P8: COST ACCOUNTING

SOLUTIONS BOOK FOR CMA INTERMEDIATE SYLLABUS - 2022

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CONTENTS

CHAPTER 02: PREPARATION OF COST SHEET AND ASCERTAINMENT OF PROFIT

SOLUTION – 1

Details	(₹)	(₹)
Inventory (RM) at the beginning of the year	3000	
Add: Purchase of RM during the year	110000	
	113000	
Less: Inventory (RM) at the end of the year	(4000)	
Material consumed		109000
Add: Direct Labour		65000
Prime Cost		174000
Add: Factory Overhead @ 60% of direct labour		39000
Works Cost		213000
Adjustment for work in progress		
Opening WIP	4000	
Less: Closing WIP	(6000)	(2000)
		211000
Add: Administrative Overhead @ 5% of Sales (275000)		13750
Cost of Production		224750
Adjustment for Finished goods:		
Opening Stock of Finished Goods	7000	
Less: Closing stock of Finished Goods	(8000)	(1000)
Cost of goods sold		223750
Add: Selling overhead @ 10% of sales (275000)		27500
Cost of Sales		251250
Profit (Balancing figure)		23750
Sales		275000

SOLUTION – 2

STATEMENT OF COST SHEET

Particulars	Amount (₹)	Amount (₹)
Direct Materials		
Opening Stock of Raw Material	1,40,000	
Add: Purchases	3,20,000	
Add: Freight	16,000	
Less: Returns	4,800	
Less: Closing Stock	1,80,000	2,91,200
Direct Labour	1,60,000	

Add: Accrued	8,000	1,68,000
Prime Cost		**4,59,200**
Add: Factory Overhead		
- Indirect Labour	18,000	
- Accrued indirect labour	1,200	
- Factory supervision	10,000	
- Factory Repairs & upkeep	14,000	
- Heat, Light & Power	52,000	
- Rates & Taxes	4,200	
- Miscellaneous Factory Expenses	18,700	
- Depreciation on Plant & Machinery (10% × 4,60,500)	46,050	
- Depreciation on Buildings (8/10 × 4% × 2,00,000)	6,400	
	1,70,550	
Add: Opening WIP	2,00,000	
Less: Closing WIP	(1,92,000)	1,78,550
Factory Cost		**6,37,750**
Add: Administration Overhead		
- Heat, Light & Power (1/10 × 65,000)	6,500	
- Rates & Taxes (1/3 × 6,300)	2,100	
- Depreciation on Buildings (1/10 × 4% × 2,00,000)	800	
- Depreciation on office appliances	870	
- Office salaries	8,600	18,870
Cost of Production		**6,56,620**
Add: Opening Stock of Finished Goods	80,000	
Less: Closing Stock of Finished Goods	1,15,000	(35,000)
Cost of Goods Sold		6,21,620
Add: Selling & Distribution Overhead		
- Heat, Light & Power (1/10 × 65,000)	6,500	
- Depreciation on Buildings (1/10 × 4% × 2,00,000)	800	
- Sales Commission	33,600	
- Sales Travelling	11,000	
- Sales Promotion	22,500	
- Distribution department salaries & wages	18,000	92,400
Cost of Sales		**7,14,020**

CONDENSED PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDED 31-12-2022

Particulars	₹	₹	Particulars	₹	₹
To Cost of Sales		7,14,020	By Sales	7,68,000	
To Interest on Borrowings	2,000		Less: Sales Return	14,000	7,54,000
Add: Accrued	2,000	4,000			
To Profit (Bal. fig.)		35,980			
		7,54,000			7,54,000

SOLUTION – 3

QUOTATION FOR A PRINTING JOB

Items	Amount (₹)	Amount (₹)
Direct Material		
● Paper	10 × 1,800 = 18,000	
● Ink and other printing material	5,000	
● Binding material & consumables	3,000	
● Primary packing material	4,000	30,000
Direct Labour		
● Photographer's Charge	10,000	
● Artist (WN 1)	6,400	
● Copywriter (WN 2)	5,000	
● Client Servicing (WN 3)	1,800	23,200
Prime Cost		**53,200**
Add: Production Overhead	40% × 53,200	21,280
Factory Cost		**74,480**
Add: Selling & Distribution Overhead	25% × 74,480	18,620
Cost of Sales		**93,100**
Add: Profit (WN 4)		23,275
Price to be quoted		**1,16,375**

WORKING NOTES:

1. Charge per month for Artist ₹ 12,000
   Working Hours per month (25 × 6) 150 hours
   Actual Hours worked 80

   ∴ Labour charge for Artist = $12,000 \times \frac{80}{150}$ = ₹ 6,400

2. Charge per month for copy writer ₹ 10,000
   Working Hours per month (25 × 6) 150 hours

Actual Hours worked 75

∴ Labour charge for Copywriter = 10,000 × 75 = ₹ 5,000

3. Charge per month for client servicing ₹ 9,000
   Working Hours per month (25 × 6) 150 hours

   Actual Hours worked 30

   ∴ Labour charge for Client servicing = 9,000 × $\frac{30}{150}$ = ₹ 1,800

4. Cost of Sales + Profit = Price to be quoted

   or, 93,100 + 20% × Price to be quoted = Price to be quoted

   or, Price to be quoted = 93,100 × $\frac{100}{80}$ = ₹1,16,375

   Profit = 1,16,375 – 93,100 = ₹ 23,275

SOLUTION – 4

COST SHEET

Capacity Utilisation Period	**50% Capacity** **1st January – 31st July**		**100% Capacity** **1st August– 31st December**	
Units	$\frac{1,20,000}{12}$ × 7 × 50% = 35,000		$\frac{1,20,000}{12}$ × 5 × 100% = 50,000	
Raw Material	20 × 35,000	7,00,000	20 × 50,000	10,00,000
Direct Labour	12 × 35,000	4,20,000	12 × 50,000	6,00,000
Direct Expenses	2 × 35,000	70,000	2 × 50,000	1,00,000
Variable Overheads	16 × 35,000	5,60,000	16 × 50,000	8,00,000
Fixed Overheads	$\frac{3,00,000}{12}$ × 7	1,75,000	$\frac{3,00,000}{12}$ × 5	1,25,000

Semi-Variable Overhead	7,500 × 7	52,500	12,500 × 5	62,500
Total Cost		19,77,500		26,87,500
Profit (WN 1)		4,37,500		3,62,500
Sales (WN 2)	69 × 35,000	24,15,000		30,50,000
Selling Price per unit (WN 2)		69	30,50,000 / 50,000	61
Cost per unit	19,77,500 / 35,000	56.5	26,87,500 / 50,000	53.75

Working Notes:

1. Selling Price for 1st January – 31st July = ₹69

   ∴ Sales = 69 × 35,000 = ₹ 24,15,000

   Profit for 1st January – 31st July = 24,15,000 – 19,77,500 = ₹ 4,37,500

2. Expected total profit for the year ₹ 8,00,000
   Profit to earn from 1st August – 31st December = 8,00,000 – 4,37,500 = ₹ 3,62,500 Expected Sale from 1st August – 31st December = ₹ 30,50,000

   Expected Selling price per unit from 1st August – 31st December = ₹ 30,50,000 / 50,000 = ₹ 61

SOLUTION – 5

COST SHEET FOR THE YEAR 2021

Production Unit	**10,000**		
		Cost per unit (₹)	**Total (₹)**
Direct Material	2,00,000 / 10,000 = ₹ 20	20	2,00,000
Labour Cost	2,00,000 / 10,000 = ₹ 12	12	1,20,000
Prime Cost		**32**	**3,20,000**

Add: Factory OH Variable 80,000 × 50%	40,000 = ₹ 4 10,000	4	40,000
Fixed 80,000 × 50%		4	40,000
Works Cost		**40**	**4,00,000**
Add: Office OH Variable 40,000 × 50%	20,000 = ₹ 2 10,000	2	20,000
Fixed 40,000 × 50%		2	20,000
Cost of Production		**44**	**4,40,000**
Add: S & D OH	10,000 = ₹ 12 10,000	1	10,000
Cost of Sales		**45**	**4,50,000**
Add: Profit (Bal. fig.)		15	1,50,000
Sales	**(WN 1)**	**60**	**6,00,000**

Working Notes:

1. Computation of Selling Price of 2021
   Cost of Sales + Profit = Sales

   or, 4,50,000 + 25% of Sales = Sales

   or, Sales = 4,50,000 / 75% = ₹6,00,000

   ∴ Selling Price per unit = 6,00,000 / 10,000 = ₹ 60

COST SHEET FOR THE YEAR 2022

Production Unit	15,000		
		Total (₹)	Cost per Unit (₹)
Direct Material	15,000 × (20 × 120%) = 15,000 × 24	3,60,000	24
Labour Cost	15,000 × (12 × 110%) = 15,000 ×13.20	1,98,000	13.2
Prime Cost		**5,58,000**	**37.2**

Add: Factory OH Variable	15,000 × 4	60,000	4
Fixed		40,000	2.67
Works Cost		**6,58,000**	**43.87**
Add: Office OH Variable	15,000 × 2	30,000	2
Fixed		20,000	1.33
Cost of Production		**7,08,000**	**47.2**
Add: S & D OH	15,000 × 1 × 80%	12,000	0.8
Cost of Sales		**7,20,000**	**48**
Add: Profit (Bal. fig.)		2,40,000	16
Sales (WN 2)		**9,60,000**	**64**

Working Notes 2:

Computation of Selling Price of 2022

Cost of Sales + Profit = Sales

or, 7,20,000 + 25% of Sales = Sales

or, Sales = $\frac{7,20,000}{75\%}$ = ₹ 9,60,000

∴ Selling Price per unit = $\frac{9,60,000}{15,000}$ = ₹ 64

SOLUTION – 6

(a) COMPUTATION OF COST OF SALES FOR THE YEAR 2021-22 AND 2022-23

	2021-22	2022-23	
Sales Unit	$\frac{₹ 25,00,000}{₹ 125}$ = 20,000	20,000 × 120% = 24,000	
Direct Material	3,20,000	3,20,000 × 120% × 110%	4,22,400
Direct Wages	8,00,000	8,00,000 × 120% × 0105% × $\frac{100}{112}$	9,00,000
Prime Cost	**11,20,000**		**13,22,400**
Add: Variable Production OH	4,80,000 × 25% = 1,20,000	1,20,000 × 120% × 105%	1,51,200
Fixed Production OH	4,80,000 × 75% = 3,60,000	3,60,000 × $133^{1}/_{3}$%	4,80,000
Works Cost	**16,00,000**		**19,53,600**

Add: Variable Administrative OH	1,60,000 × 25% = 40,000	40,000 × 120% × 105%	50,400
Fixed Administrative OH	1,60,000 × 75% = 1,20,000		1,20,000
Cost of Production	**17,60,000**		**21,24,000**
Add: Variable Selling & Distribution OH	$1/_3$ × 2,40,000 = 80,000	80,000 × 120% × 105%	1,00,800
Fixed Selling & Distribution OH	$2/_3$ × 2,40,000 = 1,60,000		1,60,000
Advertisement Exp.			45,200
Cost of Sales	**20,00,000**		**24,30,000**

(b) Profit for the year 2021-22 = Sales – Cost of Sales = 25,00,000 – 20,00,000 = ₹5,00,000

(i) Selling Price of 2022-23 if same amount of profit is to be earned as in 2021-22:

$$= \frac{\text{Cost of Sales + Expected Profit}}{\text{No. of Sales Unit}} = \frac{24,30,000 + 5,00,000}{24,000} = ₹\ 122.08$$

(ii) Selling Price of 2022-23 if the same percentage of profit to sales is to be earned as in 2021-22:

Percentage of Profit to Sales in 2021-22 = $\frac{5,00,000}{25,00,000} \times 100 = 20\%$

Cost of Sales + Profit = Sales

or, 24,30,000 + 20% of Sales = Sales

or, Sales = $\frac{24,30,000}{80\%}$ = ₹30,37,500

(iii) Selling Price of 2022-23 if the existing profit to sales percentage is increased by 25%:

Profit to Sales percentage = 20 + 25% × 20 = 25%

Cost of Sales + Profit = Sales

or, 24,30,000 + 25% of Sales = Sales

or, Sales = $\frac{24,30,000}{75\%}$ = ₹32,40,000

Selling Price per unit = $\frac{₹\ 32,40,000}{24,000}$ = ₹ 135

(iv) Selling Price of 2022-23 if profit per unit of ₹ 10 is to be earned:

Sales = 24,30,000 + 10 × 24,000 = ₹ 26,70,000

Selling Price per unit = ₹ 26,70,000 / 24,000 = ₹ 111.25

SOLUTION – 7

Working Notes

1. The Factory Overheads actually incurred are ₹2,100. This amount to be apportioned on the basis of labour hours. So, the rate to be considered

as ₹ 2.10 per unit $\left(= \frac{₹\ 2{,}100}{1{,}000\ \text{hours}}\right)$ and not ₹ 2 per unit. If we consider the above mentioned point the calculations for Job Sheets and for the work in progress will change accordingly.

2. Work in progress is to be calculated for the incomplete jobs hence job no. A 66 and A 55 should only be included in the calculations of work in progress.

(a) JOB COST SHEETS FOR THE MONTH OF MARCH 2022

Cost Items	Job A 77 Amount (₹)		Job A 99 Amount (₹)	
Direct Material Issued		280		120
Direct Labour		450		600
Prime Cost		730		720
Add: Factory Overhead	2.10 × 200 =	420	2.10 × 400	840
Add: Opening WIP	420 + 450 + 400 =	1,270	80 + 150 + 200 =	430
Factory Cost		2,420		1,990
Add: S & D Overhead (WN 1)		484		398
Cost of Sales		2,904		2,388
Add: Profit (WN 1)		323		265
(b) Selling Price		**3,227**		**2,653**

Working Note

1. Factory cost + Selling & Distribution Overheads + Profit = Selling Price

Job A 77:
Let Selling Price be ₹ x
∴ Selling & Distribution Overhead = 15% × Selling Price = 0.15x and, Profit = 10% × Selling Price = 0.10x
or, 2,420 + 0.15x + 0.10x = x
or, x = 2,420 / 0.75 = ₹3,227
∴ Selling & Distribution Overhead = 0.15 × 3,227 = ₹484
and, Profit = 0.10 × 3,227 = ₹323

Similarly,

Selling Price of Job 99 = $\frac{₹\ 1,990}{0.75}$ = ₹ 2,653

∴ Selling & Distribution Overhead = 0.15 × 2,653 = ₹ 398

and, Profit = 0.10 × 2,653 = ₹ 265

(c) Calculation of Closing Work in Progress of Job A 55 and A 66

	Job A 55 Amount (₹)	Job A 66 Amount (₹)
Direct Material Issued	300	225
Direct Labour	225	675
Prime Cost	525	900
Add: Factory Overhead	100 × 2.10 = 210	300 × 2.10 = 630
Value of Work in Progress	735	1,530

∴ Total Value of Work in Progress = 735 + 1,530 = ₹2,265

SOLUTION – 8

COST SHEET FOR THE BATCH NO. 001
STANDARD BATCH SIZE OF 1,000 PIECES

Cost Items	Actual ₹	Estimated ₹			Variance ₹	Favourable / Adverse
Direct Material	1,250 × 50 (1300 – 50)	62,500	62,500 × $\frac{100}{120}$	52,083	10,417	A
Direct Labour: Foundry	200 × 10	2,000	2,000 × $\frac{110}{100}$	2,200	200	F
Machining	100 × 5	500	500 × $\frac{110}{100}$	550	50	F
Assembly	100 × 15	1,500	1,500 × $\frac{110}{100}$	1,650	150	F
Prime Cost		**66,500**		**56,483**	**10,017**	**A**
Add: Factory Overhead: Foundry	200 × 15	3,000	3,000 × $\frac{100}{120}$	2,500	500	A
Machining	100 × 20	2,000	2,000 × $\frac{100}{120}$	1,667	333	A
Assembly	100 × 10	1,000	1,000 × $\frac{100}{120}$	833	167	A
Factory Cost		**72,500**		**61,483**	**11,017**	**A**

Cost Items	Actual ₹	Estimated ₹			Variance ₹	Favourable / Adverse
Direct Material	1,250 × 50 (1300 – 50)	62,500	62,500 × 100/120	52,083	10,417	A
Direct Labour: Foundry	200 × 10	2,000	2,000 × 110/100	2,200	200	F
Machining	100 × 5	500	500 × 110/100	550	50	F
Assembly	100 × 15	1,500	1,500 × 110/100	1,650	150	F
Prime Cost		**66,500**		**56,483**	**10,017**	**A**
Add: Factory Overhead: Foundry	200 × 15	3,000	3,000 × 100/120	2,500	500	A
Machining	100 × 20	2,000	2,000 × 100/120	1,667	333	A
Assembly	100 × 10	1,000	1,000 × 100/120	833	167	A
Factory Cost		**72,500**		**61,483**	**11,017**	**A**

Working Note:

1. **For Material and Factory Overhead**
   Actual cost is 20% excess than Estimated cost
   Let Estimated cost be x
   ∴ x + 20%x = 62,500 (Actual Material Cost)
   or, x = 62,500 × 62,500 × 100/120 = ₹ 52,083 (Estimated Material Cost)
   Similarly, Factory Overhead cost has been calculated

2. **For Direct Labour**
   Estimated Cost is 10% more than Actual Cost So, Estimated Cost = Actual Cost × 62,500 × 110

CHAPTER 03: DIRECT EXPRESS

SOLUTION-1:

Computation of Direct Expenses

Particulars	₹
Royalty paid on sales	30,000
Add: Royalty paid on units produced	20,000
Add: Hire charges of equipment used for production	2,000
Add: Design charges	15,000
Add: Software development charges related to production	22,000
Direct Expenses	**89,000**

Note:

1. Expenses are related to either manufacturing of the product or rendering of service.
2. These costs are directly identifiable and can be linked with the cost object and are not related to direct material cost or direct employee cost. Hence, these are considered as direct expenses.

SOLUTION – 2:

Computation of Direct Expenses

Particulars	Product X ₹	Product Y ₹
Royalty paid on sales	15,000 × 2 = 30,000	12,000 × 2 = 24,000
Add: Royalty paid on units produced	20,000 × 1 = 20,000	15,000 × 1 = 15,000
Add: Hire charges of equipment used in manufacturing process of Product X only	5,000	-
Add: Design charges	15,000	18,000
Add: Software development charges related to production	24,000	36,000
Direct Expenses	**94,000**	**93,000**

Note:

1. Royalty on production and royalty on sales are allocated on the basis of units produced and units sold respectively. These are directly identifiable and traceable to the number of units produced and units sold. Hence, this is not an apportionment.
2. No adjustments are made related to units held, i.e., closing stock.

CHAPTER 04: OVERHEADS

SOLUTION-1:

The primary distribution of overheads is as follows:

Expense	Total ₹	Basis	P1 ₹	P2 ₹	P3 ₹	S1 ₹	S2 ₹
Rent	6,000	Area sq ft 40:30:27:15:8	2,000	1,500	1,350	750	400
Repair	3,600	Value of plant 12:9:8:1	1,440	1,080	960	120	-
Depreciation	2,700	Value of plant 12:9:8:1	1,080	810	720	90	-
Lighting	600	Area sq ft 40:30:27:15:8	200	150	135	75	40
Supervision	9,000	No. of workers 9:8:6:4:3	2,700	2,400	1,800	1,200	900
Fire Insurance for stock	3,000	Stock Value 05:03:02	1,500	900	600	-	-
ESI contribution	900	Wages 6:5:4:3:2	270	225	180	135	90
Power	5,400	Horse power of plant 12:8:6:3:1	2,160	1,440	1,080	540	180
Total	**31,200**		**11,350**	**8,505**	**6,825**	**2,910**	**1,610**

SOLUTION-2:

The overheads of the service departments have to be allocated to the production departments. The sequence and the bases on which the service departments should be selected has to be determined first. The following logical bases are decided based on the additional information given:

Service Departments :	Basis of allocation
Time Office :	No. of employees
Stores :	No. of stores requisition slips
Maintenance :	Machine Hours

Number of employees exist in all the departments. So, overhead of the time office department is allocated first. No. of stores requisition slips is used by three departments, hence overhead of the stores department is allocated next and machine hours is used by only production department. So, overhead of the maintenance department is allocated last.

Hence, the sequence of distribution of overheads will be time office, stores and maintenance.

Particulars	Total ₹	Basis	Fabrication ₹	Assembly ₹	Time Office ₹	Stores ₹	Maintenance ₹
As per primary distribution	52,000	As given	24,000	16,000	4,000	5,000	3,000
Time Office	4,000	No. of Employees (4:3:2:1)	1,600	1,200	(4,000)	800	400
Stores	5,800	No. of stores requisition slips (12:10:3)	2,784	2,320	-	(5,800)	696
Maintenance	4,096	Machine Hours (3:2)	2,458	1,638	-	-	(4,096)
Total			**30,842**	**21,158**	**-**	**-**	**-**

When the cost of Time Office is distributed first, the charge to stores department is ₹ 800. This makes the total cost of stores to be distributed as ₹ 5,800 (i.e., ₹ 5,000 + ₹ 800). Same is the logic for ₹ 4,096 i.e., the cost of Maintenance.

SOLUTION-3:

	Production Departments			Service Departments	
	A ₹	B ₹	C ₹	X ₹	Y ₹
As per primary distribution	2,400	2,100	1,500	700	900
Service department X (2:4:3:1)	140	280	210	(700)	70
Service department Y (4:2:2:2)	388	194	194	194	(970)
Service department X (2:4:3:1)	38.8	77.6	58.2	(194)	19.4
Service department Y (4:2:2:2)	7.76	3.88	3.88	3.88	(19.4)
Service department X (2:4:3:1)	0.776	1.552	1.164	(3.88)	0.388
Total	**2,975.336**	**2,657.032**	**1,967.244**	**-**	**0.388**

Ignore the fraction of the undistributed amount of the Service Department Y.

SOLUTION-4:

Statement Showing Apportionment of Overheads

Particulars	Basis of Apportionment	Total ₹	A ₹	B ₹	C ₹	X ₹	Y ₹
Material	Actual	45,000	-	-	-	22,500	22,500

Particulars	Basis of Apportionment	Total ₹	A ₹	B ₹	C ₹	X ₹	Y ₹
Wages	Actual	45,000	-	-	-	15,000	30,000
Power	KWH (4:3:2:1:1)	1,100	400	300	200	100	100
Lighting	No. of Light Points (5:8:2:3:2)	200	50	80	20	30	20
Stores Overhead	Direct Material (2:4:4:3:3)	800	100	200	200	150	150
Welfare of Staff	No. of workers (2:3:3:1:1)	3,000	600	900	900	300	300
Depreciation	Asset Value (6:4:3:1:1)	30,000	12,000	8,000	6,000	2,000	2,000
Repairs	Asset Value (6:4:3:1:1)	6,000	2,400	1,600	1,200	400	400
General Overheads	Direct Wages (2:3:4:1:2)	12,000	2,000	3,000	4,000	1,000	2,000
Rent and Taxes	Area (3:5:1:1:1)	550	150	250	50	50	50
Total		1,43,650	17,700	14,330	12,570	41,530	57,520
Cost of X	As given (5:3:2)		20,765	12,459	8,306	(41,530)	-
Cost of Y	Direct Wages (2:3:4)		12,782	19,173	25,565		(57,520)
Total Overheadsof Production Department			**51,247**	**45,962**	**46,441**	**-**	**-**

Computation of Overhead Recovery Rate

Production Overhead	Overhead Amount ₹	Wages ₹	Overhead Recovery Rate
A	51,247	30,000	$\frac{51,247}{30,000} \times 100 = 170.82\%$

Production Overhead	Overhead Amount ₹	Wages ₹	Overhead Recovery Rate
B	45,962	45,000	45,962 / 45,000 × 100 = 102.14%
C	46,441	60,000	46,441 / 60,000 × 100 = 77.40%

SOLUTION-5:

Statement showing apportionment of overheads to departments

Particulars	Basis	Total ₹	Production Department			Service Department	
			A ₹	B ₹	C ₹	D ₹	E ₹
Wages	Actuals	2,000	-	-	-	1,500	500
Rent and Rates	Floor Space (4:5:6:4:1)	5,000	1,000	1,250	1,500	1,000	250
General Lighting	Light Points (2:3:4:2:1)	600	100	150	200	100	50
Indirect Wages	Direct Wages (6:4:6:3:1)	1,500	450	300	450	225	75
Power	H.P. (6:3:5:1)	1,500	600	300	500	100	-
Depreciation on Machinery	Value of Assets (12:16:20:1:1)	10,000	2,400	3,200	4,000	200	200
Sundries	Direct Wages (6:4:6:3:1)	10,000	3,000	2,000	3,000	1,500	500
Total		**30,600**	**7,550**	**7,200**	**9,650**	**4,625**	**1,575**

Repeated Distribution Method

Particulars	Production Department			Service Department	
	A ₹	B ₹	C ₹	D ₹	E ₹
Total Overhead (As per primary distribution)	7,550	7,200	9,650	4,625	1,575
Cost of Service Department D (2:3:4:1)	925	1388	1,850	(4,625)	462
Cost of Service Department E (4:2:3:1)	815	407	611	204	(2,037)
Cost of Service Department D (2:3:4:1)	41	61	82	(204)	20
Cost of Service Department E (4:2:3:1)	8	4	6	2	(20)
Cost of Service Department D (2:3:4:1)	-	2	-	(2)	-
Total Overhead of Production Department	9,339	9,062	12,199	-	-

Working Hours	6,226	4,028	4,066	-	-
Overhead Recovery Rate per hour	1.50	2.25	3.00	-	-

Computation of Factory Cost of the Article

Particulars	Amount (₹)
Material	50.00
Labour	30.00
Prime Cost	80.00
Add: Overhead (Working hours x Rate per hour)Department A = 4 hours × ₹ 1.50	6.00
Department B = 5 hours × ₹ 2.25	11.25
Department C = 3 hours × ₹ 3	9.00
Factory Cost	**106.25**

Simultaneous Equation Method

Let total cost of Service Department D be 'd'

and total cost of Service Department E be 'e'

or, $d = 4,625 + \frac{10}{100} e$

or, $100 d = 4,62,500 + 10 e$

or, $100 d – 10 e = 4,62,500$……..equation (1)

and $e = 1,575 + \frac{10}{100} d$

or, $100 e = 1,57,500 + 10 d$

or, $10 e – d = 15,750$…….equation (2)

Adding equation (1) and (2)

or, $100 d – 10 e + 10 e – d = 4,62,500 + 15,750$

or, $99 d = 4,78,250$

or, $d = \frac{4,78,250}{99} = 4,831$

Now, putting d = 4,831 in equation (2)

or, $10 e – 4,831 = 15,750$

or, $e = \frac{20,581}{10} = 2,058$

Overhead Cost of Service Department D = ₹ 4,831

and Overhead Cost of Service Department E = ₹ 2,058

Particulars	Production Department			Service Department	
	A ₹	B ₹	C ₹	D ₹	E ₹
Total Overhead (As per primary distribution)	7,550	7,200	9,650	4,625	1,575
Cost of D ₹ 4,831 is distributed (2:3:4:1)	966	1,450	1,932	(4,831)	483
Cost of E ₹ 2,058 is distributed (4:2:3:1)	823	412	617	-	(2,058)
Total Overhead of Production Department	9,339	9,062	12,199	-	-
Working Hours	6,226	4,028	4,066	-	-
Overhead Recovery Rate per hour	1.50	2.25	3.00	-	-

SOLUTION-6:

Statement Showing apportionment of power cost and computation of cost per hour

Particulars	Basis	Total ₹	A ₹	B ₹	X ₹	Y ₹
Cost of Power Generation [Fixed Cost]	H P Hours (5:10:6:4)	2,500	500	1,000	600	400
Cost of Power Generation [Variable Cost] (9,300 – 2,500)	Actual Consumption (8:13:7:6)	6,800	1,600	2,600	1,400	1,200
		9,300	**2,100**	**3,600**	**2,000**	**1,600**
Cost of X distributed	(13:6:1)		1,300	600	-2,000	100
Cost of Y distributed	(31:3)		1,550	150	-	-1,700
Total Power Cost			4,950	4,350	-	-
Labour Hours			1,650	2,175	-	-
Cost of Power per Labour Hour			3	2		

SOLUTION-7:

The four commonly used methods of absorbing or recovering overheads are as follows:

1. Percentage of Overheads on Material Cost = $\left(\frac{25,000}{36,000} \text{x} 100\right)$ = 69.44%

2. Percentage of Overheads on Labour Cost = $\left(\frac{25,000}{30,000} \text{x} 100\right)$ = 83⅓ %

3. Overhead Recovery Rate per Labour Hour = $\left(\frac{₹\ 25,000}{12,000\ \text{hours}}\right)$ = ₹ 2.083

4. Overhead Recovery Rate per Machine Hour = $\left(\frac{₹\ 25,000}{20,000\ \text{hours}}\right)$ = ₹ 1.25

The Overheads chargeable to job under the above methods is as follows:

1. Percentage of Overheads on Material Cost = ₹ 6,000 × 69.44% = ₹ 4,166.40
2. Percentage of Overheads on Labour Cost = ₹ 4,950 × 83⅓ % = ₹ 4,125
3. Overhead Recovery Rate per Labour Hour = 1,650 × ₹2.083 = ₹ 3,437
4. Overhead Recovery Rate per Machine Hour = 1,200 × ₹1.25 = ₹ 1,500

SOLUTION-8:

Overhead Incurred	₹ 1,50,000
Overhead Recovered	₹ 1,00,000
∴ Under-absorption	₹ 50,000

Supplementary Overhead rate is calculated and allocated to Cost of Sales, Finished Goods and Work in Progress.

Total of Cost of Sales, Finished Goods and Work in Progress = ₹ 25,00,000 (10,00,000 + 8,00,000 + 7,00,000) Supplementary Overhead rate = $\frac{₹\ 50,000}{₹\ 25,00,000}$ = ₹0.02

∴ Under absorbed overhead amount will be distributed as follows:

Cost of Sales = (₹ 10,00,000 × 0.02) = ₹ 20,000

Finished Goods = (₹ 8,00,000 × 0.02) = ₹ 16,000

Work in Progress = (₹ 7,00,000 × 0.02) = ₹ 14,000

SOLUTION-9:

	₹
Overhead Incurred	4,26,544
Less: Overhead Absorbed	3,65,904
Under-absorption	60,640

The following are the three methods for disposing off this under absorbed overheads:

1. Transferring to the Costing Profit and Loss Account. Under this method, the profit will decrease by ₹ 60,640.
2. The amount may be disposed off by carrying forward to the next year. In this case, there will be no effect on profit.
3. Applying supplementary overhead rate:

Total of COGS, FG, WIP = 1,41,480 + 2,30,732 + 8,40,588 = 12,12,800

$$\therefore \text{Supplementary Overhead Rate} = \frac{₹\ 60,640}{₹\ 12,12,800} = ₹\ 0.05$$

Particulars	Existing Value ₹	Additional Overhead Absorbed ₹	New Value ₹
Working in Progress	1,41,480	0.05 × 1,41,480 = 7,074	1,48,554
Finished Goods	2,30,732	0.05 × 2,30,732 = 11,537	2,42,269
Cost of Goods Sold	8,40,588	0.05 × 8,40,588 = 42,029	8,82,617
Total	**12,12,800**	**60,640**	**12,73,440**

SOLUTION-10:

Particulars		Amount (₹)
Overhead Incurred	₹ 25 × 1,50,000 man-day	41,50,000
Less: Overhead Absorbed		37,50,000
Under Absorption		4,00,000

The under absorption of ₹ 4,00,000 being considerable whether due to defective planning or due to increase in prices, would be disposed off by applying supplementary overhead rate in the following manner.

$$\text{Supplementary Overhead Rate} = \frac{₹\ 4,00,000}{30,000 + 10,000 + 30,000 \times 66.67\%}$$

$$= \frac{₹\ 4,00,000}{60,000 \text{ units}}$$

$$= ₹\ \frac{20}{3} \text{ per unit}$$

Finished Goods Sold	= 30,000 units
Closing Stock of Finished Goods	= 10,000 units (40,000 – 30,000)
Work in Progress	= 30,000 units
Equivalent finished goods	= 30,000 × 66.67%
	= 20,000 units

So, under absorbed overhead will be absorbed by:

Cost of Goods Sold	= 30,000 × $\frac{20}{3}$	= ₹ 2,00,000
Closing Stock of Finished Goods	= 10,000 × $\frac{20}{3}$	= ₹ 66,667
Work in Progress	= 20,000 × $\frac{20}{3}$	= ₹ 1,33,333
Total		= ₹ 4,00,000

SOLUTION-11:

Statement Showing apportionment of selling expenses over the sizes and computation of cost per unit and percentage on sales:

Particulars	Basis of apportionment	Total ₹	A ₹	B ₹	C ₹
Salesman Salaries	Direct charge (4:5:1)	10,000	4,000	5,000	1,000
Sales Commission	Sales turnover (29:40:31)	6,000	1,740	2,400	1,860

Particulars	Basis of apportionment	Total ₹	A ₹	B ₹	C ₹
Sales office expenses	Number of orders (7:8:1)	2,096	917	1,048	131
Advertisement General	Sales turnover (29:40:31)	5,000	1,450	2,000	1,550
Advertisement Specific	Direct charge (% of specific advertisement) (3:4:3)	22,000	6,600	8,800	6,600

Packing	Total volume cu. ft. product sold (WN 1) (17:32:51)	3,000	510	960	1,530
Delivery expenditure	Total volume cu. ft. product sold (WN 1) (17:32:51)	4,000	680	1,280	2,040
Warehouse expenses	Total volume cu. ft. product sold (WN 1) (17:32:51)	1,000	170	320	510
Expenses credit collection	Number of orders (7:8:1)	1,296	567	648	81
Total Selling Expenses		54,392	16,634	22,456	15,302
a. Cost p.u.			= ₹ 16,634 / 3,400 units = ₹ 4.89	= ₹ 22,456 / 4,000 units = ₹ 5.61	= ₹ 15,302 / 3,000 units = ₹ 5.10
b. Percentage of Selling Expenses on Sales			= ₹ 16,634 / ₹ 58,000 × 100 = 28.67%	= ₹ 22,456 / ₹ 80,000 × 100 = 28.07%	= ₹ 15,302 / ₹ 62,000 × 100 = 24.69%

Working Note:

1.

Particulars	A	B	C
a. Volume of cu. ft. per unit of finished products	5	8	17
b. Units Sold	3,400	4,000	3,000
c. Total Volume of cu. ft (a × b)	17,000	32,000	51,000

SOLUTION-12:

Since, different materials are used for producing products, it is advisable, preferable and appropriate to use the method of absorbing overheads based on percentage of material cost instead of percentage on prime cost which is shown as follows:

Particulars	Product A ₹	Product B ₹	Product C ₹
Materials	1,600	2,000	800
Labour	1,200	1,000	400
Prime Cost	2,800	3,000	1,200

Actual Overhead Incurred	800	650	350
Overhead Recovery Rate is calculated based on historical data. So, actual overhead is used to calculate the future recovery rate	₹ 800 × 100 / ₹ 1,600 = 50%	₹ 650 × 100 / ₹ 2,000 = 32.50%	₹ 350 × 100 / ₹ 800 = 43.75%

SOLUTION-13:

1. Printing and Binding Department

It is appropriate to use machine hour rate method of absorbing overheads in Department 1 because there is large investment in machine and therefore, they are predominant

Overhead Rate per Machine Hour = Factory Overhead / Machine hours = ₹ 40,000 / 20,000 hours = ₹ 2 per machine hour

2. Lithographing Department

In Department 2, it is better and appropriate to use labour hour rate of overheads because all the workers are paid at uniform wage rate.

Overhead Rate per Labour Hour = Factory Overhead / Labour hours = ₹ 68,750 / 20,000 hours = ₹ 3.4375 per Labour hour

3. Engraving Department

In Department 3 it is better and appropriate to use overhead rate based on certain percentage of wages because workers are paid at different rates.

Overhead Percentage on Wages = Factory Overhead / Wages × 100 = ₹ 1,20,000 / ₹ 80,000 × 100 = 150%

SOLUTION-14:

Let X be the percentage of works overhead on wages, and Y be the percentage of office overhead on works cost

Particulars	Order I ₹	Order II ₹
Material	12,500	18,000
Add: Wages	10,000	14,000
Prime Cost	22,500	32,000
Add: Works Overhead	X / 100 × 10,000 = 100X	X / 100 × 14,000 = 140X

Particulars	Order I ₹	Order II ₹
Works Cost Add: Office Overhead	22,500 + 100X Y/100 × (22,500 + 100X) = 225Y + XY	32,000 + 140X Y/100 × (32,000 + 140X) = 320Y + 1.4XY
Total Cost	22,500 + 100X + 225Y + XY	32,000 + 140X + 320Y + 1.40XY
Total Cost (WN)	39,000	55,250

So, 22,500 + 100X + 225Y + XY = 39,000

or, 100 X + 225Y + XY = 16,500……..equation (1)

and 32,000 + 140X + 320Y + 1.40XY = 55,250

or, 140X + 320Y + 1.40XY = 23,250……equation (2)

equation (1) × 1.40	=> 140X	+	315Y	+	1.40XY	=	23,100
Less: equation (2)	=> 140X	+	320Y	+	1.40XY	=	23,250
			-5Y			=	-150

or, Y = 30

Now, putting the value of Y = 30 in equation (1)

We have, 100X + 225 × 30 + 30X = 16,500 or, 130X = 16,500 - 6,750

or, X = 75

Hence, Percentage of Works Overhead on Wages = 75% and Percentage of Office Overhead on Works Cost = 30%

Working Notes:

1. Calculation of Total Cost for Order I Total Cost + Profit = Sales

or, Total Cost + 15% Total Cost = 44,850

or, Total Cost = 44,850 × 100/115 = ₹ 39,000

2. Calculation of Total Cost for Order II
Total Cost + 12% Total Cost = 61,880

or, Total Cost = 61,880 × 100/112 = ₹ 55,250

SOLUTION-15:

Computation of Machine Hour Rate

Particulars	Workings	Cost per annum per machine (₹)	Total (₹)
Standing Charges			
Rent and Rates	₹ 9,000 / 5 machines	1,800	
Lighting	4 workers × ₹ 400 / 16 workers	100	
Supervision	2 / ₹ 1,250 × 5	500	
Other Charges	₹ 5,000 / 5 machines	1,000	
Total Standing Charges			**3,400**
Machine Expenses			
Depreciation	₹ 20,000 × 7.5%	1,500	
Repair and Maintenance	₹ 5,200 / 13 years	400	
Sundries		600	
Power		3,000	
Total Machine Expenses			**5,500**
Total Cost p.a.			**8,900**
Machine Hours			2,000
Machine Hour Rate	₹ 8,900 / 2,000 hours		**₹ 4.45 per hour**

SOLUTION-16:

Computation of Machine Hour Rate

Particulars	Workings	Amount (₹) [Cost per hour]
Standing Charges Standing Charges	₹ 3,000 / 100 hours × 30 machines	1.00
Machine Expenses		
Depreciation	₹ 24,000 – ₹ 4,000 / 40,000 hours	0.50
Repairs and Maintenance	₹ 2,000 / 40,000 hours	0.05
Power	4 units × ₹ 0.10	0.40
∴ Machine Hour Rate		**1.95**

SOLUTION-17:

Annual working hours = 50 weeks × 44 hours	=	2,200
Less: Maintenance time		200
Production hours		2,000
Less: Setting up time (5% × 2,000)		100
Effective hours		1,900

Computation of Machine Hour Rate

Particulars	Workings	Amount (₹)	Amount (₹) Rate per hour
Standing Charges			
Chemical Solution	50 weeks × ₹ 20	1,000	
Attendants Wage	₹ 140 × 50 weeks × $\left(\frac{1}{7 \text{ machines}}\right)$		
Departmental Overheads		2,000	
Total Standing Charges		4,000	
Machine Rate per hour for Standing Charges			₹ 4,000 / 2,200 hours **= 1.82**
Machine Expenses			
Depreciation	₹ 10,000 – ₹ 1,000 / 10 years	900	₹ 900 / 1,900 hours = 0.47
Maintenance		1,200	₹ 1,200 / 1,900 hours = 0.63
Power	16 units × ₹ 0.10		1.6
Machine Hour Rate			**4.52**

SOLUTION-18:

Computation of machine hour rate when machine is in operation

Particulars	Workings	Amount (₹)	Amount (₹)
Standing Charges			
Rent	50,000 × 3,000 sq. ft / 80,000 sq. ft	1,875	
Heating and Lighting	40,000 × 3,000 sq. ft / 80,000 sq. ft	1,500	
Supervision	1,50,000 × 1 / 25 machines	6,000	
Reserve Equipment		5,000	
Total Standing Charges		14,375	

Standing Cost per hour	₹ 14,375 / 4,000 hours (3600+400)		**3.59**
Machine Expenses: Depreciation	₹ 50,000 / 10 years × 3,600 hours	1.39	
Wages	₹ 24 / 8 hours × 1 / 2 machines	1.5	
Power		0.5	
Machine Cost per hour			**3.39**
Machine Hour Rate when in Operation			**6.98**

Computation of machine hour rate when machine is under setup

Particulars		Amount (₹)	Amount (₹)
Standing Charges Rent	50,000 × 3,000 sq. ft / 80,000 sq. ft	1,875	
Heating and Lighting	40,000 × 3,000 sq. ft / 80,000 sq. ft	1,500	
Supervision	1,50,000 × 1 / 25 machines	6,000	
Reserve Equipment		5,000	
Total Standing Charges		14,375	
Standing Cost per hour	₹ 14,375 / 4,000 hours		**3.59**
Machine Expenses: Depreciation	₹ 50,000 / 10 years × 3,600 hours	1.39	
Wages	₹ 24 / 8 hours	3	
Machine Cost per hour			**4.39**
Machine Hour Rate when under setup			**7.98**

Computation of cost of the jobs

Particulars	Job 1102		Job 1308	
Setup Cost	80 hours × ₹ 7.98	(₹) 638.40	40 hours × ₹ 7.98	(₹) 319.20
Operation Cost	130 hours × ₹ 6.98	907.40	160 hours × ₹ 6.98	1,116.80
Total Cost of the Job		**1,545.80**		**1,436.00**

SOLUTION-19:

a. Variable Cost per hour = $\frac{\text{Difference in Total Overhead}}{\text{Difference in Activity Level}}$

$= \frac{₹\ 18,000 \times ₹\ 10,000}{7,000\ \text{hrs} \times 3,000\ \text{hours}}$

$= \frac{₹\ 8,000}{4,000\ \text{hours}}$

= ₹ 2 per hour

∴ Fixed Overhead = Total Overhead – Variable Overhead

= ₹ 10,000 – 3,000 hrs × ₹ 2 per hour

= ₹ 10,000 – ₹ 6,000

= ₹ 4,000

Alternatively,

Let Variable Overhead rate be ₹ x

and Fixed Overhead be ₹ y

So, 3,000x + y = 10,000……equation (i)

and, 7,000x + y = 18,000……..equation (ii)

Equation (ii) – Equation (i)

=> (7,000 x + y) – (3,000 x + y) = 18,000 – 10,000

=> 4,000 x = 8,000

or, $x = \frac{8,000}{4,000} = 2$

putting x = 2 in equation (i)

=> y = 10,000 – 6,000 = 4,000

∴ Variable Overhead per hour = ₹ 2 per hour

Fixed Overhead = ₹ 4,000

b. Overhead Rate Per Hour = ₹ 2.5 (Given)

or, $\frac{\text{Standard Activity Level} \times \text{Variable Overhead rate per hour} + \text{Fixed Overhead}}{\text{Standard Activity Level}} = 2.5$

or, Standard Activity Level × 2 + 4,000 = 2.5 × Standard Activity level

or, Standard Activity Level = $\frac{4,000}{2.5 - 2} = 8,000$

Standard Activity Level = 8,000 hours

SOLUTION-20:

Fixed and Flexible Budget showing overhead cost per hour

Particulars	At 70% Capacity 5,000 × 70% = 3,500 hours		At 100% Capacity 5,000 hours		At 110% Capacity 5,000 × 110% = 5,500 hours	
	Workings	(₹)	Workings	(₹)	Workings	(₹)
Indirect Wages	0.40 × 3,500 hrs	1,400	0.40 × 5,000 hrs	2,000	0.40 × 5,500 hrs	2,200
Repairs	100 + 35 × (3,500 – 2,000)/500	205	100 + 35 × (4,000 – 2,000)/500 + 60	300	100 + 35 × (4,000 – 2,000)/500 + 60 + 70	370
Rent and Rate		350		350		350
Power	0.25 × 3,500	875	0.25 × 3,600 + 0.20 × 1,400	1,180	0.25 × 3,600 + 0.20 × 1,900	1,280
Consumable Supplies	0.24 × 3,500	840	0.24 × 5,000	1,200	0.24 × 5,500	1,320
Supervision (Slab rounded off to next digit)	400 + 100 × (3,500 – 2,500)/600	600	400 + 100 × (4,900 – 2,500)/600 + 150	950	400 + 100 × (4,900 – 2,500)/600 + 150	950
Depreciation		650		650		820
Cleaning		60		80		80
Heating and Lighting		120		150		175
Total Overhead		5,100		6,860		7,545
Overhead Rate per hour	**₹ 5,100 / 3,500 hours**	**1.457**	**₹ 6,860 / 5,000 hours**	**1.372**	**₹ 7,545 / 5,500 hours**	**1.372**

If under-absorbed overhead is 10% or more of actual overhead incurred then supplementary overhead rate is applied otherwise the balance amount can be charged to Profit and Loss Account or can be carried forward to next year

CHAPTER 05: COST BOOK KEEPING

SOLUTION-1:

Journal

Particulars		Dr. Amount (₹)	Cr. Amount (₹)
Material Control A/c	Dr	40,000	
To Cash A/c			40,000
Work in Progress Control A/c	Dr	30,000	
To Material Control A/c			30,000
Wages Control A/c	Dr	24,000	
To Cash A/c			24,000

Particulars		Dr. Amount (₹)	Cr. Amount (₹)
Factory Overhead Control A/c (24,000 x 30%)	Dr	7,200	
To Wages Control A/c			7,200
Work in Progress Control A/c (24,000 × 70%)	Dr	16,800	
To Wages Control A/c			16,800
Factory Overhead Control A/c	Dr	19,000	
To Cash			19,000
Work in Progress Control A/c	Dr	18,000	
To Factory Overhead Control A/c			18,000
Selling and Distribution Overhead Control A/c	Dr	4,000	
To Cash A/c			4,000
Cost of Sales A/c	Dr	4,000	
To Selling and Distribution Overhead A/c			4,000
Finished Goods Control A/c	Dr	40,000	
To Work in Progress Control A/c			40,000
Debtors A/c	Dr	58,000	
To Profit and Loss A/c			58,000
Cash A/c	Dr	13,800	
To Debtors A/c			13,800
Creditors A/c	Dr	12,000	
To Cash A/c			12,000

SOLUTION-2:

Journal

Particulars		Dr. Amount (₹)	Cr. Amount (₹)
Work in Progress Control A/c	Dr	5,50,000	
Factory Overhead Control A/c	Dr	1,50,000	
To Material Control A/c			7,00,000
Work in Progress Control A/c	Dr	2,00,000	
Factory Overhead Control A/c	Dr	40,000	
To Wages Control A/c			2,40,000
Work in Progress Control A/c	Dr	1,50,000	
To Factory Overhead Control A/c			1,50,000
Finished Goods Control A/c	Dr	50,000	
To Administrative Overhead Control A/c			50,000
Cost of Sales A/c	Dr	30,000	
To Selling and Distribution Overhead Control A/c			30,000
Factory Overhead Control A/c	Dr	20,000	
To Costing Profit and Loss A/c			20,000
Costing Profit and Loss A/c	Dr	10,000	
To Administrative Overhead Control A/c			10,000

SOLUTION-3:

Dr. Work in Progress Control Account Cr.

Particulars	(₹)	Particulars		(₹)
To Balance b/d	7,056	By Finished Goods Control A/c		1,08,000
To Material Control A/c	45,370	By Balance c/d		
To General Ledger Adjustment A/c	1,135	– Factory OH	3,080	
To Wages Control A/c	55,080	– Others	17,471	20,551
To Factory Overhead Control A/c	16,830			
To Factory Overhead Control A/c	3,080			
	1,28,551			1,28,551

Dr. Factory Overhead Control Account Cr.

Particulars	(₹)	Particulars	(₹)
To Balance b/d	360	By Work in Progress Control A/c	16,830
To Wages Control A/c	2,520	By Work in Progress Control A/c	3,080
To General Ledger Adjustment A/c	15,600	By Balance c/d	570
To Material Control A/c	2,000		
	20,480		20,480

Dr. **Finished Goods Control Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Balance b/d	5,274	By Cost of Sales A/cBy	1,03,580
To Work in Progress A/c	1,08,000	Balance c/d	14,274
To Administrative OH Control A/c	4,580		
	1,17,854		1,17,854

Dr. **Material Control Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Balance b/d	9,450	By Work in Progress Control A/c	45,370
To General Ledger Adjustment A/c	52,400	By Capital Work in Progress A/c	1,500
		By Factory Overhead Control A/c	2,000
		By Costing Profit and Loss A/c	150
		By Balance c/d	12,830
	61,850		61,850

Dr. **Administration Overhead Control Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Balance b/d	180	By Finished Goods Control A/c	4,580
To General Ledger Adjustment A/c	5,400	By Balance c/d	1,000
	5,580		5,580

Dr. **General Ledger Adjustment Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Costing Profit and Loss A/c	1,18,800	By Balance b/d	22,320
To Balance c/d	51,225	By Material Control A/c	52,400
		By Work in Progress Control A/c	1,135
		By Wages Control A/c	57,600
		By Administration OH Control A/c	5,400
		By S&D OH Control A/c	6,000
		By Factory Overhead Control A/c	15,600
		By Costing Profit and Loss A/c	9,570
	1,70,025		1,70,025

Dr. **Wages Control Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To General Ledger Adjustment A/c	57,600	By Work in Progress Control A/c	55,080
		By Factory Overhead Control A/c	2,520
	57,600		57,600

Dr. **Costing Profit and Loss A/c** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Material Control A/cTo Cost of Sales A/c To General Ledger Adjustment A/c	150 1,09,080 9,570	By General Ledger Adjustment A/c	1,18,800
	1,18,800		1,18,800

Dr. **Selling and Distribution Overhead Control A/c** **Cr.**

Particulars	(₹)	Particulars	(₹)
To General Ledger Adjustment A/c	6,000	By Cost of Sales A/c	5,500
		By Balance c/d	500
	6,000		6,000

Dr. **Capital Work in Progress Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Material Control A/c	1,500	By Balance c/d	1,500
	1,500		1,500

Dr. **Cost of Sales Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To S & D OH Control A/c	5,500	By Costing Profit and Loss A/c	1,09,080
To Finished Goods Control A/c	1,03,580		
	1,09,080		1,09,080

Trial Balance

Particulars	Dr. (₹)	Cr. (₹)
Work in Progress Control A/c	20,551	
Factory Overhead Control A/c	570	
Finished Goods Control A/c	14,274	
Material Control A/c	12,830	
Administrative Overhead Control A/c	1,000	
General Ledger Adjustment A/c		51,225
Capital Work in Progress A/c	1,500	
Selling and Distribution Overhead Control A/c	500	
	51,225	**51,225**

SOLUTION-4:

(a) Cost Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To, Stores Ledger Control A/c	3,000	By, Balance b/d	98,000
To, Costing Profit and Loss A/c	3,00,000	By, Stores Ledger Control A/c	95,000
To, Balance c/d	95,000	By, Wages Control A/c	40,000
		By, Wages Control A/c	25,000
		By, Factory Overhead Control A/c	50,000
		By, Selling and Administrative Exp A/c	40,000
		By, Costing Profit and Loss A/c	50,000
	3,98,000		**3,98,000**

(b) Stores Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	35,000	By Cost Ledger Control A/c	3,000
To Cost Ledger Control A/c	95,000	By Work in Progress Control A/cBy Balance c/d	98,000
To Work in Progress Control A/c	3,000		32,000
	1,33,000		**1,33,000**

(c) Wages Control Account

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	40,000	By Work in Progress Control A/c	40,000
To Cost Ledger Control A/c	25,000	By Factory Overhead Control A/c	25,000
	65,000		**65,000**

(d) Factory Overhead Control Account

Particulars	(₹)	Particulars	(₹)
To Wages Control A/c	25,000	By Work in Progress Control	60,000
To Cost Ledger Control A/c	50,000	A/c(150% × 40,000)	
		By Balance c/d	15,000
	75,000		**75,000**

(e) **Work in Progress Control Account**

Particulars	(₹)	Particulars	(₹)
To Balance b/d	38,000	By Store Ledger Control A/c	3,000
To Store Ledger Control A/c	98,000	By Finished Goods Stock Control A/c	2,13,000
To Wages Control A/c	40,000	By Balance c/d	20,000
To Factory Overhead Control A/c	60,000		
	2,36,000		**2,36,000**

Selling and Administrative Expenses Account

Particulars	(₹)	Particulars	(₹)
To, Cost Ledger Control A/c	40,000	By, Costing Profit and Loss A/c	40,000
	40,000		**40,000**

Finished Goods Stock Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	25,000	By Cost of Goods Sold A/c	2,10,000
To Work in Progress Control A/c	2,13,000	By Balance c/d	28,000
	2,38,000		**2,38,000**

(f) **Cost of Goods Sold Account**

Particulars	(₹)	Particulars	(₹)
To Finished Goods Stock Control A/c	2,10,000	By Costing Profit and Loss A/c	2,10,000
	2,10,000		**2,10,000**

(g) **Costing Profit and Loss Account**

Particulars	(₹)	Particulars	(₹)
To Selling & Administrative Exp A/c	40,000	By Cost Ledger Control A/c	3,00,000
To Cost of Goods Sold A/c	2,10,000		
To Cost Ledger Control A/c	50,000		
	3,00,000		**3,00,000**

(h) **Trial Balance as at 30-04-2022**

Particulars	Dr. (₹)	Cr. (₹)
Stores Ledger Control A/c	32,000	
Work in Progress Control A/c	20,000	
Finished Goods Control A/c	28,000	
Factory Overhead Control A/c	15,000	
Cost Ledger Control A/c		95,000
	95,000	**95,000**

SOLUTION-5:

Dr. **Share Capital Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Balance c/d	3,00,000	By Balance b/d	3,00,000
	3,00,000		3,00,000

Dr. **Reserve Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Balance c/d	5,15,000	By Balance b/d	2,00,000
		By Profit and Loss A/c	3,15,000
	5,15,000		5,15,000

Dr. **Sundry Creditors Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Cash and Bank A/c	11,00,000	By Balance b/d	5,00,000
To Balance c/d	4,00,000	By Material Control A/c	10,00,000
	15,00,000		15,00,000

Dr. **Plant and Machinery Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Balance b/d	5,75,000	By Balance c/d	5,75,000
	5,75,000		5,75,000

Dr. **Sundry Debtors Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Balance b/d	2,00,000	By Cash and Bank A/c	21,00,000

To Profit and Loss A/c	22,00,000	By Balance c/d	3,00,000
	24,00,000		24,00,000

Dr. **Material Control Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Balance b/d	1,50,000	By Work in Progress Control A/c	10,50,000
To Sundry Creditors A/c	10,00,000	By Manufacturing OH Control A/c (Bal. fig.)	5,000
		By Balance c/d	95,000
	11,50,000		11,50,000

Dr. **Cash and Bank Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Balance b/d	75,000	By Wages Control A/c	6,50,000
To Sundry Debtors A/c	21,00,000	By Manufacturing OH Control A/c	3,00,000
		By S & D Overhead Control A/c	1,00,000
		By Sundry Creditors A/c	11,00,000
		By Balance c/d	25,000
	21,75,000		21,75,000

Dr. **Work in Progress Control Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Material Control A/c	10,50,000	By Finished Goods Control A/C	18,00,000
To Wages Control A/c	6,00,000	By Balance c/d	1,25,000
To Manufacturing OH Control A/c	2,75,000		
	19,25,000		19,25,000

Dr. **Wages Control Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Cash and Bank A/c	6,50,000	By Work in Progress Control A/c By Manufacturing OH Control A/c (Bal. fig.)	6,00,000 50,000
	6,50,000		6,50,000

Dr. **Manufacturing Overhead Control Account** **Cr.**

Particulars	₹	Particulars	₹
To Cash and Bank A/c	3,00,000	By Work in Progress Control A/c	2,75,000
To Material Control A/c	5,000	By Profit and Loss A/c (Bal. fig.)	80,000
To Wages Control A/c	50,000	(Under recovery)	
	3,55,000		3,55,000

Dr. **Selling and Distribution Overhead Control Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Cash and Bank A/c	1,00,000	By Cost of Sales A/c (Bal. fig. transferred)	1,00,000
	1,00,000		1,00,000

Dr. **Finished Goods Control Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Work in Progress Control A/c	18,00,000	By Cost of Sales A/c (Bal. fig. transferred)	17,05,000
		By Balance c/d	95,000
	18,00,000		18,00,000

Dr. **Profit and Loss Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Manufacturing OH Control A/c	80,000	By Sundry Debtors A/c	22,00,000
To Cost of Sales A/c	18,05,000		
To Reserve A/c	3,15,000		
	22,00,000		22,00,000

Dr. **Cost of Sales Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To S & D Overhead Control A/c	1,00,000	By Profit and Loss A/c	18,05,000
To Finished Goods Control A/c	17,05,000		
	18,05,000		18,05,000

Trial Balance

Particulars	Dr. (₹)	Cr. (₹)
Share Capital		3,00,000

Reserve		5,15,000
Sundry Creditors		4,00,000
Plant and Machinery	5,75,000	
Sundry Debtors	3,00,000	
Closing Stock		
– Material	95,000	
– WIP	1,25,000	
– Finished Goods	95,000	
Cash and Bank	25,000	
	12,15,000	**12,15,000**

SOLUTION-6:

Statement showing Reconciliation of Profit shown by Cost and Financial Accounts as on 31-

Particulars	Amount (₹)	Amount (₹)
Profit as per Financial Accounts		64,500
Add: Income tax provided in financial accounts only	20,000	
Works overhead under recovered	1,550	
Loss due to obsolescence charged in financial accounts only	2,800	
Loss due to depreciation in stock value (recorded in financial accounts only)	3,350	27,700
		92,200
Less: Bank interest credited in financial accounts only	250	
Over recovery of depreciation in cost accounts (6,000 – 5,600)	400	
Administrative Overhead over recovered	850	
Interest on investments not included in cost accounts	4,000	
Stores adjustments (credit in financial accounts)	240	5,740
Profit as per Cost Accounts		86,460

SOLUTION-7:

Statement showing Reconciliation of Profit shown by Cost and Financial Accounts

	Amount (₹)	Amount (₹)
Profit as per Financial Accounts		18,550
Add: Director's fee charged in financial accounts only	650	
Provision for Bad Debt charged in financial accounts only	570	
Income tax shown in financial accounts only	8,300	

Depreciation shown in financial accounts only 16,000 × 5%	800	10,320
Less: Bank interest credited in financial accounts only	30	28,870
Over recovery of overheads in cost accounts (8,500 – 8,320)	180	210
Profit as per Cost Accounts		28,660

SOLUTION-8:

Statement showing Reconciliation of Profit shown by Cost and Financial Accounts as on 31-03-2021

Particulars	Amount (₹)	Amount (₹)
Profit / (Loss) as per Financial Accounts		(2,08,000)
Add: Under recovery of factory overhead	3,000	63,000
Income tax	60,000	
Less: Over recovery of administration overhead	2,000	(1,45,000)
Excess depreciation charged in cost accounts (65,000 – 60,000)	5,000	

Particulars	Amount (₹)	Amount (₹)
Interest on investments included in financial accounts	10,000	19,000
Transfer fee charged in financial accounts only	1,000	
Stores adjustment (credit in financial accounts)	1,000	
Profit / (Loss) as per Cost Accounts		(1,64,000)

SOLUTION-9:

Statement showing Reconciliation of Profit shown by Cost and Financial Accounts

Particulars	Amount (₹)	Amount (₹)
Profit as per Financial Accounts		1,68,000
Add: Over Valuation of Closing Stock as per Cost Accounts (7,80,000 – 7,50,000)	30,000	

Particulars	Amount (₹)	Amount (₹)
Under recovery of factory overhead (2,10,000 – 1,89,800)	20,200	1,01,950
Under recovery of Selling Expenses in Cost Accounts (2,25,000 – 5% × 34,65,000) = (2,25,000 – 1,73,250)	51,750	

	52,750	2,69,950
Less: Sundry Income not considered in Cost Accounts	5,000	
Over recovery of wages in cost accounts (2,46,000 – 2,30,000) Over recovery of administration expenses in cost accounts	16,000	
(3% × 34,65,000 – 95,000) = (1,03,950 – 95,000)	8,950	**29950**
Profit as per Cost Accounts		2,40,000

SOLUTION-10:

Cost Sheet (Computation of Profit as per Cost Accounts)

Particulars **Production = 540 transistor set**	**Cost Per unit (₹)**	**Total Cost (₹)**
Material	240	1,29,600
Wages	80	43,200
Prime Cost	320	1,72,800
Add: Works Overhead (75% × Wages)	60	32,400
Works Cost	380	2,05,200
Add: Office Overhead (30% × Works Cost)	114	61,560
Cost of Production / Total Cost	494	2,66,760
Add: Profit (Bal. fig.)	106	57,240
Sales	600	3,24,000

Dr. Trading and Profit & Loss Account (Computation of Profit as per Financial Accounts) Cr.

Particulars	**(₹)**	**Particulars**	**(₹)**
To Material A/c	1,29,600	By Sales A/c	3,24,000
To Wages A/c	43,200		
To Works Overhead A/c	32,160		
To Gross Profit c/d	1,19,040		
	3,24,000		3,24,000
To Office Expenses A/c	61,800	By Gross Profit b/d	1,19,040
To Net Profit c/d	57,240		
	1,19,040		1,19,040

Statement showing Reconciliation of Profit shown by Cost and Financial Accounts

	Amount (₹)	**Amount (₹)**
Profit as per Financial Accounts		57,240

Add: Under recovery of Office Expenses (61,800 – 61,560)	240	240
Less: Over recovery of Works Overhead (32,400 – 32,160)	240	57,480 240
Profit as per Cost Accounts		57,240

SOLUTION-11:

Cost Sheet (Computation of Profit as per Cost Accounts)

Particulars	(₹)	(₹)
Material		3,00,000
Wages		2,00,000
Prime Cost		5,00,000
Add: Works Overhead		
Fixed	75,000	
Variable (₹ 1,20,000 - ₹ 60,000)	60,000	1,35,000
Works Cost		6,35,000
Add: Office Expenses		50,000
Cost of Production		6,85,000
Add: Selling and Distribution Overhead		
Fixed	62,500	
Variable (₹ 80,000 - ₹ 50,000)	30,000	92,500
Cost of Sales		7,77,500
Less: Loss		27,500
Sales		7,50,000

Statement showing Reconciliation of Profit shown by Cost and Financial Accounts

	Amount (₹)	Amount (₹)
Profit as per Financial Accounts		10,000
Less: Over recovery of Works Overhead (1,35,000 – 1,20,000)	15,000	37,500
Over recovery of Office Expenses (50,000 – 40,000)	10,000	
Over recovery of Selling and Distribution Overhead (92,500 – 80,000)	12,500	
Profit / (Loss) as per Cost Accounts		-27,500

SOLUTION-12:

Cost Sheet (Computation of Profit as per Cost Accounts)

Particulars	(₹)
Materials	7,08,000
Direct Wages	3,71,000
Prime Cost	**10,79,000**
Works Overhead	2,15,800

Less: Closing WIP	30,000
Works Cost	**12,64,800**
Administration Overhead A/c	93,000
Cost of Production	**13,57,800**
Less: Closing Stock of Finished Goods	43,800
Cost of Goods Sold	**13,14,000**
Selling & Distribution OH	1,20,000
Cost of Sales	**14,34,000**
Profit (Bal. Fig)	66,000
Sales	**15,00,000**

Statement showing Reconciliation of Profit shown by Cost and Financial Accounts

	Amount (₹)	Amount (₹)
Profit as per Financial Accounts		69,000
Add: Under recovery of Office Expenses (95,500 – 93,000)	2,500	
Over Valuation of Closing Stock of Finished Goods in Cost Accounts (43,800 – 40,000)	3,800	6,300
		75,300
Less: Over recovery of Works Overhead (2,15,800 – 2,13,000)	2,800	
Over recovery of Selling & Distribution Overhead (1,20,000 – 1,13,500)	6,500	9,300
Profit as per Cost Accounts		66,000

SOLUTION-13:

Memorandum Reconciliation Account

Particulars	(₹)	Particulars	(₹)
To Over Valuation of Opening Stock in Cost A/c (90,800 – 77,500)	13,300 26800	By Profit as per Financial A/c By Over Valuation of Closing Stock in Cost A/c (69,500 – 65,700)	1,26,400 3,800
To Miscellaneous Revenue not considered in Cost A/c		By Bad Debts not considered in Cost A/c	15,600
To Profit as per Cost Accounts	126200	By Administration Expenses not considered in Cost A/c	20,500
	1,66,300		1,66,300

Valuation of Closing Stock as per Financial Accounts (30,000 + 15,000 + 20,700) = ₹ 65,700 Valuation of Opening Stock as per Financial Accounts (25,000 + 40,000 + 12,500) = ₹ 77,500

SOLUTION-14:

Dr. Financial Profit and Loss Account Cr.

Particulars	Amount (₹)	Particulars	Amount (₹)
To Material A/c	50,00,000	By Sales A/c	1,20,00,000
To Direct Wages A/c	30,00,000	By Dividend A/c By Interest A/c	1,00,000
To Factory Overhead A/c	16,00,000	By Closing Stock A/c	20,000
To Administration Overhead A/c	7,00,000	– Finished Goods	
To Selling & Distribution Overhead A/c	9,60,000	– WIP	3,20,000
To Bad Debts A/c	80,000		2,40,000
To Preliminary Expenses Written Off A/c	40,000		
To Legal Charges A/c	10,000		
To Net Profit	12,90,000		
	1,26,80,000		**1,26,80,000**

Cost Sheet (Computation of Profit as per Cost Accounts)

Particulars	Amount (₹)
Material Direct Wages	56,00,000
	30,00,000
Prime Cost	**86,00,000**
Factory Overhead	17,20,000
Less: Closing WIP	2,40,000
Factory Cost Administration Overhead (1,24,000 × 6)	**1,00,80,000** 7,44,000
Cost of Production	**1,08,24,000**
Less: Closing Stock of Finished Goods	3,49,161
Cost of Goods Sold	**1,04,74,839**
Selling & Distribution Overhead (1,20,000 × 8)	9,60,000
Cost of Sales	**1,14,34,839**
Profit	5,65,161
Sales	**1,20,00,000**

Statement showing Reconciliation of Profit shown by Cost and Financial Accounts

	Amount (₹)	Amount (₹)
Profit as per Financial Accounts		12,90,000
Add: Over Valuation of Closing Stock as per Cost Accounts (3,49,161 – 3,20,000)	29,161	
Financial Expenses not considered in Cost Account		
i) Bad Debt		

ii) Preliminary Expenses Written off	80,000	
iii) Legal Charged	40,000	
	10,000	1,59,161
		14,49,161
Less: Over recovery of Material Cost (56,00,000 – 50,00,000) Over recovery of Factory Overhead (17,20,000 – 16,00,000)	6,00,000	
Over recovery of Administration Overhead (7,44,000 – 7,00,000)	1,20,000	
Financial Income not considered in Cost Account	44,000	
i) Dividend		
ii) Interest	1,00,000	
	20,000	8,84,000
Profit as per Cost Accounts		5,65,161

SOLUTION-15:

Dr. **Factory Overhead Control Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To General Ledger Adjustment A/c	14,055.00	By Finished Goods Control A/c	
		(1,550 × 8.25)	12,787.50
		By WIP Control A/c	1,170.00
		By Under Recovery	97.5
	14,055.00		14,055.00

Dr. **Administration Overhead Control Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To General Ledger Adjustment A/c	13.650.00	By Finished Goods Control A/c	14,046.88
To Over recovery	396.875	(1,550 × 9.0625)	
	14,046.88		14,046.88

Memorandum Reconciliation Account

Particulars	(₹)	Particulars	(₹)
To Over Recovery of Administrative Overhead	396.875	By Profit as per Financial A/c	6,877.50
		By Under Recovery of Factory Over- head	97.5
To Profit as per Cost Accounts	7031.25	By Over Valuation of Closing Stock in Cost Accounts (2,265.625 – 1,812.50) (WN 1) Alternative (50 × 9.0625)	453.125
	7,428.13		7,428.13

Workings:

1.

Cost Sheet

Particulars	(₹)	(₹)
Materials		29,150.00
Wages		18,610.00
Prime Cost		47,760.00
Add: Factory Expenses	1,550 × 8.25	12,787.50
		60,547.50
Less: Closing WIP		
Material	2,800.00	
Wages	1,560.00	4,360.00
Works Cost		56,187.50
Add: Administration Overhead	1,550 × 9.0625	14,046.88
Cost of Production		70,234.38
Less: Closing Stock of Finished Goods		2,265.63
Cost of Goods Sold		67,968.75

CHAPTER 06: JOB COSTING

SOLUTION-1:

Computation of Selling Price per unit

Particulars	Workings	Amount (₹)
Material Used (₹ 8,000 - ₹ 400)		7,600
Direct Wages		500
Prime Cost		8,100
Works Overhead		
- Machine P	200 hours × ₹ 1.25 = ₹ 250	
- Machine Q	160 hours × ₹ 2.50 = ₹ 400	
- Machine R	240 hours × ₹ 3 = ₹ 720	
- Machine S	132 hours × ₹ 2.25 = ₹ 297	1,667
Works Cost		9,767
Office Overhead	60% × 9,767	5,860
Cost of Sale		15,627
Less: Sale proceeds of Scrap	5% × (10% × 15,627)	78
Total Cost of Work Order		15,549
Add: Profit	20% × 15,549	3,110
Selling Price		18,659
Selling Price per unit	₹ 18,659 / 100 units	186.59

Note: It was known before that 10% of production will have to be scrapped, therefore, inputs must have been made taking this factor into consideration. No other adjustment is necessary except deducting the value of scrap from the cost of production.

SOLUTION-2:

(a) Statement of Cost and Profit for the year 2021-2022

Particulars	Amount (₹)
Direct Materials	9,00,000
Direct Wages	7,50,000
Prime Cost	16,50,000
Add: Factory Overhead	4,50,000
Works Cost	21,00,000
Add: Administration Overhead	4,20,000
Cost of Production / Cost of Goods Sold	25,20,000
Add: Selling & Distribution Overhead	5,25,000

Cost of Sales	30,45,000
Add: Profit	6,09,000
Sales	36,54,000

(b) Estimated Cost Sheet for the Work Order

Particulars		Amount (₹)
Direct Materials		12,00,000
Direct Wages		7,50,000
Prime Cost		19,50,000
Add: Factory Overhead	60% × 7,50,000	4,50,000
Works Cost		24,00,000
Add: Administration Overhead	20% × 24,00,000	4,80,000
Cost of Production / Cost of Goods Sold		28,80,000
Add: Selling & Distribution Overhead	40% × 24,00,000	9,60,000
Cost of Sales		38,40,000
Add: *Profit		7,68,000
Sales		46,08,000

Cost + Profit = Sales

or, 38,40,000 + $16\frac{2}{3}\%$ × Sales = Sales

or, $83\frac{1}{3}\%$ Sales = ₹ 38,40,000

or, Sales = $\frac{38,40,000}{83\frac{1}{3}\%}$ = ₹ 46,08,000

or, *Profit = ₹ 46,08,000 - ₹ 38,40,000 = ₹ 7,68,000

Workings:

(i) Percentage of Profit on Sales = $\frac{₹\ 6,09,000}{₹\ 36,54,000} \times 100 = 16\frac{2}{3}\%$

(ii) Percentage of Factory Overhead on Direct Wages = $\frac{₹\ 4,50,000}{₹\ 7,50,000} \times 100 = 60\%$

(iii) Percentage of Administration Overhead on Works Cost = $\frac{₹\ 4,20,000}{₹21,00,000} \times 100 = 20\%$

(iv) Percentage of Selling and Distribution Overhead to Works Cost

$= \frac{₹\ 5,25,000}{₹\ 21,00,000} \times 100 = 25\%$

- Revised Percentage of Selling and Distribution Overhead on Works Cost = 25% + 15% = 40%

SOLUTION-3:

(a) In order to draw up Job Cost Sheet, the factory overhead rates of different departments and percentage of selling cost will have to be determined first on the basis of previous year's figures as follows:

Factory Overhead Recovery Rates based on Labour Hours

Direct Wages ₹ 5.50

Labour Hours = $\frac{₹\ 5.50}{₹0.25 \text{ per hour}}$ 22 hours

	Department A		Department B		Department C	
Direct Wages		₹ 5,000		₹ 6,000		₹ 4,000
Labour Hours	₹ 5,000 / ₹0.25 per hour	20,000	₹ 6,000 / ₹0.25 per hour	24,000	₹ 4,000 / ₹0.25 per hour	16,000
Factory Overheads		₹ 2,500		₹ 4,000		₹ 1,000
Factory Overhead Rate per Labour Hour	₹2,500 / 20,000	₹ 0.13	₹4,000 / 24,000	₹ 0.17	₹1,000 / 16,000	₹ 0.06

Cost Sheet of Previous Year

Particulars	Amount (₹)
Materials Used	77,500
Direct Wages (A = ₹ 5,000, B = ₹ 6,000, C = ₹ 4,000)	15,000
Prime Cost	92,500
Factory Overhead (A = ₹ 2,500, B = ₹ 4,000, C = ₹ 1,000)	7,500
Works Cost	1,00,000
Selling Cost	30,000
Cost of Sales	1,30,000

Percentage of Selling Cost on Works Cost = $\frac{₹30,000}{₹1,00,0000} \times 100 = 30\%$

(b) Job Cost Sheet of the Current Year (Job No. 9669) (Per unit)

Particulars	Workings	Amount (₹)
Materials Direct		12.08
Wages		
- Department A	10 hours × ₹ 0.25 = ₹ 2.50	
- Department B	4 hours × ₹ 0.25 = ₹ 1.00	
- Department C	8 hours × ₹ 0.25 = ₹ 2.00	5.50
Prime Cost		17.58
Factory Overhead		
- Department A	10 hours × ₹ 0.125 = ₹ 1.25	
- Department B	4 hours × ₹ 0.167 = ₹ 0.67	
- Department C	8 hours × ₹ 0.063 = ₹ 0.50	2.42
Factory Cost		20.00
Selling Cost	₹ 20 × 30%	6.00
Cost of Sales		26.00
(c) Profit (10% × ₹ 26.00)		2.60
Selling Price		28.60

SOLUTION-4:

(a) Calculation of Departmental Overhead Recovery Rates

Particulars	Department X	Department Y	Department Z
i. Direct Wages	₹ 10,000	₹ 12,000	₹ 8,000
ii. Rate of wages per hour	₹ 2.50	₹ 2.50	₹ 2.50
iii. Labour Hours	₹10,000 / ₹ 2.50 = 4,000	₹12,000 / ₹ 2.50 = 4,800	₹8,000 / ₹ 2.50 = 3,200
iv. Actual Overhead	₹ 5,000	₹ 9,000	₹ 2,000
iv. Overhead Recovery Rates per Labour Hour (iv/iii)	₹5,000 / 4,000 hours = ₹1.25	₹9,000 / 4,800 hours = ₹1.875	₹2,000 / 3,200 hours = ₹0.625

(b) Revised Job Cost Sheet

Particulars	Workings	Amount (₹)
Materials		70
Direct Wages		
- Department X	8 hours × ₹ 2.5 = ₹ 20.00	
- Department Y	6 hours × ₹ 2.5 = ₹ 15.00	
- Department Z	4 hours × ₹ 2.5 = ₹ 10.00	45

Chargeable Expenses		5
Prime Cost		120
Add: Overhead		
- Department X	8 hours × ₹ 1.25 = ₹ 10.00	
- Department Y	6 hours × ₹ 1.875 = ₹ 11.25	
- Department Z	4 hours × ₹ 0.625 = ₹ 2.50	23.75
Works Cost		143.75
Selling Overhead (10% of Works Cost) [WN]		14.38
Total Cost		158.13
(c) Add: Profit		31.626
Selling Price	20% × 158.13	189.756

Working:

Selling Overheads are charged @ 10% on Works Cost as calculated below:

$\frac{\text{Selling Overhead}}{\text{Works Cost}} = \frac{₹\ 20,000}{₹\ 2,00,000} \times 100 = 10\%$

SOLUTION-5:

The predominant fault is the adoption of a blanket rate for the distribution of the indirect manufacturing costs

for all the three departments, i.e., 100% ($\frac{\text{Indirect Manufacturing Costs}}{\text{Direct Labour Cost}} \times 100$) of total direct labour cost. This has been done despite of the fact that there are glaring differences of the direct labour cost of three departments. For calculating the revised cost of jobs, departmental rates based on indirect manufacturing cost percentage to direct labour costs are calculated:

Particulars	Department A (₹)	Department B (₹)	Department C (₹)
Indirect Manufacturing Cost	20,000	40,000	30,000
Direct Labour	40,000	20,000	30,000
Percentage of Indirect Manufacturing Cost on Direct Labour	$\frac{20,000}{40,000} \times 100 = 50\%$	$\frac{40,000}{20,000} \times 100 = 200\%$	$\frac{30,000}{30,000} \times 100 = 100\%$

On the assumption that direct labour cost method is considered to be a reasonable method of absorption of overheads, it is quite possible that departmental application of overhead may be able to resolve the difficulty faced by the manager regarding the costing of the job given. On this basis the amended job cost sheet will be as under:

Revised Cost Sheet of Job

Particulars	Amount (₹)	Amount (₹)
Direct Materials		1,000
Direct Labour		
- Department A	120	
- Department B	280	
- Department C	200	600
Prime Cost		1,600
Add: Indirect Manufacturing Costs		
- Department A	50% × 120 = 60	
- Department B	200% × 280 = 560	
- Department C	100% × 200 = 200	820
Total Cost		**2,420**

SOLUTION-6:

Calculation of Selling Price of the Job

Job No.	Job No. 115		Job No. 118		Job No. 120	
		Amount (₹)		Amount (₹)		Amount (₹)
Costs in September:						
Material		1,325		810		765
Labour		800		500		475
Overheads		640		400		380
Total Cost of September (A)		2,765		1,710		1,620
Costs in October:						
Material		-		515#		665
Labour	25×3+25×2	125	90×3+30×2	330	75×3+10×2	245
Overhead	125 × 80%	100	330 × 80%	264	245 × 80%	196
Total Cost of October (B)		225		1,109		1,106
Factory Cost (A+B)		2,990.00		2,819.00		2,726.00
Add: Administration Overhead @ 10% of FactoryCost	2,990×10%	299.00	2,819×10%	281.90	2,726×10%	272.60
Cost of Sales		3,289.00		3,100.90		2,998.60
Add: Profit @20% on Cost of Sales		657.80		620.18		599.72
Selling Price		**3,946.80**		**3,721.08**		**3,598.32**

Note:

MR No. 54 was returned and MR No. 55 was directed to Job 124.So, MR No. 56 is taken for material used in Job 118.

Overhead Recovery Rate in September

Job No. 115 = $\frac{640}{800} \times 100 = 80\%$

118 = $\frac{400}{500} \times 100 = 80\%$

120 = $\frac{380}{475} \times 100 = 80\%$

(As a percentage of Labour Cost)

CHAPTER 07: BATCH COSTING

SOLUTION-1:

Particulars	Batch Size					
	10 Components		100 Components		1,000 Components	
	p.u.	Total	p.u.	Total	p.u.	Total
	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)
A. Production Cost						
Material Cost	0.06	0.6	0.06	6	0.06	60
Machine Operators Wages (WN 1)	0.12	1.2	0.12	12	0.12	120
Overheads (WN 2)	0.25	2.5	0.25	25	0.25	250
Total Production Cost	**0.43**	**4.3**	**0.43**	**43**	**0.43**	**430**
B. Setting up Cost						
Machine Operator Wages (WN 3)	0.168	1.68	0.0168	1.68	0.00168	1.68
Overheads (WN 4)	0.35	3.5	0.035	3.5	0.0035	3.5
Total Setting up Cost	**0.518**	**5.18**	**0.0518**	**5.18**	**0.00518**	**5.18**
Total Cost	**0.948**	**9.48**	**0.4818**	**48.18**	**0.43518**	**435.18**

Working Notes:

Particulars	10 Components	100 Components	1,000 Components
Time taken to produce the Components @ 10 minutes per component	(10 × 10) = 100 Minutes or, 100 hours 60	(100 × 10) = 1,000 Minutes or, 1,000 hours 60	(1000 × 10) = 10,000 Minutes or, 10,000 hours 60
1. Machine Operators Wage @ ₹ 0.72 per hour	100 × 0.72 = ₹ 1.20 60	1,000 × 0.72 = ₹ 12 60	10,000 × 0.72 = ₹ 120 60
2. Overheads @ ₹ 1.50 per hour	100 × 1.50 = ₹ 2.50 60	1,000 × 1.50 = ₹ 25 60	10,000 × 1.50 = ₹ 250 60

Setting up Cost:

3. Machine Operators Wages = 2 hours 20 minutes × ₹ 0.72 = $2\frac{1}{3}$ × 0.72 = ₹ 1.68

4. Overhead = 2 hours 20 minutes × ₹ 1.50 = $2\frac{1}{3}$ × 1.50 = ₹ 3.50

SOLUTION-2:

EBQ = $\sqrt{\frac{2AS}{C}}$

where, EBQ = Economic Batch Quantity

A = Annual Demand = 2,400 units

S = Set up cost per batch = ₹ 100

C = Carrying cost per unit per year = 200 × 6% = ₹12

∴ EBQ = $\sqrt{\frac{2x2,400x100}{12}}$ = 200 units

SOLUTION-3:

Economic Production Run = $\sqrt{\frac{2 \text{ x Annual Output x Setup Cost per Production Run}}{\text{Inventory Carrying Cost per unit per annum}}}$

= $\sqrt{\frac{2 \text{ x } 90,000 \text{ x } 1,500}{15\% \text{ x } 200 \text{ (i.e } 120+60+20 \text{)}}}$ = 3,000 columns

SOLUTION-4:

(a) Optimum Production Run Size = $\sqrt{\frac{2AS}{C}}$

where, A = Number of units to be produced within one year = 24,000 bearings

S = Setup cost per production run = ₹ 324

C = Carrying cost per unit per annum = ₹ 0.10 × 12 months = ₹ 1.20

Optimum Production Run Size = $\sqrt{\frac{2 \text{ x } 24,000 \text{ x } 324}{1.20}}$ = 3,600 bearings

(b) Minimum Inventory holding cost at Optimum Production Run Size

= Average Inventory × Carrying Cost per unit per annum

= $\frac{3,600}{2}$ × 1.20 = ₹ 2,1602

(c) Statement showing Total Cost at Production Run size of 3,600 and 6,000 bearings

Particulars	Production Run Size	
	3,600	**6,000**
i. Annual Requirements	24,000	24,000
ii. Number of Runs	$\frac{24,000}{3,600} \approx 7$ (approx)	$\frac{24,000}{6,000} = 4$
iii. Setup Cost per run	₹ 324	₹ 324
iv. Average Inventory	$\frac{3,600}{2} = 1,800$	$\frac{6,000}{2} = 3,000$
v. Carrying Cost per unit per annum	₹ 0.10 × 12months = ₹ 1.20	₹ 0.10 × 12 months = ₹ 1.20
	(₹)	(₹)
Total Set up Cost (ii × iii)	(7 × ₹ 324) = 2,268	(4 × ₹ 324) = 1,296
Total Carrying Cost (iv × v)	1,800 × 1.20 = 2,160	3,000 × 1.20 = 3,600
Total Cost	4,428	4,896

Extra Cost incurred, if run size is 6,000 bearings = ₹ 4,896 - ₹ 4,428 = ₹ 468

CHAPTER 08: MATERIAL COSTS

SOLUTION-1:

Statement showing computation of total cost of material purchased and unit cost of material issued for production.

Particulars	Unit Cost		Total Cost (1,200 kg)	
		₹		₹
Basic price of raw material		20	20 × 1,200	24,000.00
Less: Trade Discount @20%	20 × 20%	4	24,000 × 20%	4,800.00
		16		19,200.00
Add: Drum Charges (No. of Drums 200/25 = 48)	₹ 10 / 25 kg	0.4	48 × 10	480
		16.4		19,680.00
Add: GST	(16 × 12% + 0.40 × 5%)	1.94	(19,200 × 12% + 480 × 5%)	2,328.00
Net Invoice Price		18.34		22,008.00
Add: Insurance	18.34 × 2.5%	0.4585	22,008 × 2.5%	550.2
Add: Freight	₹ 240 / 1,200 kg	0.2		240
		18.9985		22,798.20
Less: Credit for drums returned	₹ 8 / 25 kg	0.32	48 × 8	384
Total Cost of Material Purchased		18.6785		22,414.20
Add: Stores Overhead	18.6785 × 5%	0.9339	22,414.20 × 5%	1,120.71
Material Cost issued to production		**19.6124**		**23,534.91**

SOLUTION-2:

$$EOQ = \sqrt{\frac{2AO}{C}}$$

A = Annual Demand (Units Consumed during the year) = 10,000 kg
O = Ordering Cost per order = ₹ 50
C = Carrying Cost per unit per annum = ₹ 2 × 8% = ₹ 0.16

$$EOQ = \sqrt{\frac{2 \times 10{,}000 \times 50}{0.16}} = 2{,}500 \text{ units}$$

Number of orders to be placed in a year = $\frac{\text{Total Consumption of Materials per annum}}{\text{EOQ}}$

$$= \frac{10{,}000}{2{,}500} = 4 \text{ orders per year}$$

SOLUTION-3:

$$EOQ = \sqrt{\frac{2 \times 18{,}250 \times 50}{36.50 \times 20\%}}$$

A = Annual Consumption = 18,250 units

$$= \sqrt{\frac{18{,}25{,}000}{7.30}} = 500 \text{ units}$$

O = Ordering Cost per order = ₹ 50
C = Carrying Cost per unit per annum = 36.50 × 20% = ₹ 7.30

SOLUTION-4:

$$EOQ = \sqrt{\frac{2AO}{C}}$$

A = Annual requirement = 36,000 units
O = Ordering Cost per order = ₹ 25
C = Carrying cost per unit per annum = 1 × 20% = ₹ 0.20

$$EOQ = \sqrt{\frac{2 \times 36{,}000 \times 25}{0.20}} = 3{,}000 \text{ units}$$

Comparative Cost Statement of Existing Purchase Policy with proposed EOQ Purchase Policy

	Existing Purchase Policy **Ordering Quantity = $\frac{36000}{6}$ = 6,000 units**		**Proposed EOQ Purchase PolicyOrdering Quantity = 3,000 units**	
		₹		₹
Purchase Cost	36,000 × 1	36,000	36,000 × 1	36,000
Ordering Cost	6 × 25	150	12 × 25	300
Carrying Cost		600		300
Total Cost		36,750		36,600

Net Savings = ₹ 36,750 – ₹ 36,600 = ₹ 150

SOLUTION-5:

a. EOQ = $\sqrt{\frac{2AO}{C}}$

A = Annual requirement = 3,200 units
O = Ordering Cost per order = ₹ 150
C = Carrying cost per unit per annum = 6 × 25% = ₹ 1.50

EOQ = $\sqrt{\frac{2 \times 3,200 \times 150}{1.50}}$ = 800 units

b. Number of orders per year = $\frac{3,200}{800}$ = 4

c. Time between two consecutive orders = $\frac{12 \text{ months}}{\text{No.of orders}}$ = $\frac{12 \text{ months}}{4}$ = 4

SOLUTION-6:

a. EOQ = $\sqrt{\frac{2AO}{C}}$

A = Annual requirement = 8,000 units
O = Ordering Cost per order = ₹ 200
C = Carrying cost per unit per annum = 400 × 20% = ₹ 80

EOQ = $\sqrt{\frac{2 \times 8,000 \times 200}{80}}$ = 200 units

b. Evaluation of Profitability of Different Options of Order Quantity

	When EOQ is order			When Quantity Discount is offered		
	$\frac{8,000}{\text{No. of Orders}} = \frac{200}{40}$			$\frac{8,000}{\text{No. of Orders}} = \frac{4,000}{2}$		
			(₹)			(₹)
Purchase Cost	8,000 × 400		32,00,000		8,000 × 400 × 96%	30,72,000
Ordering Cost	40 × 200		8,000		2 × 200	400
Carrying Cost	$\frac{1}{2}$	× 200 × 400 ×20%	8,000	$\frac{1}{2}$	× 4000 × 400 ×96% ×20%	1,53,600
Total Cost			32,16,000			32,26,000

Advise:

The total cost of inventory is lower if EOQ is adopted. Hence, the company is advised not to accept the quantity discount.

SOLUTION-7:

Computation of Total Inventory Cost for different Ordering Quantities

Particulars	Ordering Quantities (tonne)				
	200	**250**	**800**	**2,000**	**4000**
1. Annual Demand (tonne)	4,000	4,000	4,000	4,000	4,000
2. No. of Orders [(1)/ordering quantity]	20	16	5	2	1
3. Price per tonne (₹)	6.00	5.90	5.80	5.70	5.60
4. Average Quantity(tonne) $\frac{\text{Ordering Quantities}}{2}$	100	125	400	1,000	2,000
5. Cost per Order (₹)	6.00	6.00	6.00	6.00	6.00
6. Rate of Interest	20%	20%	20%	20%	20%
Purchase Cost (1) × (3) (₹)	24,000	23,600	23,200	22,800	22,400
Ordering Cost (2) × (5) (₹)	120	96	30	12	6
Carrying Cost (₹) (4) × (3) × (6)	120	147.50	464	1,140	2,240
Total Inventory Cost (₹)	**24,240**	**23,843.50**	**23,694**	**23,952**	**24,646**

From the above computations the best quantity to order is 800 units.

SOLUTION-8:

	Particulars	Component A	Component B
a)	Re-order Level = Maximum Usage × Maximum Re-order period	450 × 6 = 2,700 units	450 × 4 = 1,800 units
b)	Minimum Level = Re-order Level – (Normal Usage × Normal Re-order period)	2,700 – (300 × $\frac{4+6}{2}$) = 1,200 units	1,800 – (300 × $\frac{2+4}{2}$) = 900 units
c)	Maximum Level = Re-order Level + Re-order Quantity – (Minimum Usage × Minimum Re- order period)	= 2,700 + 2,400 – (150 × 4) = 4,500 units	= 1,800 + 3,600 – (150 × 2) = 5,100 units

	Particulars	Component A	Component B
d)	Average Stock Level = $\frac{\text{Minimum Level+Maximum Level}}{2}$	= $\frac{1,200+4,500}{2}$ = 2,850 units	= $\frac{900+5,100}{2}$ = 3,000 units

SOLUTION-9:

	Particulars	Component A	Component B
a)	Re-order Level = Maximum Usage × Maximum Re-order period	75 × 6 = 450 units	75 × 4 = 300 units
b)	Minimum Level = Re-order Level – (Normal Usage × Normal Re-order period)	450 – (50 × 5) = 200 units	300 – (50 × 3) = 150 units
c)	Maximum Level = Re-order Level + Re-order Quantity – (Minimum Usage × Minimum Re-order period)	= 450 + 300 – (25 × 4) = 650 units	= 300 + 500 – (25 × 2) = 750 units
d)	Average Stock Level = $\frac{\text{Minimum Level+Maximum Level}}{2}$	= $\frac{200+650}{2}$ = 425 units	= $\frac{150+750}{2}$ = 450 units

SOLUTION-10:

EOQ = $\sqrt{\frac{2AO}{C}}$

A = Annual Consumption = 5,000 units

O = Ordering Cost = ₹ 20

C = Carrying Cost per unit per annum = ₹ 5

EOQ = $\sqrt{\frac{2 \times 5,000 \times 20}{5}}$ = 200 units

Reordering Quantity = EOQ = 200 units

i. Re-order Level = Maximum Usage × Maximum Re-order period
= 20 × 15 = 300 units

ii. Maximum Level = Re-order Level + Re-order Quantity – (Min. Usage × Min. Re-order period)
= 300 + 200 – (10 × 6) = 440 units

$$\left(\text{Average Usage} = \frac{\text{Minimum Usage} + \text{Maximum Usage}}{2}\right)$$

$$\left(\text{or, } 15 = \frac{\text{Minimum Usage} + 20}{2}\right)$$

(or, Minimum Usage = (15 × 2) - 20 = 10 units)

iii. Minimum Level = Re-order Level – (Average Usage × Average Re-order period)
= 300 – (15 × 10) = 150 units

iv. Danger Level = Average Usage × Lead Time for Emergency Purchase
= 15 × 4 = 60 units

SOLUTION-11:

EOQ = $\sqrt{\frac{2AO}{C}}$

A = Annual usage of tubes = Normal usage per week × 52 weeksor, A = 100 × 52 = 5,200 tubes

O = Ordering Cost per order = ₹ 100
C = Carrying Cost per unit per annum = 500 × 20% = ₹ 100

(i) EOQ = $\sqrt{\frac{2 \times 5,200 \times 100}{100}} \approx 102$

Calculation of Total Inventory Cost

	EOQ Purchase Policy		Discount given by Supplier	
Ordering Quantity	102 tubes		1,500 tubes	
No. of Order per annum	$\frac{5,200}{102} \approx 51$		$\frac{5,200}{1,500} \approx 4$	
Purchase Cost (₹)	5,200 × 500	26,00,000	5,200 × 500 × 95%	24,70,000

Add: Ordering Cost (₹)	51 × 100	5,100	4 × 100	400
Add: Carrying Cost (₹)	$\frac{1}{2}$ × 102 × 500 × 20%	5,100	$\frac{1}{2}$ × 1500 × 500 × 20% × 95%	71,250
Total (₹)		**26,10,200**		**25,41,650**

Since the total cost under quarterly supply of 1,500 units with 5% discount is lower than that when order size is 102 units, the offer should be accepted. While accepting this offer capital blocked on order size of 1,500 units per quarter has been ignored.

(ii) Re-order Level = Maximum Usage × Maximum Re-order period

= 200 × 8 =1,600 tubes

(iii) Minimum Level of Stock

= Re-order Level – (Average Usage × Average Re-order period)

= 1,600 – (100 × 7) = 900 tubes

(iv) Maximum Level of Stock

= Re-order Level + Re-order Quantity – (Minimum Usage × Minimum Re-order period)

= 1,600 + 102 – (50 × 6) = 1,402 tubes

SOLUTION-12:

Stores Ledger Account (FIFO Method)

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹
2022 01/03							500	200	1,00,000
03/03				70	200	14,000	430	200	86,000
04/03				100	200	20,000	330	200	66,000
05/03				80	200	16,000	250	200	50,000
13/03	200	190	38,000				250	200	50,000

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹
							200	190	38,000
14/03	15	200	3,000				250	200	50,000
							200	190	38,000

							15	200	3,000
16/03				180	200	36,000	70	200	14,000
							200	190	38,000
							15	200	3,000
20/03	240	195	46,800				70	200	14,000
							200	190	38,000
							15	200	3,000
							240	195	46,800
24/03				70	200	14,000	225	195	43,875
				200	190	38,000			
				15	200	3,000			
				15	195	2,925			
25/03	320	200	64,000				225	195	43,875
							320	200	64,000
26/03				115	195	22,425	110	195	21,450
							320	200	64,000
27/03	35	195	6,825				110	195	21,450
							320	200	64,000
							35	195	6,825
28/03	100	200	20,000				110	195	21,450
							320	200	64,000
							35	195	6,825
							100	200	20,000

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹
							200	190	38,000
14/03	15	200	3,000				250	200	50,000
							200	190	38,000
							15	200	3,000
16/03				180	200	36,000	70	200	14,000
							200	190	38,000
							15	200	3,000
20/03	240	195	46,800				70	200	14,000
							200	190	38,000
							15	200	3,000
							240	195	46,800
24/03				70	200	14,000	225	195	43,875
				200	190	38,000			
				15	200	3,000			
				15	195	2,925			
25/03	320	200	64,000				225	195	43,875

							320	200	64,000
26/03				115	195	22,425	110	195	21,450
							320	200	64,000
27/03	35	195	6,825				110	195	21,450
							320	200	64,000
							35	195	6,825
28/03	100	200	20,000				110	195	21,450
							320	200	64,000
							35	195	6,825
							100	200	20,000

SOLUTION-13:

Stores Ledger Account (LIFO Method)

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹
2022 01/02							100	10	1,000
02/02	200	10.50	2,100				100	10	1,000
							200	10.50	2,100
03/02	300	10.60	3,180				100	10	1,000
							200	10.50	2,100
							300	10.60	3,180
04/02				300	10.60	3,180	100	10	1,000
				100	10.50	1,050	100	10.50	1,050
06/02				100	10.50	1,050	80	10	800
				20	10	200			
07/02	400	11	4,400				80	10	800
							400	11	4,400
08/02				200	11	2,200	80	10	800
							200	11	2,200
12/02	300	11.40	3,420				80	10	800
							200	11	2,200
							300	11.40	3,420
13/02	200	11.50	2,300				80	10	800
							200	11	2,200
							300	11.40	3,420
							200	11.50	2,300
17/02				200	11.50	2,300	80	10	800
				200	11.40	2,280	200	11	2,200
							100	11.40	1,140

SOLUTION-14:

a. Simple Average Method

Stores Ledger Account

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹
2022 01/03	100	10	1,000				100	10	1,000
02/03	200	10.20	2,040				300		3,040
05/03				250	10.10	2,525	50		515
07/03	200	10.50	2,100				250		2,615
10/03	300	10.80	3,240				550		5,855
13/03				200	10.50	2,100	350		3,755
18/03				200	10.65	2,130	150		1,625
20/03	100	11	1,100				250		2,725
25/03				150	10.90	1,635	100		1,090

Working Notes

1. Calculation of Simple Average Price for

$$\text{Issue on 05/03/2022} = \frac{10 + 10.20}{2} = ₹\ 10.10$$

$$\text{Issue on 13/03/2022} = \frac{10.20 + 10.50 + 10.80}{3} = ₹\ 10.50$$

$$\text{Issue on 18/03/2022} = \frac{10.50 + 10.80}{2} = ₹\ 10.65$$

$$\text{Issue on 25/03/2022} = \frac{10.80 + 11}{2} = ₹\ 10.90$$

b. Weighted Average Method

Stores Ledger Account

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹*	Amount ₹
2022 01/03	100	10	1,000				100	10	1,000

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹*	Amount ₹
02/03	200	10.20	2,040				300	10.13	3,040
05/03				250	10.13	2,533	50	10.13	507
07/03	200	10.50	2,100				250	10.43	2,607
10/03	300	10.80	3,240				550	10.63	5,847
13/03				200	10.63	2,126	350	10.63	3,721
18/03				200	10.63	2,126	150	10.63	1,595
20/03	100	11	1,100				250	10.78	2,695
25/03				150	10.78	1,617	100	10.78	1,078

* Balance Rate = $\frac{\text{Balance Amount}}{\text{Balance Quantity}}$

SOLUTION-15:

Stores Ledger Account (under Base Stock through FIFO Method)

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹
2022 01/04							100	50	5,000
							300	50	15,000
02/04	100	55	5,500				100	50	5,000
							300	50	15,000
							100	55	5,500
06/04				300	50	15,000	100	50	5,000
				100	55	5,500			
10/04	600	55	33,000				100	50	5,000
							600	55	33,000
13/04				400	55	22,000	100	50	5,000
							200	55	11,000
20/04	500	65	32,500				100	50	5,000
							200	55	11,000
							500	65	32,500
25/04				200	55	11,000	100	50	5,000
				400	65	26,000	100	65	6,500
10/05	800	70	56,000				100	50	5,000

							100	65	6,500
							800	70	56,000
12/05				100	65	6,500	100	50	5,000
				400	70	28,000	400	70	28,000
13/05				200	70	14,000	100	50	5,000
							200	70	14,000
15/05	500	75	37,500				100	50	5,000
							200	70	14,000
							500	75	37,500
12/06				200	70	14,000	100	50	5,000
				200	75	15,000	300	75	22,500
15/06	300	80	24,000				100	50	5,000
							300	75	22,500
							300	80	24,000

Stores Ledger Account (under Base Stock through LIFO Method)

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹
2022 01/04							100	50	5,000
							300	50	15,000
02/04	100	55	5,500				100	50	5,000
							300	50	15,000
							100	55	5,500
06/04				100	55	5,500	100	50	5,000
				300	50	15,000			
10/04	600	55	33,000				100	50	5,000
							600	55	33,000
13/04				400	55	22,000	100	50	5,000
							200	55	11,000
20/04	500	65	32,500				100	50	5,000
							200	55	11,000
							500	65	32,500
25/04				500	65	32,500	100	50	5,000
				100	55	5,500	100	55	5,500
10/05	800	70	56,000				100	50	5,000
							100	55	5,500
							800	70	56,000
12/05				500	70	35,000	100	50	5,000
							100	55	5,500
							300	70	21,000
13/05				200	70	14,000	100	50	5,000

							100	55	5,500
							100	70	7,000
15/05	500	75	37,500				100	50	5,000
							100	55	5,500
							100	70	7,000
							500	75	37,500
12/06				400	75	30,000	100	50	5,000
							100	55	5,500
							100	70	7,000
							100	75	7,500

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹
15/06	300	80	24,000				100	50	5,000
							100	55	5,500
							100	70	7,000
							100	75	7,500
							300	80	24,000

SOLUTION-16:

Stores Ledger Account (Replacement Price Method)

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹
2022 01/03							400	4	1,600
10/03	100	4.10	410				500		2,010
15/03				300	4.20	1,260	200		750
17/03	200	4.30	860				400		1,610
20/03				250	4.40	1,100	150		510
25/03	400	4.50	1,800				550		2,310
26/03				200	4.60	920	350		1,390
27/03	100	4.60	460				450		1,850
30/03				300	4.80	1,440	150		410

SOLUTION-17:

$$\text{Standard Price} = \frac{10 \times 240 + 20}{10} = ₹\ 242$$

Stores Ledger Account (Standard Price Method)

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹
01/01							10	240	2,400
04/01	5	260	1,300				15		3,700
05/01				3	242	726	12		2,974
12/01				4	242	968	8		2,006
13/01	3	250	750				11		2,756
19/01				4	242	968	7		1,788
26/01				3	242	726	4		1,062
30/01	4	280	1,120				8		2,182
31/01				3	242	726	5		1,456

Valuation of Closing Stock at Standard Price = 5 × 242 = ₹ 1,210

Valuation of Closing Stock (as per store ledger) = ₹ 1,456

Material Price Variance = 1,210 – 1,456 = ₹ 246 (A) will be charged to Profit and Loss A/c

SOLUTION-18:

i. Simple Average of February Receipts = $\frac{12 + 16.90}{2}$ = ₹ 14.45

ii. Simple Average of January Receipts = $\frac{17 + 10 + 8}{3}$ = ₹ 11.67

Moving Monthly Average of January – February = $\frac{14.45 + 11.67}{2}$ = ₹ 13.06

Moving Monthly Average of February – March = $\frac{14.45 + 20}{2}$ = ₹ 17.225

iii. Stores Ledger Account (Weighted Average Method)

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹
09/01	10	17	170				10	17	170

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹
19/01	25	10	250				35	12 $\left(\frac{420}{35}\right)$	420
20/01				10	12	120	25	12	300
29/01				20	12	240	5	12	60
30/01	15	8	120				20	9 $\left(\frac{180}{20}\right)$	180

iv. Stores Ledger Account (Issue at Weighted Average Price at month end)

Date	Receipts			Issue			Balance		
	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹	Qty	Rate ₹	Amount ₹
09/01	10	17	170				10	17	170
19/01	25	10	250				35	12 $\left(\frac{420}{35}\right)$	420
30/01	15	8	120				50	10.80 $\left(\frac{540}{50}\right)$	540
January Issue				30	10.80	324	20	10.80	216
13/02	20	12	240				40	11.40 $\left(\frac{456}{40}\right)$	456
27/02	10	16.90	169				50	12.50 $\left(\frac{625}{50}\right)$	625
February Issue				40	12.50	500	10	12.50	125
30/03	20	20	400				30	17.50 $\left(\frac{525}{30}\right)$	525
March Issue				20	17.50	350	10	17.50	175

SOLUTION-19:

$$\text{Inventory Turnover Ratio} = \frac{\text{Value of material consumed during the period}}{\text{Value of average stock held during the period}}$$

$$\text{Value of average stock held during the period} = \frac{\text{Opening Stock + Closing Stock}}{2}$$

$$= \frac{10{,}000+16{,}000}{2} = 13{,}000$$

$$= \frac{78{,}000}{13{,}000} = 6 \text{ times}$$

SOLUTION-20:

$$\text{Inventory Turnover Ratio} = \frac{\text{Cost of Material Used}}{\text{Average Stock}}$$

Cost of Material Used = Opening Stock + Purchase – Closing Stock

	Material A Amount (₹)	**Material B Amount (₹)**
Opening stock on 1-1-2021	10,000	9,000
Add: Purchase during the year 2021	52,000	27,000
Less: Closing stock on 31-12-2021	62,000 6,000	36,000 11,000
Raw Material Consumed	56,000	25,000
Average Stock	$\frac{10{,}000 + 6{,}000}{2}$ = 8000	$\frac{9{,}000+11{,}000}{2}$ = 10000
Inventory Turnover Ratio	$\frac{56{,}000}{8000}$ = 7 times	$\frac{25{,}000}{10000}$ = 2.5 times

Material inventory turnover ratio indicates the efficiency of the management with which they are able to utilize their inventory. It indicates the existence or non-existence of non-moving items, dormant items, slow moving items etc in inventory. If the ratio is high, the efficiency is said to be high and on the other hand if the ratio is low, the efficiency is said to be low.

In view of above, in the instant case, the usage of Material A is better than Material B.

CHAPTER 09: EMPLOYEE COSTS

SOLUTION-1:

Computation of Employee Cost

Particulars	Amount (₹)
Basic Pay	5,00,000
Add: Net cost to employer towards lease rent paid for accommodation provided toemployee [2,00,000 – 40,000]	1,60,000
Add: Employer's contribution to PF	75,000
Add: Reimbursement of Medical Expenses	67,000
Add: Hospitalisation expenses of employee's family member paid by the employerAdd: Festival Bonus	19,000 20,000
Employee Cost	**8,41,000**

Note:

1. Festival advance is a recoverable amount. Hence, not included in employee cost.
2. Employee's contribution to PF is not a cost to the employer. Hence, not considered.

SOLUTION-2:

Computation of Employee Cost

Particulars	Amount (₹)
Gross Pay (net of cost of idle time) [10,30,000 – 25,000]Add: Cost of Accommodation provided by employer	10,05,000
= Depreciation + Maintenance Charges + Municipal Tax	1,93,000
= 1,00,000 + 90,000 + 3,000	98,000
Add: Employer's contribution to PF excluding penalty paid to PF authority	
Employee Cost	**12,96,000**

Note:

1. Assumed that the entire accommodation is exclusively used by the employee. Hence, cost of accommodation provided includes all related expenses / costs, since these are identifiable / traceable to the cost centre.
2. Cost of idle time hours is assumed as abnormal. Since, it is already included in the gross pay, hence, excluded.
3. Penalty paid to PF authorities is not a normal cost. Since, it is included in the amount of contribution, it is excluded.

SOLUTION-3:

Computation of Employee Cost

Particulars	Amount (₹)
Salaries	15,00,000
Add: Net cost of Perquisites to Employees	
= 4,50,000 – 35,000	4,15,000
Add: Contribution to Gratuity Fund	4,00,000
Add: Lease rent for accommodation provided to employees	3,00,000
Add: Festival Bonus	50,000
Less: Special Subsidy received from Government towards employee salary	2,75,000
Employee Cost	**23,90,000**

Note:

1. Recoverable amount from employee is excluded from the cost of perquisites.
2. Employee training cost is not an employee cost. It is to be treated as an overhead, hence not included.
3. Special subsidy received is to be excluded, as it reduces the cost of the employer.
4. Unamortised amount of employee cost related to a discontinued operation is not an includible item of cost.

SOLUTION-4:

Time Taken (T) = 48 hours

Rate per hour (R) = ₹ 1.80

Actual Production = 180 units

a. Earnings under Time Rate = T × R = 48 × 1.80 = ₹ 86.40

b. Earnings under Piece Rate with a guaranteed weekly wage:

Normal time taken to manufacture one unit = 20 minutes

Add: Allowance @ 25% = 5 minutes

∴ Standard Time (or Time Allowed) for one unit = 25 minutes

∴ Number of Pieces to manufacture per hour $= \frac{60}{25}$

$$\text{Piece Rate} = \frac{\text{Rate per hour}}{\text{Number of Pieces to manufacture per hour}}$$

$$= \frac{₹\ 1.80 \text{ per hour}}{\frac{60}{25}\ 60 \text{ pieces per hour } 25}$$

= ₹ 0.75 per piece

Earnings under Piece Rate = 180 units × ₹ 0.75 per piece = ₹ 135

c. Earnings under Halsey Premium Bonus Plan:

Time Allowed (TA) for 180 units = 180 units × $\frac{25}{60}$ = 75 hours

Time Saved (TS = TA – T) = 75 – 48 = 27 hours

Earnings under Halsey Plan = T × R + 50% × TS × R

= 48 × 1.80 + 50% × 27 × 1.80

= 86.40 + 24.30 = ₹ 110.70

d. Earnings under Rowan Premium Bonus Plan = T × R + TS × T × R

$$= 48 \times 1.80 + \frac{27}{75} \times 48 \times 1.80$$

= 86.40 + 31.104 ≈ ₹ 117.50

SOLUTION-5:

Computation of Factory Cost under three systems:

Particulars	Time Rate System	Halsey Plan	Rowan Plan
	(₹)	(₹)	(₹)
Material	4.00	4.00	4.00
Labour (working note)	2.25	1.88	2.00

Prime Cost	6.25	5.88	6.00
Overheads	150% × 2.25 = 3.38	150% × 1.88 = 2.82	150% × 2 = 3
Factory Cost	9.63	8.70	9.00

Working Note

1. **Computation of Earnings (i.e., Labour Cost) under three systems**

Particulars	Time Rate System	Halsey Plan	Rowan Plan
Earning	**T × R**	**$T \times R + \frac{50}{100} \times TS \times R$**	**$T \times R + \frac{TS}{TA} \times T \times R$**
Time Taken (T)	9 hours	6 hours	6 hours
Time Allowed (TA)	-	9 hours	9 hours
Time Saved (TS)	-	3 hours	3 hours
Rate (R)	₹ 0.25	₹ 0.25	₹ 0.25
Earnings (i.e., Labour Cost)	9 × 0.25 = ₹ 2.25	$6 \times 0.25 + \frac{50}{100} \times 3 \times 0.25$ = 1.50 + 0.375 ₹ 1.88	$6 \times 0.25 + \frac{3}{9} \times 6 \times 0.25$ = 1.50 + 0.50 = ₹ 2.00

SOLUTION-6:

Particulars	A	B	C
Time Allowed (TA)	50 hours	50 hours	50 hours
Time Taken (T)	45 hours	40 hours	30 hours
Time Saved (TS)	5 hours	10 hours	20 hours
Rate per hour (R)	₹ 1	₹ 1	₹ 1
Earnings under Rowan Plan = $T \times R + \frac{TS}{TA} \times T \times R$			
Earnings	$45 \times 1 + \frac{5}{50} \times 45 \times 1$ = 45 + 4.50 = ₹ 49.50	$40 \times 1 + \frac{10}{50} \times 40 \times 1$ = 40 + 8 = ₹ 48	$30 \times 1 + \frac{20}{50} \times 30 \times 1$ = 30 + 12 = ₹ 42
Effective Rate (i.e., Earnings per hour)	$= \frac{₹\ 49.50}{45 \text{ hours}}$ = ₹ 1.10	$= \frac{₹\ 48}{40 \text{ hours}}$ = ₹ 1.20	$= \frac{₹\ 42}{30 \text{ hours}}$ = ₹ 1.40
Earnings under Halsey Plan = $T \times R + \frac{50}{100} \times TS \times R$			
Earnings	$45 \times 1 + \frac{50}{100} \times 5 \times 1$ = 45 + 2.50 = ₹ 47.50	$40 \times 1 + \frac{50}{100} \times 10 \times 1$ = 40 + 5 = ₹ 45	$30 \times 1 + \frac{50}{100} \times 20 \times 1$ = 30 + 10 = ₹ 40

Effective Rate (i.e., Earnings per hour)	= ₹ 47.50 / 45 hours = ₹ 1.06	= ₹ 45 / 40 hours = ₹ 1.125	= ₹ 40 / 30 hours = ₹ 1.33

SOLUTION-7:

Time Allowed (TA) = 8 hours Time Taken (T) = 6 hours

Time Saved (TS = TA – T) = 2 hours Rate per hour = ₹ 12 / 48 hours = ₹ 0.25

Earnings under Halsey Plan	= T × R + 30% × TS × R	
	= 6 × 0.25 + 30% × 2 × 0.25 = 1.50 + 0.15	= ₹ 1.65
Add: Cost of Living Bonus (6 paise per hour) hours × 10		= ₹ 0.60
Gross Earnings under Halsey Plan		= ₹ 2.25

Earnings under Rowan Plan	$= \mathbf{T \times R + \frac{TS}{TA} \times T \times R}$	
	$= 6 \times 0.25 + \frac{2}{8} \times 6 \times 0.25 = 1.50 + 0.375$	≈ ₹ 1.88
Add: Cost of Living Bonus (6 hours × 10 paise per hour)		= ₹ 0.60
Gross Earnings under Rowan Plan		= ₹ 2.48

SOLUTION-8:

Time Allowed (TA) = 48 hours, Time Taken (T) = 40 hours,

Time Saved (TS = TA – T) = 8 hours, Rate per hour (R) = ₹ 15

a. Halsey Plan

Earnings $= T \times R + \frac{50}{100} \times TS \times R$

$= 40 \times 15 + \frac{50}{100} \times 8 \times 15$

= 600 + 60 = ₹ 660

b. Halsey – Weir Plan

Earnings = T × R + $33\frac{1}{3}$% × TS × R

= 40 × 15 + $\frac{1}{3}$ x 8x 15

= 600 + 40 = ₹ 640

c. Rowan Plan

Earnings = T × R + $\frac{TS}{TA}$ × T × R

= 40 × 15 + 8 × 40 × 15

= 600 + 100 = ₹ 700

d. Barth Variable Sharing Plan

Earnings = R x $\sqrt{TA \times T}$

= 15 x $\sqrt{48 \times 40}$

= 15 × 43.82 = ₹657.30

SOLUTION-9:

Particulars	Worker X	Worker Y
Standard Production in 8 Hours	20 × 8 = 160 units	20 × 8 = 160 units
Actual Production	140 units	165 units
	Below Standard = 80% of Normal Piece Rate	Above Standard = 120% of Normal Piece Rate
Piece Rate = Rate per Hour / Production per hour	₹ 30 / 20 units = ₹ 1.50 per unit	₹ 30 / 20 units = ₹ 1.50 per unit
Earnings	= 140 × 1.50 × 80% = ₹ 168	165 × 1.50 × 120% = ₹ 297
Labour Cost per unit	₹ 168 / 140 units = ₹ 1.20	₹ 297 / 165 units = ₹ 1.50 per unit

Comment: Labour cost increase from ₹ 1.20 per unit to ₹ 1.80 per unit. Taylor's system is resisted on this ground as well as on the ground that it is very harsh on the workers.

1. Merrick Differential Piece Rate System

Merrick's system is modification of Taylor's system and is comparatively less harsh on the workers. The scale of remunerations is as follows:

Production	-	Rates of Payment
Upto 83% of production	-	Normal piece rate
83% to 100% of production	-	110% of ordinary piece rate
Above 100% of production	-	120% of ordinary piece rate

2. Gantt Task Bonus Plan

In this method, there is a combination of time rate, bonus and piece rate plan. The remuneration is

computed as shown below:

Production below standard	-	Guaranteed time rate
Production at standard	-	Bonus of 20% (normally) of time rate
Production above standard	-	High piece rate for the entire output

This method assures minimum wages for even too less efficient workers and hence is a preferred method of payment of wages. It also offers reasonably good incentive to efficient workers. However, the main limitation is that the method is complicated to understand by the workers and hence may create confusion amongst them.

SOLUTION-10:

(i) Earnings under Taylor Plan

Particulars	Amar	Akbar	Anthony
Standard Production in 40 hours	100 units	100 units	100 units
Actual Production	96 units	111 units	126 units
Efficiency	Below Standard = 80% of Normal Piece Rate	Above Standard = 120% of Normal Piece Rate	Above Standard = 120% of Normal Piece Rate
Total Earnings	= 96 x 6 x 80% = ₹ 460.80	= 111 x 6 x 120% = ₹ 799.20	= 126 x 6 x 120% = ₹ 907.20
Labour Cost per unit	₹ 460.80 / 96 units = ₹ 4.80	₹ 799.20 / 111 units = ₹ 7.20	₹ 907.20 / 126 units = 7.20

(ii) Earnings under Merrick Plan

Particulars	Amar	Akbar	Anthony
Standard Production in 40 hours	100 units	100 units	100 units
Actual Production	96 units	111 units	126 units

Efficiency	96 × 100 = 96% 100	111 × 100 = 111% 100	126 × 100 = 126% 100
Rate to be applied (PR = Piece Rate)	110% of Ordinary PR = ₹ 6 × 110% = ₹ 6.6	120% of Ordinary PR = ₹ 6 × 120% = ₹ 7.20	120% of Ordinary PR = ₹ 6 × 120% = ₹ 7.20
Total Earnings	₹ 6.6 × 96 = ₹ 633.60	₹ 7.20 × 111 = ₹ 799.20	₹ 7.20 × 126 = ₹ 907.20
Labour Cost per unit	₹ 633.60 = ₹ 6.60 96 units	₹ 799.20 = ₹ 7.20 111 units	₹ 907.20 = ₹ 7.20 126 units

(iii) Earnings under Gantt Task Bonus Plan

Particulars	Amar	Akbar	Anthony
Standard Production in 40 hours	100 units	100 units	100 units
Actual Production	96 units	111 units	126 units

Particulars	Amar	Akbar	Anthony
Efficiency	Below Standard = Guaranteed Time Rate	Above Standard = High Piece Rate	Above Standard = High Piece Rate
Total Earnings	= 40 x 10 = ₹ 400	= 111 x 6 = ₹ 666	= 126 x 6 = ₹ 756
Labour Cost per unit	₹ 400 = ₹ 4.17 96 units	₹ 666 = ₹ 6 111 units	₹ 756 = ₹ 6 126 units

SOLUTION-11:

Standard time to manufacture one unit = 20 seconds

Number of units to manufacture in one minute = $\frac{60}{20}$ = 3 units

Number of units to manufacture in one hour = 60 × 3 = 180 units

Rate per hour = ₹ 1.80

∴ Rate per piece = $\frac{\text{Rate per hour}}{\text{Number of units to manufacture per hour}}$

= $\frac{₹\ 1.80 \text{ per hour}}{180 \text{ pieces per hour}}$

= ₹ 0.01

Standard Production in 8 hours = 180 × 8 = 1,440 units

Earnings under Straight Piece Rate:

Earnings of X = 1,300 × 0.01 = ₹ 13.00

Earnings of Y = 1,500 × 0.01 = ₹ 15.00

Earnings under Taylor's Differentials Piece Rate

Particulars	X	Y
Standard Production	1,440 units	1,440 units
Actual Production	1,300 units	1,500 units
Efficiency	= 1, 330 ×100 = 90.28 % 1, 440	= 1, 500 ×100 = 104.17 % 1, 440
	Below Standard = 80% of Normal Piece Rate	Above Standard = 120% of Normal Piece Rate
Earnings	= 1,300 × 0.01 × 80% = ₹ 10.40	= 1,500 × 0.01 × 120% = ₹ 18.00

SOLUTION-12:

Calculation of wages of workers under Merrick Differential Piece Rate System

Particulars	Ajay	Vijay	Sujay
Normal Piece Rate*	₹ 0.20	₹ 0.20	₹ 0.20

Particulars	Ajay	Vijay	Sujay
Standard Production per day 6 units × 8 hours	48 units	48 units	48 units
Actual Production	32 units	42 units	50 units
Efficiency#	32 × 100 = 66 2 % 48 3	42 × 100 = 87 1 % 48 2	50 × 100 = 104 1 % 48 6
	Normal Piece Rate	110% of Normal Piece Rate	120% of Normal Piece Rate
Earnings	0.20 × 32 = ₹ 6.40	110% × 0.20 × 42 = ₹ 9.24	120% × 0.20 × 50 = ₹ 12

*Normal Piece Rate = Normal Rate per hour / Standard Production per hour = ₹ 1.20 / 6 units = ₹ 0.20

#Efficiency = Actual Production / Standard Production x 100

SOLUTION-13:

a. Piece rate = $\frac{\text{Normal Wage (at hourly rate)}}{\text{Normal output per week}} = \frac{\text{48 hours} \times ₹\ 3.75 \text{ per hour}}{120 \text{ units}} = ₹\ 1.50$ per piece

or, Piece rate = $\frac{\text{24 minutes}}{\text{60 minutes}} \times ₹3.75 = ₹\ 1.50$

Earnings under Straight Piece Rate = ₹ 1.50 × 150 = ₹ 225

b. Efficiency = $\frac{\text{Actual Output}}{\text{Normal Output}} \times 100 = \frac{150}{120} \times 100 = 125\%$

Earnings under Differential Piece Rate = ₹ 1.50 × 150 × 120% = ₹ 270

c. Earning Under Halsey Premium System = $T \times R + \frac{50}{100} \times TS \times R$

T (Time Taken) = 48 hours

R (Rate per hour) = ₹ 3.75

TA (Time Allowed) = 150 pieces × $\frac{\text{24 minutes}}{60}$ = 60 hours

TS (Time Saved) = TA – T = 60 – 48 = 12 hours

∴ Earnings = $48 \times 3.75 + \frac{50}{100} \times 12 \times 3.75 = 180 + 22.50 = ₹\ 202.50$

d. Earning Under Rowan System = $T \times R + \frac{TS}{TA} \times T \times R$

$= 48 \times 3.75 + 12 \times 48 \times 3.75$

$=180 + 36$

$= ₹\ 216$

SOLUTION-14:

Let Cost of Material be 'M' and Wage Rate per hour be 'R'

Particulars	Jay (Rowan Plan)	Viru (Halsey Plan)
Material	M	M
Labour (Working Note)	$60 \times R + \frac{40}{100} \times 60 \times R$	$80 \times R + \frac{50}{100} \times 20 \times R$
	= 84 R	= 90 R
Prime Cost	M + 84 R	M + 90 R
Add: Overhead	60 × 10 = 600	80 × 10 = 800
Factory Cost	7,280	7,600

Particulars	Jay (Rowan Plan)	Viru (Halsey Plan)
Equation	M + 84R + 600 = 7,280 or, M + 84R = 6,680	M + 90R + 800 = 7,600 or, M + 90R = 6,800

So, Equation (1) => M + 84R = 6,680

And, Equation (2) => M + 90R = 6,800

Equation (2) – Equation (1)

or, 6R = 120 or, R = 20

A. Wage Rate per hour = ₹ 20 per hour
putting R = 20 in equation (1) => M = 6,680 – 84 × 20 = 6,680 – 1,680 = 5,000

B. Material Cost = ₹ 5,000

C. Statement comparing the factory cost of the products as made by the two workmen

Particulars	Jay (₹)	Viru (₹)
Material	5,000	5,000
Wages Overhead	(60×20 + 40/100 ×60×20) 1,680	(80 ×20 + 50/100 ×20×) 1,800
	600	800
Factory Cost	7,280	7,600

Working Note:

Computation of Wages

Jay	Viru
Rowan Plan = $T \times R + \frac{TS}{TA} \times T \times R$ T = 60 hrs, TA = 100 hrs, TS = 100 – 60 = 40 hrs	Halsey Plan = $T \times R + \frac{50}{100} \times TS \times R$ T = 80 hrs, TS = 100 – 80 = 20 hrs

SOLUTION-15:

Calculation of Standard time for the task

Total time (10 hours × 60)	=	600 minutes
Less: Idle Time (15% × 600)	=	90 minutes
Actual Time	=	510 minutes

Normal Time = 510 × 120% = 612 minutes

Add: Allowance time

[10% or $\frac{1}{10}$ on standard time i.e., $\frac{1}{9}$ on normal time

$\frac{1}{9} \times 612$ = 68 minutes

Standard Time = 680 minutes

Alternatively

Standard Time – Allowance Time = Normal Time

or, Standard Time – 10% of Standard Time = 612

or, 90% Standard Time = 612

or, Standard Time = $\frac{612}{90\%}$ = 680 minutes

SOLUTION-16:

Let 'T' be the time taken by the worker

Earnings under Rowan Plan = $T \times R + \frac{TS}{TA} \times T \times R$

T = Time Taken, TA = Time Allotted or Allowed, TS = Time Saved = TA – T, R = Rate per hour

or, Earnings = $T \times 1.25 + \frac{40 - T}{40} \times T \times 1.25$

$= \frac{50T + 50T - 1.25T2}{40}$

$= \frac{100T - 1.25T2}{40}$

Factory Cost = Material Cost + Wages + Factory Overhead

or, $161.875 = 100 + \frac{100T - 1.25T^2}{40} + 0.5T$

or, $6,475 = 4,000 + 100T - 1.25T^2 + 20T$

or, 1.25T2 – 120T + 2,475 = 0

Dividing the equation by 1.25

or, T^2 - 96T + 1,980 = 0

or, T2 - 66T - 30T + 1,980 = 0

or, T (T - 66) - 30 (T - 66) = 0

or, (T - 66) (T - 30) = 0

or, T ≠ 66 [Since, Time taken should not be more than Time Allotted]

So, T = 30. Hence, Time taken by the worker = 30 hours

SOLUTION-17:

Particulars	P	Q	R	S	T
Standard Output (units)	200	200	200	200	200
Actual Output (units)	180	164	200	208	130
Efficiency	$\frac{180}{200} \times 100$ = 90%	$\frac{164}{200} \times 100$ = 82%	$\frac{200}{200} \times 100$ = 100%	$\frac{208}{200} \times 100$ = 104%	$\frac{130}{200} \times 100$ = 65 %
Bonus %	9%	5%	20%	24%	Nil

Particulars	P	Q	R	S	T
Normal daily wage (6 days × ₹ 2.50)	₹ 15	₹ 15	₹ 15	₹ 15	₹ 15
Add: Bonus	15 × 9% = ₹ 1.35	15 × 5% = ₹ 0.75	15 × 20% = ₹ 3	15 × 24% = ₹ 3.60	Nil
Total Wages	₹ 16.35	₹ 15.75	₹ 18	₹ 18.60	₹ 15

SOLUTION-18:

Standard working hours per day 6 hours or 360 minutes

Standard Time required per unit 6 minute p.u.

∴ Standard Production / output per day = $\frac{360 \text{ minutes}}{6 \text{ minutes p.u.}}$ = 60 units

Hourly wages rate = $\frac{₹ 32}{8 \text{ hours}}$ = ₹ 4 per hour

Statement Showing computation of performance achieved and total earnings per day of four workers

Particulars	M	N	O	P
Standard output	60 units	60 units	60 units	60 units
Actual output	48 units	60 units	75 units	90 units
a. Performance Level (efficiency)	$\frac{48}{60} \times 100$ = 80%	$\frac{60}{60} \times 100$ = 100%	$\frac{75}{60} \times 100$ = 125%	$\frac{90}{60} \times 100$ = 150%
Wages of Measured Work	6 hours @ ₹ 4 = ₹ 24	6 hours @ ₹ 4 = ₹ 24	6 hours @ ₹ 4 = ₹ 24	6 hours @ ₹ 4 = ₹ 24

SOLUTION-19:

Sl. No.	Particulars	X (₹)	Y (₹)
1	No. of units produced	3,600	4,200
2	Rejected units	540	420
3	Saleable units (1. – 2.)	3,060	3,780
4	Normal Rate per hour	₹ 5	₹ 6
5	Standard Time	$\frac{12 \text{ minutes}}{12 \text{ units}} \times \frac{3,600 \text{ units}}{60 \text{ minutes}}$ = 60 hours	$\frac{3 \text{ hours}}{200 \text{ units}} \times 4,200$ units = 63 hours

Sl. No.	Particulars	X (₹)	Y (₹)
6	Actual Time worked	45 hours	50 hours
7	Overtime worked (Actual Time Worked – Normal Working Hours)	45 – 42 = 3 hours	50 – 42 = 8 hours
8	Bonus Hours (5. – 6.)	60 – 45 = 15 hours	63 – 50 = 13 hours
9	Amount Bonus	15 hours × ₹ 5 × $\frac{2}{3}$ = ₹ 50	13 hours × ₹ 6 × $\frac{2}{3}$ = ₹ 52
10	Overtime Wage	3 hours × ₹ 5 × $\frac{4}{3}$ = ₹ 20	4 hours × ₹ 6 × $\frac{4}{3}$ + 4 hours x ₹ 6 × $\frac{3}{2}$ = ₹ 68 2
11	Basic Wage	42 × 5 = ₹ 210	42 × 6 = ₹ 252
12	Total Wage (9 + 10 + 11)	₹ 280	₹ 372

13	Direct Wage Cost for 100 saleable units	₹ 280 × 100 units = 3,060 units ₹ 9.15	₹ 372 × 100 units = 3,780 units ₹ 9.84

SOLUTION-20:

a. Standard Production in Actual Time = 480 × 200 = 96,000 units
b. Actual Production = 1,19,600 units
c. Excess of Actual Production over standard = 1,19,600 – 96,000 = 23,600 units
d. Percentage of excess over standard = $\frac{23,600}{96,000} \times 100 = 24.58\%$
e. Percentage of Bonus = $\frac{1}{2} \times 24.58\% = 12.29\%$
f. Bonus Rate per hour = ₹ 3.20 × 12.29% = ₹ 0.393
g. Total Bonus for week = 480 × 0.393 = ₹ 188.64

Computation of Total Earnings of Ram & Shyam:

Particulars		Ram (₹)		Shyam (₹)
Basic Wages	41.50 × 2	83.00	44.50 × 2.50	111.25
Bonus	41.50 × 0.393	16.31	44.50 × 0.393	17.49
Total Earnings		**99.31**		**128.74**

SOLUTION-21:

Number of units per worker in Period I = $\frac{16,800}{175} = 96$

Number of units per worker in Period II = $\frac{14,000}{125} = 112$

Increase in production per worker = 112 – 96 = 16 units

Percentage increase in output in Period II = $\frac{16}{96} \times 100 = 16\frac{2}{3}\%$

Wages in Period I = ₹ 33,600

Wages in Period II (at Period I labour rate) = $\frac{₹\ 33,600}{175} \times 125 = ₹\ 24,000$

Increase in Wages $\left(16\frac{2}{3}\% \times \frac{1}{2} = 8\frac{1}{3}\%\right) = 24,000 \times 8\frac{1}{3}\% = ₹\ 2,000$

Sales in Period I = ₹ 75,600

Sales in Period II (at Period I sales price) = $\frac{₹\ 75,600}{16,800} \times 14,000 = ₹\ 63,000$

Decrease in Sales in Period II =₹ 63,000 × 8 1/3 % = ₹ 5,250

Total loss due to increase in wages and reduction in sales = 2,000 + 5,250 = ₹ 7,250

To offset the loss, the required net savings in production costs must be ₹ 7,250

SOLUTION-22:

Statement showing computation of earnings of each worker

Particulars	Fitter 1 (₹)	Fitter 2 (₹)	Labourer (₹)	Boy (₹)	Total (₹)
Basic Wage	220 × 1.5 = 330	220 × 1.5 = 330	220 × 1 = 220	220 × 0.5 = 110	990
Add: Bonus	100	100	67	33	300
Total Wage	430	430	287	143	1,290

Bonus = Total Wage – Basic Wage = 1,290 – 990 = ₹ 300

Bonus of Fitter 1 and Fitter 2 = $\frac{330}{990}$ × 300 = ₹ 100 each

Bonus of Labourer = $\frac{220}{990}$ × 300 = ₹ 67

Bonus of Boy = $\frac{110}{990}$ × 300 = ₹ 33

Computation of Selling Price of Job

Particulars	Amount (₹)
MaterialsLabour	2,010 1,290
Prime Cost Add: Works Overhead @ 20% × 3,300	3,300 660
Factory Cost Add: Selling and Distribution Overhead @ 10% × 3,960	3,960 396
Cost of Sales or Total Cost Add: Profit @ 25% × 4,356	4,356 1,089
Selling Price	5,445

SOLUTION-23:

Computation of Labour Turnover

a. Additions Method

$$= \frac{\text{Number of Additions}}{\text{Average Number of Workers during the period}} \times 100 = \frac{280}{2,000} \times 100 = 14\%$$

b. Separation Method

$$= \frac{\text{Number of Seperations}}{\text{Average Number of Workers during the period}} \times 100 = \frac{(25 + 40)}{2,000} \times 100 = \frac{65}{2,000} \times 100 = 3.25\%$$

c. Replacement Method

$$= \frac{\text{Number of Additions}}{\text{Average Number of Workers during the period}} \times 100 = \frac{30}{2,000} \times 100 = 1.5\%$$

d. Flux Method

$$= \frac{\frac{1}{2} \text{ x (Number of Additions + Number of Separations) x } 100}{\text{Average Number of workers during the period}}$$

$$= \frac{\frac{1}{2} \text{ x (} 280 + 65 \text{) x } 100}{2,000}$$

= 8.63%

Average Number of Workers during the period

$$= \frac{\text{Opening number of workers + Closing number of workers}}{2}$$

$$= \frac{1,900 + 2,100}{2}$$

SOLUTION-24:

1. Separation Method = $\frac{25}{\frac{150 + 200}{2}} \times 100 = 14.29\%$

2. Replacement Method = $\frac{20}{\frac{150 + 200}{2}} \times 100 = 11.43\%$

3. Flux Method = $\frac{25 + 20}{\frac{150 + 200}{2}} \times 100 = 25.71\%$

SOLUTION-25:

Profit foregone = Loss in Contribution + Additional Cost incurred as a result of labour turnover

i. Actual Productive Hours during last year = 4,45,000 – 15,000 [i.e. 50% × 30,000 hours]

= 4,30,000 hours

ii. Sales during last year = ₹ 83,03,300

iii. Productive Hours Lost in Current Year = 1,00,000 hours

∴ Loss in Sales during the current year = $\frac{₹\ 83,03,300}{4,30,000} \times 1,00,000 = ₹\ 19,31,000$

and Loss in Contribution = 20% × ₹ 19,31,000 = ₹ 3,86,200

Computation of Profit Foregone during the current year

	Amount (₹)
Contribution Lost	3,86,200
Settlement Cost due to leaving	43,820
Recruitment Cost	26,740
Selection Cost	12,750
Training Cost	30,490
Profit Foregone	**5,00,000**

CHAPTER 10: PROCESS COSTING

SOLUTION-1:

Dr. **Process I Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Material A/c (Introduced)	1,000	6	6,000	By Normal Loss A/c	50	4	200
To Material A/c			5,200	(1,000 × 5%)			
To Direct Wages A/c			4,000	By Process II A/c	950	20	19000
To Production Overheads A/c			4,000	(₹19,000 =₹ 20)			
(100% x Direct wages)				950 units			
				(Bal. fig.)			
	1,000		**19,200**		**1,000**		**19,200**

Dr. **Process II Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Process I A/c	950	20	19,000	By Normal Loss A/c	95	8	760
To Material A/c			3,960	(950 × 10%)			
To Direct Wages A/c			6,000	By Balance c/d	855	40	34,200
To Production Overheads A/c			6000	(₹34,000 = ₹ 40)			
				855 units			
	950		**34,960**		**950**		**34,960**
To Balance b/d	855	40	34,200	By Process III A/c	840	40	33,600
				By Abnormal Loss A/c (Bal.	15	40	600
	34,200		**34,200**		**855**		**34,200**

Dr. **Process III Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Process II A/c	840	40	33,600	By Normal Loss A/c	126	10	1,260
To Material A/c			5,924	(840 × 15%)			
To Direct Wages A/c			8,000	By Balance c/d			
To Production Overheads A/c			8,000	(₹54,264 = ₹ 76) 714 units	714	76	54,264
	840		**55,524**		**840**		**55,524**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Balance b/d	714	76	54,264	By Finished Stock A/c	750	75	57,000
To Abnormal Gain A/c (Bal.fig.)	36	76	2,736				
	750		**57,000**		**750**		**57,000**

Dr. **Normal Loss Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Process I A/c	50	4	200	By Cash A/c	50	4	200
To Process II A/c	95	8	760	By Cash A/c	95	8	760
To Process III A/c	126	10	1,260	By Cash A/c (Bal. fig.)	90	10	900
				By Abnormal Gain A/c	36	10	360
	271		**2,220**		**271**		**2,220**

Dr. **Abnormal Loss Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Process II A/c	15	40	600	By Cash A/c	15	8	120
				By Costing Profit & Loss A/c			480
	15		**600**		**15**		**600**

Dr. **Abnormal Gain Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Normal Loss A/c	**36**	10	360	By Process III A/c	36	76	2,736
To Costing Profit & Loss A/c (Bal. fig.)			2376				
	36		**2,736**		**36**		**2,736**

SOLUTION-2:

Dr. **Process II Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Process I A/c	4,000	2.25	9,000	By Normal Loss A/c	800	5	4,000
To Direct Wages A/c			2,000	(4,000 × 20%)			
To Direct Materials A/c			3,000	By Balance c/d			
To Factor Overheads A/c			12,000	(₹22,000 = ₹ 6.875)	3,200	6.875	22,000
(400% × ₹ 3,000)				3,200 units	(Bal. fig)		
	4,000		**26,000**		**4,000**		**26,000**
To Balance b/d	3,200	6.875	22,000	By Finished Stock A/c	3,240	6.875	22,275
To Abnormal Gain A/c (Bal. fig)	40	6.875	275				
	3,240		**22,275**		**3,240**		**22,275**

Dr. **Abnormal Gain Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Normal Loss A/c	40	5	200	By Process II A/c	40	6.875	275
To Costing Profit & Loss A/c(Bal. fig)			75				
	40		**275**		**40**		**275**

SOLUTION-3:

(a) Statement of Equivalent Production

Inputs		Output		Equivalent Production Units					
				Material		Labour		Overhead	
Items	Units	Items	Units	% Completion	Units	% Completion	Units	% Completion	Units
Units Introduced	10,000		100	-	-	-	-	-	-
		Normal Loss	9,500	100	9,500	100	9,500	100	9,500
		Finished Goods (Transferred)							
		Cl. WIP	350	100	350	50	175	50	175
			9,950		**9,850**		**9,675**		**9,675**
		Abnormal Loss	50	100	50	80	40	80	40
	10,000		**10,000**		**9,900**		**9,715**		**9,715**

Normal Loss = 1% × 10,000 = 100 units

(b)

Statement of Cost per unit

Particulars	Amount (₹)	Equivalent Units	Cost per unit (₹)
Material	44,550	9,900	4.5
Labour	21,148	9,715	2.1768
Overhead	42,000	9,715	4.3232
			11

Particulars	Amount (₹)
Material Introduced (1,000 × 3)	30,000
Additional Material	14,650
	44,650
Less: Scrap Realised from Normal Loss (100 × 1)	100
	44,550

(c)

Dr. **Process B Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Material (Introduced) A/c	10,000	3	30,000	By Normal Loss A/c	100	1	100
To Material			14650	By Closing Stock A/c	350	2,713 / 350 = 7.75	2,713
(Additional) A/c				By Abnormal Loss A/c	50	485 / 50 = 9.70	485
To Labour A/c			21,148				
To Overhead A/c			42,000	By Finished Stock A/c	9500	1,04,500 / 9,500 = 1.10	104500
	10,000		**1,07,798**		**10,000**		**1,07,798**

Working Notes:

1. **Valuation of Closing Stock**

Particulars	Units	Cost per unit (₹)	Total Cost (₹)
Material	350	5	1575
Labour	175	2	380.94
Overhead	175	4	756.56
			2712.5 ≈ 2,713

2. **Valuation of Abnormal Loss**

Particulars	Units	Cost per unit (₹)	Total Cost (₹)
Material	50	5	225
Labour	40	2	87.072
Overhead	40	4	172.928
			485

SOLUTION-4:

Statement of Equivalent Production

Inputs		Output		Equivalent Production Units					
				Material		Labour		Overhead	
Items	Units	Items	Units	% Completion	Units	% Completion	Units	% Completion	Units
Units Introduced	2,000	Normal Loss	100	-	-	-	-	-	-
		Finished Goods (Transferred)	1,400	100	1,400	100	1,400	100	1,400
		Cl. WIP	460	75	345	50	230	50	230
			1,960		**1,745**		**1,630**		**1,630**
		Abnormal Loss	40	100	40	80	40	100	40
	2,000		**2,000**		**1,785**		**1,670**		**1,670**

Normal Loss = 5% × 2,000 = 100 units

Statement of Cost per unit

Particulars	Amount (₹)	Equivalent Units	Cost per unit (₹)
Material	71,400	1,785	40
Labour	33,400	1,670	20
Overhead	16,700	1,670	10

Particulars	Amount (₹)
Material Introduced	58,000
Additional Material	14,400
	72,400
Less: Scrap Realised from Normal Loss (100 x 10)	1,000
	71,400

Valuation of Closing Stock

Particulars	Units	Cost per unit (₹)	Total Cost (₹)
Material	345	40	13,800
Labour	230	20	4,600
Overhead	230	10	2,300
			20,700

Valuation of Abnormal Loss

Particulars	Units	Cost per unit (₹)	Total Cost (₹)
Material	40	40	1,600

Labour	40	20	800
Overhead	40	10	400
			2,800

Dr. **Process X Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Material (Introduced) A/c	2,000	29	58,000	By Normal Loss A/c	100	10	1,000
To Material (Additional) A/c			14,400	By Closing Stock A/c	460	20,700/460 = 45	20 700
To Direct Labour A/c			33,400	By Abnormal Loss A/c	40	2,800/40 = 70	2,800
To Overhead A/c			16,700	By Finished Stock A/c	1400	98,000/1,400 = 70	98000
	2,000		1,22,500		2,000		1,22,500

SOLUTION-5:

Statement of Equivalent Production

Input Units	Particulars	Output Units	Material E. Units	% of Completion	Labor & Overheads E. Units	% of Completion
200	Opening Stock					
1,050	Units Introduced					
	Output					
	Completion of work on opening stock	200	-	-	120	60
	Units introduced and completed	900	900	100	900	100
	Closing stock	150	150	100	105	70
1,250		**1,250**	**1,050**		**1,125**	

*E. Units = Equivalent units

Statement of Cost of Each Element

Elements of Cost	Cost ₹	Equivalent Production	*Cost Per Unit ₹
Material	3,150	1,050	3
Labour	4,500	1,125	4
Overheads	2,250	1,125	2
Total	**9,900**		**9**

*Cost ÷ Equivalent units

Statement of Apportionment of Cost

Particulars	Elements	Equivalent Production	Cost Per Unit ₹	Cost ₹	Total ₹
1. Cost incurred to complete the work on	Material	-			
Opening Stock	Labour	120	4	480	720
	Overheads	120	2	240	
2. Units introduced and completed	Material	900	3	2,700	8,100
	Labour	900	4	3,600	
	Overheads	900	2	1,800	
3. Closing Stocks	Material	150	3	450	1,080
	Labour	105	4	420	
	Overheads	105	2	210	
					9,900

Dr. **Process Account** **Cr.**

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Opening Stock	200	800	By Transfer to next Process *	1,100	9,620

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
Units Introduced	1,050		Closing Stocks	150	1,080
Material		3,150			
Labour		4,500			
Overheads		2,250			
Total	**1,250**	**10,700**	**Total**	**1,250**	**10,700**

*Transfer to next process is calculated as shown under

- ❖ Cost incurred on opening stock already: ₹ 800
- ❖ Cost incurred to complete the opening work in progress [stock]: ₹ 720
- ❖ Cost of completion of units introduced in this process: ₹8,100. Total ₹ 9,620 (800 + 720 + 8100)

There are mainly three methods of calculating cost per unit, out of which FIFO method and Weighted Average Methods are frequently used in equivalent production.

SOLUTION-6:

(i) Statement of Equivalent Production

Inputs		Output		Equivalent Production Units					
Items	**Units**	**Items**	**Units**	**Material**		**Labour**		**Overhead**	
				% Completion	**Units**	**% Completion**	**Units**	**% Completion**	**Units**
Op. WIP	200	Op. WIP	200	-	-	60	120	60	120
Units		Finished Goods	900	100	900	100	900	100	900
Introduced	1,050	(Introduced & completed)							
		Cl. WIP	150	100	150	70	105	70	105
	1,250		**1,250**		**1,050**		**1,125**		**1,125**

Transfer to Next Process = 1,100 units (given)

Work done on Op. WIP and Completed = 200 units

Work done on units introduced and completed (1,100 – 200) = 900 units

(ii) Statement of Cost per unit

Particulars	Amount (₹)	Equivalent Units	Cost per unit (₹)
Material	1,050	1,050	1
Labour	2,250	1,125	2
Production Overhead	1,125	1,125	1

Valuation of Closing Stock

Particulars	Units	Cost per unit (₹)	Total Cost (₹)
Material	150	1	150
Labour	105	2	210
Production Overhead	105	1	105
			465

(iii) Dr. Process Account Cr.

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Opening Stock A/c	200	4	800	By Closing Stock, A/c	150	465 =3.10	465
To Material A/c	1,050	1	1,050			150	
To Labour A/c			2,250	By Finished Stock A/c	1,100	4,760 = 4.33	4,760
To Production Overhead A/c			1,125			1,100	
	1,250		**5,225**		**1,250**		**5,225**

Working Note:

Checking the transfer value of the Finished Stock

Element	Units	Cost per unit (₹)	Total Cost (₹)
Op. Stock Material	200	4	800
Work done on Op. WIP			
Labour	120	2	240
Production Overhead	120	1	120
Units Introduced and Completed			
Material	900	1	900
Labour	900	2	1,800
Production Overhead	90	1	900
			4,760

SOLUTION-7:

Statement of Equivalent Production

Inputs		Output		Equivalent Production Units					
				Material I		Material II		Labour & Overhead	
Items	Units	Items	Units	% Completion	Units	% Completion	Units	% Completion	Units
Op. WIP	800	Op. WIP	800	-	-	40	320	60	480
Units Introduced	12,000	Normal Loss	1,100	-	-	-	-	-	-
		Finished Goods (Introduced &	8,900	100	8,900	100	8,900	100	8,900

		Completed) Cl. WIP	1,800	100	1,800	60	1,080	50	900
			12,600		**10,700**		**10,300**		**10,280**
		Abnormal Loss (Bal. fig.)	200	100	200	100	200	50	100
	12,800		**12,800**		**10,900**		**10,500**		**10,380**

Normal Loss $= \frac{10}{100} \times$ (Op.WIP+Units Introduced - Cl.WIP) $= \frac{10}{100} \times$ (800+12,000 - 1,800)

= 1,100 units

Transfer to Next Process = 9,700 units (given)

Work done on Op. WIP and Completed = 800 units

Work done on units introduced and completed (9,700 – 800) = 8,900 units

Statement of Cost per unit

Particulars	Amount (₹)	Equivalent Units	Cost per unit (₹)
Material I	16,350	10,900	1.5
Material II	10,500	10,500	1
Labour	20,760	10,380	2
Overhead (16,670 - 1,100)	15,570	10,380	1.5

Cost of Overhead ₹ 16,670

Less: Scrap Realised ₹ 1,100

₹ 15,570

Valuation of Closing Stock

Particulars	Units	Cost per unit (₹)	Total Cost (₹)
Material I	1,800	1.5	2,700
Material II	1,080	1	1,080
Labour	900	2	1,800
Overhead	900	1.5	1,350
			6,930

Valuation of Abnormal Loss

Particulars	Units	Cost per unit (₹)	Total Cost (₹)
Material I	200	1.5	300
Material II	200	1	200
Labour	100	2	200
Overhead	100	1.5	150
			850

Dr. **Process Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Opening Stock	800	6	4,800	By Normal Loss A/c	1,100	1	1,100
To Material I	12,000		16,350	By Closing Stock A/c	1,800	6,930 = 3.85 1800	6,930
A/c To Material II A/c			10,500	By Abnormal Loss A/c	200	850 = 4.25 200	850
To Labour A/c			20,760	By Finished Stock A/c	9,700	60,200 = 6.206 9,700	60,200
To Overhead A/c			16670				
	12,800		**69,080**		**12,800**		**69,080**

SOLUTION-8:

Statement of Equivalent Production.

Inputs		Output		Equivalent Production Units					
Items	Units	Items	Units	Material		Labour		Overhead	
				% Completion	Units	% Completion	Units	% Completion	Units
Op. WIP	1,600	Op. WIP	1,600	30	480	40	640	40	640
Units	10,200	Normal Loss	1,000	-	-	-	-	-	-
Introduced		Finished Goods	7,600	100	7,600	100	7,600	100	7,600
		(Introduced &							

		Completed)							
		Cl. WIP	1,800	60	1,080	40	720	40	720
			12,000		**9,160**		**8,960**		**8,960**
		Less: Abnormal Gain	200	100	200	100	200	100	200
	11,800		**11,800**		**8,960**		**8,760**		**8,760**

Inputs		**Output**		**Equivalent Production Units**					
Items	**Units**	**Items**	**Units**	**Material**		**Labour**		**Overhead**	
				% Completion	**Units**	**% Completion**	**Units**	**% Completion**	**Units**
Op. WIP	1,600	Op. WIP	1,600	30	480	40	640	40	640
Units Introduced	10,200	Normal Loss	1,000	-	-	-	-	-	-
		Finished Goods (Introduced & Completed)	7,600	100	7,600	100	7,600	100	7,600
		Cl. WIP	1,800	60	1,080	40	720	40	720
			12,000		**9,160**		**8,960**		**8,960**
		Less: Abnormal Gain	200	100	200	100	200	100	200
	11,800		**11,800**		**8,960**		**8,760**		**8,760**

Normal Loss

$= \frac{10}{100} \times (\text{Op.WIP} + \text{Units Introduced} - \text{Cl.WIP}) = \frac{10}{100} \times (1,600 + 10,200 - 1,800) = 1,000$ units

Transfer to Next Process = 9,200 units (given)

Work done on Op. WIP and Completed = 1,600 units

Work done on units introduced and completed (9,200 – 1,600) = 7,600 units

SOLUTION-9:

Suppose the output in Process I is 100 kg.

Statement of Production in Different Processes Based on Input of 100 kg in Process I

Particulars	Process I	Process II	Process III	Process IV
Input	100 Kg	75 Kg	60 Kg	48 Kg

Loss (%)	25	20	20	$16\frac{2}{3}$
Loss in kg	25	15	12	8
Output in kg (Input -Loss in kg)	75	60	48	40

If output in process IV is 40 kg, input in process I = 100 kg

If output in process IV is 40,000 kg, input in process I = [40,000 × 100]/40 = 1,00,000 kg Cost of raw material required = 1,00,000 kg × ₹5 = ₹5,00, 000

Effect: The input is 2.5 times of the final output ($\frac{100 \text{ kg}}{40 \text{ kg}}$).

Therefore, for variation of every rupee in the cost of raw material the final effect will be ₹2.50

SOLUTION-10:

Dr. Process A Account Cr.

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Material (Introduced) A/c	10,000	10	11,000	By Normal Loss A/c	500	0.25	125
To (Additional) Material A/c			1,500	(10,000 × 5%)			
To Direct Labour A/c			4,500	By Process B A/c	9,500	2.64	25,075
To Direct Expenses A/c			1,000	(₹25,075 =₹ 2.64)			
To Overhead A/c (160% × 4,500)			7,200	9,500 units			
				(Bal. fig.)			
	10,000		**25,200**				**25,200**

Dr. Process B Account Cr.

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Process A A/c	9,500	2.64	25,075	By Normal Loss A/c	380	0.5	190
To Material A/c			1,500	(9,500 × 4%)			
To Direct Labour A/c			8,000	By Process C A/c	9,120	5.28	48,185
To Direct Expenses A/c			1,000	(₹48,185 =₹ 5.28)			
To Overhead A/c (160% × 8,000)			12,800	9,120 units			

				(Bal. fig.)			
	9,500		**48,375**		9500		**48,375**

Dr. **Process C Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Process B A/c	9,120	5.28	48,185	By Normal Loss A/c	696	1	696
To Material A/c			1,500	(WN 1) [9120×7.63%]			
To Direct Labour A/c			6,500	By Finished Stock A/c	8,424	8	67,392
To Direct Expenses A/c			1,503	(₹97,392 = ₹ 8)			
To Overhead A/c (160% × 6,500)			10,400	8,424 units			
				(Bal. fig.)			
	9,120		**68,088**		9120		**68,088**

Computation of percentage of waste in Process C

	(₹)
Sales Price per unit	10
Less: Profit @ 20%	2
Cost Price p.u	8

Let the number of units of normal loss in Process C be x

⊙ Value of Scrap of Process C = x × 1 = ₹ x

or, Total Cost = Value of Scrap + Value of Finished Goods

or, Total Cost = Value of Scrap + (Units Introduced-Normal Loss in units) × 8

or, 68,088 = x + (9,120 - x) × 8

or, 68,088 = x + 72,960 - 8x

or, x = 4,872 = 696
7

Percentage of Normal Loss = 696 × 100 = 7.63%
9,120

SOLUTION-11:

Statement of Equivalent Production

Inputs		Output		Equivalent Production Units							
Items	Units	Items	Units	Material I		Material II		Labour		Overhead	
Items	Units	Items	Units	%C	Units	% C	Units	%C	Units	%C	Units
Op. WIP	1,000	Normal Loss*	250	-	-	-	-	-	-	-	-
Transfer from		Transfer to Process IV	4,700	100	4,700	100	4,700	100	4,700	100	4,700
Process II	6,000	Cl. WIP	2,000	100	2,000	60	1,200	50	1,000	40	800
			6,950		**6,700**		**5,900**		**5,700**		**5,500**
		Abnormal Loss	50	100	50	100	50	80	40	60	30
	7,000		**7,000**		**6,750**		**5,950**		**5,740**		**5,530**

% C - % Completion

*Normal Loss = 5% × Production = 5% x (Op. WIP + Transfer from Process I – Cl. WIP)

= 5% × (1,000 + 6,000 – 2,000) = 5% × 5,000 = 250 units

Statement of Cost per unit

Particulars	Amount (₹) Op. WIP + Introduced	Equivalent Units	Cost per unit (₹)
Material – I	390 + 2,360 – 50 = 2,700	6,750	0.4
Material – II	75 + 520 = 595	5,950	0.1
Labour	112 + 1,036 = 1,148	5,740	0.2
Overhead	118 + 1,541 = 1,659	5,530	0.3

	₹
Material I (390 + 2,360)	2,750
Less: Scrap Realised from Normal Loss (250 × 0.20)	50
	2,700

Dr. **Valuation of Closing Stock** **Cr.**

Particulars	Units	Cost per unit (₹)	Total Cost (₹)
Material – I	2,000	0.4	800
Material – II	1,200	0.1	120
Labour	1,000	0.2	200
Overhead	800	0.3	240
			1,360

Dr. **Valuation of Abnormal Loss** **Cr.**

Particulars	Units	Cost per unit (₹)	Total Cost (₹)
Material – I	50	0.4	20
Material – II	50	0.1	5
Labour	40	0.2	8
Overhead	30	0.3	9
			42

Process III Account

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Op. Stock A/c	1,000	0.695	695	By Normal Loss A/c	250	0.2	50
(390 + 75+ 112+118)				By Closing Stock A/c	2,000	1,360 = 0.68	1,360
To Process II A/c (Transfer)	6,000	0.393	2,360			2,000	
To Material A/c			520	By Abnormal Loss A/c	50	42 = 0.84	42
To Labour A/c			1,036			50	
To Overhead A/c			1,541	By Finished Stock A/c or, (Transfer to Next process)	4,700	4700 = 1	4,700
						4,700	
	7,000		**6,152**		**7,000**		**6,152**

SOLUTION-12:

Dr. **Process A Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Material (Introduced) A/c	40,000	0.4	16,000	By Normal Loss A/c	800	0.25	200
To Material (Additional) A/c			16,000	(40,000 × 2%)			
To Direct Labour A/c			9,000				
To Direct Expenses A/c			8,200	By Balance c/d	39,200	1.25	49,000
				(₹49,000 = ₹1.25) 39,200			
	40,000		**49,200**				**49,200**
To Balance b/d	39,200	1.25	49,000	By Abnormal Loss A/c	200	1.25	250
				By Process A Finished Stock A/c	39,000	1.25	48,750
	39,200		**49,000**		**39,200**		**49,000**

Dr. **Process A Finished Stock Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Opening Stock A/c	6,000	1.2	7,200	By Process B A/c (₹55,950 = ₹1.243)	40,000	1.243	49,733
To Process A A/c	39,000	1.25	48,750		45,000		
				By Closing Stock A/c	5,000	1.243	6,217
	45,000		55,950				55,950

Dr. **Process B Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Process A Finished Stock A/c	40,000	1.243	49,733	By Normal Loss A/c (40,000 × 10%)	4000	0.5	2000
To Other Material A/c			5,000				
To Direct Labour A/c			8,000	By Balance c/d	36,000	1.7287	62,233
To Direct Expenses A/c			1500				
				(₹62,233 = ₹1.7287) 36000			
	40,000		**64,233**		**40000**		**64233**
To Balance b/d	36000	1.7287	62233	By Process B Finished Stock A/c	36,500	1.7287	63,097
To Abnormal Gain A/c	500	1.7287	864				
	36,500		**63,097**		**36,500**		**63,097**

Dr. **Process B Finished Stock Account** **Cr.**

Particulars	Units	Rate	Amount (₹)	Particulars	Units	Rate	Amount (₹)
To Opening Stock A/c	5,000	1.6	8,000	By Finished Stock A/c (or transfer to next process) (₹71,097 = ₹1.713) 41,500 Units	33,500	1.713	57,392
To Process B A/c	36,500	1.7287	63,097				
				By Closing Stock A/c	8,000	1.713	13,705
	41,500		**71,097**		**41,500**		**71,097**

CHAPTER 11: JOINT & BY PRODUCTS

SOLUTION-1:

(i)

Computation of Profit after distributing Joint Cost on the basis of weight

Particulars	Product A ₹	Product B ₹	Total ₹
Sales	100 Qtls × ₹ 80 = 8,000	150 Qtls × ₹ 40 = 6,000	14,000
Less: Joint Cost	100 Qtls / 250 Qtls × ₹12,000 = 4,800	150 Qtls / 250 Qtls × ₹12,000 = 7,200	12,000
Profit / (Loss)	3,200	(1,200)	2,000

(ii)

Computation of Profit after distributing Marginal Cost on the basis of Weight and Fixed Cost on the basis of Contribution

Particulars	Product A ₹	Product B ₹	Total ₹
Sales	100 Qtls × ₹ 80 = 8,000	150 Qtls × ₹ 40 = 6,000	14,000
Less: Variable Cost ₹ (5,000+3,000+2,000)	100 Qtls / 250 Qtls × 10,000 = 4,000	150 Qtls / 250 Qtls × 10,000 = 6,000	10,000
Contribution	4,000	Nil	4,000
Less: Fi × ed Cost	4000 / 4000 × 2000 = 2,000	0 / 4000 × 2000 = 0	2,000
Profit	2,000	Nil	2,000

(iii)

Computation of Profit after distributing Joint Cost on the basis of Sales

Particulars	Product A ₹	Product B ₹	Total ₹
Sales	100 Qtls × ₹ 80 = 8,000	150 Qtls × ₹ 40 = 6,000	14,000
Less: Joint Cost	8,000 / 14,000 × 12,000 = 6,857	6,000 / 14,000 × 12,000 = 5,143	12,000
Profit	1,143	857	2,000

SOLUTION-2:

Statement Showing Apportionment of Joint Expenses

Particulars	'A' Amount (₹)	'B' Amount (₹)	'C' Amount (₹)	Total ₹
	Products	By Products	By Products	
Sales	6,000	4,000	2,500	12,500
Less: Profit	$33\frac{1}{3}\% \times 6,000 = 2,000$	25% × 4,000 = 1,000	15% × 2,500 = 375	3,375
Total Cost	4,000	3,000	2,125	9,125
Less: Separate Expenses	450	325	150	925
Share of Joint Cost	**3,550**	**2,675**	**1,975**	**8,200**

SOLUTION-3:

	Joint Expenses	Separate Expenses	
		X	Y
	₹	₹	₹
Materials	10,000	2,000	2,800
Labour	4,000	2,500	2,500
Overheads	2,500	1,400	1,000
	16,500	5,900	6,300
			₹
Sales Price of Product Y (50 quintals × ₹ 200)			10,000
Less: Profit $\left(10,000 \times \frac{33\frac{1}{3}\%}{133\frac{1}{3}\%}\right)$			2,500
Cost			7,500
Less: Separate Expense of Y			6,300
Share of Joint Expense of Y			1,200

⊙ Share of Joint Expense of Product X = ₹ 16,500 - ₹ 1,200 = ₹ 15,300

Dr. **Joint Expense Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Material A/c	10,000	By Product X A/c By Product Y A/c	15,300
To Labour A/c	4,000		1,200
To Overhead A/c	2,500		
	16,500		16,500

Dr. **Product X Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Material A/c	2,000	By Cost of Production A/c (@ ₹ 21,200 = ₹ 141.33) 150 quintals	21,200
To Labour A/c	2,500		
To Overhead A/c	1,400		
To Joint Expense A/c	15,300		
	21,200		21,200

Dr. **Product Y Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Material A/c	2,800	By Cost of Production A/c (@ ₹ 7,500 = ₹ 150) 50 quintals	7,500
To Labour A/c	2,500		
To Overhead A/c	1,000		
To Joint Expense A/c	1,200		
	7,500		7,500

SOLUTION-4:

Allocation of Joint Cost to Product B and Product C

	Product B (₹)	Product C (₹)
Sales	16,000	24,000
Less: Profit	20% × 16,000 = 3,200	30% × 24,000 = 7,200
Total Cost	12,800	16,800
Less: Selling Expenses	20% × 16,000 = 3,200	20 % × 24,000 = 4,800
	9,600	**12,000**
Less: Cost after Separation	4,800	7,200
Share in Joint Cost	**4,800**	**4,800**

⊙ Share in Joint Cost of Product A = 68,000 – (4,800 + 4,800) = ₹ 58,400

Comparative Profit and Loss Statement

Particulars	Product A (₹)	Product B (₹)	Product C (₹)	Total (₹)
Sales (A)	1,64,000	16,000	24,000	2,04,000
Joint Cost	58,400	4,800	4,800	68,000
Cost After Separation	-	4,800	7,200	12,000
Selling Expenses	32,800	3,200	4,800	40,800
Total Cost (B)	91,200	12,800	16,800	1,20,800
Profit (A – B)	72,800	3,200	7,200	83,200

Selling Expense of Product A = 20% × 1,64,000 = ₹ 32,800

SOLUTION-5:

Calculation of Selling Expenses

Particulars		₹
Total Sales (1,50,000+12,000+7,000)		1,69,000
Less: Profit (1,50,000 × 20%+12,000 × 15%+7,000 × 10)		
(30,000 + 1,800 + 700)		32,500
Total Cost		1,36,500
Less: Administration Cost (12,000 + 1,500 + 1,000)	14,500	
After Separation (23,000 + 2,200 + 1,800)	27,000	
Joint Cost (Before separation)	75,000	1,16,500
Selling Expenses		20,000

Selling Expenses of Product A = $\frac{85}{100}$ × 20,000 = ₹ 17,000

Selling Expenses of By-Product B = $\frac{10}{100}$ × 20,000 = ₹ 2,000

Selling Expenses of By-Product C = $\frac{5}{100}$ × 20,000 = ₹ 1,000

Statement Showing Apportionment of Joint Cost

Particulars	Main Product (₹)	By-Product A (₹)	By-Product B (₹)	Total (₹)
Sales	1,50,000	12,000	7,000	1,69,000
Less: Profit	30,000	1,800	700	32,500
Total Cost	1,20,000	10,200	6,300	1,36,500
Less: Administration Cost	12,000	1,500	1,000	14,500
Selling Expenses	17,000	2,000	1,000	20,000
Cost after Separation	23,000	2,200	1,800	27
Share of Joint Cost	68,000	4,500	2,500	75,000

SOLUTION-6:

Statement Showing Calculation of Material, Labour and Overhead Cost of Each Product

Element	Total ₹ / tonne	Coke = 1,420/2000 ×100 =71%	Coal Tar = 120/2,000 ×100 = 6%	Benzol = 22/2,000 ×100 = 1.1%	Sulphate = 26/2,000 ×100 = 1.3%	Gas = 412/2,000 ×100 = 20.6%
Material	80	56.8	4.8	0.88	1.04	16.48
Labour	40	28.4	2.4	0.44	0.52	8.24
Overhead	60	42.6	3.6	0.66	0.78	12.36
Total	**180**	**127.8**	**10.8**	**1.98**	**2.34**	**37.08**

SOLUTION-7:

Production of Main Product A = 1,000 × 60% = 600 units

Production of By-Product B = 1,000 × 15% = 150 units

Production of By-Product C = 1,000 × 20% = 200 units

Wastage = 1,000 × 5% = 50 units

Statement Showing Apportionment of Joint Cost

Element of Cost	Basis of Apportionment	Total	Main Product A	By-Product B	By-Product C
Material	*18 : 3 : 2	4,600	3,600	600	400
Labour	#36 : 3 : 2	4,100	3,600	300	200
Overhead	06:01:01	6,000	4,500	750	750

Working Note:

***Basis of Apportionment of Material**

Let By-Product B requires x units of material

then Main Product A requires 1.5x units of material and By-Product C requires 0.5x units of material

- ⊙ Ratio of apportionment for each unit = 1.5x : x : 0.5x

  or,3:2:1
- ⊙ Ratio of apportionment for total units of production = 600 × 3 : 150 × 2 : 200 × 1

  = 1,800 : 300 : 200 or, 18 : 3 : 2

#Basis of Apportionment of Labour

Let By-Product B requires y hours of labour

then By-Product C requires 0.5y hours of labour

and Main Product A requires 2 × (y + 0.5y) = 3y

- ⊙ Ratio of apportionment for each unit = 3y:y:0.5y or,6:2:1
- ⊙ Ratio of apportionment for total units of production = 600 × 6 : 150 × 2 : 200 × 1

  = 3,600 : 300 : 200 or, 36 : 3 : 2

SOLUTION-8:

Particulars	Product X Amount (₹)	Product Y Amount (₹)	Total Amount (₹)
Sales after further processing	6,00,000	3,00,000	9,00,000
Sales at split off point	$66\frac{2}{3}$ % × 7,50,000 = 5,00,000	$33\frac{1}{3}$ % × 7,50,000 = 2,50,000	7,50,000
Incremental Sales (A)	1,00,000	50,000	1,50,000
Incremental Cost Material	50,000	20,000	70,000
Labour Variable Overhead (150% on Labour)	20,000	8,000	28,000
	30,000	12,000	42,000
Total Incremental Cost (B)	1,00,000	40,000	1,40,000
Incremental Profit (A – B)	Nil	10,000	10,000

It is recommended to further process Product Y because there is incremental profit of ₹ 10,000 whereas Product X need not be further processed because there is no incremental profit.

Product Y sales = 100% - 66 2/3 %

= 33 1/3 %

SOLUTION-9:

(a) Statement showing Computation of Profit after further Processing

Particulars	A	B	C	D	Total
Output	5,00,000 litres	10,000 litres	5,000 litres	9,000 kg	
Selling Price p.u.	₹ 1.84	₹ 8.00	₹ 6.40	₹ 26.67	
Sales after further Processing (₹)	9,20,000	80,000	32,000	2,40,030	12,72,030
Less: Post Separation Cost	2,40,000	48,000	Nil	8,030	2,96,030
Net Realisable Value (NRV)	6,80,000	32,000	32,000	2,32,000	9,76,000
Less: Joint Cost (WN 1)	5,78,000	27,200	27,200	1,97,200	8,29,600
Profit	1,02,000	4,800	4,800	34,800	1,46,400

(b) Statement Showing Computation of Profit before further Processing

Particulars	A	B	C	D	Total
Output	5,00,000 litres	10,000 litres	5,000 litres	9,000 kg	
Selling Price p.u.	₹ 1.20	₹ 4.00	₹ 6.40	₹ 24.00	
Sales before further Processing (₹)	6,00,000	40,000	32,000	2,16,000	8,88,000
Less: Joint Cost (WN 1) (₹)	5,78,000	27,200	27,200	1,97,200	8,29,600
Profit (₹)	22,000	12,800	4,800	18,800	58,400

Statement of the profitability in selling the products with and without further processing.

	Particulars	A	B	C	D	Total
i.	Profit after further Processing (₹)	1,02,000	4,800	4,800	34,800	1,46,400
ii.	Profit before further Processing (₹)	22,000	12,800	4,800	18,800	58,400
iii.	Incremental Profit / (Loss) (i. – ii.) (₹)	80,000	(8,000)	Nil	16,000	88,000

Product A and Product D should be further processed, because there is incremental profit whereas Product B and Product C should not be further processed.

Working Note

1. Allocation of Joint Cost on NRV basis

Share of Joint Cost for Product A = $\frac{6,80,000}{9,76,000} \times 8,29,600 = ₹\ 5,78,000$

Share of Joint Cost for Product B = $\frac{32,000}{9,76,000} \times 8,29,600 = ₹\ 27,200$

Share of Joint Cost for Product C = $\frac{32,000}{9,76,000} \times 8,29,600 = ₹\ 27,200$

Share of Joint Cost for Product D = $\frac{2,32,000}{9,76,000} \times 8,29,600 = ₹\ 1,97,200$

SOLUTION-10:

(a) Statement showing Computation of Profit after further Processing

Particulars	A	B	C	D	Total
Sales after further Processing (₹)	1,15,000	10,000	4,000	30,000	1,59,000
Less: Post Separation Cost	30,000	6,000	Nil	1,000	37,000
Net Realisable Value (NRV)	85,000	4,000	4,000	29,000	1,22,000
Less: Joint Cost (WN 1)	68,000	3,200	3,200	23,200	97,600
Profit / (Loss)	17,000	800	800	5,800	24,400

(b) Statement Showing Computation of Profit before further Processing

Particulars	A	B	C	D	Total
Output	5,00,000 units	10,000 units	5,000 units	9,000 units	
Selling Price p.u.	₹ 0.15	₹ 0.50	₹ 0.80	₹ 3.00	
Sales before further Processing (₹)	75,000	5,000	4,000	27,000	1,11,000
Less: Joint Cost (WN 1)	68,000	3,200	3,200	23,200	97,600
Profit / (Loss)	7,000	1,800	800	3,800	13,400

Statement of the profitability in selling the products with and without further processing.

	Particulars	A	B	C	D	Total
i.	Profit after further Processing (₹)	17,000	800	800	5,800	24,400
ii.	Profit before further Processing (₹)	7,000	1,800	800	3,800	13,400
iii.	Incremental Profit / (Loss) (i. – ii.)	10,000	(1,000)	Nil	2,000	11,000

Product A and Product D should be further processed, because there is incremental profit whereas Product B and Product C should not be further processed.

(c) Computation of Profit after implementing the decision

	(₹)
Product A (Profit after further processing)	17,000
Product B (Profit before further processing)	1,800
Product C (Profit before further processing)	800
Product D (Profit after further processing)	5,800
Overall Profit	25,400

Working Note

1. Allocation of Joint Cost based on Net Realisable Value

Share of Joint Cost for Product A = $\frac{85,000}{1,22,000} \times 97,600 = ₹ 68,000$

Share of Joint Cost for Product B = $\frac{4,000}{1,22,000} \times 97,600 = ₹ 3,200$

Share of Joint Cost for Product C = $\frac{4,000}{1,22,000} \times 97,600 = ₹ 3,200$

Share of Joint Cost for Product D = $\frac{29,000}{1,22,000} \times 97,600 = ₹ 23,200$

SOLUTION-11:

Calculation of Joint Cost

Particulars	Amount (₹)
Sales	
- Komal	15,00,000
- Lovely	31,00,000
- Makeup	2,80,000
- Nice	1,20,000
Total Sales	50,00,000
Less: Profit = 50,00,000 × $\frac{25}{125}$	*10,00,000
Total Cost	40,00,000
Less: Post Separation Cost (1,20,000 + 1,30,000 + 50,000)	3,00,000
Joint Cost	37,00,000

or, *Cost + Profit = Sales

or, Cost + $\frac{25}{125}$ × Cost = 50,00,000

or, $\frac{100 \text{ Cost} + 25 \text{ Cost}}{100}$ = 50,00,000

or, Cost = 50,00,000 × $\frac{100}{125}$ = ₹ 40,00,000

and, Profit = 50,00,000 – 40,00,000 = ₹ 10,00,000

(a) Statement showing Computation of Profit after further Processing

Particulars	Komal	Lovely	Makeup	Nice	Total
Sales after further Processing (₹)	15,00,000	31,00,000	2,80,000	1,20,000	50,00,000
Less: Post Separation Cost	1,20,000	1,30,000	-	50,000	3,00,000
Net Realisable Value (NRV)	13,80,000	29,70,000	2,80,000	70,000	47,00,000
Less: Joint Cost (WN 1)	10,86,383	23,38,085	2,20,426	55,106	37,00,000
Profit	2,93,617	6,31,915	59,574	14,894	10,00,000

(b) Statement Showing Computation of Profit before further Processing

Particulars	Komal	Lovely	Makeup	Nice	Total
Output	3,00,000 units	5,00,000 units	70,000 units	40,000 units	
Selling Price p.u.	₹ 4.50	₹ 6.00	₹ 4.00	₹ 1.50	
Sales before further Processing (₹)	13,50,000	30,00,000	2,80,000	60,000	46,90,000

Particulars	Komal	Lovely	Makeup	Nice	Total
Less: Joint Cost (WN 1)	10,86,383	23,38,085	2,20,426	55,106	37,00,000
Profit	2,63,617	6,61,915	59,574	4,894	9,90,000

(c) **Statement of the profitability in selling the products with and without further processing**.

	Particulars	Komal	Lovely	Makeup	Nice	Total
i.	Profit after further Processing (₹)	2,93,617	6,31,915	59,574	14,894	10,00,000
ii.	Profit before further Processing (₹)	2,63,617	6,61,915	59,574	4,894	9,90,000
iii.	Incremental Profit / (Loss) (i. – ii.)	30,000	(30,000)	Nil	10,000	10,000

Product Komal and Product Nice should be further processed, because there is incremental profit whereas Product Lovely and Product Makeup should not be further processed.

Working Note

1. Allocation of Joint Cost based on Net Realisable Value

Share of Joint Cost for Product Komal = $\frac{13,80,000}{47,00,000}$ × 37,00,000 = ₹ 10,86,383

Share of Joint Cost for Product Lovely = $\frac{29,70,000}{47,00,000} \times 37,00,000 = ₹\ 23,38,085$

Share of Joint Cost for Product Makeup = $\frac{2,80,000}{47,00,000} \times 37,00,000 = ₹\ 2,20,426$

Share of Joint Cost for Product Nice = $\frac{70,000}{47,00,000} \times 37,00,000 = ₹\ 55,106$

SOLUTION-12:

(a) Statement showing apportionment of Joint Costs

Particulars	Main Product 'P'	By-Product 'A'	By-Product 'B'	Total
	(₹)	(₹)	(₹)	(₹)
Sales	90,000	60,000	40,000	1,90,000
Less: Profit (WN – 1)	22,500	12,000	6,000	40,500
Cost of Sales	67,500	48,000	34,000	1,49,500
Less: Selling Expenses (WN – 2)	2,990	5,980	5,980	14,950
Post Separation Cost	6,000	5,000	4,000	15,000
Share of Joint Cost	58,510	37,020	24,020	1,19,550

(b) Statement showing Profit of By-Product 'A' if sold at split of point

	(₹)
Sale Price of By-Product 'A' at split off point	58,500
Less: Share of Joint Cost of By-Product A	37,020
Profit of By-Product 'A' if sold at spit off point	21,480

Profit of By-Product 'A' if sold at spit off point ₹ 21,480

Profit of By-Product 'A' if sold at split off point ₹ 21,480

Profit of By-Product 'A' if sold after further processing ₹ 12,000

It is better to sell By-Product 'A' at split off point because it gives more profit ₹ 21,480 against profit after processing ₹ 12,000.

Working Notes:

1. Calculation of Profit

Particulars	Main Product 'P'	By-Product 'A'	By-Product 'B'
	(₹)	(₹)	(₹)
Profit	25% × 90,000 = 22,500	20% × 60,000 = 12,000	15% × 40,000 = 6,000

2. Calculation of Selling Expense

Total Selling Expense = 10% × Cost of Sales = 10% × 1,49,500 = ₹ 14,950

Selling Expense of Main Product 'P' = $\frac{20}{100}$ × 14,950 = ₹ 2,990

Selling Expense of By-Product 'A' = $\frac{40}{100}$ × 14,950 = ₹ 5,980

Selling Expense of By-Product 'B' = $\frac{40}{100}$ × 14,950 = ₹ 5,980

SOLUTION-1:

Dr. **Contract A/c** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Materials Purchased A/c	1,16,126	By Materials at site c/d	19,716
To Materials Issued A/c	19,570	By Cost of Construction c/d (Bal. fig.)	2,87,000
To Depreciation A/c	2,260		
To Wages A/c	1,47,268		
To Direct Expenses A/c	4,052		
To Prop. Estab. Expenses A/c	17,440		
	3,06,716		**3,06,716**
To Cost of Construction b/d	2,87,000	By Work in Progress A/c	3,02,000
To Notional Profit c/d (Bal. fig.)	15,000	- Value of work certified [WN-1]	
	3,02,000		**3,02,000**
To Profit & Loss A/c [WN-2]	8,000	By Notional Profit b/d	15,000
To Work in progress A/c - Provision for Contingencies (Bal.fig.)	7,000		
	15,000		**15,000**

Working Notes:

1. Value of work certified = $\frac{₹\ 2,41,600}{(1-20\%)}$ = ₹ 3,02,000
2. Since, value of work certified is above 50% of contract value so amount transferred to Profit & Loss A/c = $\frac{2}{3}$ × 15,000 × 80% = ₹ 8,000 ($\frac{2}{3}$ × Notional Profit × $\frac{\text{Cash Received}}{\text{Work Certified}}$)

SOLUTION-2:

Dr. Contract Account Cr

Particulars	(₹)	Particulars	(₹)
To Depreciation on Machinery A/c [WN-1]	8,000	By Materials (Returned) A/c	1,098
		By Materials at site c/d	3,766
To Materials A/c	1,70,698	By Cost of Construction c/d (Bal. fig.)	3,42,550
To Wages A/c	1,48,750		
To Outstanding Wages A/c	5,380		
To Direct Expenses A/c	6,334		
To Overheads A/c	8,252		
	3,47,414		**3,47,414**
To Cost of Construction b/d	3,42,550	By Work in Progress A/c	
To Notional Profit c/d (Bal. fig.)	56,450	- Value of work certified	3,90,000
		- Cost of uncertified work	9,000
	3,99,000		**3,99,000**
To Profit & Loss A/c [WN-2]	34,738	By Notional Profit b/d	56,450
To Work in progress A/c			
- Provision for Contingencies (Bal. fig.)	21,712		
	56,450		**56,450**

Working Notes

1. Depreciation on Machinery = ₹ 30,000 - ₹ 22,000 = ₹ 8,000
2. Since, degree of completion is above 50% so amount transferred to Profit & Loss A/c = $\frac{2}{3} \times 56,450 \times \frac{3,60,000}{3,90,000}$ = ₹ 34,738

SOLUTION-3:

Dr. Contract Account Cr

Particulars	(₹)	Particulars	(₹)
To Materials A/c	43,000	By Materials at site c/d	2,500

To Jr. Engineer A/c	12,620	By Cost of Construction c/d (Bal.	1,77,460
To Labour A/c	1,00,220	fig.)	
To Depreciation on Machine A/c	1,120		
[WN-1]	9,000		
To Supervisor A/c [WN-2]	14,000		
To Other Expenses A/c			
	1,79,960		**1,79,960**
To Cost of Construction b/d	1,77,460	By Work in Progress A/c	
To Notional Profit c/d (Bal. fig.)	66,905	- Value of work certified	2,00,000
		- Cost of uncertified work [WN-3]	44,365
	2,44,365		**2,44,365**

Particulars	(₹)	Particulars	(₹)
To Profit & Loss A/c [WN-4]	35,683	By Notional Profit b/d	66,905
To Work in progress c/d			
- Provision for Contingencies (Bal. fig.)	31,222		
	66,905		**66,905**

Working Notes

1. Depreciation on Machine = $\frac{30,000 - 2,000}{5 \text{ years}} \times \frac{1}{5}$ = ₹ 1,120

2. Amount paid to Supervisor = $\frac{₹2,000 \times 9 \text{ months}}{2}$ = ₹ 9,000

3. Degree of Completion is $\frac{2}{3}$ rd.

So, Cost for Construction of $\frac{2}{3}$ rd = ₹ 1,77,460

Therefore, Expected Cost of Construction = 177,460 × 3/2 = ₹ 2,66,190

Cost of Work Certified is 50% = 50% × 2,66,190= ₹ 1,33,095
Cost of Work Uncertified = ₹ 1,77,460 - ₹ 1,33,095 = ₹ 44,365

4. Since, degree of completion is 2/3 rd, so amount transferred to Profit & Loss A/c = 2/3 × 66,905 × 80% = ₹ 35,683

SOLUTION-4:

Dr. Contract Account Cr

Particulars	(₹)	Particulars	(₹)
To Work in Progress A/c	85,000	By Materials A/c (Returned to Supplier)	450
To Wages A/c	8,500	By Materials A/c (Returned to Stores)	550
To Materials A/c (Purchased)	6,000	By Cost of Construction c/d (Bal. fig.)	1,14,000
To Materials A/c (Issued)	10,500		
To Working Expenses A/c	1,500		
To Administrative Expenses A/c	1,000		
To Plant A/c	2,500		
	1,15,000		**1,15,000**
To Cost of Construction b/d	1,14,000	By Work in Progress A/c	
To Notional Profit c/d	11,500	- Value of work certified	15,000
		- Cost of uncertified work (Bal. fig.)	88,000
		By Contractee A/c	22,500
	1,25,500		**1,25,500**

Dr. Contractee Account Cr

Particulars	(₹)	Particulars	(₹)
To Contract A/c	22,500	By Balance b/d	55,000
To Balance c/d (Bal. fig.)	72,500	By Cash A/c	40,000
	95,000		**95,000**

Balance Sheet as on 31.12.2021 (Abstract)

Liabilities	(₹)	Assets	(₹)
		Work in Progress (15,000 + 88,000) 1,03,000 Less: Cash Received 72,500	30,500

SOLUTION-5:

(a)

Statement showing computation of estimated profit on completion

Particulars	Cost incurred to date	Estimated cost to be incurred	Estimated total cost
	₹	₹	₹
Materials	2,80,000	2,80,000 × 20% = 70,000 80%	2,80,000 = 3,50,000 80%
Direct Labour	90,000	90,000 × 25% = 30,000 75%	90,000 = 1,20,000 75%
Overheads	75,000	75,000 × 25% = 25,000 75%	75,000 = 1,00,000 75%
Erection	15,000	15,000 × 75% = 45,000 25%	15,000 = 60,000 25%
Total Cost	**4,60,000**	**1,70,000**	**6,30,000**
Profit (Bal. fig.)			1,89,000
Contract Price			8,19,000

Therefore, Estimated Profit on completion = ₹ 1,89,000

(b) Estimated Profit to date = Estimated Profit on Completion × Cash Received / Contract Price

= 1,89,000 × 6,00,000 / 8,19,000 = ₹ 1,38,462

Or

Estimated Profit to date = Estimated Profit on Completion × Total Cost to Date / Estimated Total Cost

= 1,89,000 × 4,60,000 = ₹ 1,38,000

SOLUTION-6:

Dr. Contract Account Cr

Particulars	(₹)	Particulars	(₹)
To Materials A/c	4,00,000	By Costing Profit & Loss A/c	20,000
To Labour A/c	10,00,000	(loss due to damage)	
To Depreciation on Plant A/c [WN-1]	20,000	By Cost of Construction c/d (Bal. fig.)	14,00,000
	14,20,000		**14,20,000**
To Cost of Construction b/d	14,00,000	By Work in Progress A/c	
To Notional Profit c/d (Bal. fig.)	2,40,000	- Value of Work Certified [WN-2]	16,00,000
		- Cost of Uncertified Work	40,000
	16,40,000		**16,40,000**
To Profit & Loss A/c [WN-3]	72,000	By Notional Profit b/d	2,40,000
To Work in Progress			
- Provision for Contingencies (Bal. fig.)	1,68,000		
	2,40,000		**2,40,000**

Working Notes:

1. Depreciation on Plant = 80,000 × 25% = ₹ 20,000

2. Value of Work Certified = $\frac{14,40,000}{90\%}$ = ₹ 16,00,000

3. Amount to be credited to Profit & Loss Account = $\frac{1}{3}$ × 2,40,000 × 90% = ₹ 72,000

Amount that may be credited to Profit & Loss Account

1. Estimated Profit × $\frac{\text{Work Certified}}{\text{Contract Price}}$ = 3,20,000 × $\frac{16,00,000}{40,00,000}$ × = ₹ 1,28,000

2. Estimated Profit × $\frac{\text{Work Certified}}{\text{Contract Price}}$ × $\frac{\text{Cash Received}}{\text{Work Certified}}$ = 3,20,000 × 16,00,000 × 90% = ₹ 1,15,200

3. Estimated Profit × $\frac{\text{Total Cost to date}}{\text{Total Cost}}$ = 3,20,000 × $\frac{14,20,000}{36,80,000}$ = ₹1,23,478

4. Estimated Profit × Total Cost to date / Total Cost × Cash Received / Work Certified = 3,20,000 × 14,20,000 × 90% = ₹ 1,11,130

SOLUTION-7:

Dr. Contract Account Cr.

Particulars	Contract I	Contract II	Contract III	Particulars	Contract I	Contract II	Contract III
	(₹)	(₹)	(₹)		(₹)	(₹)	(₹)
To Materials A/c	14,400	11,600	4,000	By Materials on	800	800	800
To Wages A/c	22,000	22,500	2,800	hand c/d			
To O/s Wages A/c	700	750	350	By Cost of Construction c/d (Bal. fig)	37,800	34,980	6,720
To Gen. Exp. A/c	800	550	200				
To O/s Gen. Exp. A/c	150	100	50				
To Depreciation on Plant A/c [WN-1]	550	280	120				
	38,600	**35,780**	**7,520**		**38,600**	**35,780**	**7,520**

Particulars	Contract I	Contract II	Contract III	Particulars	Contract I	Contract II	Contract III
	(₹)	(₹)	(₹)		(₹)	(₹)	(₹)
To Cost of Construction b/d	37,800	34,980	6,720	By Work in prog- ress c/d			
To Notional Profit c/d (Bal. fig)	3,400	-	880	- Value of Work Certified	40,000	32,000	7,200
				- Cost of Uncertified Work	1,200	1,600	400
				By Profit & Loss A/c (Bal. fig.)	-	1,380	-
	41,200	**34,980**	**7,600**		**41,200**	**34,980**	**7,600**
To Profit & Loss A/c [WN-2]	1,700	-	-	By Notional Profit b/d	3,400	-	880

To Work in Progress A/c - Provision for Contingencies	1,700		880				
	3,400	-	880		3,400	-	880

Working Notes:

1. Depreciation on Plant for
   Contract I = $4,000 \times 15\% \times \frac{11}{12} = ₹ 550$
   Contract II = $3,200 \times 15\% \times \frac{7}{12} = ₹ 280$
   Contract III = $2,400 \times 15\% \times \frac{4}{12} = ₹ 120$
2. Amount transferred to Profit & Loss A/c
   Work done more than 50% Contract I = Profit = $\frac{2}{3} \times 3,400 \times \frac{30,000}{40,000} = ₹ 1,700$
   Contract II = Loss = ₹ 1,380
   Work done less than 25% Contract III = Nil

SOLUTION-8:

Dr. Contract Account Cr.

Particulars	(₹)	Particulars	(₹)
Year I		By Cost of Construction c/d (Bal. fig.)	91,000
To Materials A/c	45,000		
To Direct Expenses A/c	1,750		
To Indirect Expenses A/c	750		
To Wages A/c	42,500		
To Depreciation on Plant A/c [WN-1]	1,000		
	91,000		**91,000**
To Cost of Construction b/d	91,000	By Work in Progress c/d	
		- Value of Work Certified	87,500
		By Profit & Loss A/c	
		Less (Bal. fig.)	3,500
	91,000		**91,000**

Year II		By Cost of Construction c/d (Bal. fig.)	2,08,750
To Work in Progress b/d			
- Value of work certified	87,500		
To Materials A/c	55,000		
To Direct Expenses A/c	6,250		
To Indirect Expenses A/c	1,000		
To Wages A/c	57,500		
To Depreciation on Plant A/c [WN-1]	1,500		
	2,08,750		**2,08,750**

Particulars	(₹)	Particulars	(₹)
To Cost of Construction b/d	2,08,750	By Work in Progress c/d	
To Notional Profit c/d (Bal. fig)	78,750	- Value of Work Certified	2,82,500
		- Cost of Uncertified Work	5,000
	2,87,500		**2,87,500**
To Profit & Loss A/c [WN-2]	47,250	By Notional Profit b/d	78,750
To Work in Progress c/d			
- Provision for Contingencies	31,500		
	78,750		**78,750**
Year III		By Work in Progress b/d	
To Work in Progress A/c		- Provision for Contingencies	31,500
- Value of work certified	2,82,500	By Cost of Construction c/d (Bal. fig)	3,33,750
- Cost of Uncertified Work	5,000		
To Materials A/c	31,500		
To Direct Expenses A/c	2,250		
To Wages A/c	42,500		
To Depreciation on Plant A/c [WN-1]	1,500		
	3,65,250		**3,65,250**
To Cost of Construction b/d	3,33,750	By Work in Progress A/c	
To Notional Profit c/d (Bal. fig)	41,250	- Value of Work Certified	3,75,000

	3,75,000		**3,75,000**
To Profit & Loss A/c	41,250	By Notional Profit b/d	41,250
	41,250		**41,250**

Working Notes:

1. Depreciation on Plant
   Year I = ₹ 5,000 – ₹ 4,000 = ₹ 1,000
   Year II = ₹ 4,000 – ₹ 2,500 = ₹ 1,500
   Year III = ₹ 2,500 – ₹ 1,000 = ₹ 1,500
2. Amount transferred to Profit & Loss A/c in
   Year I = Loss ₹ 3,500
   Year II = $\frac{2}{3}$ × 78,750 × 90% = ₹ 47,250
   Year III = Profit ₹ 41,250

SOLUTION-9:

Dr. Contract Account Cr

Particulars	(₹)	Particulars	(₹)
To Materials A/c	1,70,000	By Costing Profit & Loss A/c	6,000
To Wages A/c	1,80,000	(loss due to accident)	
To Depreciation on Plant A/c [WN-1]	20,000	By Materials at Site	4,000
To Expenses A/c	45,000	By Cost of Construction c/d (Bal. fig.)	4,05,000
	4,15,000		**4,15,000**
To Cost of Construction b/d	4,05,000	By Work in Progress c/d	
To Notional Profit c/d (Bal. fig.)	90,000	- Value of Work Certified [WN-3]	4,80,000
		- Cost of Uncertified Work	15,000
	4,95,000		**4,95,000**
To Profit & Loss A/c	50,625	By Notional Profit b/d	90,000
To Work in Progress c/d			
- Provision for Contingencies (Bal. fig.)	39,375		
	90,000		**90,000**

Working Notes:

1. Depreciation on Plant = 2,00,000 × 10/100 × 9/12 + 50,000 × 10/100 × 3/12 = 15,000 + 1,250 = ₹ 20,000

2. Expenses = 25% × 1,80,000 = ₹ 45,000

3. Value of Work Certified = 80% × 6,00,000 = ₹ 4,80,000

4. Amount to be transferred to Profit & Loss A/c = 9/12 × 90,000 × 75% = ₹ 50,625

Dr. **Profit & Loss Account** **Cr**

Particulars	(₹)	Particulars	(₹)
To Contract A/c	6,000	By Contract A/c	50,625
To Depreciation on Plant A/c (2,00,000 × 10% × 3/12)	5,000		
To Expenses A/c (47,000 – 45,000)	2,000		
To Net Profit c/d	37625		
	50,625		**50,625**

Balance Sheet as on 31.12.2022

Liabilities	(₹)	Assets	(₹)	(₹)
Capital	5,00,000	Work in Progress		
Profit & Loss A/c	37,,625	- Value of Work Certified	4,80,000	
Creditors	72,000	- Cost of Uncertified Work	15,000	
			4,95,000	
		Less: Work in Progress - Provision for Contingencies	39,375	
			4,55,625	
		Less: Cash Received	3,00,000	1,55,625

		Buildings		1,60,000
		Plant (2,50,000 – 25,000)		2,25,000
		Bank		35,000
		Stock of Materials (2,00,000 – 1,70,000) + 4,000		34,000
	6,09,625			**6,09,625**

SOLUTION-10:

Dr. **Contract Account** **Cr.**

Particulars	(₹)	Particulars	(₹)
To Materials A/c	6,00,000	By Materials at Site c/d	27,000
To Wages A/c	8,30,000	By Cost of Construction c/d (Bal. fig.)	14,69,000
To Outstanding Wages A/c	6,000		
To Expenses A/c	40,000		
To Depreciation on Machinery A/c [WN-1]	20,000		
	14,96,000		**14,96,000**
To Cost of Construction b/d	14,69,000	By Work in Progress c/d	
To Notional Profit c/d (Bal. fig.)	1,47,000	- Value of Work Certified [WN-2]	16,00,000
		- Cost of Uncertified Work	16,000
	16,16,000		**16,16,000**
To Profit & Loss A/c [WN-3]	78,400	By Notional Profit b/d	1,47,000
To Work in Progress c/d			
- Provision for Contingencies (Bal. fig.)	68,600		
	1,47,000		**1,47,000**

Working Notes:

1. Depreciation on Machinery charged to Contract A/c = 1,60,000 × 12.5% = ₹ 20,000
2. Value of Work Certified = $\frac{12,80,000}{80\%}$ = ₹ 16,00,000
3. Amount transferred to Profit & Loss A/c = $\frac{2}{3}$ × 1,47,000 × 80% = ₹ 78,400

Dr. **Profit & Loss Account** **Cr**

Particulars	(₹)	Particulars	(₹)
To Depreciation on Machinery A/c (52,000 × 12.5%)	6,500	By Balance b/d	25,000
To Net Profit (Bal. fig)	96,900	By Contract A/c	78,400
	1,03,400		**1,03,400**

Balance Sheet as on 31.12.2021

Liabilities	(₹)	Assets	(₹)	(₹)
Capital	3,51,800	Land & Buildings		74,000
Profit & Loss	96,900	Machinery (at Cost) (1,60,000 + 52,000)	2,12,000	
A/c Creditors	81,200	Less: Provision for Depreciation (63,000 + 26,500)Work in Progress	89,500	1,22,500
Outstanding Labour	6,000	- Value of Work Certified	16,00,000	
		- Cost of Uncertified Work	16,000	
			16,16,000	

Liabilities	(₹)	Assets	(₹)	(₹)
		Less: Work in Progress		
		- Provision for Contingencies	68,600	
			15,47,400	
		Less: Cash Received	12,80,000	2,67,400
		Bank		45,000
		Stock of Materials		27,000
	5,35,900			**5,35,900**

SOLUTION-11:

Dr. **Contract Account** **Cr.**

Particulars	V.29 ₹ in lacs	V.24 ₹ in lacs	V.25 ₹ in lacs	Particulars	V.29 ₹ in lacs	V.24 ₹ in lacs	V.25 ₹ in lacs
To Expenses other than	4.84	4.56	2.22	By Cost of Construction c/d			
Depreciation				(Bal. fig.)	5.56	4.98	2.46
To Depreciation [WN-1]	0.72	0.42	0.24				
	5.56	4.98	2.46		5.56	4.98	2.46
To Cost of Construction b/d	5.56	4.98	2.46	By Work in Progress A/c			
				- Value of Work Certified	7.2	4.2	2.4
To Notional Profit c/d (Bal. fig.)	1.64	-	-				
				By Profit & Loss A/c (Bal. fig.)	-	0.78	0.06
	7.2	**4.98**	**2.46**		**7.2**	**4.98**	**2.46**
To Profit & Loss A/c [WN-2] To Work in Progress	1.025	-	-				
- Provision for contingencies				By Notional Profit b/d	1.64	-	-
	0.615	-	-				
	1.64	**-**	**-**		**1.64**	**-**	**-**

Working Notes:

1. Depreciation for Contract V.29 = (4,90,000+2,00,000) × 20% × $\frac{7.20}{7.20+4.20+2.40}$ = ₹ 72,000

Contract V.24 = 6,90,000 × 20% × $\frac{4.20}{7.20+4.20+2.40}$ = ₹ 42,000

Contract V.25 = 6,90,000 × 20% × $\frac{2.40}{7.20+4.20+2.40}$ = ₹ 24,000

2. Amount to be transferred to Profit & Loss = Estimated Profit × Cash Received / Contract Price

= 1.64 × 5.00 / 8.00 = ₹ 1.025 lacs

SOLUTION-12:

Dr. Contract Account Cr.

Particulars	(₹)	Particulars	(₹)
To Materials A/c (Purchased)	1,00,000	By Materials at Site c/d	25,000
To Wages A/c	45,000	By Cost of Construction c/d (Bal. fig.)	1,40,000
To Outstanding Wages A/c	5,000		
To General Expenses A/c	10,000		
To Depreciation on Plant A/c	5,000		
	1,65,000		**1,65,000**
To Cost of Construction b/d	1,40,000	By Work in Progress A/c	
To Notional Profit c/d (Bal. fig.)	80,000	- Value of Work Certified	2,00,000
		- Escalation [WN-1]	5,000
		- Cost of Uncertified Work	15,000
	2,20,000		**2,20,000**

Particulars	(₹)	Particulars	(₹)
To Profit & Loss A/c [WN-2]	20,000	By Notional Profit b/d	80,000
To Work in Progress A/c			
- Provision for Contingencies (Bal.fig.)	60,000		
	80,000		**80,000**

Working Notes:

1. Increase in Contract Price due to Escalation in the Prices of Materials and Labour
   Cost of Materials and Labour incurred = 1,00,000 + 45,000 + 5,000 – 25,000
   = ₹ 1,25,000
   Increase in prices of Materials and Labour by 25%
   So, Cost of Materials and Labour before increase in Prices = $1,25,000 \times \frac{100}{125} = ₹ 1,00,000$
   Increase in Contract Price (beyond 5% increase) = $\frac{25}{100} \times (1,25,000 - 1,00,000 \times \frac{105}{100})$
   $= \frac{25}{100} \times (1,25,000 - 1,05,000)$
   = ₹ 5,000
2. Amount to be transferred to Profit & Loss A/c = $\frac{1}{3} \times 80,000 \times \frac{1,50,000}{2,00,000}$ = ₹ 20,000

SOLUTION-13:

Statement Showing Number of Hours

Particulars	Building Bricks		Fire Bricks		Total
		Hours		Hours	Hours
Brick Forming	$\frac{1,30,000}{100} \times 3$	3,900	$\frac{70,000}{100} \times 2$	1,400	5,300
Heat Treatment	$\frac{1,30,000}{100} \times 2$	2,600	$\frac{70,000}{100} \times 5$	3,500	6,100

Cost of Forming per hour = $\frac{₹21,200}{5,300 \text{ hours}}$ = ₹ 4 per hour

Cost of Heat Treatment = $\frac{₹48,800}{6,100 \text{ hours}}$ = ₹ 8 per hour

Statement Showing Computation of Manufacturing Cost for two variety of Bricks

Particulars	Building Bricks		Fire Bricks		Total
		(₹)		(₹)	(₹)
Brick Forming	3,900 × 4	15,600	1,400 × 4	5,600	21,200

Heat Treatment	2,600 × 8	20,800	3,500 × 8	28,000	48,800
Total		**36,400**		**33,600**	**70,000**

CHAPTER 13: OPERATING COSTING

SOLUTION-1:

Absolute basis: MT-Kilometer: = (20MT × 80 Kms) + (12 MT×120 Kms) + (16 MT × 160 Kms)

= 1,600 + 1,440 + 2,560 = 5,600 MT-Kilometer

Commercial basis: MT-Kilometer: = [{(20+12+16)/3} MT × {(80+120+160) Kms]

= 16 MT×360 Kms = 5,760 MT–Kilometer

The next step is to collect and identify various costs under different heads. Such as:

i. Fixed or standing charges
ii. Semi-fixed or maintenance charges
iii. Variable or running charges.

One of the important features of operating costing is that mostly such costs are fixed in nature. For example, in case of passenger transport organisation, most of the costs are fixed while few costs like diesel and oil are variable and dependent on the kilometers run The methods of computing costs in service organisations is discussed here with special reference to Transport, Hotel and Hospital Sectors:

SOLUTION-2:

Statement showing computation of total cost and cost per tonne kilometer of carrying finished goods to warehouses:

Particulars	Warehouse A		Warehouse B	
Time for travelling	$\frac{10\times2}{30} \times 60$	40 Min	$\frac{15\times2}{30} \times 60$	60 Min
Time for loading		40 Min		40 Min
Time for unloading		30 Min		30 Min
Total Time involved		110 Min		130 Min
Drivers' wages, depreciation, insurance and taxes	$\frac{110}{60} \times 18$	₹ 33	$\frac{120}{60} \times 18$	₹ 36
Fuel & Oil etc	10 × 2 × 2.40	₹ 48	15 × 2 × 2.4	₹ 72
Total Cost		₹ 81		₹ 108
Tonne Kilometers	5 tonne × 10 km	50	5 tonne × 15 km	75

Cost per tonne-kilometer	₹ 81 / 50 tonne - km	₹ 1.62	₹ 108 / 75 tonne - km	₹ 1.44

SOLUTION-3:

Computation of Tonne-km

= (Distance to × Tonne × capacity +Distance from × capacity × occupancy) × No.of days operating per month

= (50km × 5 tonne × 100% + 50km × 5tonne × 20%) × 25days = 7,500

Computation of Total Cost of the truck per month

Particulars	Workings	₹ (Cost per month)
Fixed Charges		
Wages of Driver		500
Wages of Cleaner		250
Insurance	₹ 4,800 / 12	400
Tax	₹ 2,400 / 12	200

Particulars	Workings	₹ (Cost per month)
General Supervision Charges	₹ 4,800 / 12	400
Maintenance Charges		
Repairs and Maintenance		500
Running Charges		
Depreciation	₹90,000 / 10 years × 1 / 12	750
Diesel, oil and grease	₹15 × 2 trips × 25days	750
Total Cost		**3,750**

(a) Computation of Cost per tonne-km

Operating Cost per tonne-km = Cost incurred per month = 3,750 = ₹ 0.50

Tonne - km per month 7,500

Computation of Rate per tonne-km

Let the Rate per tonne-km be ₹ X
or, Cost + Profit = Rate
or, 0.50 + 50% X = X
or, X= $\frac{0.50}{50\%}$ = ₹ 1

⊙ Rate per tonne-km = ₹ 1

SOLUTION-4:

Operating Cost Statement for the month of April 2022

Particulars	Amounts ₹	Amounts ₹
A. Standing Charges		
• Wages of drivers, conductors and cleaners.	2,40,000	
• Salaries of office staff	1,00,000	
• Taxation, insurance etc.	1,60,000	
• Interest and other expenses	2,00,000	
• Depreciation	2,60,000	
• Total standing charges		9,60,000
B. Running and Maintenance Charges		
• Repairs and maintenance	80,000	
• Diesel oil and other oil	3,50,000	
• Total running and maintenance charges		4,30,000
C. Total cost [A+B]		13,90,000
D. Cost per passenger kilometre* ₹13,90,000 / 5,62,500 passenger kilometers		2.471

Working:

*Passenger kilometers are computed as below:

= Number of buses × Distance in one round trip × Seating capacity available × Percentage of seating capacity actually used × Number of days in a month × No. of trips

= 5 buses × 50 kilometers × 2 × 50 passengers × 75% × 30 days

= 5,62,500 passenger-kms

SOLUTION-5:

Computation of Cost per Passenger Mile

= Number of buses × Distance Covered per day × Number of days operating in a month × Number of passenger × Occupancy × No. of trips

= 4 × (50 × 2) × 30 × 40 × 75%

= 3,60,000 passenger-mile

Cost per Passenger-Mile = $\frac{\text{Total Cost}}{\text{Total Passenger Mile}} = \frac{₹\ 14,100}{3,60,000\ \text{Passenger - Mile}} = ₹\ 0.04$

SOLUTION-6:

Total Distance travelled by 10 taxi per month = 4,000km/month × 10 Taxies = 40,000 km

Passenger - km = Total Distance × Occupancy = 40,000 × 80% = 32,000 passenger-km

Statement Showing Total Cost incurred per month for 10 taxies

Particulars	Workings	Cost per month (₹)	Cost per month (₹)
Fixed Expenses			
Salary of Staff		1,500	
Salary of Garage Supervisor		2,000	
Rent of Garage		1,000	
Drivers Salary	400 x 10	4,000	
Road Tax and Repairs	2,160 ×10	1,800	

Insurance Premium	12 75,000 × 10 × 4% 12	2,500	
∴ Total Fixed Expenses per month			12,800
Running Expenses			

Particulars	Workings	Cost per month (₹)	Cost per month (₹)
Depreciation	₹ 75,000 - ₹ 15,000 × 4,000 km × 10 3,00,000 km	8,000	
Petrol	₹ 6.30 × 4,000 km × 10 9 km	28,000	
Oil and other sundries	₹ 10 × 4,000 km × 10 100 km	4,000	
∴ Total Running Expenses per month			40,000
∴ Total Cost per month (A)	12,800 + 40,000		52,800
Total Hire charges (B)	32,000 × 1.80		57,600
Profit per month (B- A)	57,600 – 52,800		4,800
∴ Profit per year	4,800 × 12 months		57,600

SOLUTION-7:

Total Distance travelled by 10 bus per month

= (Distance of route one way × 2) × Number of trips per day × Number of days operating in the month × Number of buses

= 20 × 2 × 3 × 25 × 10

= 30,000 km per month

Computation of Passenger-Km per month

= Total Distance Travelled by 10 bus per month × Number of passenger

= 30,000 × 40

= 12,00,000 passenger - km per month

Computation of Total Cost for 10 bus per month (Excluding Commission of Driver and Conductor)

Particulars	Workings	₹ (Cost per month)
Fixed or Standing Charges		
Depreciation	$\frac{₹\ 50,000}{5\ \text{years}} \times 10 \times \frac{1}{12}$	8,333.33
Insurance	$\frac{₹\ 50,000 \times 10 \times 3\%}{12}$	1,250.00
Tax	$\frac{₹\ 1,000 \times 10}{12}$	833.33
Garage Charges		1,000.00
Salary of Drivers	₹ 150 × 10	1,500.00
Salary of Conductors	₹ 100 × 10	1,000.00
Cost of Stationery		500.00
Salary of Manager		2,000.00
Salary of Accountant		1,500.00
Maintenance Charges		
Repairs	$\frac{₹\ 1,000 \times 10}{12}$	833.34
Running Charges		
Petrol and Oil	$\frac{30,000\ \text{km}}{100\ \text{km}} \times ₹\ 25$	7,500
		26,250.00

Let the taking be ₹ X

Total Cost (Excluding Commission) + Commission + Profit = Takings

or, $26,250 + \frac{10\ X}{100} + \frac{100\ X}{100} = X$

or, $\frac{75}{100} X = 26,250$

or, X = 35,000

⊙ Takings= ₹ 35,000

Profit = 15% × 35,000 = ₹ 5,250

Commission of Driver and Conductor = 10% × 35,000 = ₹ 3,500

⊙ Fare per passenger - km = $\frac{₹\ 35,000}{12,00,000 \text{ passenger - km}}$ = ₹ 0.0292 ≈ ₹ 0.03

SOLUTION-8:

Total Equivalent Single Room Suites

Nature of Suite	Occupancy (Room-days)	Equivalent Single Room Suite (Room-days)
Single Room	36,000 (100 rooms × 360 days × 100%)	36,000 (36,000 × 1)
Double Rooms	14,400 (50 rooms × 360 days × 80%)	36,000 (14,400 × 2.5)
Triple Rooms	6,480 (30 rooms × 360 days × 60%)	32,400 (6,480 × 2.5 × 2)
Total		**1,04,400**

Computation of Total Cost

Particulars	₹
Salary of Staff	14,25,000
Wages of Room Attendants	4,50,000
Lighting, heating and power	2,15,000
Repairs and renovation	1,23,500
Laundry charges	80,500
Interior decoration	74,000
Sundries	1,53,000

Total Cost (Excluding Building Rent)	**25,21,000**
Building Rent (10,000 × 12 + 5% × Takings)	**1,20,000 + 5% takings**
Total Cost	**26,41,0000+5% × Takings**

Total Cost + Profit = Takings

or, (26,41,0000+5% × Takings)+20% × Takings = Takings

or, 75% Takings = 26,41,000

or, Takings = $\frac{26,41,000}{75\%}$ = ₹ 35,21,333

Let the Rent of Single Room Suite = R

or,Takings = 1,04,400 R

or, R = $\frac{₹\ 35,21,333}{1,04,400\ \text{Equivalent Single Room}}$ days = ₹ 33.73

⊙ Rent to be charged for Single Room = ₹ 33.73

Rent to be charged for Double Rooms = ₹ 33.73 × 2.5 = ₹ 84.33

Rent to be charged for Triple Rooms = ₹ 33.73 × 2.5 × 2 = ₹ 168.65

SOLUTION-9:

Computation of Estimated Cost for the year Ending 31st March 2022

Particulars	Amounts ₹
Salary	2,75,000

Particulars	Amounts ₹
Repairs	1,30,500
Laundry and linen	40,000
Interior decoration	87,500
Depreciation: 5% on ₹80 lakhs: ₹4,00,000 15% on ₹20lakhs: ₹3,00,000	7,00,000

Miscellaneous Expenses	95,400
Total costs	13,28,400

Workings:

1. Number of room days in a year:
   - ❖ Occupancy during season for 6 months @ 80% = [50×0.80×6×30] = 7200
   - ❖ Off-season occupancy for 6 months @ 40% = [50×0.4×6×30] = 3600
   - ❖ Total number of room days during a year = 10,800
2. Attendant's salary
   - ❖ For 10,800 room days @ ₹5 per day = ₹54,000
3. Light charges for 8 months @ ₹120 per month i.e. ₹120/30 = ₹4 per room day Light charges for 4 months @₹30 per month, i.e. ₹30/30 = ₹1 per room day
   - ❖ Total lighting charges:
     - During season @ ₹4 for 7200 days = ₹28,800
     - During off season 2 months @ ₹4 for 1200 days [2/6 × 3600 × 4] = ₹4,800
     - During 4 months of winter @ ₹1 for 2, 400 days [4/6 × 3600 × 1] = ₹2,400
     - Total lighting charges: ₹36,000 [28,800 + 4,800 + 2,400)

Note: It is given in the example that during four months of winter, the lighting is ₹30 per room, which is 1/4th of the lighting charges during the remaining period of the year. Hence the rate of room day which is ₹4 will also be 1/4th for winter period and so it is taken as ₹1 per room day.

Statement of Total Estimated Cost

Particulars	Amounts ₹
Expenses as shown in I above	13,28,400
Attendant's salary as shown in III above	54,000
Lighting charges as shown in IV above	36,000
Total cost	14,18,400

Computation of Total Full Room Days

- ❖ During season: 7,200
- ❖ During off-season: 1,800 [Equivalent to 50% rate of 3,600 days]
- ❖ Total Full Room Days: 7,200 + 1,800 = 9,000

Computation of Room Rent

- ❖ Cost per room day: ₹14,18,400 /9,000 = ₹157.60
- ❖ Add: Profit margin at 20% of rent or 25% of cost = ₹39.40
- ❖ Room Rent = ₹197.00

Thus, during season, room rent of ₹197 is to be charged while in the off-season room rent of ₹ 98.50 is to be charged.

SOLUTION-10:

Computation of Total Room days and Equivalent Full Room Rent days

Season	Total Room days	Equivalent Full Room Rent days
Season – 80% Occupancy	100 rooms × 80% × 6 months × 30 days in a month = 14,400	14,400 × 100%=14,400
Off – Season – 40% Occupancy	100 rooms × 40% × 6 months × 30 days in a month = 7,200	7,200 × 50%=3,600
Total	**21,600**	**18,000**

Lighting charges

The lighting charges for 8 months is ₹ 120 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.

Being hill station, winter season is to be considered as off-season. Hence, the non-winter season of 8 months include: peak season of 6 months and off-season of 2 months.

Computation of Lighting charges

Season	Workings	(₹)
Season & Non winter – 80% Occupancy (6 months)	100 rooms × 80% × 6 months × ₹ 120 per month	57,600
Off Season & Non winter – 40% Occupancy (2 months)	100 rooms × 40% × 2 months × ₹ 120 per month	9,600
Off Season & Winter – 40% Occupancy (4 months)	100 rooms × 40% × 4 months × ₹ 30 per month	4,800
Total Lighting charges		**72,000**

Computation of Total Cost

Particulars	(₹)
Salary of Staff	5,50,000
Repairs of Building	2,61,000
Laundry charges	80,000

Interior	1,75,000
Miscellaneous expenses	1,90,800
Depreciation – Building (₹ 200 lakhs × 80% × 5%)	8,00,000
Depreciation – Furniture & Equipment (₹ 200 lakhs × 20% × 15%)	6,00,000
Wages of Room Attendants (₹ 10 × 21,600 room days)	2,16,000
Lighting Charges	72,000
Total Cost	29,44,800

Total Cost + Profit = Takings

or, 29,44,800 + 20% Takings = Takings

or, Takings = 29,44,800 = ₹ 36,81,000

80%

Computation of Room Rent per day

$$= \frac{\text{Takings}}{\text{Equivalent Full Room Rent days}} = \frac{₹\ 36,81,000}{18,000} = ₹\ 204.50$$

Room Rent during season = ₹ 204.50

and, Room Rent during Off-Season = ₹ 204.50 x 50% = ₹ 102.25

SOLUTION-11:

Computation of Total Room days and Equivalent Full Room Rent days

Season	Total Room days	Equivalent Full Room Rent days
Season – 80% Occupancy	50 rooms × 80% × 6 months × 30 days in a month = 7,200	7,200 × 100%=7,200
Off – Season – 40% Occupancy	50 rooms × 40% × 6 months × 30 days in a month = 3,600	3,600 × 50%=1,800
Total	**10,800**	**9,000**

Lighting charges

The lighting charges for 8 months is ₹ 120 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.

Being hill station, winter season is to be considered as off-season. Hence, the non-winter season of 8 months include: peak season of 6 months and off-season of 2 months.

Computation of Lighting charges

Season	Workings	₹
Season & Non winter – 80% Occupancy (6 months)	50 rooms × 80% × 6 months × ₹ 120 per month	28,800
Off Season & Non winter – 40% Occupancy (2months)	50 rooms × 40% × 2 months × ₹ 120 per month	4,800
Off Season & Winter – 40% Occupancy (4 months)	50 rooms × 40% × 4 months × ₹ 30 per month	2,400
Total Lighting charges		**36,000**

Computation of Total Cost

Particulars	(₹)
Salary of Staff	2,75,000
Repairs of Building	1,30,500
Laundry charges	40,000
Interior	87,500
Miscellaneous expenses	95,400
Depreciation – Building (₹ 80 lakhs × 5%)	4,00,000
Depreciation – Furniture & Equipment (₹ 20 lakhs × 15%)	3,00,000
Wages of Room Attendants (₹ 5 × 10,800 room days)	54,000
Lighting Charges	36,000
Total Cost	**14,18,400**

Total Cost + Profit = Takings

or, 14,18,400 + 20% Takings = Takings

or, Takings = $\frac{14,18,400}{80\%}$ = ₹ 17,73,000

Computation of Room Rent per day

$$= \frac{\text{Takings}}{\text{Equivalent Full Room Rent days}} = \frac{17,73,000}{9,000} = ₹\ 197$$

⊙ Room Rent during season = ₹ 197

and, Room Rent during Off-Season = ₹ 197 × 50% = ₹ 98.50

SOLUTION-12:

Working Notes:

Calculation of number of patient days

35 Beds × 150 days	5,250
25 Beds × 80 days	2,000
Extra beds	750
Total	8,000

Profitability Statement

Particulars	(₹)	(₹)
Income for the year (₹ 2,000 per patient per day × 8,000 patient days)		1,60,00,000
Less: Variable Costs:		
Doctor Fees (₹ 2,50,000 per month × 12months)	30,00,000	
Food to Patients (variable)	8,80,000	
Other services to patients (variable)	3,00,000	

Particulars	(₹)	(₹)
Laundry charges (variable)	6,00,000	
Medicines (variable)	7,50,000	
Bed Hire Charges (₹100 × 750 beds)	75,000	
Total variable costs		56,05,000
Contribution		1,03,95,000
Less: Fixed Costs:		

Rent (₹75,000 per month × 12 months)	9,00,000	
Supervisor (2 persons × ₹25,000 × 12months)	6,00,000	
Nurses (4 persons × ₹20,000 × 12months)	9,60,000	
Ward Boys (4 persons × ₹5,000 × 12months)	2,40,000	
Repairs (fixed)	81,000	
Other fixed expenses	10,80,000	
Administration expenses allocated	10,00,000	
Total Fixed Costs		48,61,000
Profit		55,34,000

Calculation of Contribution per Patient Day

Total Contribution = ₹1,03,95,000

Total Patient days = 8,000

Contribution per Patient Day = ₹1,03,95,000 / 8,000 = ₹1,299.375

Break even Point = Fixed Cost / Contribution per Patient Day

= ₹48, 61,000 / ₹1,299.375

= 3,741 patient days

CHAPTER 14: MARGINAL COSTING

SOLUTION-1:

P/V Ratio = $\frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{\text{Fixed Cost + Profit}}{\text{Sale}} \times 100 = \frac{45,000 + 30,000}{1,50,000} \times 100 = 50\%$

Break Even Sales for the six months ending 30th June, 2021 = $\frac{\text{Fixed Cost}}{\text{P / V Ratio}} = \frac{45,000}{50\%} = ₹\ 90,000$

Margin of Safety for the six months ending 30th June, 2021 = Sales – Break Even Sales

= 1,50,000 – 90,000 = ₹ 60,000

(i) Income Statement for the second half of the year 2021

Particulars	Workings	(₹)
Sales	Sales = $\frac{\text{Contribution}}{\text{P/V Ratio}} = \frac{35,000}{50\%}$	70,000
Less: Variable Cost	Bal. fig. or Sales × (1 – P/V Ratio)	35,000
Contribution	Fixed Cost – Loss = 45,000 – 10,000	35,000
Less: Fixed Cost		45,000
Loss		10,000

Step 1 – Calculation of Contribution = Fixed Cost – Loss = 45,000 – 10,000 = ₹ 35,000

Step 2 – Calculation of Sales

Step 3 – Calculation of Variable Cost

Break Even Sales for the year 2021 = $\frac{\text{Fixed Cost for the year}}{\text{P/V Ratio}} = \frac{45,000 + 45,000}{50\%}$ **= ₹ 1,80,000**

Margin of Safety for the year 2021 = Sales for year – Break Even Sales

= (1,50,000 + 70,000) – 1,80,000

= ₹ 40,000

SOLUTION-2:

(a) Income Statement (₹)

Sales (1,00,000 × ₹ 1 per unit)	1,00,000
Less: Variable Cost (1,00,000 × ₹ 0.40)	40,000

Contribution	60,000
Less: Fixed Cost	50,000
Profit	10,000

P/V Ratio = $\frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{60,000}{1,00,000} \times 100 = 60\%$

BE Sales = $\frac{\text{Fixed Cost}}{\text{P / V Ratio}} = \frac{₹\ 50,000}{60\%} = ₹\ 83,000$

Margin of Safety = Sales – BEP Sales = ₹ 1,00,000 - ₹ 83,333 = ₹ 16,667

	Income Statement	P/V Ratio	BE Sales	MOS
(i) Increase in volume by 20%	₹ Sales (1,20,000 × 1) 1,20,000 Less: VC (1,20,000 × 0.4) 48,000 Contribution 72,000 FC 50,000	= $\frac{72,000}{1,20,000} \times 100$ = 60%	= $\frac{50,000}{60\%}$ = ₹ 83,333	= 1,20,000 – 83,333 = ₹ 36,667
(ii) Decrease in volume by 20%	₹ Sales (80,000 × 1) 80,000 Less: VC (80,000 × 0.4) 32,000 Contribution 48,000 FC 50,000	= $\frac{48,000}{80,000} \times 100$ = 60%	= $\frac{50,000}{60\%}$ = ₹ 83,333	= 80,000 – 83,333 = ₹ 3,333
(iii) 5% Increase in Variable Cost	₹ Sales (1,00,000×1) 1,00,000 Less: VC	= $\frac{58,000}{1,00,000} \times 100$	= $\frac{50,000}{58\%}$	= 1,00,000 – 86,207

	(1,00,000 × 0.42) 42,000 Contribution 58,000 FC 50,000	= 58%	= ₹ 86,207	= ₹ 13,793
(iv) 5% Decrease in Variable Cost	₹ Sales (1,00,000×1) 1,00,000 Less: VC (1,00,000 × 0.38) 38,000 Contribution 62,000 FC 50,000	= 62,000 / 1,00,000 × 100 = 62%	= 50,000 / 62% = ₹ 80,645	= 1,00,000 – 80,645 = ₹ 19,355
(v) 10% Increase in Fixed Cost	₹ Sales (1,00,000×1) 1,00,000 Less: VC (1,00,000 × 0.40) 40,000 Contribution 60,000 FC 55,000	= 60,000 / 1,00,000 × 100 = 60%	= 55,000 / 60% = ₹ 91,667	= 1,00,000 – 91,667 = ₹ 8,333
(vi) 10% Decrease in Fixed Cost	₹ Sales (1,00,000×1) 1,00,000 Less: VC (1,00,000 × 0.40) 40,000 Contribution 60,000 FC 45,000	= 60,000 / 1,00,000 × 100 = 60%	= 45,000 / 60% = ₹ 75,000	= 1,00,000 – 75,000 = ₹ 25,000
(vii) 10% Decrease in selling price and 10%	₹ Sales (1,10,000 × 0.9) 99,000 Less: VC	= 55,000 / 99,000 × 100	= 50,000 / 55.55%	= 99,000 – 90,009

	(1,10,000 × 0.40) 44,000			
increase in	Contribution 55,000			
sales volume	FC 50,000	55.55%	= ₹ 90,009	= ₹ 8,991

	Income Statement	P/V Ratio	BE Sales	MOS
(viii) 10% Increase in selling price and 10% decrease in sales volume	₹ Sales (90,000 × 1.10) 99,000 Less: VC (90,000 × 0.40) 36,000 Contribution 63,000 FC 50,000	= 63,000 × 100 / 99,000 = 63.63%	= 50,000 / 64% = ₹ 78,579	= 99,000 – 78,597 = ₹ 20,421
(ix) ₹ 5,000 variable cost decrease accompanied by ₹15,000 fixed cost	₹ Sales (1,00,000 ×1) 1,00,000 Less: VC (40,000 - 5,000) 35,000 Contribution 65,000 FC 65,000	= 65,000 × 100 / 1,00,000 = 65%	= 65,000 / 65% = ₹ 1,00,000	= 1,00,000 -1,00,000 = Nil

SOLUTION-3:

Particulars	Present Situation (₹)	Proposed Situation (₹)
Selling Price per unit	300	350
Less: Variable Cost per unit	285	330
Contribution Per unit	15	20

Budgeted Sales 70,000 units:		
Total Contribution	10,50,000	14,00,000
Less: Fixed Cost	3,00,000	4,50,000
Profit	7,50,000	9,50,000
Break Even Point (units) = Fixed costs / Contribution per unit	3,00,000 / 15 = 20,000	4,50,000 / 20 = 22,500
Indifference point of sales (i.e. sales unit when both situation have equal profits)	Let x be the units of sales where profit will remain same under both the situation. 15x – 3,00,000 = 20x – 4,50,000 or, x = 1,50,000 / 5 = 30,000 units So, beyond 30,000 units of sales Proposed situation will have more profit and below 30,000 units of sales present situation will have more profit.	

SOLUTION-4:

At 40% capacity, Production 10,000 units

Overheads per unit is ₹ 5 and 60% is fixed => Variable 40%

So, Variable cost per unit = 5 × 40% = ₹ 2

Fixed Cost = 5 × 60% × 10,000 = ₹ 30,000

Statement showing Computation of Profit at 50% and 90% Capacity as well as at Current Capacity

	Particulars	40%		50%		90%	
	Production	10,000 units		= 10,000 / 40% × 50% = 12,500 units		= 10,000 / 40% × 90% = 22,500 units	
		Per unit	**Total**	**Per unit**	**Total**	**Per unit**	**Total**
		(₹)	**(₹)**	**(₹)**	**(₹)**	**(₹)**	**(₹)**
i.	Selling Price	20	2,00,000	19.4	2,42,500	19	4,27,500

ii.	Variable Cost						
	Material	10	1,00,000	10	1,25,000	9.5	2,13,750
	Labour	3	30,000	3	37,500	3	67,500
	Variable Overhead	2	20,000	2	25,000	2	45,000
	Total Variable Cost	15	1,50,000	15	1,87,500	14.5	3,26,250

	Particulars	**40%**		**50%**		**90%**	
iii.	Contribution = Sales – Variable Cost	5.00	50,000	4.40	55,000	4.50	1,01,250
iv.	Fixed Cost		30,000		30,000		30,000
v.	Profit		20,000		25,000		71,250
vi.	BE Sales = Fixed Cost x Selling price p.u. / Contribution p.u.		1,20,000		1,32,272		1,26,667

SOLUTION-5:

Statement showing computation of P/V Ratio, BEP and determination of Profitability in different conditions:

Particulars	**AB Ltd (₹)**	**CD Ltd (₹)**
Sales	1,50,000	1,50,000
Less: Variable Cost	1,20,000	1,00,000
Contribution	30,000	50,000
Less: Fixed Cost	15,000	35,000
Profit	15,000	15,000
P/V Ratio = Contribution × 100 / Sale	30,000 × 100 = 20 % / 1,50,000	50,000 × 100 = 33 1 % / 1,50,000 2

Particulars	AB Ltd (₹)	CD Ltd (₹)
BE Sales = Fixed Cost / P / V Ratio	= 15,000 / 20% = ₹ 75,000	35000 / $33\frac{1}{2}\%$ = ₹ 1,05,000

(a) When there is heavy demand for the product – Product produced by CD Ltd is profitable because the P/V Ratio is higher than AB Ltd.

(b) When there is low demand for the product – Product produced by AB Ltd is profitable because fixed cost is less than CD Ltd. This is also revealed from the break even sales. The break even sales for AB Ltd is less than CD Ltd because the fixed cost of AB Ltd is less in comparison to CD Ltd.

SOLUTION-6:

P/V Ratio = Change in Profit × 100 = 40,000 – 20,000 / Change in Sales 3,00,000 – 2,00,000 × 100 = 20,000 / 1,00,000 × 100 = 20%

	Period 1 (₹)	Period 2 (₹)	Proposed sales (₹)
Contribution = Sales * P/V Ratio	2,00,000 × 20% = 40,000	3,00,000 × 20% = 60,000	1,80,000 × 20% = 36,000
Less: Fixed Cost (Bal. fig.)	20,000	20,000	20,000
Profit	20,000	40,000	16,000

So, Desired Sales = Fixed Cost + Desired Profit / P / V Ratio

= 20,000 + 50,000 / 20% = 70,000 × 100 / 20 = ₹ 3,50,000

SOLUTION-7:

P/V Ratio = Change in Profit x 100 / Change in Sales

$= \frac{25,000 - 20,000}{1,70,000 - 1,50,000} \times 100 = 5,000 \times 100 = 25\%$

(i) BEP (i.e. Break Even Sales) $= \frac{\text{Fixed Cost}}{\text{P / V Ratio}} = \frac{\text{Sales} \times \text{P / V Ration} - \text{Profit}}{\text{P / V Ratio}}$

$= \frac{1,50,000 \times 25\% - 20,000}{25\%} = \frac{17,500}{25\%} = ₹\ 70,000$

Alternatively, $= \frac{1,70,000 \times 25\% - 25,000}{25\%} = \frac{17,500}{25\%} = ₹\ 70,000$

(ii) Desired Sales $= \frac{\text{Fixed Cost + Desired Profit}}{\text{P / V Ratio}}$

$= \frac{17,500 + 40,000}{25\%} = \frac{57,500}{25\%} = ₹\ 2,30,000$

(iii) Profit = Sales × P/V Ratio – Fixed Cost = 2,50,000 × 25% – 17,500 = ₹ 45,000

(iv) Margin of Safety $= \frac{\text{Profit}}{\text{P / V Ratio}} = \frac{50,000}{25\%} = ₹\ 2,00,000$

(v) Variable Cost Ratio = 1 – P/V Ratio = 1 – 25% = 75% Variable Cost = Sales × Variable Cost Ratio

Variable Cost for 2020 = 1,50,000 x 75% = ₹ 1,12,500

Variable Cost for 2021 = 1,70,000 x 75% = ₹ 1,27,500

SOLUTION-8:

	First Half of the year	**Second Half of the year**
Sales Total Cost	₹ 45,000 ₹ 40,000	₹ 50,000 ₹ 43,000
Profit	₹ 5,000	₹ 7,000

(i) P/V Ratio = Change in Profit x 100
Change in Sales

= 7,000 – 5,000 x 100

50,000 – 45,000

= 2,000 × 100 = 40%

5,000

(ii) Fixed Expenses = Sales P/V Ratio – Profit; [Sales × P/V Ratio = Contribution]
Fixed Expenses for the First half = 45,000 × 40% – 5,000 = ₹ 13,000 Fixed Expenses for the Second half = 50,000 × 40% – 7,000 = ₹ 13,000 Fixed Expenses for the year = 13,000 + 13,000 = ₹ 26,000

(iii) Break Even Sales = Fixed Cost = 26,000 = ₹ 65,000
P / V Ratio 40%

(iv) Percentage of Margin of Safety = Margin of Safety x 100
Sales

= Sales – Break Even Sales x 100
Sales

= 95,000 – 65,000 x 100
95,000

= 30,000 x 100

90,000

= 31.58 %

[Total Sales for the year = 50,000 + 45,000 = ₹ 95,000]

SOLUTION-9:

Statement showing Marginal Product Cost and Contribution per unit

Sl. No.	Particulars	Product A (₹)	Product B (₹)
i.	Selling Price per unit	20.00	15.00
ii.	Variable Cost		
	Direct Material cost per unit	10.00	9.00
	Direct Wages cost per unit	3.00	2.00
	Variable Expenses (100% of Direct Wages)	3.00	2.00

	Marginal Product Cost	16.00	13.00
iii.	Contribution per unit (i. – ii.)	4.00	2.00

Computation of Profit under Sales Mix (a)

Sl. No.	Particulars	Product A (₹)	Product B (₹)	Total (₹)
i.	No. of units	100	200	
ii.	Contribution per unit	4.00	2.00	
iii.	Total Contribution (i. × ii.)	400	400	800
iv.	Fixed Cost			800
v.	Profit (iii. – iv.)			Nil

Computation of Profit under Sales Mix (b)

Sl. No.	Particulars	Product A (₹)	Product B (₹)	Total (₹)
i.	No. of units	150	150	
ii.	Contribution per unit	4.00	2.00	
iii.	Total Contribution (i. × ii.)	600	300	900
iv.	Fixed Cost			800

Sl. No.	Particulars	Product A (₹)	Product B (₹)	Total (₹)
v.	Profit (iii. – iv.)			100

Computation of Profit under Sales Mix (c)

Sl. No.	Particulars	Product A (₹)	Product B (₹)	Total (₹)
i.	No. of units	200	100	
ii.	Contribution per unit	4.00	2.00	
iii.	Total Contribution (i. × ii.)	800	200	1,000
iv.	Fixed Cost			800
v.	Profit (iii. – iv.)			200

SOLUTION-10:

(i) Sales revenue divided 60% to Product L & 40% to Product M

Statement showing computation of P/V Ratio, Break Even Point and Net Income

	Product L (₹)	Product M (₹)	Total (₹)
Sales	1,20,000 × 60% =72,000	1,20,000 × 40% = 48,000	1,20,000
Less: Variable Cost (Sales × Variable Cost Ratio)	72,000 × 70% = 50,400	48,000 × 50% =24,000	74,400
Contribution (Sales × P/V Ratio)	72,000 x 30% = 21,600	48,000 × 50% =24,000	45,600
Less: Fixed Cost			36,000
Net Income			9,600
P/V Ratio = Contribution / Sales × 100	21,600 / 72,000 × 100 = 30%	24,000 / 48,000 × 100 = 50%	45,600 / 1,20,000 × 100 = 38%

	Product L (₹)	Product M (₹)	Total (₹)
Break Even Sales = Fixed Cost / P / V Ratio			= 36,000 / 38% = 94,737

(ii) Sales revenue divided 40% to Product L & 60% to Product M

Statement showing computation of P/V Ratio, Break Even Point and Net Income

	Product L (₹)		Product M (₹)		Total (₹)
Sales	1,20,000 × 40%	48,000	1,20,000 × 60%	72,000	1,20,000
Less: Variable Cost (Sales × Variable Cost Ratio)	48,000 x 70%	33,600	72,000 x 50%	36,000	69,600

Contribution (Sales × P/V Ratio)	48,000 x 30%	14,400	72,000 x 50%	36,000	50,400
Less: Fixed Cost					36,000
Net Income					14,400
P/V Ratio = Contribution x 100 Sales	14,400 × 100 48,000 = 30%		36,600 × 100 72,000 = 50%		50,400 × 100 1,20,000 0.42
Break Even Sales = Fixed Cost P / V Ratio					= 36,000 42% = 85,714

SOLUTION-11:

Calculation of Contribution of the Products

Particulars	Product A (₹)	Product B (₹)	Product C (₹)	Product D (₹)	Total (₹)
Sales	60,000 × 33⅓ % = 20,000	60,000 × 41⅔ % = 25,000	60,000× 6⅔ % = 10,000	60,000 × 8⅓ % = 5,000	60,000
Less: Variable Cost	60% × 20,000 = 12,000	68% × 25,000 = 17,000	80% × 10,000 = 8,000	40% × 5,000 = 2,000	39,000
Contribution	8,000	8,000	2,000	3,000	21,000
Less: Fixed Cost					14,700
Profit					6,300
P/V Ratio = Contribution × 100 Sales	8,000 × 100 20,000 = 40%	8,000 × 100 25,000 = 32%	2,000 × 100 10,000 = 20%	3,000 × 100 5,000 = 60%	21,000×100 60,000 = 35%

(a) Break Even Sales = Fixed Cost = 14,700 = ₹ 42,000
P / V Ratio 35%

Calculation of Contribution of the Products

Particulars	Product A (₹)	Product B (₹)	Product C (₹)	Product D (₹)	Total (₹)
Sales	60,000 × 25% = = 15,000	60,000 × 40 % = 24,000	60,000×30 % = 18,000	60,000 × 5 % = 3,000	60,000
Less: Variable Cost	60% × 15,000 = 9,000	68% × 24,000 = 16,320	80% × 18,000 = 14,400	40% × 3,000 = 1,200	40,920
Contribution	6,000	7,680	3,600	1,800	19,080
Less: Fixed Cost					14,700
Profit					4,380
P/V Ratio = Contribution × 100 / Sales	6,000 × 100 / 25,000 = 40%	7,680 × 100 / 24,000 = 32%	2,600 × 100 / 18,000 = 20%	1,800 × 100 / 3,000 = 60%	19,080×100 / 60,000 = 31.80%

SOLUTION-12:

Statement showing computation of profit before and after accepting the order

Sl. No.	Particulars	Present Position (Before accepting) 80,000 units		Order Value (20,000 units)		Total (after accepting) 1,00,000 units
		Per unit (₹)	Total (₹)	Per unit (₹)	Total (₹)	(₹)
i.	Sales	15	12,00,000	10	2,00,000	14,00,000
ii.	Variable Cost					
	Material	3	2,40,000	3	60,000	3,00,000
	Labour	4	3,20,000	4	80,000	4,00,000
	Variable Overheads	2	1,60,000	2	40,000	2,00,000

Sl. No.	Particulars	Present Position (Before accepting)80,000 units		Order Value (20,000 units)		Total (after accepting) 1,00,000 units
		Per unit (₹)	Total (₹)	Per unit (₹)	Total (₹)	(₹)
iii.	Total variable cost	9	7,20,000	9	1,80,000	9,00,000
iv.	Contribution (i. – ii.)	6	4,80,000	6	20,000	5,00,000
v.	Fixed cost		3,20,000			3,20,000
vi.	Profit (iv. – v.)		1,60,000		20,000	1,80,000

As the profit is increased by ₹ 20,000 by accepting the order, it is advised to accept the same. If the order is from local one, it should not be accepted because it will adversely affect the present market.

SOLUTION-12:

Statement showing computation of profit before and after accepting the order

Sl. No.	Particulars	Present Position (Before accepting) 80,000 units		Order Value (20,000 units)		Total (after accepting) 1,00,000 units
		Per unit (₹)	Total (₹)	Per unit (₹)	Total (₹)	(₹)
i.	Sales	15	12,00,000	10	2,00,000	14,00,000
ii.	Variable Cost					
	Material	3	2,40,000	3	60,000	3,00,000
	Labour	4	3,20,000	4	80,000	4,00,000
	Variable Overheads	2	1,60,000	2	40,000	2,00,000

Sl. No.	Particulars	Present Position (Before accepting)80,000 units		Order Value (20,000 units)		Total (after accepting) 1,00,000 units
		Per unit (₹)	Total (₹)	Per unit (₹)	Total (₹)	(₹)
iii.	Total variable cost	9	7,20,000	9	1,80,000	9,00,000
iv.	Contribution (i. – ii.)	6	4,80,000	6	20,000	5,00,000
v.	Fixed cost		3,20,000			3,20,000
vi.	Profit (iv. – v.)		1,60,000		20,000	1,80,000

As the profit is increased by ₹ 20,000 by accepting the order, it is advised to accept the same. If the order is from local one, it should not be accepted because it will adversely affect the present market.

SOLUTION-13:

Statement showing present and anticipated cost structure

Particulars	Present Cost Structure (₹)	Workings	Anticipated Cost Structure (₹)
Variable Cost per unit			
Material	3.5	3.50 × 106%	3.71
Labour	1.25	1.25 × 108%	1.35
Works overhead (50% × 6.25)	3.125		3.125
Sales overhead (25% × 0.80)	0.2		0.2
Total Variable Cost per unit	**8.075**		**8.385**
Fixed Cost			
Works overhead (50% × 6.25 × 6,000)	18,750	18,750 × 110%	20,625
Sales overhead (75% × 0.80 × 6,000)	3,600	3,600 × 110%	3,960
Total Fixed Cost	**22,350**		**24,585**

Computation of Profit at Present at an anticipated Cost Structure

Particulars	6,000 units	
	Workings	(₹)
Sales	6,000 × 14.30	85,800
Less: Variable Cost	6,000 × 8.385	50,310
Contribution		35,490
Fixed Cost		24,585
Profit		10,905

Computation of Minimum Selling Price per unit from additional 2,000 units so as to get an overall profit of ₹ 16,730

Particulars	Workings	(₹)
Variable Cost to recover from 2,000 units	2,000 × 8.385	16,770
Balance amount of Profit to recover	16,730 – 10,905	5,825
Minimum Sales Value for 2,000 units		22,595

Expected Selling Price per unit = $\frac{₹\ 22,595}{2000\ \text{units}}$ = ₹ 11.2975 or ₹ 11.30

SOLUTION-14:

Statement showing computation of profit before closing down Division C

Sl No.	Particulars	Division A	Division B	Division C	Total
		(₹)	(₹)	(₹)	(₹)
i.	Sales	1,12,000	56,000	84,000	2,52,000
ii.	Variable Cost				
	Direct Material	14,000	7,000	14,000	35,000
	Direct Labour	5,600	7,000	22,400	35,000
	Direct Expenses	14,000	7,000	28,000	49,000

iii.	Total Variable Cost	33,600	21,000	64,400	1,19,000
iv.	Contribution (i. – iii.)	78,400	35,000	19,600	1,33,000

Sl No.	Particulars	Division A	Division B	Division C	Total
		(₹)	(₹)	(₹)	(₹)
v.	Fixed Cost	28,000	14,000	28,000	70,000
vi.	Profit (iv. – v)				63,000

Statement showing computation of profit closing down Division C

Sl No.	Particulars	Division A	Division B	Total
		(₹)	(₹)	(₹)
i.	Sales	1,12,000	56,000	1,68,000
ii.	Variable Cost Direct Material	14,000	7,000	21,000
	Direct Labour	5,600	7,000	12,600
	Direct Expenses	14,000	7,000	21,000
iii.	Total Variable Cost	33,600	21,000	54,600
iv.	Contribution (i. – iii.)	78,400	35,000	1,13,400
v.	Fixed Cost			70,000
vi.	Profit (iv. – v.)			43,400

If Division C is closed down then there is a reduction in the overall profit by ₹ 19,600 (63,000 – 43,400). Since, there is no possibility of reducing the fixed cost of Division C, so as long as if there is a contribution of ₹ 1 from division C, it should not be closed down.

SOLUTION-15:

Statement showing computation of profit before and after plant expansion

Sl. No.	Particulars	Present Situation (Before Expansion)	Additional Revenue and Cost (On Plant Expansion)	Total (After Expansion)
i.	Sales	4,00,000	2,40,000	6,40,000
ii.	Variable Cost (60% of i.)	2,40,000	1,44,000	3,84,000
iii.	Contribution (i. – ii.)	1,60,000	96,000	2,56,000
iv.	Fixed Cost	80,000	40,000	1,20,000
v.	Profit before tax (iii. – iv.)	80,000	56,000	1,36,000
vi.	Tax (60% of v.)	48,000	33,600	81,600
vii.	Profit after tax (v. – vi.)	32,000	22,400	54,400

There is an increase of overall profit by ₹ 22,400 after plant expansion, so the plant expansion should be carried out.

SOLUTION-16:

Statement showing computation of differential cost, incremental revenue and determination of capacity at which profit is maximum:

Capacity %	Units	Sales (₹)	Variable Cost @ ₹ 0.15 per unit (₹)	Fixed cost (₹)	Total Cost (₹)	Profit (₹)	Differential Cost (₹)*	Incremental Revenue (₹)#
i.	**ii.**	**iii.**	**iv.**	**v.**	**vi. = iv. + v.**	**vii. = iii. – vi.**	**viii.**	**ix.**
60	60,000	54,000	9,000	40,000	49,000	5,000	-	-

70	70,000	56,000	10,500	40,000	50,500	5,500	1,500	2,000
80	80,000	60,000	12,000	40,000	52,000	8,000	1,500	4,000
90	90,000	60,300	13,500	40,000	53,500	6,800	1,500	300
100	1,00,000	61,000	15,000	40,000	55,000	6,000	1,500	700

*Differential Cost is the change in total cost with respect to previous year.

#Incremental Revenue is the change in the value of sales over previous year.

The incremental revenue is more than incremental cost up to 80% capacity, the profit is maximum at that capacity.

SOLUTION-17:

Computation of Material and Labour cost

Particulars	**Amount** (₹)	**Amount** (₹)
Sales at present		15,00,000
Less: Profit @ 10%		1,50,000
Total Cost		13,50,000
Less: All costs other than material and labour		
Fixed expenses Semi fixed expensesVariable expenses	3,00,500 97,500	
	1,45,000	5,43,000
Material and Labour Cost		8,07,000

(a) Statement showing differential cost of producing 1,500 units

Particulars	**Amount (₹)**
Material and Labour Cost = (₹ 8,07,000 x 1,500 units / 13,500 units)	89,667

Particulars	Amount (₹)
Fixed expenses (3,00,600 – 3,00,500)	100
Semi-fixed expenses (1,00,500 – 97,500)	3,000
Variable expenses (1,49,500 – 1,45,000)	4,500
Differential cost	97,267

(b) Differential cost per unit = ₹ 97,267 / 1,500 units = ₹ 64.84

The minimum price for these 1,500 units should not be less than ₹ 64.84 for export.

SOLUTION-18:

Variable Cost Ratio = 60% (given)

P/V Ratio = 1 – Variable Cost Ratio = 1 – 60% = 40%

(a) Break Even Point (in ₹) = Fixed Cost / P / V Ratio = 75,000 / 40% = ₹ 1,87,500

(b) Desired Profit = 1,50,000 × 15% = ₹ 22,500

Expected Sales = (Fixed Cost + Desired Profit) / P / V Ratio = (75,000 + 22,500) / 40% = ₹ 2,43,750

(c) Shut Down Sales = (Fixed Cost – Shut Down Cost) / P / V Ratio = (75,000 – 25,000) / 40% = ₹ 1,25,000

SOLUTION-19:

Let the total cost per unit at present be ₹ X and Profit per unit be ₹ Y

Particulars	Present Cost Structure (₹)	Percentage increase/decrease	Anticipated Cost Structure (₹)
Material	0.50X	17% increase = 0.50X × 117%	0.585X
Labour	0.20X	20% increase = 0.20X × 120%	0.24X
Overhead	0.30X		0.30X
Total (Cost of Sales)	X		1.125X

Profit	Y	25% decrease = Y × 75%	0.75Y
Sales	3,000		3,000

So, two equations are X + Y = 3,000……(i)

and 1.125X + 0.75Y = 3,000……(ii)

Multiplying equation (i) by 1.125 and subtracting equation (ii) from (i)

1.125X + 1.125Y	=	3,375
(–) 1.125X + 0.75Y	=	3,000
0.375Y	=	375

or, Y = 1,000 or, Profit = ₹ 1,000

by putting the value of Y = 1,000 in equation (i)

or, X + 1,000 = 3,000

or, X = 2,000

or Total Cost = ₹ 2,000

(a) Statement showing Profit or Loss per unit at present

Particulars	Workings	(₹)
Material	0.50 × 2,000	1,000
Labour	0.20 × 2,000	400
Overheads	0.30 × 2,000	600
Total Cost		2,000
Profit		1,000
Selling Price per unit		3,000

Percentage of Profit on Sales = $\frac{\text{Profit}}{\text{Sales}} \times 100 = \frac{1,000}{3,000} \times 100 = 33\frac{1}{3}\% = \frac{1}{3}$ rd of Sales

(b) Computation of New Selling Price to get same percentage of profit on sales

Particulars	Workings	(₹)
Material	0.585 × 2,000	1,170
Labour	0.24 × 2,000	480
Overheads	0.30 × 2,000	600
Total Cost		2,250
Profit	Bal. fig. on Sales × 1/3	1,125
Selling Price per unit	(Working Note)	3,375

Working Note

Cost + Profit = Sales

or, 2,250 + 1/3 × Sales = Sales

or, 3 × Sales = 2,250

or Sales = 3,375

SOLUTION-20:

(a) Statement showing computation of contribution per unit of different factors of production and determination of profitability

(b)

Sl. No.	Particulars	Product A (₹)	Product B (₹)
i.	Selling price per unit	100	120
ii.	Variable Cost per unit		
	Material	10	15
	Labour	15	10
	Direct expenses	5	6
	Variable overhead	15	20
iii.	Total Variable Cost per unit	45	51
iv.	Contribution per unit (i. – iii.)	55	69

v.	P/V Ratio = Contribution per unit / Selling Price per unit	55%	57.50%
vi.	Contribution per kg of material	₹ 55 / 2kg = ₹ 27.50	₹ 69 / 3kg = ₹ 23
vii.	Contribution per machine hour	₹ 55 / 3 hours = ₹ 18.33	₹ 69 / 2 hours = ₹ 34.50

From the above computation, we may comment upon the profitability in the following manner:

1. If total sales potential in units is limited, Product B is more profitable, it has more contribution per unit.
2. If total sales potential in value is limited, Product B is more profitable, because it has higher P/V Ratio.
3. If the raw material is in short supply, Product A is more profitable, because it has more contribution per kg of material.
4. If the production capacity is limited, Product B is more profitable, because it has more contribution per machine hour.

(c) Statement showing optimum product mix – when raw material is a limiting factor

Sl. No.	Particulars	Product A	Product B	Total
i.	No. of units	3,500	1,000	
		(₹)	**(₹)**	**(₹)**
ii.	Contribution per unit	55	69	
iii.	Total contribution	1,92,500	69,000	2,61,500
iv.	Fixed cost	3,500 × 5 = 17,500	#3,500 × 10 = 35,000	52,500
v.	Profit (iii. – iv.)			2,09,000

Fixed cost is taken at maximum capacity

Working Notes

Available Material	10,000 kgs
Less: Utilized for Product A 3,500 units × 2 kg/unit	7,000 kgs
Balance quantity available for Production of Product B	3,000 kgs

Number of units of Production of Product B = 3000 kg / 3 kg per unit = 1,000 units

SOLUTION-21:

Fixed production costs absorbed

Particulars	(₹)
Budgeted fixed production costs	1,60,000
Budgeted output (normal level of activity 800 units) Therefore, the absorption rate: 1,60,000/800 = ₹ 200 per unit	
During the first quarter, the fixed production cost absorbed by Boost would be (220 units × ₹ 200)	44,000

Under / over recovery of overheads during the period

Particulars	(₹)
Actual fixed production overhead (1/4 quarters of ₹ 1,60,000)	40,000
Absorbed fixed production overhead	44,000
Over-recovery of overheads	4,000

Profit for the Quarter (Absorption Costing)

	(₹)	(₹)
Sales revenue (160 units × ₹ 2,000): (A)		3,20,000
Less: Production costs:		
- Variable cost (220 units × ₹ 800)	1,76,000	
- Fixed overheads absorbed (220 units × ₹ 200)	44,000	2,20,000
Less: Opening Stock		-----
Add: Closing Stock (₹ 2,20,000/220 units × 60 units)		60,000
Cost of Goods sold		1,60,000
Less: Adjustment for over-recovery of fixed production overheads		4,000

Add: Selling & Distribution Overheads:		
-Variable (160 units × ₹ 400)	64,000	
- Fixed (1/4th of ₹ 2,40,000)	60,000	1,24,000
Cost of Sales (B)		2,80,000
Profit {(A) – (B)}		40,000

Profit for the Quarter (Marginal Costing)

Particulars	(₹)	(₹)
Sales revenue (160 units × ₹ 2,000): (A)		3,20,000
Less: Production costs: - Variable cost (220 units × ₹ 800)	1,76,000	
Add: Opening Stock Less: Closing Stock (₹ 1,76,000/220 units × 60 units)	48,000	-----
Variable cost of goods sold		1,28,000
Add: Selling & Distribution Overheads: -Variable (160 units × ₹ 400)		64,000
Total Variable Cost (B)		1,92,000
Contribution {(C) = (A) – (B)}		1,28,000
Less: Fixed Costs: - Production cost - Selling & distribution cost	(40,000) (60,000)	(1,00,000)
Profit		28,000

CHAPTER 15: STANDARD COSTING AND VARIANCE ANALYSIS

SOLUTION-1:

SQ = Standard Quantity for Actual Output = 80 × 25 = 2,000 units

SP = Standard Price = ₹ 2 per unit

AQ = Actual Quantity Used for Production = 3,000 – 500 = 2,500 units

AP = Actual Price per unit = ₹ 9,000 / 3,000 units = ₹ 3 per unit

(a) Material Cost Variance = SQ × SP – AQ × AP

= (2,000 × 2) – (2,500 × 3)

= 4,000 – 7,500 = ₹ 3,500 (A)

(b) Material Price Variance = (SP – AP) × AQ

= (2 – 3) × 2,500 = ₹ 2,500 (A)

(c) Material Usage Variance = (SQ – AQ) × SP

= (2,000 – 2,500) × 2 = ₹ 1,000 (A)

SOLUTION-2:

It is assumed that the data given here is for the production of one unit of output.

SQ – Standard Quantity for Actual Output

Material A = 10 kg Material B = 20 kg Material C = 20 kg

SP –Standard Price per unit

Material A = ₹ 2 Material B = ₹ 3 Material C = ₹ 6

AQ – Actual Quantity used for Production

Material A = 5 kg Material B = 10 kg Material C = 15 kg

AP – Actual Price per unit

Material A = ₹ 3 Material B = ₹ 6 Material C = ₹ 5

RSQ – Revised Standard Quantity for Actual Input

Material A = 10/50 × 30 = 6 kg Material B = 20/50 × 30 = 12 kg Material C = 20/50 × 30 = 12 kg

i. Material Cost Variance = SQ × SP – AQ × AP

Material A = (10 × ₹ 2) – (5 × ₹ 3) = 20 – 15 = ₹ 5 (F)

Material B = (20 × ₹ 3) – (10 × ₹ 6) = 60 – 60 = Nil

Material C = (20 × ₹ 6) – (15 × ₹ 5) = 120 – 75 = ₹ 45 (F)

= ₹ 50 (F)

ii. Material Price Variance = (SP – AP) × AQ

Material A = (2 – 3) × 5 = ₹ 5 (A)

Material B = (3 – 6) × 10 = ₹ 30 (A)

Material C = (6 – 5) × 15 = ₹ 15 (F)

= ₹ 20 (A)

iii. Material Usage Variance = (SQ – AQ) × SP

Material A = (10 – 5) × ₹ 2 = ₹ 10 (F)

Material B = (20 – 10) × ₹ 3 = ₹ 30 (F)

Material C = (20 – 15) × ₹ 6 = ₹ 30 (F)

= ₹ 70 (F)

iv. Material Mix Variance = (RSQ – AQ) × SP

Material A = (6 – 5) × ₹ 2 = ₹ 2 (F)

Material B = (12 – 10) × ₹ 3 = ₹ 6 (F)

Material C = (12 – 15) × ₹ 6 = ₹ 18 (A)

= ₹ 10 (A)

v. Material Yield Variance = (SQ – RSQ) × SP

Material A = (10 – 6) × ₹ 2 = ₹ 8 (F)

Material B = (20 – 12) × ₹ 3 = ₹ 24 (F)

Material C = (20 – 12) × ₹ 6 = ₹ 48 (F)

= ₹ 80 (F)

SOLUTION-3:

SQ – Standard Quantity for Actual Output = $\frac{100}{70}$ × 2,10,000 = 3,00,000 kg

SP – Standard Price per unit = ₹ 1 per kg AQ – Actual Quantity used = 2,80,000 kg

AP – Actual Price per unit = $\frac{₹\ 2,52,000}{2,80,000\ kg}$ = ₹ 0.90 per kg

(a) Material Cost Variance = SQ × SP – AQ × AP

= (3,00,000 × 1) – (2,80,000 × 0.90) = ₹ 48,000 (F)

(b) Material Price Variance = (SP – AP) × AQ

= (1 – 0.90) × 2,80,000 = ₹ 28,000 (F)

(c) Material Usage Variance = (SQ – AQ) × SP

= (3,00,000 – 2,80,000) × 1 = ₹ 20,000 (F)

SOLUTION-4:

SQ – Standard Quantity for Actual Output = 100 kg

SP – Standard Price per unit = ₹ 2.25 per kg

AQ – Actual Quantity used = 110 kg

(a) Material Usage Variance = (SQ – AQ) × SP

= (100 – 110) × 2.25 = ₹ 22.50 (A)

(b) Computation of Price Variance = (SP – AP) × AQ = SP × AQ – AP × AQ

1. When variance is calculated at point of purchase: AP – Actual Price at the point of purchase is ₹ 2.15 Price Variance = (2.25 × 110) – (2.15 × 110) = ₹ 11(F)
2. When variance is calculated at point of issue on FIFO basis:
   Price Variance = (2.25 × 110) – [2.25 × 100 + 2.15 × 10] = ₹ 1 (F)
3. When variance is calculated at point of issue on LIFO basis:
   Price Variance = (2.25 × 110) – (2.15 × 110) = ₹ 11 (F)

SOLUTION-5:

Since there are more than one input so five parameters will be calculated

1. SQ – Standard Quantity for Actual Output
   Material X = 500 × 2 = 1,000 kg
   Material Y = 500 × 4 = 2,000 kg

2. SP – Standard Price per unit

Material X = ₹ 3 per kg Material Y = ₹ 2 per kg

3. AQ – Actual Quantity
   Material X = 1,100 kg
   Material Y = 1,800 kg Total AQ = 1,100 + 1,800 = 2,900

4. AP – Actual Price per unit
   Material X = ₹ 3,410 / 1,100 kg

   Material Y = ₹ 3,960 / 1,800 kg

5. RSQ – Revised Standard Quantity for Actual Input

Material X = $\frac{2}{6} \times 2,900 = 966.67\%$

Material Y = $\frac{4}{6} \times 2,900 = 1,933.33$ kg

i. Material Cost Variance = SQ × SP – AQ × AP

Material X = $(1,000 \times 3) - \frac{(1,100 \times 3,410)}{1,100} = 3,000 - 3,410 = ₹\ 410\ (A)$

Material Y = $(2,000 \times 2) - \frac{(1,800 \times 3,960)}{1,800} = 4,000 - 3,960 = ₹\ 40\ (F)$

= ₹ 370 (A)

ii. Material Price Variance = (SP – AP) × AQ = SP × AQ – AP × AQ

Material X = $(3 \times 1,100) - \frac{(3,410 \times 1,100)}{1,100} = 3,300 - 3,410 = ₹\ 110\ (A)$

Material Y = $(2 \times 1,800) - \frac{(3,960 \times 1,800)}{1,800} = 3,600 - 3,960 = ₹\ 360\ (A)$

= ₹ 470 (A)

iii. Material Usage Variance = (SQ – AQ) × SP

Material X = (1,000 – 1,100) × 3 = ₹ 300 (A)

Material Y = (2,000 – 1,800) × 2 = ₹ 400 (F)

= ₹ 100 (F)

iv. Material Mix Variance = (RSQ – AQ) × SP

Material × = ₹ (966.67 – 1,100) × 3 = ₹ 399.99 (A)

Material Y = ₹ (1933.33 – 1,800) × 2 = ₹ 266.66 (F)

= ₹ 133.33 (A)

v. Material Yield Variance = (SQ – RSQ) × SP

Material × = (1,000 – 966.67) × 3 = ₹ 99.99 (F)

Material Y = (2,000 – 1,933.33) × 2 = ₹ 133.34 (F)

= ₹ 233.33 (F)

SOLUTION-6:

Assume 100 kg of Standard Input is used in the ratio of 40% and 60% for Material A and Material B respectively. So, the information can be presented as follows:

	Standard		**Actual**	
	Quantity	Rate	Quantity	Rate
	Kg	(₹)	Kg	(₹)
Material A	40	20	180	18
Material B	60	30	220	34
Total	100		400	
Less: Loss	10		40 (Bal. fig.)	
Output	90		360	

When there are more than one input then five parameters are to be calculated as follows:

1. SQ – Standard Quantity for Actual Output

Material A = $\frac{40}{90} \times 360 = 160$ kg

Material B = $\frac{60}{90} \times 360 = 240$ kg

2. SP – Standard Price per unit

Material A = ₹ 20, Material B = ₹ 30

3. AQ – Actual Quantity

Material A = 180 kg, Material B = 220 kg

4. AP – Actual Price per unit

Material A = ₹ 18, Material B = ₹ 34

5. RSQ – Revised Standard Quantity for Actual Input

Material A = $\frac{40}{100} \times 400 = 160$ kg

Material B = $\frac{60}{100} \times 400 = 240$ kg

6. Material Cost Variance = SQ × SP – AQ × AP

Material A = 160 × 20 – 180 × 18 = 3,200 – 3,240 = ₹ 40 (A)

Material B = 240 × 30 – 220 × 34 = 7,200 – 7,480 = ₹ 280 (A)

= ₹ 320 (A)

7. Material Price Variance = (SP – AP) × AQ

Material A = (20 – 18) × 180 = ₹ 360 (F)

Material B = (30 – 34) × 220 = ₹ 880 (A)

= ₹ 520 (A)

8. Material Usage Variance = (SQ – AQ) × SP

Material A = (160 – 180) × 20 = ₹ 400 (A)

Material B = (240 – 220) × 30 = ₹ 600 (F)

= ₹ 200 (F)

9. Material Mix Variance = (RSQ – AQ) × SP

Material A = (160 – 180) × 20 = ₹ 400 (A)

Material B = (240 – 220) × 30 = ₹ 600 (F)

= ₹ 200 (F)

10. Material Yield Variance = (SQ – RSQ) × SP

Material A = (160 – 160) × 20 = Nil

Material B = (240 – 240) × 30 = Nil

SOLUTION-7:

SQ = Standard Quantity for Actual Output

Material A = $\frac{40}{90}$ × 4,18,500 = 1,86,000 kg

Material B = $\frac{10}{90}$ × 4,18,500 = 46,500 kg

Material C = $\frac{50}{90}$ × 4,18,500 = 2,32,500 kg

SP = Standard Price per unit

Material A = ₹ 76 Material B = ₹ 50 Material C = ₹ 20

AQ = Actual Quantity used

Material A = 1,95,000 kg Material B = 42,500 kg Material C = 2,25,000 kg

AP = Actual Price per unit

Material A = ₹ 80 Material B = ₹ 52 Material C = ₹ 21

RSQ = Revised Standard Quantity for Actual Input

Material A = $\frac{40}{100} \times (1,95,000 + 42,500 + 2,25,000) = \frac{40}{100} \times 4,62,500 = 1,85,000$ kg

Material B = $\frac{10}{100} \times 4,62,500 = 46,250$ kg

Material C = $\frac{50}{100} \times 4,62,500 = 2,31,250$ kg

i. Material Cost Variance = SQ × SP – AQ × AP

Material A = (1,86,000 × 76) – (1,95,000 × 80) = ₹ 14,64,000 (A)

Material B = (46,500 × 50) – (42,500 × 52) = ₹ 1,15,000 (F)

Material C = (2,32,500 × 20) – (2,25,000 × 21) = ₹ 75,000 (A)

= ₹ 14,24,000 (A)

ii. Material Price Variance = (SP – AP) × AQ

Material A = (76 – 80) × 1,95,000 = ₹ 7,80,000 (A)

Material B = (50 – 52) × 42,500 = ₹ 85,000 (A)

Material C = (20 – 21) × 2,25,000 = ₹ 2,25,000 (A)

= ₹ 10,90,000 (A)

iii. Material Usage Variance = (SQ – AQ) × SP

Material A = (1,86,000 – 1,95,000) × 76 = ₹ 6,84,000 (A)

Material B = (46,500 – 42,500) × 50 = ₹ 2,00,000 (F)

Material C = (2,32,500 – 2,25,000) × 20 = ₹ 1,50,000 (F)

= ₹ 3,34,000 (A)

iv. Material Mix Variance = (RSQ – AQ) × SP

Material A = (1,85,000 – 1,95,000) × 76 = ₹ 7,60,000 (A)

Material B = (46,250 – 42,500) × 50 = ₹ 1,87,500 (F)

Material C = (2,31,250 – 2,25,000) × 20 = ₹ 1,25,000 (F)

= ₹ 4,47,500 (A)

v. Material Yield Variance = (SQ – RSQ) × SP

Material A = (1,86,000 – 1,85,000) × 76	= ₹	76,000 (F)
Material B = (46,500 – 46,250) × 50	= ₹	12,500 (F)
Material C = (2,32,500 – 2,31,250) × 20	= ₹	25,000 (F)
	= ₹	**1,13,500 (F)**

SOLUTION-8:

Analysis of the Given Data

	Standard		Actual	
Raw Material	Quantity (kg)	Price per kg (₹)	Quantity (kg)	Price per kg (₹)
Alpha	30	4	140/500 × 100 = 28	588/140

	Standard		Actual	
Beta	40	5	220/500 × 100 = 44	1,056/200
Gamma	80	6	440/500 × 100 = 88	2,860/440
Input	150		160	
Less : Loss	50		60	
Output (Delta)	100		100	

SQ – Standard Quantity for Actual Output

Alpha = 30/100 (Standard output) × 100 (Actual output) = 30 kg

Beta = 40/100 × 100 = 40 kg

Gamma = 80/100 × 100 = 80 kg

SP – Standard Price per unit

Alpha = ₹ 4 per kg Beta = ₹ 5 per kg Gamma = ₹ 6 per kg

AQ – Actual Quantity use

Alpha = 28 kg Beta = 44 kg Gamma = 88 kg

AP – Actual Price per unit

Alpha = ₹ 588 per kg / 140 Beta = ₹ 1,056 per kg / 200 Gamma = ₹ 2,860 per kg / 440

RSQ – Revised Standard Quantity for Actual Input

Alpha = 30/150 × 100 = 32 kg

Beta = 40/150 × 160 = 42.67 kg

Gamma = 80/150 × 160 = 85.33 kg

i. Material Cost Variance = SQ × SP – AQ × AP

Alpha = (30 × 4) – (28 × 588/140)	= ₹ 2.40	(F)
Beta = (40 × 5) – (44 × 1,056/220)	= ₹ 11.20	(A)
Gamma = (80 × 6) – (88 × 2,860/440)	= ₹ 92	(A)
	= ₹ 100.80	**(A)**

ii. Material Price Variance = (SP – AP) × AQ = SP × AQ – AQ × AP

Alpha = ₹ (4 × 28) – (28 × 588/140)	= ₹ 5.60	(A)
Beta = ₹ (5 × 44) – (44 × 1,056/220)	= ₹ 8.80	(F)
Gamma = ₹ (6 × 88) – (88 × 2,860/440)	= ₹ 44	(A)
	= ₹ 40.80	**(A)**

iii. Material Usage Variance = (SQ – AQ) × SP

Alpha = (30 – 28) × 4	= ₹ 8	(F)
Beta = (40 – 44) × 5	= ₹ 20	(A)
Gamma = (80 – 88) × 6	= ₹ 48	(A)
	= ₹ 60	**(A)**

iv. Material Mix Variance = (RSQ – AQ) × SP

Alpha = (32 – 28) × 4 = ₹ 16 (F)

Beta = (42.67 – 44) × 5 = ₹ 6.65 (A)

Gamma = (85.33 – 88) × 6 = ₹ 16.02 (A)

= ₹ 6.67 (A)

Material Yield Variance = (SQ – RSQ) × SP

Alpha = (30 – 32) × 4 = ₹ 8 (A)

Beta = (40 – 42.67) × 5 = ₹ 13.35 (A)

Gamma = (80 – 85.33) × 6 = ₹ 31.98 (A)

= ₹ 53.33 (A)

SOLUTION-9:

SQ – Standard Quantity for Actual Output

Material A = $\frac{500}{1,080}$ × 1,180 = 546.29 kg

Material B = $\frac{400}{1,080}$ × 1,180 = 437 kg

Material C = $\frac{300}{1,080}$ × 1,180 = 327.78 kg

SP – Standard Price per unit

Material A = ₹ 6 per kg Material B = ₹ 3.75 per kg Material C = ₹ 3 per kg

AQ – Actual Quantity

Material A = 400 kg Material B = 500 kg Material C = 400 kg

AP = Actual Price per unit

Material A = ₹ 6 per kg Material B = ₹ 3.60 per kg Material C = ₹ 2.80 per kg

RSQ – Revised Standard Quantity for Actual Input

Material A = $\frac{500}{1,200}$ × 1,300 = 541.67 kg

Material B = $\frac{400}{1,200}$ × 1,300 = 433.33 kg

Material C = $\frac{300}{1,200}$ × 1,300 = 325 kg

i. Material Cost Variance = SQ × SP – AQ × AP

Material A = (546.29 × 6) – (400 × 6) = ₹ 877.74 (F)

Material B = (437 × 3.75) – (500 × 3.60) = ₹ 161.25 (A)

Material C = (327.78 × 3) – (400 × 2.80) = ₹ 136.66 (A)

= ₹ 579.83 (F)

ii. Material Price Variance = (SP – AP) × AQ

Material A = (6 – 6) × 400 = Nil

Material B = (3.75 – 3.60) × 500 = ₹ 75 (F)

Material C = (3 – 2.80) × 400 = ₹ 80 (F)

= ₹ 155 (F)

iii. Material Usage Variance = (SQ – AQ) × SP

Material A = (546.29 – 400) × 6 = ₹ 877.74 (F)

Material B = (437 – 500) × 3.75 = ₹ 236.25 (A)

Material C = (327.78 – 400) × 3 = ₹ 216.66 (A)

= ₹ 424. 83 (F)

iv. Material Mix Variance = (RSQ – AQ) × SP

Material A = (541.67 – 400) × 6 = ₹ 850.02 (F)

Material B = (433.33 – 500) × 3.75 = ₹ 250.01 (A)

Material C = (325 – 400) × 3 = ₹ 225 (A)

= ₹ 375.01 (F)

v. Material Yield Variance = (SQ – RSQ) × SP

Material A = (546.29 – 541.67) × 6 = ₹ 27.72 (F)

Material B = (437 – 433.33) × 3.75 = ₹ 13.76 (F)

Material C = (327.78 – 325) × 3 = ₹ 8.34 (F)

= ₹ 49.82 (F)

SOLUTION-10:

Department X

SH – Standard Hours for Actual Output = 8,640 hours

SR – Standard Rate per hour = ₹ 3 per hour

AH – Actual Hours Paid for = 8,200

AR – Actual Rate per hour = $\frac{₹\ 28,080}{8,200 \text{ hours}}$

i. Labour Cost Variance = SH × SR – AH × AR

$= ₹\ 8,640 \times 3 - 8,200 \times \frac{28,080}{8,200}$

= ₹ 25,920 – 28,080 = ₹ 2,160 (A)

ii. Labour Rate Variance = (SR – AR) × AH = SR × AH – AR × AH

$$= (3 \times 8,200) - \left(\frac{28,080}{8,200} \times 8,200\right)$$

$$= ₹\ 24,600 - ₹\ 28,080 = ₹\ 3,480\ (A)$$

iii. Labour Efficiency Variance = (SH – AH) × SR

$$= (8,640 - 8,200) \times 3$$

$$= ₹\ 1,320\ (F)$$

Department Y

SH = 6,015 hours

SR = ₹ 3.40 per hour

AH = 6,395 hours

$$AR = \frac{₹\ 19,370}{6,395 \text{ hours}}$$

i. Labour Cost Variance = SH × SR – AH × AR

$$= (6,015 \times ₹\ 3.40) - \left(6,395 \times \frac{19,370}{6,395}\right) = ₹\ 1,081\ (F)$$

ii. Labour Rate Variance = (SR – AR) × AH = SR × AH – AR × AH

$$= (₹\ 3.40 \times 6,395) - \left(\frac{19,370}{6,395} \times 6,395\right) = ₹\ 2,373\ (F)$$

iii. Labour Efficiency Variance = (SH – AH) × SR = (6,015 – 6,395) × ₹ 3.40 = ₹ 1,292 (A)

SOLUTION-11:

Analysis of the Given data

Workers	Standard		Actuals	
Skilled	32 × 40 = 1,280 hours	@ ₹ 3 per hour	28 × 40 = 1,120 hours	@ ₹ 4 per hour
Semi-Skilled	12 × 40 = 480 hours	@ ₹ 2 per hour	18 × 40 = 720 hours	@ ₹ 3 per hour
Unskilled	6 × 40 = 240 hours	@ ₹ 1 per hour	4 × 40 = 160 hours	@ ₹ 2 per hour

Workers	Standard		Actuals	
Input	2,000 hours		2,000 hours	
Output	2,000 hours		1,800 hours	

SH – Standard Labour Hours for Actual output

$$\text{Skilled} = \frac{1,280}{2,000} \times 1,800 = 1,152 \text{ hours}$$

$$\text{Semi – Skilled} = \frac{480}{2,000} \times 1,800 = 432 \text{ hours}$$

Unskilled = $\frac{240}{2,000} \times 1,800 = 216$ hours

SR – Standard Rate per hour

Skilled = ₹ 3 per hour Semi-Skilled = ₹ 2 per hour Unskilled = ₹ 1 per hour

AH – Actual Hours Paid

Skilled = 1,120 hours Semi-Skilled = ₹ 720 hours Unskilled = ₹ 160 hours

AR – Actual Rate

Skilled = ₹ 4 per hour Semi-Skilled = ₹ 3 per hour Unskilled = ₹ 2 per hour

RSH – Revised Standard Hours for Actual Input

Skilled = $\frac{1,280}{2,000} \times 2,000 = 1,280$ hours

Semi-Skilled = $\frac{480}{2,000} \times 2,000 = 480$ hours

Unskilled = $\frac{240}{2,000} \times 2,000 = 240$ hours

i. Labour Cost Variance = SH × SR – AH × AR

Skilled = (1,152 × 3) – (1,120 × 4) = ₹ 1,024 (A)

Semi-Skilled = (432 × 2) – (720 × 3) = ₹ 1,296 (A)

Unskilled = (216 × 1) – (160 × 2) = ₹ 104 (A)

= ₹ 2,424 (A)

ii. Labour Rate Variance = (SR – AR) × AH

Skilled = (3 – 4) × 1,120 = ₹ 1,120 (A)

Semi-Skilled = (2 – 3) × 720 = ₹ 720 (A)

Unskilled = (1 – 2) × 160 = ₹ 160 (A)

= ₹ 2,000 (A)

iii. Labour Efficiency Variance = (SH – AH) × SR

Skilled = (1,152 – 1,120) × 3 = ₹ 96 (F)

Semi – Skilled = (432 – 720) × 2 = ₹ 576 (A)

Unskilled = (216 – 160) × 1 = ₹ 56 (F)

= ₹ 424 (A)

iv. Labour Mix Variance = (RSH – AH) × SR

Skilled = (1,280 – 1,120) × 3 = ₹ 480 (F)

Semi-Skilled = (480 – 720) × 2 = ₹ 480 (A)

Unskilled = (240 – 160) × 1 = ₹ 80 (F)

= ₹ 80 (F)

v. Labour Yield Variance = (SH – RSH) × SR

Skilled = (1,152 – 1,280) × 3 = ₹ 384 (A)

Semi-Skilled = (432 – 480) × 2 = ₹ 96 (A)

Unskilled = (216 – 240) × 1 = ₹ 24 (A)

= ₹ 504 (A)

SOLUTION-12:

1. SH – Standard Hours for Actual Production
= Standard hour per worker × Number of workers

$$= \frac{\text{Actual Production}}{\text{Standard output per hour per labour}} \times \text{Number of workers}$$

$$= \frac{1{,}040 \text{ units}}{25 \text{ units per hour}} \times 100 \text{ workers}$$

= 4,160 hours

2. SR – Standard Rate = ₹ 30 per hour

3. AH – Actual Hours paid = 42 × 100 = 4,200 hours

4. AR – Actual Rate per hour

Worker Type I - ₹ 31 per hour (Number of Type I worker = 10)

Worker Type II - ₹ 30 per hour (Number of Type II worker = 30)

Worker Type III - ₹ 28.50 per hour (Number of Type III worker = 60)

5. AHW – Actual Hours worked = 4,200 hours × 95% = 3,990 hours

6. Idle time = AH – AHW = 4,200 – 3,990 = 210 hours or 4,200 × 5% = 210 hours

i. Labour Cost Variance = SH × SR – AH × AR

= 4,160 × 30 – (42 × 10 × 31 + 42 × 30 × 30 + 42 × 60 × 28.50)

= 1,24,800 – (13,020 + 37,800 + 71,820) = **₹ 2,160 (F)**

ii. Labour Rate Variance = (SR – AR) × AH

For Type I workers = (30 – 31) × 42 × 10 = ₹ 420 (A)

For Type II workers = (30 – 30) × 42 × 30 = Nil

For Type III workers = (30 – 28.50) × 42 × 60 = ₹ 3,780 (F)

= ₹ 3,360 (F)

iii. Labour Efficiency Variance = (SH – AHW) × SR

= (4,160 – 3,990) × ₹ 30 = ₹ 5,100 (F)

iv. Labour Idle time Variance = (AHW – AH) × SR

= (3,990 – 4,200) × ₹ 30 = ₹ 6,300 (A)

SOLUTION-13:

Material Variances

SQ – Standard Quantity for Actual Output

Material A = $\frac{450}{720} \times 760 = 475$ kg

Material B = $\frac{360}{720} \times 760 = 380$ kg

SP – Standard Price per unit

Material A = ₹ 20 per kg Material B = ₹ 10 per kg

AQ – Actual Quantity used

Material A = 450 kg Material B = 360 kg

AP – Actual Price per unit

Material A = ₹ 19 per kg Material B = 11 per kg

RSQ – Revised Standard Quantity for Actual Input

Material A = $\frac{450}{810} \times 810 = 450$ kg

Material B = $\frac{360}{810} \times 810 = 360$ kg

i. Material Cost Variance = SQ × SP – AQ × AP

Material A = (475 × 20) – (450 × 19) = ₹ 950 (F)

Material B = (380 × 10) – (360 × 11) = ₹ 160 (A)

= ₹ 790 (F)

ii. Material Price Variance = (SP – AP) × AQ

Material A = (20 – 19) × 450 = ₹ 450 (F)

Material B = (10 – 11) × 360 = ₹ 360 (A)

= ₹ 90 (F)

iii. Material Usage Variance = (SQ – AQ) × SP

Material A = (475 – 450) × 20 = ₹ 500 (F)

Material B = (380 – 360) × 10 = ₹ 200 (F)

= ₹ 700 (F)

iv. Material Mix Variance = (RSQ – AQ) × SP

Material A = (450 – 450) × 20 = Nil

Material B = (360 – 360) × 10 = Nil

= Nil

v. Material Yield Variance = (SQ – RSQ) × SP

vi. Material A = (475 – 450) × 20 = ₹ 500 (F)

vii. Material B = (380 – 360) × 10 = ₹ 200 (F)

= ₹ 700 (F)

Labour Variances

SH – Standard Hours for Actual Output

Skilled = $\frac{2,400}{720} \times 760$ = 2,533.33 hours

Unskilled = $\frac{1,200}{720} \times 760$ = 1,266.67 hours

SR – Standard Rate per hour

Skilled = ₹ 2 per hour Semi-skilled = ₹ 1 per hour

AH – Actual Hours

Skilled = 2,400 hours Semi-skilled = 1,200 hour

AR – Actual Rate

Skilled = ₹ 2.25 per hour Semi-skilled = ₹ 1.25 per hour

RSH – Revised Standard Hour for Actual Input

Skilled = $\frac{2,400}{720} \times 810$ = 2,400 hours

Unskilled = $\frac{1,200}{720} \times 810$ = 1,200 hours

i. Labour Cost Variances = SH × SR – AH × AR

Skilled = (2,533.33 × 2) – (2,400 × 2.25) = ₹ 333.34 (A)

Unskilled = (1,266.67 × 1) – (1,200 × 1.25) = ₹ 233.33 (A)

= ₹ 566.67 (A)

ii. Labour Rate Variances = (SR – AR) × AH

Skilled = (2 – 2.25) × 2,400 = ₹ 600 (A)

Unskilled = (1 – 1.25) × 1,200 = ₹ 300 (A)

= ₹ 900 (A)

iii. Labour Efficiency Variances = (SH – AH) × SR

Skilled = (2,533.33 – 2,400) × 2 = ₹ 266.66 (F)

Unskilled = (1,266.67 – 1,200) × 1 = ₹ 66.67 (F)

= ₹ 333.33 (F)

iv. Labour Mix Variances = (RSH –AH) × SR

Skilled = (2,400 – 2,400) × 2 = Nil

Unskilled = (1,200 – 1,200) × 1 = Nil

= Nil

v. Labour Yield Variances = (SH – RSH) × SR

Skilled = (2,533.33 – 2,400) × 2 = ₹ 266.66 (F)

Unskilled = (1,266.67 – 1,200) × 1 = ₹ 66.67 (F)

= ₹ 333.33 (F)

CHAPTER 16: BUDGET & BUDGETARY CONTROL

SOLUTION-1:

Barker Company

(Sales Budget for June 2022)

Product	Sales Volume (Unit)	Unit Selling Price (₹)	Total Sales Price (₹)
A	7,500	75	5,62,500
B	5,000	120	6,00,000
			11,62,500

Barker Company

(Production Budget for June 2022)

Particulars	Products A (units)	Product B (units)
Expected Sales	7,500	5,000
Ending inventory, desired	4,000	2,500
Total	11,500	7,500
Less : Beginning inventory	4,500	2,250
Total production (In units)	7,000	5,250

SOLUTION-2:

Opening Stock + Production = Sales + Closing Stock

or, Production = Sales + Closing Stock – Opening Stock

Particulars	Product A	Product B	Product C	Product D
Sales	10,000	15,000	13,000	12,000
Add: Closing Stock	3,000	5,000	3,000	2,000
	13,000	20,000	16,000	14,000
Less: Opening Stock	2,000	3,000	4,000	3,000
Production (units)	**11,000**	**17,000**	**12,000**	**11,000**

SOLUTION-3:

Production Budget for 6 months ending 30th June - Product X

Particulars	January	February	March	April	May	June
Sales	10,000	12,000	16,000	20,000	24,000	24,000
Add: Closing Stock	6,000	8,000	10,000	12,000	12,000	10,000

Less: Opening Stock	16,000 5,000	20,000 6,000	26,000 8,000	32,000 10,000	36,000 12,000	34,000 12,000
Product (units)	11,000	14,000	18,000	22,000	24,000	22,000

Closing Stock of December = Opening Stock of January = $\frac{50}{100}$ × Sales of February

and Closing Stock of January = $\frac{50}{100}$ × Sales of February

Total Production of Product X for 6 months = 11,000 + 14,000 + 18,000 + 22,000 + 24,000 + 22,000 = 1,11,000 units

Production Budget for 6 months ending 30th June - Product Y

Particulars	January	February	March	April	May	June
Sales	28,000	28,000	24,000	20,000	16,000	16,000
Add: Closing Stock	14,000	12,000	10,000	8,000	8,000	9,000
Less: Opening Stock	42,000 14,000	40,000 14,000	34,000 12,000	28,000 10,000	24,000 8,000	25,000 8,000
Product (units)	28,000	26,000	22,000	18,000	16,000	17,000

Total Production of Product Y for 6 months = 28,000 + 26,000 + 22,000 + 18,000 + 16,000 + 17,000 = 1,27,000 units

Summarized Cost of Production Budget for 6 month ending 30th June

Particulars	Product X (1,11,000 units) (₹)	Product Y (1,27,000 units) (₹)	Total (₹)
Materials	@ ₹ 12.50 = 13,87,500	@ ₹ 19 = 24,13,000	38,00,500
Direct Wages	@ ₹ 4.50 = 4,99,500	@ ₹ 7 = 8,89,000	13,88,500
Variable Overhead [WN]Co	@ ₹ 3 = 3,33,000	@ ₹ 4 = 5,08,000	8,41,000
of Production	22,20,000	38,10,000	60,30,000

Working Notes:

Computation of Variable Factory Overhead Rate per unit

Product X = $\frac{₹\ 6,60,000}{2,20,000 \text{ units}}$ = ₹ 3

Product Y = $\frac{₹\ 9,60,000}{2,40,000 \text{ units}}$ = ₹ 4

SOLUTION-4:

(a) **Production Budget (in units)**

Particulars	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Product A													
Sales	28	28	24	20	16	16	18	18	18	18	18	18	240
Add: Cl. Stock	14	12	10	8	8	9	9	9	9	9	9	9	
	42	**40**	**34**	**28**	**24**	**25**	**27**	**27**	**27**	**27**	**27**	**27**	
Less: Op. Stock	14	14	12	10	8	8	9	9	9	9	9	9	
	28	**26**	**22**	**18**	**16**	**17**	**18**	**18**	**18**	**18**	**18**	**18**	**235**
Product B													
Sales	10	12	16	20	24	24	20	20	20	20	20	20	226
Add: Cl. Stock	6	8	10	12	12	10	10	10	10	10	10	10	
	16	**20**	**26**	**32**	**36**	**34**	**30**	**30**	**30**	**30**	**30**	**30**	
Less: Op. Stock	5	6	8	10	12	12	10	10	10	10	10	10	
	11	**14**	**18**	**22**	**24**	**22**	**20**	**20**	**20**	**20**	**20**	**20**	**231**

Closing Stock of January = $\frac{1}{2}$ × Sales of February

and, Opening Stock of January = Closing Stock of December = $\frac{1}{2}$ × Sales of January

or, Opening Stock of January = $\frac{1}{2}$ × Sales of January

(b) **Summarised Production Cost Budget**

Particulars	Product A	Product B	Total
Production	235 units	231 units	
	(₹)	(₹)	(₹)
Direct Material:	235 @ ₹ 20 = 4,700	231 @ ₹ 10 = 2,310	7,010
Direct Labour	235 @ ₹ 5 = 1,175	231 @ ₹ 4 = 924	2,099
Works Overheads	10,105	9,009	19,114
Total Production Cost	**15,980**	**12,243**	**28,223**

Particulars	Product A	Product B	Total
Production Cost p.u.	$\frac{15,980}{235 \text{ units}}$ = ₹ 68 p.u	$\frac{12,243}{231 \text{ units}}$ = ₹ 53 p.u	

Summarised Profit and Loss Statement for the year

Particulars	Product A (₹)	Product B (₹)	Total (₹)
Sales	240 × 100 = 24,000	226 × 75 = 16,950	40,950
Less: Cost of Goods Sold	240 × 68 = 16,320	226 × 53 = 11,978	28,298
Marketing Overhead	1,200	1,100	2,300
Profit	6,480	3,872	10,352

SOLUTION-5:

Opening Stock + Purchase = Consumption + Closing Stock

or, Purchase = Consumption + Closing Stock – Opening Stock

Raw Materials Purchase Budget for January 2022

Particulars	A	B	C	D	E	F
Budgeted Consumption (units)	1,20,000	44,000	1,32,000	36,000	88,000	1,72,000
Add: Estimated Stock on 31st Jan (units)	20,000	8,000	28,000	4,000	16,000	32,000
	1,40,000	52,000	1,60,000	40,000	1,04,000	2,04,000
Less: Estimated Stock on 1st Jan (units)	16,000	6,000	24,000	2,000	14,000	28,000
Budgeted Purchase (units)	1,24,000	46,000	1,36,000	38,000	90,000	1,76,000
Standard Price per unit	25 paise	5 paise	15 paise	10 paise	20 paise	30 paise
Budgeted Purchase Cost (₹)	31,000	2,300	20,400	3,800	18,000	52,800

SOLUTION-6:

Production = Sales + Closing Stock – Opening Stock

= 40,000 +7,000 – 5,000 = 42,000 units

Raw Materials Purchase Budget

Particulars	Product A units	Product B units
Materials Required	42,000 × 3 = 1,26,000	42,000 × 5 = 2,10,000
Add: Closing Stock	15,000	25,000

Add: Closing Stock of Material on Order	8,000	10,000
	1,49,000	2,45,000
Less: Opening Stock	12,000	20,000
Less: Opening Stock of Material on Order	7,000	11,000
Raw Material Purchase	1,30,000	2,14,000

SOLUTION-7:

(a) Number of material units needed to produce products X and Y

Particulars	Material A	Material B
Number of Product X to be produced (a)	2000	2000
Number of material units needed per product X (b)	3.0	4.0
Material required (a × b)	6000	8000

Particulars	Material A	Material B
Number of Product Y to be produced (a)	3000	3000
Number of material units needed per product Y (b)	1.0	6.5
Material required (a × b)	3000	19500

Particulars	Material A	Material B
Total number of material units needed for Production of Product X and Product Y (6000 + 3000) (8000 + 19500)	9000	27500

(b) Cost of materials used for production

Particulars	Material A	Material B
Total number of material units	9,000	27,500
Unit Price (₹)	2	1.20
Cost of materials used for production (₹)	18,000	33,000

(c) Number of materials units to be purchased

Particulars	Material A	Material B
Total number of material units required for production	9000	27500
Add : Desire ending inventory	3000	6000
	12000	33500

Less : Beginning inventory Material to be purchased	2000	6000
	10000	27500

(d) Cost of materials units to be purchased

Particulars	Material A	Material B
Materials to be purchased	10000	27500
Unit Price (₹)	2.00	1.20
Material to be purchased (₹)	20,000	33,000

SOLUTION-8:

Production Budget for Product A and Product B

Particulars	Product A units	Product B units
Sales	15,000	75,000
Add: Closing Stock	1,500	4,500
	16,500	79,500
Less: Opening Stock	3,000	4,000
Production	13,500	75,500

Material Purchase Budget for the year ending December 31st, 2021

Particulars	P	Q	R	Total
Materials required for Product A in the ratio of 3 : 5 : 2	4,050	6,750	2,700	13,500
Materials required for Product B in the ratio of 1 : 2	–	25,167	50,333	75,500
Total requirement	4,050	31,917	53,033	89,000
Add: Closing Stock	3,000	4,000	9,000	16,000
	7,050	35,917	62,033	1,05,000
Less: Opening Stock	4,000	3,000	30,000	37,000
Purchases (in units)	3,050	32,917	32,033	68,000
Cost per kg	12	10	8	
Total Purchase Cost (₹)	36,600	3,29,170	2,56,264	6,22,034

SOLUTION-9:

(a) Quarterly and annual purchase of raw material by weight and value

Quarter	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
Production (units)	65 × 100 = 6,500	60 × 110 = 6,600	55 × 120 = 6,600	60 × 105 = 6,300	26,000

Material Required (kg) (Production × 2 kg p.u) Add: Closing Stock (kg)	13,000	13,200	13,200	12,600	52,000 2,000
Less: Opening Stock (kg)					54,000 4,000
Annual Purchase by weight (kg)					**50,000**
Quarterly Purchase by weight (kg)	30% × 50,000 = **15,000**	50% × 50,000 = **25,000**	20% × 50,000 = **10,000**	–	
Budgeted Purchase Price per kg (₹)	1	1.05	1.125		
Quarterly and AnnualPurchase by Value (₹)	15,000 × 1 = 15,000	25,000 × 1.05 = 26,250	10,000 × 1.125 = 11,250		52,500

(b) Closing quarterly stock by weight and value

Store Ledger (FIFO)

Quarter	Receipt			Issue			Balance (Closing Stock)		
	Quantity (kg)	Rate	Amount (₹)	Quantity (kg)	Rate	Amount (₹)	Quantity (kg)	Rate	Amount (₹)
Opening							4,000	1	4,000

Quarter	Receipt			Issue			Balance (Closing Stock)		
	Quantity (kg)	Rate	Amount (₹)	Quantity (kg)	Rate	Amount (₹)	Quantity (kg	Rate	Amount (₹)
1	**15,000**	**1**	**15,000**	**13,000**	**1**	**13,000**	**6,000**	**1**	**6,000**
2	**25,000**	**1.05**	**26,250**	**13,200** $\binom{6,000}{7,200}$	$\binom{1}{1.05}$	**13,560** $\binom{6,000}{7,560}$	**17,800**	**1.05**	**18,690**
3	**10,000**	**1.125**	**11,250**	**13,200**	**1.05**	**13,860**	**14,600** $\binom{4,600}{10,000}$	$\binom{1.05}{1.125}$	**16,080** $\binom{4,830}{11,250}$
4	–	–	–	**12,600** $\binom{4,600}{8,000}$	$\binom{1.05}{1.125}$	**13,830** $\binom{4,830}{9,000}$	**2,000**	**1.125**	**2,250**

SOLUTION-10:

Long Beach Tool Corporation

Production Budget

Particulars	June (units)	July (units)	August (units)
Forecasted Sales	6000	5000	8000
Add : Closing Inventory (Desired)	2500	4000	3500
Total Requirement	8500	9000	11500
Less : Opening Inventory	1500	2500	4000
Number of Units to be produced	7000	6500	7500

Long Beach Tool Corporation

Direct Labour Budget

Particulars	June (units)	July (units)	August (units)
Machining:			
a. Budgeted Production	7000 units	6500 units	7500 units
b. Direct Labour Hours per unit	6 hours	6 hours	6 hours
c. Total direct Labour hours required (a × b = c)	42000 hrs.	39000 hrs.	45000 hrs.
d. Direct Labour Cost [c × ₹ 10)	₹ 4,20,000	₹ 3,90,000	₹ 4,50,000

Particulars	June (units)	July (units)	August (units)
Assembly :			
Budgeted Production	7000 units	6500 units	7500 units
Direct Labour Hours per unit	10 hours	10 hours	10 hours
Total direct Labour hours required (a × b = c)Direct Labour Cost [c (as calculated) × ₹ 8)	70000 hrs.	65000 hrs.	75000 hrs.
	₹ 5,60,000	₹ 5,20,000	₹ 6,00,000

SOLUTION-11:

Calculation of units of Production of Different Products (in units)

Particulars	Product X	Product Y	Product Z
Sales	4,800	2,400	2,400
Add: Closing Stock	$\frac{4,800}{12 \text{ months}} \times 2$ months = 800	$\frac{2,400}{12 \text{ months}} \times 2$ months = 400	$\frac{2,400}{12 \text{ months}} \times 2$ months = 400

Less: Opening Stock	600	300	800
Production	5,000	2,500	2,000

Machine Hours Utilisation Budget

Particulars	Cost Centers							
	A				B			
	X	Y	Z	Total	X	Y	Z	Total
Production (units)	5,000	2,500	2,000		5,000	2,500	2,000	
Hours required p.u.	30	200	30		70	100	20	
Total Machine hoursrequired	1,50,000	5,00,000	60,000	7,10,000	3,50,000	2,50,000	40,000	6,40,000
Number of Machines required [WN]	60	200	24	284	140	100	16	256

Working Notes:

Number of Machines required:

Cost Centre A : Product X = $\frac{284}{7,10,000} \times 1,50,000 = 60$ machines

Product Y = $\frac{284}{7,10,000} \times 5,00,000 = 200$ machines

Product Z = $\frac{284}{7,10,000} \times 60,000 = 24$ machines

Cost Centre B : Product X = $\frac{256}{6,40,000} \times 3,50,000 = 140$ machines

Product Y = $\frac{256}{6,40,000} \times 2,50,000 = 100$ machines

Product Z = $\frac{256}{6,40,000} \times 40,000 = 16$ machines

SOLUTION-12:

Selling Overhead Budget

Particulars	₹	₹	₹
Sales	80,000	90,000	1,00,000
A. Fixed Overhead			
Advertisement Salaries	1,000	1,000	1,000
of Sales Dept.	1,000	1,000	1,000
Expenses of Sales Dept.	750	750	750
Salesmen Remuneration	3,000	3,000	3,000
Total (A)	**5,750**	**5,750**	**5,750**
B. Variable Overhead			
Salesmen Commission	720 [(80,000 – 8,000) × 1%]	800 [(90,000 – 10,000) × 1%]	895 [(1,00,000 – 10,500) × 1%]
Carriage Outward	4,000 [80,000 × 5%]	4,500 [9,00,000 × 5%]	5,000 [1,00,000 × 5%]
Agent's Commission	600 [8,000 × 7.5%]	750 [10,000 × 7.5%]	788 [10,500 × 7.5%]
Total (B)	**5,320**	**6,050**	**6,683**
Grand Total (A + B)	**11,070**	**11,800**	**12,433**

SOLUTION-13:

1. February Sales **->** (1 – 0.7 – 0.2) = ₹ 3600 **->** 3600 ÷ (1 – 0.9) = ₹ 36000

March Sales **->** (1 – 0.7) = ₹ 14400 ₹ 14400 ÷ 0.3 = ₹ 48000

2. Budgeted Cash Collections from Sales

Details		April	May	June
Cash collection				
February :	40000 (8%)	3200		
March :	50000 (20%)	10,000		
	50000 (8%)		4000	
April :	45000 (70%)	31500		
	45000 (20%)		9000	
	45000 (8%)			3600
May :	50000 (70%)		35000	
	50000 (20%)			10000
June :	60000 (70%)			42000
		44700	48000	55600

SOLUTION-14:

Cash Budget for the period January to June (for first 6 month) (in ₹)

Particulars	January	February	March	April	May	June
Opening Balance (A)	10,000	18,000	29,800	27,000	24,700	33,100
Add: Receipts (B)						
Cash Sales [WN 1]	10,000	11,000	14,000	18,000	15,000	20,000
Collection from Debtors [WN 1]	-	10,000	11,000	14,000	18,000	15,000
Share Call Money	-	-	10,000	-	-	-
Share Premium	-	-	2,000	-	-	-
Total (A + B)	20,000	39,000	66,800	59,000	57,700	68,100
Payments (C)						
Creditors for Materials	-	-	20,000	14,000	14,000	22,000
Wages [WN 2]	2,000	4,200	4,500	4,600	4,300	4,500
Production O/H	-	3,200	3,300	3,400	3,500	3,200
Selling & Distribution	-	800	900	900	1,000	900
Sales Commission	-	1,000	1,100	1,400	1,800	1,500
Installment of Machinery	-	-	10,000	10,000	-	-
Total (C)	2,000	9,200	39,800	34,300	24,600	32,100

Particulars	January	February	March	April	May	June
Closing Balance (A + B – C)	18,000	29,800	27,000	24,700	33,100	36,000

Working Notes :

1. Calculation of Cash Sales and Collection from Debtors

Month	Total Sales (₹)	Cash Sales (50%) (₹)	Credit Sales (50%) (₹)	Collection Month
January	20,000	10,000	10,000	February
February	22,000	11,000	11,000	March
March	28,000	14,000	14,000	April
April	36,000	18,000	18,000	May
May	30,000	15,000	15,000	June
June	40,000	20,000	20,000	July

2. **Calculation of Payment of Wages (in ₹)**

Month	Wages	Payment Month					
		January	February	March	April	May	June
January	4,000	2,000	2,000	-	-	-	-
February	4,400	-	2,200	2,200	-	-	-
March	4,600	-	-	2,300	2,300	-	-
April	4,600	-	-	-	2,300	2,300	-
May	4,000	-	-	-	-	2,000	2,000
June	5,000	-	-	-	-	-	2,500
		2,000	4,200	4,500	4,600	4,300	4,500

SOLUTION-15:

Cash Budget for the 3 months ending 30th June, 2022

Particulars	April	May	June
	(₹)	(₹)	(₹)
Opening Balance (A)	6,000	3,950	3,000
Add: **Receipts (B)**			
Cash Sales [WN 1]	1,600	1,700	1,800
Collection from Debtors [WN 1]	13,050	13,950	14,850
Advance from Sale of Vehicles	–	–	9,000
Dividend	–	–	1,000
Total (A + B)	20,650	19,600	29,650
Payments (C)			
Creditors for			
Materials	9,600	9,000	9,200
Wages [WN 2]	3,150	3,500	3,900
Overheads [WN 3]	1,950	2,100	2,250
Installment of Plant and Machinery	2,000	2,000	2,000
Preference Dividend	–	–	10,000
Total (C)	16,700	16,600	27,350
Closing Balance (A + B – C)	3,950	3,000	2,300

Working Notes:

1. Calculation of Cash Sales and Collection from Debtors Amount (₹)

Month	Total Sales	Cash Sales	Credit Sales	Collection			
				March	April	May	June
February	14,000	1,400	12,600	6,300	6,300	_	_
March	15,000	1,500	13,500	_	6,750	6,750	_

Month	Total Sales	Cash Sales	Credit Sales	Collection			
				March	April	May	June
April	16,000	1,600	14,400	_	_	7,200	7,200
May	17,000	1,700	15,300	_	_	_	7,650
June	18,000	1,800	16,200	_	_	_	_
					13,050	13,950	14,850

2. Calculation of Payment of Wages (Amount in ₹)

Month	Wages (₹)	March (₹)	April (₹)	May (₹)	June (₹)
March	3,000	2,250	750	–	–
April	3,200	–	2,400	800	–
May	3,600	–	–	2,700	900
June	4,000	–	–	–	3,000
			3,150	3,500	3,900

3. Calculation of Payment of Overheads

Month	Overheads (₹)	Overheads			
		March (₹)	April (₹)	May (₹)	June (₹)
March	1,900	950	950	1,000	1,100
April	2,000		1,000	1,100	1,150
May	2,200				
June	2,300				
			1,950	2,100	2,250

SOLUTION-16:

Flexible Budget at Different Capacities and Determination of Overhead Rates

Particulars	10,000 units		7,000 units		9,000 units	
	Cost p.u. (₹)	Total (₹)	Cost p.u. (₹)	Total (₹)	Cost p.u. (₹)	Total (₹)
Variable Cost						
Direct Materials	48	4,80,000	48	3,36,000	48	4,32,000
Direct Labour	24	2,40,000	24	1,68,000	24	2,16,000
Variable Overheads	20	2,00,000	20	1,40,000	20	1,80,000
Variable Expenses	4	40,000	4	28,000	4	36,000
Selling Expenses (90% × 12)	10.80	1,08,000	10.80	75,600	10.80	97,200
Distribution Expenses (80% × 4)	3.20	32,000	3.20	22,400	3.20	28,800

Total Variable Cost (A)	110	11,00,000	110	7,70,000	110	9,90,000
Fixed Cost						
Fixed Overheads	12	1,20,000		1,20,000		1,20,000
Selling Expenses (10% × 12)	1.20	12,000		12,000		12,000
Administration Expenses	4	40,000		40,000		40,000
Distribution Expenses (20% × 4)	0.80	8,000		8,000		8,000
Total Fixed Cost (B)	18	1,80,000		1,80,000		1,80,000
Total Cost (A + B)	128	12,80,000		9,50,000		11,70,000

SOLUTION-17:

(a) Direct materials cost is variable cost.

Check :

Cost per %

70% : $\frac{17,780}{70}$ = 254

80% : $\frac{20,320}{80}$ = 254

90% : $\frac{22,860}{90}$ = 254

So, Direct materials at 45% level of activity = 254 × 45 = ₹ 11,430

(b) Direct labour is a variable cost.

Check :

Cost per %

70% : $\frac{44,800}{70}$ = 640

80% : $\frac{54,200}{80}$ = 640

90% : $\frac{57,600}{90}$ = 640

So, Direct labour at 45% level of activity = 640 × 45 = ₹ 28,800

(c) Production overhead is a semi-variable cost.

Check :

Cost per %

70% : $\frac{30,500}{70}$ = 436

80% : $\frac{32,000}{80}$ = 400

90% : $\frac{33,500}{90}$ = 372

Variable cost of (90% – 70%) activity = (33,500 – 30,500)

Or, Variable cost portion in Production overhead of 20% = ₹ 3,000

Or, Variable cost of 1% change in activity = 3,000/20 = ₹ 150

Now, Fixed cost portion in Production overhead = 33,500 – (90 × 150) = ₹ 20,000

Therefore, Total Production overhead cost at 45% level of activity = 20,000 + (45 × 150) = ₹ 26,750

SOLUTION-18:

(i) Statement showing segregation of the items in Fixed, Variable and Semi-Variable

Items of Cost	Nature of Cost	Variable Cost p.u	Fixed
Wages	Variable	1,200 = ₹ 2. p.u. 600	

Items of Cost	Nature of Cost	Variable Cost p.u	Fixed
Consumable stores	Variable	900 = ₹ 1.50 p.u. 600	
Maintenance	Semi-Variable	= Change in total Cost Change in Output = 1,500 – 1,100 1,000 – 600 = 400 400 = ₹ 1. p.u.	Total Cost – Variable Cost = 1,100 – (600 × 1) = ₹ 500
Power and fuel	Semi-Variable	= Change in total Cost	Total Cost – Variable Cost

		Change in Output = 2,000 – 1,600 1,000 – 600 = 400 400 = ₹ 1. p.u.	= 1,600 – (600 × 1) = ₹ 1,000
Depreciation	Fixed		₹ 4,000
Insurance	Fixed		₹ 1,000

(ii) Budget at 80% Capacity

Production	1,000 × 80% = 800 units (₹)
Wages Consumable stores	800 × 2 = 1,600
Maintenance Power and fuel	800 × 1.50 = 1,200
Depreciation	800 × 1 + 500 = 1,300
Insurance	800 × 1 + 1,000 = 1,800
	4,000
	1,000
Total Cost	10,900

(iii)

Capacity	60%		80%		100%	
Production	**600 units**		**800 units**		**1000 units**	
	p.u. (₹)	**Total (₹)**	**p.u. (₹)**	**Total (₹)**	**p.u. (₹)**	**Total (₹)**
Variable Costs						
Wages	2	1,200	2	1,600	2	2,000
Consumable stores	1.5	900	1.5	1,200	1.5	1,500
Maintenance	1	600	1	800	1	1,000
Power and Fuel	1	600	1	800	1	1,000
Total Variable Costs	5.5	3,300	5.5	4,400	5.5	5,500
Fixed Costs						
Maintenance		**500**		**500**		**500**
Power and Fuel		1000		1000		1000
Depreciation		4000		4000		4000
Insurance		1000		1000		1000
Total Fixed Costs	6500 600 = 10.83	6500	6500 800 = 8.125	6500	6500 1,000 = 6.5	6500
Total Costs	16.33	9,800	13.625	10,900	12	12,000

SOLUTION-19:

Flexible Budget

At 40%, 50% and 90% Capacity Utilization

Particulars	40% Capacity Utilization	50% Capacity Utilization	90% Capacity Utilization
Production - Units	10,000	12,500	22,500
Selling Price Per Unit	₹ 20	₹ 19.40	₹ 19
Sales Value [units × selling price]	**₹ 2,00,000**	**₹ 2,42,500**	**₹ 4,27,500**
Variable Costs :			
Material ₹ 10 per unit	₹ 1,00,000	₹ 1,21,250*	₹ 2,13,750**
Labour ₹ 3 per unit	₹ 30,000	₹ 37,500	₹ 67,500
Overheads ₹ 2 per unit (₹ 5 × 40%)	₹ 20,000	₹ 25,000	₹ 45,000
Total Variable Costs	₹ 1,50,000	₹ 1,83,750	₹ 3,26,250
Fixed Costs (₹ 5 × 60% × 10,000)	₹ 30,000	₹ 30,000	₹ 30,000
Total Costs [Variable Cost + Fixed Cost]	₹ 1,80,000	₹ 2,13,750	₹ 3,56,250
Profit/Loss [Sales – Total Costs]	₹ 20,000	₹ 28,750	₹ 71,250

* 12,500 units × ₹ 9.70 per unit = ₹ 1,21,500

** 22,500 units × ₹ 9.50 per unit = ₹ 2,13,750

SOLUTION-20:

Production Cost Budget for the forthcoming year

Particulars	₹
i. Wages $80,000 \times 133\frac{1}{3}\% \times \frac{0.75}{0.80} \times \frac{100}{95}$	1,05,263
ii. Materials $1,20,000 \times 133\frac{1}{3}\%$	1,60,000
iii. Variable Overhead $60,000 \times 133\frac{1}{3}\%$	80,000
iv. Fixed Overhead	40,000
Production Cost (i + ii + iii)	3,85,263

SOLUTION-21:

Flexible Budget at Different Capacities and Determination of Overhead Rate

Plant Capacity	80% (₹)	70% (₹)	90% (₹)
Variable Overhead:			
Indirect Labour	12,000	$\frac{12,000}{80\%} \times 70\% \times 10,500$	$\frac{12,000}{80\%} \times 90\% \times 13,500$
Stores including spares	4,000	$\frac{4,000}{80\%} \times 70\% \times 3,500$	$\frac{4,000}{80\%} \times 90\% \times 4,500$
Total Variable Overhead (A)	16,000	14,000	18,000
Semi Variable:			
[WN 1] Power	20,000	18,250	21,750
Repairs	2,000	1,900	2,100
Total Semi Variable (B)	22,000	20,150	23,850
Fixed:			
Depreciation	11,000	11,000	11,000
Insurance	3,000	3,000	3,000
Salaries	10,000	10,000	10,000
Total Fixed (C)	24,000	24,000	24,000
Total (A + B + C)	62,000	58,150	65,850

Plant Capacity	80% (₹)	70% (₹)	90% (₹)
Labour Hours	1,24,000	$\frac{1,24,000}{80\%} \times 70\% \times 1,08,500$	$\frac{1,24,000}{80\%} \times 90\% \times 1,39,500$
Labour Hour Rate (₹ / hour)	0.5 $\left(\frac{62,000}{1,24,000\ \text{hr}}\right)$	0.536 $\left(\frac{58,150}{1,08,500\ \text{hr}}\right)$	0.472 $\left(\frac{65,850}{1,39,500\ \text{hr}}\right)$

Working Notes:

1. Calculation of Semi Variable Costs

Plant Capacity	80% (₹)	70% (₹)	90% (₹)
Semi Variable:			
a. Power – Variable 70%	14,000	14,000 × 70% = 12,250	$\frac{14,000}{} \times 90\% = 15,750$

Fixed 30%	6,000	80% 6,000	80% 6,000
	20,000	18,250	21,750
b. Repairs – Variable 40%	800	800 × 70% = 700 80%	800 × 90% = 900 80%
Fixed 60%	1,200	1,200	1,200
	2,000	1,900	2,100

SOLUTION-22:

Budget showing Costs and Profits for the year 2022

	Amount (₹)
i. Sales	1,50,000
ii. Costs	
Raw Materials $53,000 \times \frac{60,000}{40,000} \times \frac{105}{100}$	83,475
Wages $11,000 \times \frac{60,000}{40,000} \times \frac{110}{100} \times \frac{105}{100}$	19,058
	24,000
Variable Overheads $16,000 \times \frac{60,000}{40,000}$	13,700
Fixed Overheads $10,000 + (25,000 + 12,000) \times \frac{10}{100}$	
Total Cost	1,40,233
iii. Profit (i. – ii.)	9,767

THE END