribution expenses, if any
- Post-split off costs.

➢ The resultant figure so obtained is known as net realizable value of joint products. Joint costs are apportioned in the ratio of net realizable value.

Q7. Describe briefly, how joint costs up to the point of separation may be apportioned amongst the joint products under the following methods: (PM)

i. **Average unit cost method**
ii. **Contribution margin method**
iii. **Market value at the point of separation**
iv. **Market value after further processing**
v. **Net realizable value method.**

Answer

Methods of apportioning joint cost among the joint products:

i. Average Unit Cost Method: Under this method, total process cost (upto the point of separation) is divided by total units of joint products produced. On division average cost per unit of production is obtained. The effect of application of this method is that all joint products will have uniform cost per unit.

ii. **Contribution Margin Method:** Under this method joint costs are segregated into two parts – variable and fixed. The variable costs are apportioned over the joint products on the basis of units produced (average method) or physical quantities. If the products are further processed, then all variable cost incurred be added to the variable cost determined earlier. Then contribution is calculated by deducting variable cost from their respective sales values. The fixed costs are then apportioned over the joint products on the basis of contribution ratios.

iii. **Market Value at the Time of Separation:** This method is used for apportioning joint costs to joint products up to the split off point. It is difficult to apply if the market values of the products at the point of separation are not available. The joint cost may be apportioned in the ratio of sales values of different joint products.

iv. **Market Value after further Processing:** Here the basis of apportionment of joint costs is the total sales value of finished products at the further processing. The use of this method is unfair where further processing costs after the point of separation are disproportionate or when all the joint products are not subjected to further processing.

v. **Net Realisable Value Method:** Here joint costs is apportioned on the basis of net realisable value of the joint products,

Net Realisable Value = Sale value of joint products (at finished stage)

(-) estimated profit margin

(-) selling & distribution expenses, if any

(-) post-split off cost

13. SERVICE COSTING

Q1. Describe Operation costing with two examples of industries where operation costing is applied. RTP May'18; RTP Nov'20

Answer

This product costing system is used when an entity produces **more than one variant of final product using different materials but with similar conversion activities.** Which means conversion activities are similar for all the product variants but materials differ significantly.

Operation Costing method is also known as **Hybrid product costing system** as materials costs are accumulated by job order or batch wise but conversion costs i.e., labour and overheads costs are accumulated by department, and process costing methods are used to assign these costs to products. Moreover, under operation costing, conversion costs are applied to products using a predetermined application rate. This predetermined rate is based on budgeted conversion costs.

The two examples of industries are Ready made garments and Jewellery making.

Q2. Describe Composite Cost unit as used in Service Costing and discuss the ways of computing it. Nov'19

Answer

Composite Cost Unit: Sometime **two measurement units** are combined together to know the cost of service or operation. These are called composite cost units. For example, a public transportation undertaking would measure the operating cost per passenger per kilometre.

Examples of Composite units are Ton- km., Quintal- km, Passenger-km., Patient-day etc.

Composite unit may be computed in two ways:

i. Absolute (Weighted Average) basis.

ii. Commercial (Simple Average) basis.

In both bases of computation of service cost unit, weightage is also given to qualitative factors rather quantitative (which are directly related with variable cost elements) factors alone.

i. **Weighted Average or Absolute basis –** It is summation of the products of qualitative and quantitative factors. For example, to calculate absolute Ton-Km for a goods transport is calculated as follows:

   Σ (Weight Carried × Distance)1 + (Weight Carried × Distance)2 +…. + (Weight Carried × Distance) n

   Similarly, in case of Cinema theatres, price for various classes of seats are fixed differently. For

example–

First class seat may be provided with higher quality service and hence charged at a higher rate, whereas Second Class seat may be priced less. In this case, appropriate weight to be given effect for First Class seat and Second-Class seat – to ensure proper cost per composite unit.

ii. **Simple Average or Commercial basis –** It is the product of average qualitative and total quantitative factors. For example, in case of goods transport, Commercial Ton-Km is arrived at by multiplying total distance km., by average load quantity.

$$\sum(\text{Distance}_1 + \text{Distance}_2 + \ldots\ldots\ldots + \text{Distance}_n) \times \left(\frac{W_1 + W_2 + \ldots\ldots + W_n}{n}\right)$$

In both the example, variable cost is dependent of distance and is a quantitative factor. Since, the weight carried does not affect the variable cost hence and is a qualitative factor.

Q3. DIFFERENTIATE between Service costing and Product costing. (May 21)

Answer

Service costing differs from product costing (such as job or process costing) in the following ways due to some basic and peculiar nature.

i. Unlike products, services are intangible and cannot be stored, hence, there is no inventory for the services.

ii. Use of Composite cost units for cost measurement and to express the volume of outputs.

iii. Unlike a product manufacturing, employee (labour) cost constitutes a major cost element than material cost.

iv. Indirect costs like administration overheads are generally have a significant proportion in total cost of a service as unlike manufacturing sector, service sector heavily depends on support services and traceability of costs to a service may not economically feasible.

Q4. Explain standing charges and running charges in the case of transport organisations. LIST three examples of both. (Nov 20)

Answer

Standing Charges: These are the fixed costs that remain constant irrespective of the distance travelled. These costs include the following: -

- Insurance
- License fees
- Salary to Driver, Conductor, Cleaners, etc. if paid on monthly basis
- Garage costs, including garage rent
- Depreciation (if related to efflux of time)

- Taxes
- Administration expenses, etc.

Running Charges: These costs are generally associated with the distance travelled. These costs include the following-

- Petrol and Diesel
- Lubricant oils,
- Wages to Driver, Conductor, Cleaners, etc. if it is related to operations
- Depreciation (if related to activity)
- Any other variable costs identified.

14. STANDARD COSTING

Q1. Describe three distinct groups of variances that arise in standard costing.

Answer

The three distinct groups of variances that arise in standard costing are:

I. Variances of efficiency. These are the variance, which arise due to efficiency or inefficiency in use of material, labour etc.

II. Variances of prices and rates: These are the variances, which arise due to changes in procurement price

III. Variances due to volume: These represent the effect of difference between actual activity and standard level of activity. and standard price.

Q2. "Calculation of variances in standard costing is not an end in itself, but a means to an end." Discuss.

Answer

The crux of standard costing lies in variance analysis. Standard costing is the technique whereby standard costs are predetermined and subsequently compared with the recorded actual costs. It is a technique of cost ascertainment and cost control. It establishes predetermined estimates of the cost of products and services based on management's standards of efficient operation. It thus lays emphasis on "what the cost should be". These should be costs are when compared with the actual costs. The difference between standard cost and actual cost of actual output is defined as the variance. The variance in other words in the difference between the actual performance and the standard performance. The calculations of variances are simple. A variance may be favourable or unfavourable. If the actual cost is less than the standard cost, the variance is favour arable but if the actual cost is more than the standard cost, the variance will be unfavourable. They are easily expressible and do not provide detailed analysis to enable, management of exercise control over them. It is not enough to know the figures of these variances from month to month. We in fact are required to trace their origin and causes of occurrence for taking necessary remedial steps to reduce / eliminate them.

A detailed probe into the variance particularly the controllable variances helps the management to ascertain:

i. the amount of variance

ii. the factors or causes of their occurrence

iii. the responsibility to be laid on executives and departments and

iv. corrective actions which should be taken to obviate or reduce the variances.

Mere calculation and analysis of variances is of no use. The success of variance analysis depends upon how quickly and effectively the corrective actions can be taken on the analysed variances. In fact, variance gives information. The manager needs to act on the information provided for taking corrective action. Information is the means and action taken on it is the end. In other words, the calculation of variances in standard costing is not an end in itself, but a means to an end.

Q3. Describe the various steps involved in adopting standard costing system in an organization

Answer

The Steps of standard costing is as below:

(i) Setting of Standards: The first step is to set standards which are to be achieved.

(ii) Ascertainment of actual costs: Actual cost for each component of cost is ascertained. Actual costs are ascertained from books of account, material invoices, wage sheet, charge slip etc.

(iii) Comparison of actual cost and standard cost: Actual costs are compared with the standards costs and variances are determined.

(iv) Investigation of variances: Variances arises are investigated for further action. Based on this performance is evaluated and appropriate actions are taken.

(v) Disposition of variances: Variances arise are disposed of by transferring it the relevant accounts (costing profit and loss account) as per the accounting method (plan) adopted.

15. MARGINAL COSTING

Q1. What are the limitations of marginal costing? May'19

Answer

Limitations of Marginal Costing

i. **Difficulty in classifying fixed and variable elements:** It is difficult to classify exactly the expenses into fixed and variable category. **Most of the expenses are neither totally variable nor wholly fixed.** For example, various amenities provided to workers may have no relation either to volume of production or time factor.

ii. **Dependence on key factors:** Contribution of a product itself is not a guide for optimum profitability unless it is linked with the key factor.

iii. **Scope for Low Profitability: Sales staff may mistake marginal cost for total cost** and sell at a price; which will result in loss or low profits. Hence, sales staff should be cautioned while giving marginal cost.

iv. **Faulty valuation:** Overheads of fixed nature cannot altogether be excluded particularly in large contracts, while valuing the work-in- progress. In order to show the correct position fixed overheads, have to be included in work-in-progress.

v. **Unpredictable nature of Cost:** Some of the assumptions regarding the behaviour of various costs are not necessarily true in a realistic situation. For example, the assumption **that fixed cost will remain static throughout is not correct**. Fixed cost may change from one period to another. For example, salaries bill may go up because of annual increments or due to change in pay rate etc. **The variable costs do not remain constant per unit of output**. There may be changes in the prices of raw materials, wage rates etc. after a certain level of output has been reached due to shortage of material, shortage of skilled labour, concessions of bulk purchases etc.

vi. **Marginal costing ignores time factor and investment: The marginal cost of two jobs may be the same** but the time taken for their completion and the cost of machines used may differ. The true cost of a job which takes longer time and uses costlier machine would be higher. This fact is not disclosed by marginal costing.

vii. **Understating of W-I-P:** Under marginal costing stocks and work in progress are understated.

Q2. Differentiate between "Marginal and Absorption Costing". (Nov 20)

Answer

S.No.	Marginal costing	Absorption costing
1.	Only variable costs are considered for product costing and inventory valuation.	Both fixed and variable costs are considered for product costing and inventory valuation.

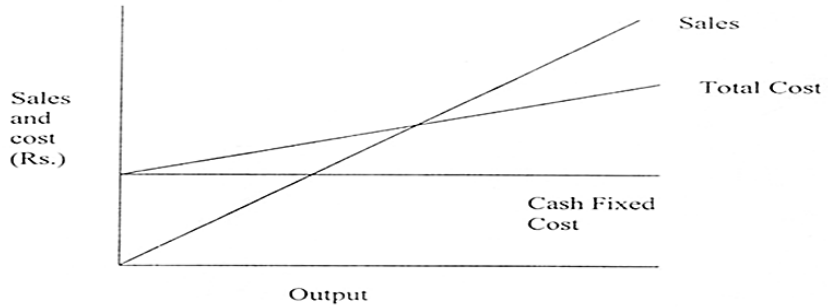
2.	Fixed costs are regarded as period costs. The Profitability of different products is judged by their P/V ratio.	Fixed costs are charged to the cost of production. Each product bears a reasonable share of fixed cost and thus the profitability of a product is influenced by the apportionment of fixed costs.
3.	Cost data presented highlight the total contribution of each product.	Cost data are presented in conventional pattern. Net profit of each product is determined after subtracting fixed cost along with their variable costs.
4.	The difference in the magnitude of opening stock and closing stock does not affect the unit cost of production.	The difference in the magnitude of opening stock and closing stock affects the unit cost of production due to the impact of related fixed cost.
5.	In case of marginal costing the cost per unit remains the same, irrespective of the production as it is valued at variable cost	In case of absorption costing the cost per unit reduces, as the production increases as it is fixed cost which reduces, whereas, the variable cost remains the same per unit.

Q3. Explain and illustrate cash break-even chart.

Answer

In cash break-even chart, only cash fixed costs are considered. Non-cash items like depreciation etc. are excluded from the fixed cost for computation of break-even point. It depicts the level of output or sales at which the sales revenue will equal to total cash outflow. It is computed as under:

Cash BEP (Units) = Cash Fixed Cost/ Contribution per Units



Q4. Write short notes on Angle of Incidence.

Answer

This angle is formed by the intersection of sales line and total cost line at the break- even point. This angle shows the rate at which profits are being earned once the break-even point has been reached.

The wider the angle the greater is the rate of earning profits. A large angle of incidence with a high margin of safety indicates extremely favorable position.

Q5. Discuss basic assumptions of Cost Volume Profit analysis.

Answer

CVP Analysis: - Assumptions

I. Changes in the levels of revenues and costs arise only because of changes in the number of products (or service) units produced and sold.
II. Total cost can be separated into two components: Fixed and variable
III. Graphically, the behaviour of total revenues and total cost are linear in relation to output level within a relevant range.
IV. Selling price, variable cost per unit and total fixed costs are known and constant.

All revenues and costs can be added, sub traded and compared without taking into account the time value of money.

Q6. Elaborate the practical application of Marginal Costing.

Answer

Practical applications of Marginal costing:

i. **Pricing Policy:** Since marginal cost per unit is constant from period to period, firm decisions on pricing policy can be taken particularly in short term.
ii. **Decision Making:** Marginal costing helps the management in taking a number of business decisions like make or buy, discontinuance of a particular product, replacement of machines, etc.

Ascertaining Realistic Profit: Under the marginal costing technique, the stock of finished goods and work-in-progress are carried on marginal cost basis and the fixed expenses are written off to profit and loss account as period cost. This shows the true profit of the period.

16. BUDGET & BUDGETARY CONTROL

Q1. State the limitations of Budgetary Control System. (JAN 21)

Answer

Limitations of Budgetary Control System

Points	Description
1. Based on Estimates	Budgets are based on a series of estimates, which are based on the conditions prevalent or expected at the time budget is established. It requires revision in plan if conditions change.
2. Time factor	Budgets cannot be executed automatically. Some preliminary steps are required to be accomplished before budgets are implemented. It requires proper attention and time of management. Management must not expect too much during the initial development period.
3. Co-operation Required	Staff co-operation is usually not available during the initial budgetary control exercise. In a decentralised organisation, each unit has its own objective and these units enjoy some degree of discretion. In this type of organisation structure, coordination among different units is required. The success of the budgetary control depends upon willing co-operation and teamwork,
4. Expensive	The implementation of budget is somewhat expensive. For successful implementation of the budgetary control, proper organisation structure with responsibility is prerequisite. Budgeting process start from the collection of information to for preparing the budget and performance analysis. It consumes valuable resources (in terms of qualified manpower, equipment, etc.) for this purpose; hence, it is an expensive process.
5. Not a substitute for management	Budget is only a managerial tool and must be intelligently applied for management to get benefited. Budgets are not a substitute for good management.
6. Rigid document	Budgets are sometime considered as rigid documents. But in reality, an organization is exposed to various uncertain internal and external factors. Budget should be flexible enough to incorporate ongoing developments in the internal and external factors affecting the very purpose of the budget.

Q2. What are the important points an organization should consider if it wants to adopt Performance Budgeting? (NOV 20)

Answer

For an enterprise that wants to adopt Performance Budgeting, it is thus imperative that:

- the objectives of the enterprise are spelt out in concrete terms.
- the objectives are then translated into specific functions, programmes, activities and tasks for different levels of management within the realities of fiscal constraints.
- realistic and acceptable norms, yardsticks or standards and performance indicators should be evolved and expressed in quantifiable physical units.
- a style of management based upon decentralized responsibility structure should be adopted, and
- an accounting and reporting system should be developed to facilities monitoring, analysis and review of actual performance in relation to budgets.

Q3. Explain the meaning of Budget Manual. (NOV 19)

Answer

Budget Manual: A budget manual is a collection of documents that contains key information for those involved in the planning process. Typical contents could include the following:

- An introductory explanation of the budgetary planning and control process, including a statement of the budgetary objective and desired results.
- A form of organization chart to show who is responsible for the preparation of each functional budget and the way in which the budgets are interrelated.
- A timetable for the preparation of each budget. This will prevent the formation of a 'bottleneck' with the late preparation of one budget holding up the preparation of all others.
- Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion.
- A list of the organization's account codes, with full explanations of how to use them.
- Information concerning key assumptions to be made by managers in their budgets, for example the rate of inflation, key exchange rates, etc.

Q4. DESCRIBE the salient features of budget manual. (RTP May 21)

Answer

Salient features of Budget Manual

- Budget manual contains much information which is required for effective budgetary planning.

- A budget manual is a collection of documents that contains key information for those involved in the planning process.
- An introductory explanation of the budgetary planning and control process, including a statement of the budgetary objective and desired results is included in Budget Manual.
- Budget Manual contains a form of organisation chart to show who is responsible for the preparation of each functional budget and the way in which the budgets are interrelated.
- In contains a timetable for the preparation of each budget.
- Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion is included in Budget Manual.

Q5. Describe the steps necessary for establishing a good budgetary control system.

Answer

The following steps are necessary for establishing a good budgetary control system:

1. Determining the objectives to be achieved, over the budget period, and the policy or policies that might be adopted for the achievement of these objectives.
2. Determining the activities that should be undertaken for the achievement of the objectives.
3. Drawing up a plan or a scheme of operation in respect of each class of activity, in quantitative as well as monetary terms for the budget period.
4. Laying out a system of comparison of actual performance by each person, or department with the relevant budget and determination of causes for the variation, if any.
5. Ensuring that corrective action will be taken where the plan has not been achieved and, if that is not possible, for the revision of the plan.

Q6. Explain briefly the concept of 'flexible budget'.

Answer

Flexible Budget: A flexible budget is defined as "a budget which, by recognizing the difference between fixed, semi-variable and variable cost is designed to change in relation to the level of activity attained". In flexibility budgetary control system, a series of budgets are prepared one for the each of a number of alternative production levels or volumes. Flexible budgets represent the amount of expense that is reasonably necessary to achieve each level of output specified. In other words, the allowances given under flexibility budgetary control system serve as standards of what costs should be at each level of output.

Q7. Discuss the components of budgetary control system

Answer

Components of budgetary control system

The policy of a business for a defined period is represented by the master budget the details of which are given in a number of individual budgets called functional budgets. The functional budgets are broadly grouped under the following heads:

(a) Physical Budgets – Sales Quantity, Product Quantity., Inventory, Manpower budget.

(b) Cost Budgets – Manufacturing Cost, Administration Cost, Sales & Distribution cost, R & D Cost.

(c) Profit Budget.

Q8. List the eight functional budgets prepared by a business.

Answer

The various commonly used Functional budgets are:

- Sales Budget
- Production Budget
- Plant Utilisation Budget
- Direct Material Usage Budget
- Direct Material Purchase Budget
- Direct Labour (Personnel) Budget
- Factory Overhead Budget
- Production Cost Budget.

Q9. Distinguish between Fixed and flexible budget

Answer

Difference between Fixed and Flexible Budgets

	Fixed Budget	Flexible Budget
1.	It does not change with actual volume of activity achieved. Thus, it is rigid	It can be re-casted on the basis of activity level to be achieved. Thus, it is not rigid.
2.	It operates on one level of activity and under one set of conditions	It consists of various budgets for different level of activity.
3.	If the budgeted and actual activity levels differ significantly, then cost ascertainment and price fixation do not give a correct picture.	It facilitates the cost ascertainment and price fixation at different levels of activity.

4.	Comparisons of actual and budgeted targets are meaningless particularly when there is difference between two levels.	It provided meaningful basis of comparison of actual and budgeted targets.

Q10. Explain the Essentials of budget

Answer

Essentials of budget

- It is prepared in advance and is based on a future plan of actions
- It relates to a future period and is based on objectives to be attained.
- It is a statement expressed in monetary and/ or physical units prepared for the implementation of policy formulated by management.

Q11. State the considerations on which capital expenditure budget is prepared.

Answer

The preparation of Capital Expenditure Budget is based on the following considerations:

1. Overhead on production facilities of certain departments as indicated by the plant utilisation budget.
2. Future development plans to increase output by expansion of plant facilities.
3. Replacement requests from the concerned departments
4. Factors like sales potential to absorb the increased output, possibility of price reductions, increased costs of advertising and sales promotion to absorb increased output, etc.

Q12. Describe the steps involved in the budgetary control technique

Answer

There are certain steps involved in the budgetary control technique. They are as follows:

i. **Definition of objectives:** A budget being a plan for the achievement of certain operational objectives, it is desirable that the same are defined precisely. The objectives should be written out; the areas of control demarcated; and items of revenue and expenditure to be covered by the budget stated.

ii. **Location of the key (or budget) factor:** There is usually one factor (sometimes there may be more than one) which sets a limit to the total activity. Such a factor is known as key factor. For proper budgeting, it must be located and estimated properly.

iii. **Appointment of controller:** Formulation of a budget usually required whole time services of a senior executive known as budget controller; he must be assisted in this work by a Budget

Committee, consisting of all the heads of department along with the Managing Director as the Chairman.

iv. **Budget Manual:** Effective budgetary planning relies on the provision of adequate information which are contained in the budget manual. A budget manual is a collection of documents that contains key information for those involved in the planning process.

v. **Budget period:** The period covered by a budget is known as budget period. The Budget Committee determines the length of the budget period suitable for the business. It may be months or quarters or such periods as coincide with period of trading activity.

vi. **Standard of activity or output:** For preparing budgets for the future, past statistics cannot be completely relied upon, for the past usually represents a combination of good and bad factors. Therefore, though results of the past should be studied but these should only be applied when there is a likelihood of similar conditions repeating in the future.

Q13. Explain 'Activity Based Budgeting'. Nov'18

Answer

Activity Based Budgeting (ABB)

- Activity based budgeting analyse the **resource input or cost** for each activity.
- It provides a framework for **estimating the amount of resources** required in accordance with the budgeted level of activity.
- Actual results can be **compared** with budgeted results to highlight both in financial and non-financial terms those activities with major discrepancies from budget for potential reduction in supply of resources.
- It is a planning and control system which seeks to support the objectives of **continuous improvement**.
- It means planning and controlling the expected activities of the organization to derive a **cost-effective budget** that meet forecast workload and agreed strategic goals.
- ABB is the **reversing of the ABC process** to produce financial plans and budgets.

Q14. State the advantages of Zero-based budgeting. RTP May'18; May' 18; RTP Nov'20

Answer:

The advantages of zero-based budgeting are as follows:

- It provides a systematic approach for the **evaluation of different activities and rank them** in order of preference **for the allocation of scarce resources**.
- It ensures that the **various functions undertaken by the organization are critical** for the achievement of its objectives and are being performed in the best possible way.

- It provides an opportunity to the management to allocate resources for various activities only after having a **thorough cost-benefit-analysis**. The chances of arbitrary cuts and enhancement are thus avoided.
- The areas of **wasteful expenditure can be easily identified** and eliminated.
- Departmental budgets are closely **linked with corporation objectives**.
- The technique can also be used for the introduction and implementation of the system of **'management by objective.'** Thus, it cannot only be used for fulfillment of the objectives of traditional budgeting but it can also be used for a variety of other purposes.

Q15. Explain the meaning of Budget Manual. RTP Nov'19

Answer:

Budget Manual: A budget manual is a collection of documents that contains key information for those involved in the planning process. Typical contents could include the following:

- An introductory **explanation of the budgetary planning and control process**, including a statement of the budgetary objective and desired results.
- A **form of organization chart** to show **who is responsible** for the preparation of each functional budget and the way in which the budgets are interrelated.
- A **timetable** for the preparation of each budget. This will prevent the formation of a 'bottleneck' with the late preparation of one budget holding up the preparation of all others.
- **Copies of all forms** to be completed by those responsible for preparing budgets, with explanations concerning their completion.
- A **list of the organization's account codes**, with full explanations of how to use them.

Q16. Explain the difference between fixed budget and flexible budget. MTP Aug'18

Answer:

Sl.No.	Fixed Budget	Flexible Budget
1.	It does not change with actual volume of activity achieved. Thus, it is known as rigid or inflexible budget	It can be re-casted on the basis of activity level to be achieved. Thus, it is not rigid.
2.	It operates on one level of activity and under one set of conditions. It assumes that there will be no change in the prevailing conditions, which is unrealistic.	It consists of various budgets for different levels of activity

3.	Here as all costs like - fixed, variable and semi-variable are related to only one level of activity so variance analysis does not give useful information.	Here analysis of variance provides useful information as each cost is analysed according to its behaviour.
4.	If the budgeted and actual activity levels differ significantly, then the aspects like cost ascertainment and price fixation do not give a correct picture.	Flexible budgeting at different levels of activity facilitates the ascertainment of cost, fixation of selling price and tendering of quotations.
5.	Comparison of actual performance with budgeted targets will be meaningless specially when there is a difference between the two activity levels.	It provides a meaningful basis of comparison of the actual performance with the budgeted targets.

Q17. What are the cases when a flexible budget is found suitable? May'19

Answer:

Flexible budgeting may be resorted to under following situations:

i. In the case of **new business venture** due to its typical nature it may be difficult to forecast the demand of a product accurately.
ii. Where the business is dependent upon the **mercy of nature** e.g., a person dealing in wool trade may have enough market if temperature goes below the freezing point.
iii. In the case of **labour - intensive industry** where the production of the concern is dependent upon the availability of labour.

Suitability for flexible budget:

i. **Seasonal fluctuations** in sales and/or production, for example in soft drinks industry;
ii. A company which keeps on introducing **new products or makes changes** in the design of its products frequently;
iii. Industries engaged in **make-to-order business** like ship building;
iv. An industry which is influenced by **changes in fashion**; and
v. **General changes in sales**.

Q18. Define Zero Base Budgeting and mention its various stages. Nov'19

Answer:

Zero-based Budgeting: (ZBB) is an emergent form of budgeting which arises **to overcome the limitations of incremental (traditional) budgeting system**. Zero- based Budgeting (ZBB) is defined as 'a method of budgeting which requires each cost element to be specifically justified, although the

activities to which the budget relates are being undertaken for the first time, without approval, the budget allowance is zero'.

ZBB is an activity-based budgeting system where **budgets are prepared for each activity rather than functional department.** Justification in the form of **cost benefits for the activity** is required to be given. The activities are then **evaluated and prioritized** by the management on the basis of factors like synchronisation with organisational objectives, availability of funds, regulatory requirement etc.

ZBB is **suitable for both corporate and non-corporate entities.** In case of non-corporate entities like Government department, local bodies, not for profit organisations, where these entities need to justify the benefits of expenditures on social programmes like mid-day meal, installation of street lights, provision of drinking water etc.

ZBB involves the following stages:

i. **Identification** and description of Decision packages
ii. **Evaluation** of Decision packages
iii. **Ranking** (Prioritisation) of the Decision packages
iv. **Allocation** of resources