4. OVERHEADS

PROBLEM NO: 1

Direct Method:

Particulars	Basis	A (Rs)	B (Rs)	C (Rs)	S_1 (Rs)	S_2 (Rs)	S_3 (Rs)	S_4 (Rs)
Primary distribution summary	Given	30,000	26000	24000	4000	3000	1600	1000
Reapportionment of Service charges								
Stores	St (25:15:10)	2000	1200	800	(4000)			
Time Keeping	Workers (4:3:3)	1200	900	900	-	(3000)	-	-
Power	Horse power (3:3:2)	600	600	400	-	-	(1600)	
Canteen	Works	400	300	300	-	-	(1000)	
Total	-	34200	29000	26400	-	-	-	-

PROBLEM NO: 2

Particulars	Basis	Production		Service Dept.	
		A (Rs)	B (Rs)	X (Rs)	Y (Rs)
Primary distribution summary	Given	3000	3200	2000	1500
Re-apportionment of					
X	25:40:35	800	700	(2000)	500
Y	40:60	800	1200	-	(2000)
Total		4600	5100	-	-

PROBLEM NO: 3

Assume this sum to be done in simultaneous equation method

Expenses of Service Department

B = Rs.3000

P = Rs.600

As Per Primary distribution summary

Total over head of B = 3000 + 0.50 P $\rightarrow$ 1

Total over head of P = 600 + 0.05 B $\rightarrow$ 2

From 1, and 2

B = 3000 + 0.5 (600 + 0.05 B)

$\Rightarrow$ B =3000 + 300 + 0.025 B

$\Rightarrow$0.975B = 3300

$\Rightarrow$B = 3385

Substitute B = 3385 in - 2

$\Rightarrow$ P = 600+0.05(3385) = 769

Secondary distribution summary

Particulars		Production Dept.		Service Dept.	
	Basis	A	B	Boiler house	Pumproom
Primary distribution summary	-	-	-	3,000	600

Re apportionment of service charges					
Boiler	60:35:05	2031	1185	(3385)	169
Pump	10:40:50	77	308	385	(769)
		2108	**1493**		

PROBLEM NO: 4

a) Statement showing primary distribution summary

Particulars	Amount	Basis	A	B	C	X	y
Direct materials	3000	Given	-	-	-	2000	1000
Direct wages	3000	Given	-	-	-	1000	2000
Factory rent	4000	Area	1000	500	1000	500	1000
Power	2500	HP x MH	500	800	800	150	250
Depreciation	1000	Capital value	200	400	200	100	100
Other over heads	9000	Machine hours	1000	2000	4000	1000	1000
Total			**2700**	**3700**	**6000**	**4750**	**5350**

b) $X = 4750+0.05Y \rightarrow 1$

$Y = 5350+0.1X \rightarrow 2$

$X = 4750 + 0.05(5350 + 0.1X)$

$\Rightarrow 0.995X = 5018$

$\Rightarrow X = 5043$

Substitute x = 5043 in 2

$\Rightarrow Y = 5350+0.1(5043)$

$\Rightarrow Y = 5854$

Statement showing overhead recovery rate

a) Total overheads	8482	6505	7513
b) Machine hours	1000	2000	4000
c) OH recovery rate	8.482	3.25	1.878

Workings

Particulars	Basis	A	B	C	X	y
Primary distribution summary	-	2700	3700	6000	4750	5350
Re-Apportionment of service charges						
X	45:15:30:0:10	2270	756	1513	(5043)	504
Y	60:35:0:5:0	3512	2049	-	293	(5854)
Total		**8482**	**6505**	**7513**		

PROBLEM NO: 5

Primary Distribution Summary

Particulars	Basis of apportionment	Total Amount	Production Department		Service Department	
			Fabrication	Assembly	Stores	Maintenance
Overheads allocated	Allocation	27,28,000	15,52,000	7,44,000	2,36,000	1,96,000
Direct Costs	Actual	86,36,000	71,88,000	14,48,000	-	-

Other Overheads						
Factory Rent	Floor area (48:20:5:7)	15,28,000	9,16,800	3,82,000	95,500	1,33,700
Factory Building insurance	Floor area (48:20:5:7)	1,72,000	1,03,200	43,000	10,750	15,050
Plant & machinery Insurance	Value of plant & machinery (66:30:3:7)	1,96,000	1,22,038	55,472	5,547	12,943
Plant & machinery Depreciation	Value of plant & machinery (66:30:3:7)	2,65,000	1,65,000	75,000	7,500	17,500
Canteen Subsidy	No of employees (60:40:19:6	4,48,000	2,15,040	1,43,360	68,096	21,504
	Total	**1,39,73,000**	**1,02,62,078**	**28,90,832**	**4,23,393**	**3,96,697**

Redistribution of service departments expenses

Particulars	Basis of apportionment	Production Department		Service Department	
		Fabrication	Assembly	stores	maintenance
Overheads as per primary distribution	As per primary distribution	1,02,62,078	28,90,832	4,23,393	3,96,697
Maintenance department cost	Maintenance hours (28:23:4: -)	2,01,955	1,65,891	28,851	(3,96,697)
		1,04,64,033	30,56,723	4,52,244	-
Stores Department	No of stores requisition (18:7: - : -)	3,25,616	1,26,628	(4,52,244)	-
	Total	1,07,89,649	31,83,351	-	-

b) Overhead recovery rate

Department	Apportioned Overhead	Basis of OH recovery rate	OH recovery rate
Fabrication	1,07,89,649	30,00,000 Machine hours	3.60 per machine hour
Assembly	31,83,351	26,00,000 labour hours	1.22 per labour hour

c) Calculation of full production costs of job no.1G12014

Particulars	Amount (Rs)
Direct materials	1,15,200
Direct Labour	
Fabrication Department (240 hours x Rs. 18)	4320
Assembly Department (180 hours x Rs. 18)	3240
Production overheads	
Fabrication Department (210 hours x Rs. 3.60)	756
Assembly Department (180 hours x Rs. 1.22)	220
Total production Cost	123736

PROBLEM NO: 6

Statement showing primary distribution summary

		Total	Production Dept.			Service Dept.	
Particulars	**Basis**		**P_1 (Rs.)**	**P_2 (Rs.)**	**P_3 (Rs.)**	**S_1 (Rs.)**	**S_2 (Rs.)**
Direct Wages	Given	1695	-	-	-	1500	195
Rent & Rates	Floor Space	5000	1000	1250	1500	1000	250
General lighting	Light Points	600	100	150	200	100	50
Indirect wages	Wages direct	1939	600	400	600	300	39
Power	HP	1500	600	300	500	100	

Deprecation	Cost of Machines	10,000	2400	3200	4000	200	200
sundries	Direct wages	9695	3000	2000	3000	1500	195
		30429	7700	7300	9800	4700	929

$S_1 = 4700 + 0.1S_2 \rightarrow (1)$

$S_2 = 929 + 0.1S_1 \rightarrow (2)$

Sub (2) in (1) $\Rightarrow S_1 = 4700 + 0.1 (929+0.1S_1)$

$= 4700 + 93 + 0.01 S_1$

$S_1 = 4793/0.99 = 4841$

$\therefore S_2 = 929 + 0.1 (4841) = 1413$

Statement showing secondary distribution summary distribution summary (simultaneous equation)

Particulars	**P_1** (Rs.)	**P_2** (Rs.)	**P_3** (Rs.)	**S_1** (Rs.)	**S_2** (Rs.)
Primary distribution	7700	7300	9800	4700	929
Reapportionment					
S_1 cost	968	1432	1936	(4841)	484
S_2 cost	565	283	424	141	(1413)
	9233	9035	12160	-	-

Overhead Recovery Rate:

$$P_1 = \frac{9233}{8070} = 3.01$$

$$P_2 = \frac{9035}{4475} = 2.02$$

$$P_3 = \frac{12160}{2419} = 5.03$$

Calculation of cost of product X

Particulars	**Amt (Rs.)**	**Amt (Rs.)**
Direct Material		50
Direct labour cost		30
prime cost		80
Add overheads		
P1 (3.01 x 4)	12.04	
P2 (2.02 x 5)	10.1	
P3 (5.03 x 3)	15.09	37.23
Total		117.23

ALTERNATIVE ANSWER:

Statement Showing Distribution of Overheads of Modern Manufactures Ltd.

		Total	**Production Dept.**			**Service Dept.**	
Particulars	**Basis**		**P_1** (Rs.)	**P_2** (Rs.)	**P_3** (Rs.)	**S_1** (Rs.)	**S_2** (Rs.)
Direct Wages	Given	1695	-	-	-	1500	195
Rent & Rates	Floor Space	5000	1000	1250	1500	1000	250
General lighting	Light Points	600	100	150	200	100	50
Indirect wages	Wages direct	1939	600	400	600	300	39
Power	HP	1500	600	300	500	100	
Deprecation	Cost of Machines	10,000	2400	3200	4000	200	200
sundries	Direct wages	9695	3000	2000	3000	1500	195
		30429	7700	7300	9800	4700	929

Redistribution of Service Department's Expenses over Production Departments

Particulars	Total (Rs.)	P1 (Rs.)	P2 (Rs.)	P3 (Rs.)	S1 (Rs.)	S2 (Rs.)
Total Overheads	30,429.00	7700	7300	9800	4700	929
Dept. S1 Overheads apportioned in the ratio: (20:30:40:—:10)	4700	940	1410	1880	-4700	470
Dept. S2 overheads apportioned in the ratio :(40:20:30:10:—)	1399	559.60	279.80	419.70	139.90	-1399.00
Dept. S1 overheads apportioned in the ratio (20:30:40:—:10)	139.90	27.98	41.97	55.96	-139.90	13.99
Dept. S2 overheads apportioned in the ratio (40:20:30:10:—)	13.99	5.60	2.80	4.20	1.39	13.99
Dept. S1 overheads apportioned in the ratio (20:30:40:—:10)	1.39	0.28	0.42	0.56	-1.39	0.13
Dept. S2 overheads apportioned in the ratio (40:20:30:10:—)	0.13	0.06	0.03	0.04		-0.13
Total	9233.52	9035.02	12160.46			

Working hours	3,070.00	4,475.00	2,419.00
Working rate per hour	3.00	2.02	5.03

Cost of the Product 'X'

Particulars	(Rs.)
Direct material cost	50.00
Direct labour cost	30.00
Overhead cost (See working note)	37.19
	117.19

Working Note :

Overhead cost :

(Rs. 3 × 4 hrs.) + (Rs. 2.02 × 5 hrs.) + (Rs. 5.03 × 3 hrs.)

= Rs. 12 + Rs. 10.10 + Rs. 15.09 = Rs. 37.19

PROBLEM NO: 7

a) Overhead Distribution statement

Allocated expenses	Production Dept		Service Dept	
	Machine Shop (Rs.)	Packing (Rs.)	General plant (Rs.)	Stores and maintenance (Rs.)
Indirect labour	4000	3000	2000	5650
Maintenance material	1800	700	1020	1500
Superintendent's salary	-	-	4000	-
Miscellaneous supplies	400	1000	150	200
Cost and payroll salaries	-	-	10000	-
Total	6200	4700	17,170	7350
Apportioned expenses (See schedule below)	77,720	25,800	2.830	22650
Total	83,920	30500	20,000	30,000

Schedule of Apportioned expenses

Item	Basis	Machine shop (Rs.)	Packing (Rs.)	General plant (Rs.)	Stores & maintenance (Rs.)
Power	House power houses	5600	800	-	1600
Rent	Floor Space	5000	2000	1000	4000
Fuel & Heat	Radiator secs.	1200	2400	800	1600
Taxes	Investment	1280	400	20	300
Insurance	Investment	640	200	10	150
Depreciation	Investment	64,000	20,000	1000	15,000
Total		77,720	25,800	2,830	22,650

Distribution of service Dept. Expenses

	Production Dept		Service Dept	
Particulars	Machine	Packing plant	General Maintenance	Stores & maintenance
Total Expense	83,920	30,500	20,000	30,000
Transfer from Stores and Maintenance	15000	6000	9000	(30,000)
Transfer from general plant	16,571	8286	(29000)	4,143
Transfer from stores & Maintenance	2072	829	1242	(4,143)
Transfer from general plant	710	355	(1242)	177
Transfer from stores and Maintenance	88	36	53	(177)
Transfer from General plant	35	18	(53)	-
Total	**1,18,396**	**46024**		

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

PROBLEM NO: 8

Primary Distribution Summary

Item of cost	Basis of apportionment	Total	Production Dept.			Service Dept.		
		(Rs.)	M_1	M_2	A_1	Store Service	Engineering Service	General Service
Indirect wages	Allocation given	1,25,140	46,520	41,340	16,220	8,200	5,340	7,520
Consumable stores	Allocation given	45,200	12,600	18,200	4,200	2,800	4,200	3,200
Depreciation	Capital value of machine (20:15:5:2:6:2)	39,600	15,840	11,880	3,960	1,584	4,752	1,584
Insurance of Machine	Capital value of Machine (20:15:5:2:6:2)	7,200	2,880	2,160	720	288	864	288
Insurance on Building	1/3rd to M_1 Balance area basis (-:12:16:4:5:3)	3,240	1,080	648	864	**216**	**270**	**162**
Power	HP Hr% (10:7:1:-:2:-)	6,480	3,240	2,268	324	-	**648**	-
Light	Area (10:12:16:4:5:3)	5,400	1,080	1,296	1,728	**432**	**540**	**324**
Rent*	Area (10:12:16:4:5:-)	12,675	2,697	3,236	4,315	**1079**	**1348**	-
		2,44,935	**85,937**	**81,028**	**32,331**	**14,599**	**17,962**	**13078**

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

(ii) Allocation of service departments overheads

Service Dept.	Basis of Apportionment	M1	M2	A1	Store Service	Engineering Service	General Service
Store	Ratio of consumable value (126 :182 : 42)	5256	7591	1752	(14,599)	-	-
Engineering service	In Machine hours Ratio of M1 and M2 (4 : 5)	7983	9979	-	-	(17962)	-
General service	Labour hour Basis (20 : 15 : 30)	4024	3018	6036	-	-	(13,078)
Production Department allocated in (i)		85,937	81,028	32,331			
Total		**1,03,200**	**1,01,616**	**40,119**			

(iii) Overhead Absorption rate

	M1	M2	A1
Total overhead allocated	1,03,200	1,01,616	40,119
Machine hours	40,000	50,000	
Labour hours	-	-	3,00,000
Rate per machine hour	2.58	2.032	-
Rate per Direct labour	-	-	0.134

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

Machine Deptt.	Absorption Rate	Product X		Product Y	
		Hours	(Rs.)	Hours	(Rs.)
M1	2.58	10	25.80	6	15.48
M2	2.032	4	8.13	14	28.45
A1	0.134	14	1.88	18	2.41
			35.81		46.34

PROBLEM NO: 9

Statement Showing Primary Distribution Summary

		Production Dept.			Service Dept.	
Particulars	**Basis**	**X (Rs.)**	**Y (Rs.)**	**Z (Rs.)**	**A (Rs.)**	**B (Rs.)**
Indirect Material	Given	20000	30000	45000	25000	5000
Indirect Labour	Given	45000	50000	70000	60000	35000
Superintendent's Salary	Given	-	-	96000	-	-
Fuel & heat	Radiator sections	1500	3000	4500	3750	2250
Power	KH	52500	60000	45000	22500	-
Rent & Rates	Area	44000	40000	30000	24000	12000
Insurance	Cap. value of assets	4000	6000	5000	1000	2000
Mealcharges	Employees	12000	14000	24000	6000	4000
Depreciation	Capital value	60000	90000	75000	15000	30000
Total Overheads		**239000**	**293000**	**394500**	**157250**	**90250**

A = 157250 + 0.1B → (1)

B = 90250 + 0.2 A → (2)

Form (1) & (2) $\Rightarrow$ A = 157250+ 0.1 (90250 + 0.2A)

= 157250 + 9025 +0.02 A

$$A = \frac{1662750}{0.98} = 169668$$

$\therefore$ B = 90250 + 169668 (0.2) = 124184

Statement showing secondary distribution summary (simultaneous equation)

Particulars	X (Rs.)	Y (Rs.)	Z (Rs.)	A (Rs.)	B (Rs.)
Primary distribution	239000	2393000	394500	157250	90250
Reapportionment					
Department A	50900	50900	33934	(169668)	33934
Department B	31046	49674	31046	12410	(124184)
	320946	393574	459480	-	-

PROBLEM NO:10

Solution

i.

Let Factory overhead recovery rate, as percentage of direct wages be F and administrative overheads recovery rate, as percentage of Factory Cost be A

Factory cost of jobs

Job 101 = (96,000 + 42,000F)

Job 102 = (67,500 + 30,000F)

Total cost of production of jobs:

Job 101 = (96,000 + 42,000F) + (96,000 + 42,000F) A = Rs. 1,51,500

Job 102 = (67,500 + 30,000F) + (67,500 + 30,000F) A = Rs. 106875

(Refer to Working Note)

On Solving above relations : F = 0.60 and A = 0.25

Hence percentage recovery rate of Factory overheads and administrative overheads are 60% and 25% respectively

WORKING NOTE

	Job 101	Job 102
Total Cost of production (Rs.) $\left(\frac{\text{Selling price}}{100\% + \text{Percentage of profit}}\right)$	1,51,500 $\left(\frac{Rs.166650}{110\%}\right)$	1,06,875 $\left(\frac{Rs.128250}{120\%}\right)$

ii. Statement of Jobs, showing amount of Factory OH, Administrative Overheads and profit

Particulars	Job 101 (Rs.)	Job 102 (Rs.)
Direct materials	54,000	37,500
Direct Wages	42,000	30,000
Prime Cost	96,000	67,500
Factory overheads		
60% of Direct Wages	25,200	18,000
Factory cost	1,21,200	85,500
Administrative overheads		
25% of Factory Cost	30,300	21,375
Total Cost	151500	106875

Profit	15150	21375
Selling price	1,66,650	1,28,250

iii. Selling price of Job 103 (Rs.)

Direct materials	24,000
Direct wages	20,000
Prime cost	44,000
Factory over heads (60% of Direct wages	12,000
Factory Cost	56,000
Administrative Overheads (25% of Factory Cost)	14,000
Total Cost	70,000
Profit margin (Balancing figure)	10,000
Selling price $\left[\frac{\text{Total cost}}{87.5\%}\right]$	80,000

PROBLEM NO: 11

Let the % to Factory OH on direct labour is 'x' and % of office OH on factory cost is 'y' , then the total cost of product A and product B will be as follows.

Particulars	Product A (Rs.)	Product B (Rs.)
Direct Materials	19,000	15,000
Direct Labour	15,000	25,000
Prime Cost	34.000	40,000
Factory Overhead (Direct labour x x	150X	250x
Factory Cost (i)	34,000 + 150x	40,000 + 250x
Office OH (Factory cost x y) (ii)	340y + 1.5xy	400y + 2.5 xy
Total Cost [(i)+(ii)]	34,000 + 150x + 340y + 1.5xy	40,000 + 250y + 400y + 2.5 xy

Total cost on the basis of sales is

Particulars	Product A (Rs.)	Product B (Rs.)
Sales	60,000	80,000
(-) Profit		
Product A – 25% on Cost or 20% on sales	12,000	
Product B – 25% on sales		20,000
Total Cost	48,000	60,000

Total Cost of product A is 34,000 + 150x + 340y + 1.5xy = 48,000

$\Rightarrow$ 150X + 340Y +1.5XY = 14,000 – (I)

Total Cost of product B is 40,000 + 250x + 400y + 2.5xy = 60,000

$\Rightarrow$ 250x + 400y + 2.5xy = 20,000 – (ii)

Equation (ii) multiplied by 0.6 Then we get

150x + 340y + 1.5xy = 14,000

150x + 240y + 1.5xy = 12,000

(-) (-) (-) (-)

100y = 2,000

Y=20

Sub 'y' in (i), we get

150x + 340 x 20 1.5x (20) = 14,000

$\Rightarrow 150x + 30x = 14,000 - 6,800$

$\Rightarrow 180x = 7200$

$X = 40$

Hence (i) the factory OH on direct labour = 40%

(ii) the Office OH on Factory Cost = 20%

PROBLEM NO: 12

WORKING NOTES:

1. Fixed practical capacity cost per machine hour :

Practical Capacity (machine hors) = 150,000

Practical Capacity Fixed Costs (Rs.) = 900,000

Fixed practical Capacity cost per machine hour $= \frac{\text{Rs. } 900,000}{150,000 \text{ hrs}} = \text{Rs. 6. Pa hr}$

2. Budgeted rate per machine hour (using practical capacity):

= Fixed practical capacity cost per machine hour + budgeted variable cost per machine hour

= Rs. 6 + Rs. 4

= Rs. 10

i.

Particulars	Cutting Dept (Rs)	Welding Dept. (Rs.)	Total (Rs.)
Power plants cost allocation by using actual usage (machine hr) (Refer to W.N: 2)	6,00,000 (60k hrs x Rs.10)	400,000 (40k hrs x Rs.10)	10,00,000

ii.

Particulars	Cutting Dept (Rs)	Welding Dept. (Rs.)	Total (Rs.)
Fixed cost Allocated on practical Capacity for each dept. i.e., (90k hrs : 60k hrs)	540,000 $\left(\frac{\text{Rs. 9L x 3}}{5}\right)$	360,000 $\left(\frac{\text{Rs. 9L x 2}}{5}\right)$	900,000
Variable cost (Based on actual usage of machine hours)	240,000 (60,000hrs x Rs. 4)	160,000 (40,000hrs x Rs. 4)	400,000
Total Cost	780,000	520,000	13,00,000

iii.

Particulars	Cutting Dept (Rs)	Welding Dept. (Rs.)	Total (Rs.)
Fixed Cost Allocation of Fixed cost on actual usage basis (rater to W.No:-1)	360,000 (60,000hr x Rs.6)	240,000 (40,000hr x Rs.6)	600,000
Variable cost (Based on actual usage)	240,000 (60,000 hr x Rs 4)	160,000 (40,000hr x Rs.4)	400,000
Total Cost	600,000	400,000	10,00,000

iv. Under dual rate method, under (iii) and single rate method under (i) the allocation of fixed cost of practical capacity of plant over each department are based on single rate. The major advantage of this approach is that user department. Are allocated fixed capacity only for the capacity used. The unused capacity cost Rs. 300,000 (Rs. 900,000-Rs.6,00,00) will be allocated to the user department. This highlights the cost of the unused capacity.

Under (ii) fixed cost of capacity are allocated to operating department on the basis of practical capacity so all fixed costs are allocated and there is no unused capacity identified with the Power plant

PROBLEM NO: 13

a) Variable cost per unit = $\frac{\text{change in total cost}}{\text{change in production unit}}$

$= \frac{\text{Rs. } 310{,}000 - \text{Rs. } 280{,}000}{42{,}000 \text{ units} - 36{,}000 \text{units}}$

$= \frac{\text{Rs. } 30{,}000}{6{,}000 \text{units}}$

= Rs. 5

b) Total Fixed cost = Semi variable cost – Variable cost

= Rs. 310,000 – (42,000 x 5)

= Rs. 310,000 – Rs. 2,10,000

= Rs. 100,000

PROBLEM NO: 14

Given that Net overhead = 4,46,380

W.No:-1

Calculate the under/ over absorption

= AHW x BAR per hr AHW = Actual hours worked

= 293,104 x 1.25 BAR = Budgeted absorption rate

= 366,380

Actual factory OH Expenses incurred	= 4,46,380
(-) overhead recovered from production	= 3,66,380
Unabsorbed overhead	80,000

Supplementary rate = $\frac{\text{Rs. } 40{,}000}{(7800 + 200) \text{ units}}$

= Rs. 5 per unit

Statement showing cost to be increased

Particulars	No. of Units	Amount (Rs.)
Cost of sales	7000	7000 x 5 = 35,000
Finished Goods	800	800 x 5 = 4,000
Work-in-progress	200	200 x 5 = 1,000
		40,000

Treatment of under absorption OH

The amount of Rs.40,000 (Rs.80,000 x 50%) transfer to costing P & L A/c

The remaining amount of 40,000 we have to calculate the supplementary rate (i.e, positive rate) inflate the product (See as above already calculate the supplementary rate

PROBLEM NO: 15

Give that net overhead = 79,00,000

Calculate the under/over absorption of overhead

Absorbed overhead = AHW x BAR per hr

= 150,000 x Rs. 50

= 75,00,000

(-) Net overhead	= 79,00,000
Under absorption	400,000

Treatment of Under absorption

The amount of Rs. 240,000 (400,000 x 60%) transfer to costing P & L A/c

The remaining amount of Rs. 160,000 (400,000 x 40%) we have to calculate supplementary rate (i.e.) Positive rate)

$\therefore$ Supplementary rate = $\frac{Rs.160,000}{(35,000+5000)units}$ = Rs. 4per unit

Statement showing cost to be increased.

Particulars	No. Of Units	Amount (Rs.)
Cost of sales	30,000	30,000 x 4 = 120,000
Finished Goods	5,000	5000 x 4 = 20,000
Work-in-progress	5,000	5000 x 4 = 20,000
		160,000

Hence the profit decreased by Rs. 80,000

PROBLEM NO: 16

Given that net OH = 41,50,000

Calculation of under/over absorption of overhead

Absorbed overhead	= AHW x BAR per hr
	= 150,000 x 25
	= 37,50,000
(-) Net Overhead	= 41,50,000
Under absorption	4,00,000

Treatment of under absorption

The Amount of 240,000 (400,000 x 60%) transfer to costing P& L a/c

The Remaining amount of 160,000 (400,000 x 40%) we have to calculate supplementary rate (i.e., positive rate) inflate the price of the product.

$\therefore$ Supplemental rate = $\frac{Rs.160,000}{40,000units}$ =Rs. 4

Statement showing cost to be increased

Particulars	No. of Units	Amt (Rs.)
Cost of sales	30,000	30,000 x4 = 120,000
Finished Goods	10,000	10,000 x 4 = 40,000

hence profit decreased by 80,000

PROBLEM NO: 17

Calculation of net overhead incur

Particulars	Amt (Rs.)
Total overhead	720,000
(-) Abnormal cost	
Written off obsolete stores	(15,000)
Wages paid for strike	(12,000)
Net overhead	6,93,000

Calculation of under /over absorption of overhead

Absorbed overhead = AHW x BAR per hr — AHW = Actual hours worked

= 520,00 x 15 — BAR = Budgeted absorption rate

= 780,000

(-) net overhead = 693,000

Under absorption OH = 87,000

Treatment of under absorption

The amount of Rs. 56,000 (27,000 + 29,000) should be transfer to costing P & L a/c

For the balance amount $\left[87{,}000-\left(87{,}000\times\frac{1}{3}\right)\right]=58{,}000$ we have to calculate supplementary rate (i.e, positive rate) intends to increase the price of product.

$\therefore$ Supplementary rate $= \frac{Rs.58{,}000}{28{,}000\,Units\left[25{,}000+(6000\times 50\%)\right]}$

= Rs. 2.07142 Per units

Statement showing cost to be increased

Particulars	No of units	Amount (Rs.)
Cost of sales	20,000	20,000 x 2.07142 = 41428
Finished Goods	5,000	5000 x 2.07142 = 10,358
Work-in-program	3,000	3000 x 2.07142 = 6,214
		58,000

Hence the profit decreased by 24,856

PROBLEM NO: 18

Calculation of net overhead

Particulars	Amount (Rs.)
Total overhead	600,000
(-) Abnormal cost	
Written off obsolete stores	(45,000)
Wages Paid for strike	(30,000)
Net Overhead	525,000

Calculation of under/over absorption of overhead

Absorbed overhead = AHW x BAR per hour

= 48,000 x 10

= 4,80,000

Less: Net Overhead = (5,25,000)

Under absorption = 45,000

Treatment of under absorption

The amount of 90,000/- (75,000+15,000) should be transfer to costing P & L account

The remaining amount of 30,000 $\left[45{,}000-\left(45{,}000\times\frac{1}{3}\right)\right]$ we have to calculate the supplementary rate (i.e. positive rate) inflate the price of the product.

Statement showing cost to be increased

Particulars	No. of units	Amount (Rs)
Cost of sales	18,000	18,000 x 1.25 = 22,500/-
Finished goods	2,000	2,000 x 1.25 = 2,500/-
Work in progress	4,000	4,000 x 1.25 = 5,000/-
		30,000/-

Hence profit decreased by Rs15,000/-

Accounting treatment:

Work-in-progress control A/c Dr. 5,000

Finished goods control A/c Dr. 2,500

Cost of Sales A/c Dr. 22,500

Profit & Loss A/c Dr. 15,000

To Overhead control A/c 45,000

Working Note:

$$\therefore \text{Supplementary rate} = \frac{\text{Rs.}30{,}000}{24{,}000\,\text{Units}\left[20{,}000 + (8000 \text{x} 50\%)\right]}$$

= Rs.1.25 per units

PROBLEM NO: 19

Calculation of net overhead incurred

Particulars	Amount (Rs.)
Total overhead	24,88,200
Less: Abnormal cost	
Court order paid	(1,28,000)
Expenses for previous year	(1,200)
Paid to workers for strike	(44,000)
Written off obsolete stores	(6,700)
Net Overhead incurred	**23,08,300**

Calculation of Budgeting absorption rate per hour

$$\text{BAR rate per hour} = \frac{\text{Rs.}44{,}00{,}000/-}{2{,}20{,}000\,\text{hrs}} = \text{Rs.}20 \text{ per hour}$$

Calculation of under/over absorption of overhead

Absorbed overhead = AHW x BAR per hour

= 1,16,000 x 20

= 23,20,000

(-)Net Overhead = **(23,08,300)**

Over absorption = **11,700**

Treatment of over absorption

The amount of 1,82,825 (1,79,900+2,925) should be transfer to costing P & L account.

The remaining amount of 8,775/- $(11{,}700 \text{x} \frac{3}{4})$ we have to calculate supplementary rate.

$$\therefore \text{Supplementary rate} = \frac{\text{Rs.}8{,}775}{33{,}000\,\text{units}\left[24{,}000 + 9{,}000\right]} = \text{Rs.}0.2659$$

Statement showing cost to be increase

Particulars	No. of units	Amount (Rs)
Cost of sales	21,600	21,600 x 0.2659 = 5743.44
Finished goods	2,400	2,400 x 0.2659 = 638.16
Work in progress	9,000	9,000 x 0.2659 = 2393.10
		8,774.70

PROBLEM NO: 20

i) Computation of overhead absorption rate (Current policy)

Department	Budgeted Factory overheads (Rs.)	Budgeted direct wages (Rs.)
Machinery	3,60,000	80,000
Assembly	1,40,000	3,50,000
Packing	1,25,000	70,000
Total	**6,25,000**	**5,00,000**

$$\therefore \text{Overhead absorption rate} = \frac{\text{Budgeted factory overheads}}{\text{Budgeted direct wages}} \times 100$$

$$= \frac{\text{Rs.6,25,000}}{\text{Rs.5,00,000}} \times 100$$

= 125% of direct wages

Selling price of job No. CW – 7083

Particulars	Amount (Rs.)
Direct materials Rs.(1200+600+300)	2100
Direct wages Rs.(240+360+60)	660
Overheads (125% of 660)	825
Total factory cost	**3,585**
Add: profit @ 30% on factory cost	1075.5
Selling price	**4,660.5**

ii) Methods available for absorbing factory overheads and their overhead recovery rates in different departments

a) Machining department

In this department, machine time is the primary factor. So the machine hour rate should be used to recover overheads

$$\therefore \text{Machine hour rate} = \frac{\text{Budgeted factory overheads}}{\text{Budgeted machine hours}} = \frac{\text{Rs.3,60,000}}{\text{80,000 hrs}} = \text{Rs.4.5 per hour}$$

b) Assembly Department

In this department, direct labour hours is the primary Factor So direct labour so direct labour hour rate should be used to recover the overheads

$$\therefore \text{Direct labour hour rate} = \frac{\text{Budgeted factory Overheads}}{\text{Budgeted direct labour hours}} = \frac{\text{Rs.1,40,000}}{\text{1,00,000 hours}} = \text{Rs.1.4 per hour}$$

c) Packing Department

In this department, labour is the primary factor so direct labour hour rate should be used to recover the overheads

$$\therefore \text{Direct Labour hour rate} = \frac{\text{Budgeted factory Overheads}}{\text{Budgeted direct labour hours}} = \frac{\text{Rs.1,25,000}}{\text{50,000 hours}} = \text{Rs.2.5 per hour}$$

iii) Selling price of Job CW – 7083 [Based on overhead rates in (ii)]

Particulars	Amount (Rs.)
Direct materials	2,100
Direct wages	660
Overheads (working note)	1,078
Total factory Cost	3,838
Add profit @ 30% on factory cost	1,157.4
Selling price	4989.4

Working Note:- Overhead Summary Statement

Department	Basis	Hours	Rate (Rs)	Overheads (Rs.)
Machining	Machine Hour	180	4.5	810
Assembly	Direct labour hours	120	1.4	168
Packing	Direct labour hours	40	2.5	100
		Total		1078

iv) Department – wise statement of total under / over recovery of overheads

a) Under current policy

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

b) As per methods suggested

Basis of overhead recovery

Particulars	Machine hours	Direct labour hours	Direct labour hours	Total
Hours worked	96,000	90,000	60,000	
Rate per hour	4.5	1.4	2.5	
Overheads recovered (A)	4,32,000	1,26,000	1,50,000	7,08,000
Actual Overheads (B)	3,90,000	84,000	1,35,000	6,09,000
(Under)/ Over Recovery (A-B)	42000	42000	15000	99,000

PROBLEM NO: 21

Calculation of works cost of Job No : 198

Particulars	Amount (Rs.)
Direct materials	600
Direct labour	400
Prime cost	1,000

Add: Factory OHS:-

Particulars	Amount (Rs.)
Machine 215 (40 hours x Rs. 3.5)	140
Machine 160 (30 hours x Rs. 4)	120
Welders wages (6 x 5 days x 8 hours x Rs. 0.2)	48
Unapportioned expenses $\left(\frac{Rs.400 \times Rs.2000}{Rs.20,000}\right)$ (10% of direct wages)	40
Works cost	1348

PROBLEM NO: 22

Calculation of total cost of a machine for year

Particulars	Amount (Rs.)
Depreciation $\left(\frac{Rs.10,000 - Rs.900}{10\ years}\right)$	910
Repairs of the machine $\left(\frac{Rs.18000}{10\,years}\right)$	1800
Electricity (0.05P x 15 units x 4380 hrs)	3285
Rent of the department (Rs,. 300 x 12 months x $\frac{1}{4}$)	900
Lighting charges (Rs. 80 x 12 months x $\frac{2}{10}$)	192
Foreman monthly salary (Rs. 960 x 12 months x $\frac{1}{6}$)	1920
Insurance (Rs. 10,000 x 1%)	100
Expense on oil (Rs. 9 x 12 month)	108
Total Cost	9215

Actual hours worked = 4380 hours

$$\therefore \text{Machine hours rate} = \frac{Total\,Cost}{Actual\,Hours\,worked} = \frac{Rs.9215}{4380\,hours} = Rs.2.104$$

PROBLEM NO: 23

a) Calculation of cost of running machine for 4 week period

Particulars	Amount (Rs.)
Wages (3 operators x 48 hours x Rs. 20 x 4 weeks)	11,520
Bonus (30 operators x Rs. 20 x 4 weeks x 10%)	1,056
Depreciation $\left(52{,}000x10\%x\frac{4weeks}{52weeks}\right)$	400
Maintenance and repairs (Rs. 60 x 4 weeks)	240
Consumable stores (Rs. 75 x 4 weeks)	300
Power (20 units x Rs. 0.8 x 4 hours x 4 weeks)	2816
Apportionment to cost center $\left(\frac{5400+9720+12960}{3}x\frac{4\,weeks}{52\,weeks}\right)$	720
Total cost	**17052**

b) Effective Machine hour for four week period = total working hours – un productive set up time

= (48 x 4) - (4 x 4)

= 192 - 16 = 176 hours.

$$\therefore \text{Machine hour rate} = \frac{Total\,cost}{Actual\,hours} = \frac{Rs.17052}{176\,hrs} = Rs.96.89$$

PROBLEM NO: 24

Statement showing percentage of profit / loss on various products:-

Particulars	A	B	C	D	Total (Rs.)
Sales	3,00,000	5,00,000	2,50,000	4,50,000	15,00,000
(-) Variable costs:-					
Packing wages @ 0.2 per parcel	20,000	30,000	15,000	35,000	1,00,000
Commission @ 4% on sales	12,000	20,000	10,000	18,000	60,000

Stationery @ 0.1% on invoice	8,000	14,000	6,000	12,000	40,000
	2,60,000	4,36,000	2,19,000	3,85,000	10,85,000
(-) cost of sales (VC)	2,00,000	4,50,000	2,10,000	2,25,000	2,15,000
Contribution	60,000	(14,000)	9,000	1,60,000	
(-) Fixed Costs:-					
Rent & Insurance (5:4:8:3)	7,500	6,000	12,000	4,500	30,000
Depreciation (4:6:3:7)	2,000	3,000	1,500	3,500	10,000
Sales mens salaries and expenses (6:10:5:9)	12,000	20,000	10,000	18,000	60,000
Administrative wages and salaries (4:7:3:6)	10,000	17,500	7,500	15,000	50,000
Profit/ (loss)	28,500	(60,500)	(22,000)	1,19,000	65,000
% of profit/ loss on sales	9.5	(12.1)	(8.8)	26.4	4.3

PROBLEM NO: 25

a) Computation of machine hour rate

	Particulars	Basis of apportionment	Total (Rs.)	Machines		
				A (Rs.)	B (Rs.)	C (Rs.)
a)	**Standing Charges** Insurance	Depreciation Basis (3:3:2)	8,000	3,000	3,000	2,000
	Indirect Labour	Direct Labour (2:3:3)	24,000	6,000	9,000	9,000
	Building maintenance expenses	Floor Space (2:2:1)	20,000	8,000	8,000	4,000
	Rent and Rates	Floor Space (2:2:1)	1,20,000	48,000	48,000	24,000
	Salary of foreman	Equal	2,40,000	80,000	80,000	80,000
	Salary of attendant	Equal	60,000	20,000	20,000	20,000
	Total standing charges		4,72,000	1,65,000	1,68,000	1,39,000
	Hourly rate for standing charges			84.70	86.24	71.36
b)	**Machine Expenses:**					
	Depreciation	Direct	20,000	7,500	7,500	5,000
	Spare parts	Final estimates	13,225	4,600	5,750	2,875
	Power	K.W. rating (3:2:3)	40,000	15,000	10,000	15,000
	Consumable Stores	Direct	8,000	3,000	2,500	2,500
	Total Machine expenses		81,225	30,100	25,750	25,375
	Hourly Rate for Machine expenses			15.45	13.22	13.03
	Total (A + B)		553,225	1,95,100	1,93,750	1,64,375
	Machine Hour rate			100,15	99.46	84.38

WN:1 Calculation of effective working hours

No of full off – days = No of Sundays = No. of holidays

= 52 + 12 = 64 days

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

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

= 251 days

Total working hours = (251 days x 8 hours) + (50 days x 4 hours)

= 2,008 hours + 200 hours

= 2,208 hours

Total effective hours = Total working hours x 90 % - 2% bleak down

= 2,208 hours x 90% - 2%

= 1947.456 ~ 1948 hours

WORKING NOTE 2: Amount of spare parts

Particulars	Machine		
	A (Rs.)	B (Rs.)	C (Rs.)
Preliminary estimates	4,000	4,000	2,000
Add Increase in price @ 15%	600	600	300
	4,600	4,600	2,300
Add Increase in consumption @ 25%	-	1,150	575
Estimated Cost	4,600	5,750	2,875

WN:3 Amount of indirect labour

Particulars	Amount (Rs.)
Preliminary estimates	23,000
Add Increase in wages @ 20%	4,000
Estimated cost	24,000

Note : Interest on capital outlay is a finance cost, so it has been excluded from the cost accounts.

PROBLEM NO: 26

Total productive hours = estimated hours – maintenance hours

= 2,200 hours – 200 hours

= 2,000 hours

Calculation of machine hour rate.

Particulars	Amount (Rs.)
Wages of attendants $\left(\frac{Rs.120 \times 50 weeks}{6 machines}\right)$	1,000
Departmental and general works overhead	2,000
Depreciation $\left(\frac{Rs.10,000-1,000}{10 years}\right)$	900
Electricity (Rs. 0.09 x 16 units x (2000-100) hours)	2,736
Chemical solution (Rs 20 x 50 weeks)	1,000
Maintenance cost	1,200
Total Cost	8,836

Machine hour rate = $\frac{Rs.8,836}{2000 hours}$ = Rs. 4,418 per hour

PROBLEM NO: 27

a) Calculation of common machine hour rate i.e without the use of crane.

Common Machine hour rate = $\frac{Common\ Cost}{Total\ hours(Common\ hours)}$

For machine A = $\frac{Rs.639}{588 hrs} = Rs.1.09$

For machine B = $\frac{Rs.697}{707 hrs} = Rs.0.985$

For machine C = $\frac{Rs.951}{480 hrs} = Rs.1.98125$

b) Calculation of Machine hour rate with use of crane

$$\text{Machine A} = \text{Rs.}1.09 + \frac{\text{Rs.}570}{770\text{hrs}(160+130+480)} = \text{Rs.}1.83$$

$$\text{Machine B} = \text{Rs.}0.985 + \frac{\text{Rs.}570}{770\text{hrs}} = \text{Rs.}1.725$$

$$\text{Machine C} = \text{Rs.}1.98125 + \frac{\text{Rs.}570}{770\text{hrs}} = \text{Rs.}2.7215$$

PROBLEM NO: 28

Statement showing common cost

Particulars	Amount (Rs.)
Factory Rent $\left(\frac{\text{Rs.}96,000}{80,000} \times 5,000\,\text{Sq.feet}\right)$	6,000
Heat & gas $\left(\frac{\text{Rs.}45,000}{15\,\text{Machines}}\right)$	3,000
Supervision $\left(\frac{\text{Rs.}1,20,000}{15\,\text{Machines}}\right)$	8,000
Depreciation $\left(\frac{\text{Rs.}45,000-\text{Rs.}5,000}{10\,\text{years}}\right)$	4,000
Annual Expenses	3,000
Common cost	24,000

$$\therefore \text{Common Machine hour rate} = \left(\frac{\text{Common cost}}{\text{Total hours}}\right) = \left(\frac{24,000}{3,600\text{hrs}+400\text{hrs}}\right) = \text{Rs.}6 \text{ per hour}$$

Statement showing two tier machine hour rate

Particulars	Set up rate per hour	Operation rate per hour
Common cost	6	6
Power	-	2
Wages $\left(\frac{48}{8\text{hrs}}, \frac{48}{8\text{hrs}} \times \frac{1}{2}\right)$	6	3
	12	**11**

Statement showing machine B cost on two work orders

Particulars	Rate per hour	Order 31		Order 32	
		Hours	Amount (Rs.)	Hours	Amount (Rs.)
Set up time cost	12	10	120	20	240
Operation time cost	11	90	990	180	1980
			1,110		2,220

THE END