4. OVERHEADS

PROBLEM NO: 1

PRIMARY OH distribution statement:-

Particulars	Basis	TOTAL	P_1	P_2	S_1	S_2	S_3
IDM	Given		8,800	1,400	1,700	3500	1,600
IDW	Given		3,240	3,120	2,960	1,900	2,180
Power & light	KWH (4:3:1:1:1)	30,000	12,000	9,000	3,000	3,000	3,000
Rates & Taxes	Area (insft) (4:2:1:2:1)	5,000	2,000	1000	500	1000	500
Sup. charges	No. of emp ($\frac{22,000}{550 Emp} = 40$/emp)	22,000	6,000	4,000	3,000	4,000	5,000
Insurance	Cal val of assets ($\frac{600}{30K} \times 100 = 2\%$)	600	160	80	140	100	120
Dep	Cap val of assets (1%-pm)	800	80	40	70	50	60
			26,280	18,640	11,370	13,550	12,460

SECONDARY OH distribution statement:

Particulars	Basis	P_1	P_2	S_1	S_2	S_3
OH as per primary dist statement	As computed above	26,280	18,640	11,370	13,550	12,460
Sup. charges	No. of emp ($\frac{22,000}{550 Emp} = 40$/emp)	6,000	4,000	3,000	4,000	5,000
Insurance	Cal val of assets ($\frac{600}{30K} \times 100 = 2\%$)	160	80	140	100	120
Dep	Cap val of assets (1%-pm)	80	40	70	50	60
		26,280	18,640	11,370	13,550	12,460

SECONDARY OH distribution statement:

Particulars	Basis	P_1	P_2	S_1	S_2	S_3
OH as per primary dist statement	As computed above	26,280	18,640	11,370	13,550	12,460

Calculation of total cost of A & B.

	A	B
DM	1,000	1,000
DL	100	100
P.C	1,100	1,100
(+) OH		
P_1	9h x 9.665 = 86.985	28.95 (3h x 9.665)
P_2	3h x 6.795 = 20.385	61.155 (9h x 6.795)
	1207.37	1,190.15

working note:

Dep Rate p.a = 12%.

Dep Rate p.m = $\frac{12\%}{12}$ = 1%.

Power & Light kilowatt hour = 4,000 : 3,000 : 1000 : 1000 : 1000

= 4 : 3 : 1 : 1 : 1

Rent Rates & taxes area (Sq.ft) = 400 : 200 : 100 : 200 : 100

= 4 : 2 : 1 : 2 : 1

PROBLEM NO: 2

Summary of Overhead Distribution

Departments	X (₹)	Y (₹)	A (₹)	B (₹)
Amount as given above	2,00,000	1,50,000	3,00,000	3,20,000
Expenses of X Dept. apportioned over Y, A andB Dept. in the ratio (5:8:7)	(2,00,000)	50,000	80,000	70,000
		2,00,000	3,80,000	3,90,000
Expenses of Y Dept. apportioned over A andB Dept. in the ratio (2:3)	-	(2,00,000)	80,000	1,20,000
Total	Nil	Nil	4,60,000	5,10,000

PROBLEM NO: 3

Primary Distribution Summary

Item of cost	Basis of apportionment	Total (₹)	Production Dept.			Service Dept.	
			M (₹)	N (₹)	O (₹)	P (₹)	Q (₹)
Lease rental	Floor space (6 : 5 : 8 : 2 : 4)	35,000	8,400	7,000	11,200	2,800	5,600
Power & Fuel	HP of Machines × Working hours (93: 144 : 72)	4,20,000	1,26,408	1,95,728	97,864	-	-
Supervisor's wages*	Working hours (31 : 40 : 30)	6,400	1,964	2,535	1,901	-	-
Electricity	Light points (21: 26: 16 : 9 : 8)	5,600	1,470	1,820	1,120	630	560
Depreciation on machinery	Value of machinery (6 : 5 : 7 : 2 : 3)	16,100	4,200	3,500	4,900	1,400	2,100
Depreciation on building	Floor space (6 : 5 : 8 : 2 : 4)	18,000	4,320	3,600	5,760	1,440	2,880
Payroll expenses	No. of employees (48: 52: 45: 15: 25)	21,000	5,448	5,903	5,108	1,703	2,838
Canteen expenses	No. of employees (48: 52: 45: 15: 25)	28,000	7,265	7,870	6,811	2,270	3,784
ESI and PF contribution	Direct wages (864: 832: 765: 180: 265)	58,000	17,244	16,606	15,268	3,593	5,289
		6,08,100	**1,76,719**	**2,44,562**	**1,49,932**	**13,836**	**23,051**

* Wages to supervisor is to be distributed to production departments only.

Let 'P' be the overhead of service department P and 'Q' be the overhead of service department Q.

P = 13,836 + 0.15 Q

Q = 23,051 + 0.10 P

Substituting the value of Q in P we get

P = 13,836 + 0.15 (23,051 + 0.10 P)

P = 13,836 + 3,457.65 + 0.015 P

0.985 P = 17,293.65

∴ P = ₹ 17,557

∴ Q = 23,051 + 0.10 × 17,557

= ₹ 24,806.70 or ₹ 24,807

Secondary Distribution Summary

Particulars	Total (₹)	M (₹)	N (₹)	O (₹)
Allocated and Apportioned over-heads as per primary distribution	5,71,213	1,76,719	2,44,562	1,49,932
P (90% of ₹17,557)	15,801	5,267	6,145	4,389
Q (85% of ₹24,807)	21,086	9,923	6,202	4,961
		1,91,909	2,56,909	1,59,282

Overhead rate per hour

	M	N	O
Total overheads cost (₹)	1,91,909	2,56,909	1,59,282
Working hours	1,240	1,600	1,200
Rate per hour (₹)	154.77	160.57	132.74

PROBLEM NO: 4

Primary Distribution Summary

Item of cost	Basis of apportionment	Total (₹)	P_1 (₹)	P_2 (₹)	P_3 (₹)	S_1 (₹)	S_2 (₹)
Direct wages	Actual	25,000	--	--	--	18,750	6,250
Rent and Rates	Floor area (4 : 5 : 6 : 4 : 1)	62,500	12,500	15,625	18,750	12,500	3,125
General lighting	Light points (2 : 3 : 4 : 2 : 1)	7,500	1,250	1,875	2,500	1,250	625
Indirect wages	Direct wages (6 : 4 : 6 : 3 : 1)	18,750	5,625	3,750	5,625	2813	938
Power	Horse Power of machines used (6 : 3 : 5 : 1)	25,000	10,000	5,000	8,333	1,667	–
Depreciation of machinery	Value of machinery (12 : 16 : 20 : 1 : 1)	50,000	12,000	16,000	20,000	1,000	1,000
Insurance of machinery	Value of machinery (12 : 16 : 20 : 1 : 1)	20,000	4,800	6,400	8,000	400	400
		2,08,750	46,175	48,650	63,208	38,380	12,338

Overheads of service cost centres Let S_1 be the overhead of service cost centre S_1 and S_2 be the overhead of service cost centre S_2.

$S_1 = 38,380 + 0.10\ S_2$

$S_2 = 12,338 + 0.10\ S_1$

Substituting the value of S_2 in S_1 we get

$S_1 = 38,380 + 0.10 (12,338 + 0.10\ S_1)$

$S_1 = 38,380 + 1,233.80 + 0.01\ S_1$

$0.99\ S_1 = 39,613.80$

$\therefore S_1$ = ₹40,014.

$\therefore S_2$ = 12,338 + 0.10 × 40,014.

= ₹16,339

Secondary Distribution Summary

Particulars	Total (₹)	P_1 (₹)	P_2 (₹)	P_3 (₹)
Allocated and Apportioned over-heads as per primary distribution	1,58,033	46,175	48,650	63,208
S_1	40,014	8,003	12,004	16,006
S_2	16,339	6,536	3,268	4,902
		60,714	63,922	84,116

(i) Overhead rate per hour

	P_1	P_2	P_3
Total overheads cost	₹60,714	₹63,922	₹84,116
Production hours worked	6,225	4,050	4,100
Rate per hour (₹)	₹9.75	₹15.78	₹20.52

(ii) Cost of Product X

	(₹)
Direct material	625.00
Direct labour	375.00
Prime cost	1,000.00
Production on overheads	
P_1 5 hours × ₹9.75 = 48.75	
P_2 3 hours × ₹15.78 = 47.34	
P_3 4 hours × ₹20.52 = 82.08	178.17
Factory cost	1,178.17

PROBLEM NO: 5

(a) Overhead Distribution Statement

	Production Departments		Service Departments	
	Machine Shops	Packing	General Plant	Stores
Allocated Overheads:	(₹)	(₹)	(₹)	(₹)

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

Schedule of Apportionment of Overheads

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

(b) Re-distribution of Overheads of Service Departments to Production Departments:

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

a = 1,25,775 + 0.3b .....(i)

b = 87,550 + 0.2a .....(ii)

Putting the value of 'b' in equation no. (i)

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

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

Or 0.94a = 1,52,040 Or a = 1,61,745 (appx.)

Putting the value of a = 1,61,745 in equation no. (ii) to get the value of 'b'

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

Secondary Distribution Summary

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

PROBLEM NO: 6

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) ⇒ A = 157250+ 0.1 (90250 + 0.2A)

= 157250 + 9025 +0.02 A

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

∴ 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: 7

The total expenses of the two service departments will be determined as follows:

Let B stand for Boiler House expenses and P for Pump Room expenses.

Then

$$B = 3,00,000 + 1/2\ P$$
$$P = 60,000 + 1/20\ B$$

Substituting the value of B,

$$P = 60,000 + 1/20\ (3,00,000 + 1/2\ P)$$
$$= 60,000 + 15,000 + 1/40\ P$$
$$= 75,000 + 1/40\ P$$
$$40\ P = 30,00,000 + P$$
$$39\ P = 30,00,000$$
$$P = ₹\ 76,923$$

The total of expenses of the Pump Room are ₹ 76,923 and that of the Boiler House is ₹ 3,38,462 i.e., ₹ 3,00,000 + 1/2 × ₹ 76,923.

The expenses will be allocated to the production departments as under:

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

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

PROBLEM NO: 8

Working notes

1. Computation of total cost of jobs

Total cost of Job 1102 when 8% is the profit on Cost $= \frac{₹\ 1,07,325}{108} \times 100$

$= ₹\ 99,375$

Total cost of job 1108 when 12% is the profit on cost $= \frac{₹\ 1,57,920}{112} \times 100$

$= ₹1,41,000$

2. Factory overheads = F% of direct wages

Selling & Administrative overheads = A% of factory cost

(i) Computation of rates of factory overheads and selling and administration overheads to be charged.

Jobs Cost Sheet

	Job 1102 (₹)	Job 1108 (₹)
Direct materials	37,500	54,000
Direct wages	30,000	42,000
Prime cost	67,500	96,000
Add: Factory overheads	30,000F	42,000F
Factory cost (Refer to Working Note 2)	(67,500 + 30,000 F)	(96,000 + 42,000 F)
Add: Selling and Administration Overheads (Refer to Working Note 2)	(67,500 + 30,000 F) A	(96,000 + 42,000 F) A
Total Cost	(67,500 + 30,000 F)(1 + A)	(96,000 + 42,000 F)(1+A)

Since the total cost of jobs 1102 and 1108 are equal to ₹99,375 and ₹1,41,000 respectively, therefore we have the following equations *(Refer to Working Note 1)*

(67,500 + 30,000 F) (1 + A) = 99,375.....(i)

(96,000 + 42,000 F) (1 + A) = 1,41,000.....(ii)

Or, 67,500 + 30,000 F + 67,500 A + 30,000 FA = 99,375

Or, 96,000 + 42,000 F + 96,000 A + 42,000 FA = 1,41,000

Or, 30,000 F + 67,500 A + 30,000 FA = 31,875.....(iii)

42,000 F + 96,000 A + 42,000 FA = 45,000.....(iv)

On solving (iii) and (iv) we get : A = 0.25 and F = 0.40

Hence, A = 25% and F = 40%

(ii) Selling price of the new order:

	(₹)
Direct materials	64,000
Direct wages	50,000
Prime cost	1,14,000
Factory overheads (40% × ₹50,000)	20,000
Factory cost	1,34,000
Selling & Administration overheads (25% × ₹1,34,000)	33,500
Total cost	1,67,500

If selling price of new order is ₹100 then Profit is ₹20 and Cost is ₹80

Hence selling price of the new order $= \frac{₹1,67,500}{80} \times 100 = ₹\ 2,09,375$

PROBLEM NO: 9

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

Or, y = 20

Sub 'y' in (i), we get

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

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

$\Rightarrow$ 180 x = 7200

X = 40

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

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

PROBLEM NO: 10

(i) Calculation of Overhead Recovery Rate:

$$\text{Factory Overhead Recovery Rate} = \frac{\text{Factory Overhead in 2014}}{\text{Direct Labour Costs in 2014}} \times 100$$

$$= \frac{₹\ 3,80,000}{₹ 9,50,000} \times 100 = 40\% \text{ of Direct labour}$$

Administrative Overhead Recovery Rate

$$= \frac{\text{Administrative Overhead in 2014}}{\text{Factory Costs in 2014 (W.N.)}} \times 100$$

$$= \frac{₹\ 2,50,400}{₹\ 31,30,000} \times 100 = 8\% \text{ of Factory Cost}$$

Working Note: Calculation of Factory Cost in 2014

Particulars	Amount (₹)
Opening Stock of Material	1,50,000
Add: Purchase of Material	18,50,000
Less: Closing Stock of Material	(2,00,000)
Material Consumed	18,00,000
Direct Labour	9,50,000
Prime Cost	27,50,000
Factory Overhead	3,80,000
Factory Cost	31,30,000

(ii) Detailed Cost Statement for the Order received from M.L. Auto Ltd. during 2015

Particulars	Amount (₹)
Material	8,00,000
Labour	4,50,000
Factory Overhead (40% of ₹ 4,50,000)	1,80,000
Factory Cost	14,30,000
Administrative Overhead (8% of ₹ 14,30,000)	1,14,400
Cost of delivery	45,000
Total Cost	15,89,400
Add: Profit @ 10% of Sales or 11.11% of cost or 1/9 of 15,89,400	1,76,600
Sales value (Price to be quoted for the order) (₹ 15,89,400 /0.9)	17,66,000

Hence the price to be quoted is ₹17,66,000 if the company wants to earn a profit of 10% on sales.

PROBLEM NO: 11

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 $\left(\frac{Rs.9L \times 3}{5}\right)$	360,000 $\left(\frac{Rs.9L \times 2}{5}\right)$	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: 12

Under-absorbed overhead expenses during the month of August

	(₹)	(₹)
Total expenses incurred in the month of August :		80,000
Less: The amount paid according to labour court award (Assumed to be non-recurring)	15,000	
Expenses of previous year	5,000	20,000
Net overhead expenses incurred for the month		60,000
Overhead recovered for 10,000 hours @ ₹ 5 per hour		50,000
Under-absorbed overheads		10,000

Treatment of under-absorbed overhead in the Cost Accounts

It is given in the question that 40,000 units were produced out of which 30,000 units were sold. It is also given that 60% of the under-absorbed overhead was due to defective planning and the rest was attributed to normal cost increase.

	(₹)
1. 60 percent of under-absorbed overhead is due to defective planning. This being abnormal, should be debited to Profit and Loss A/c (60% of ₹ 10,000)	6,000

2. Balance 40 percent of under-absorbed overhead should be distributed over, Finished Goods and Cost of Sales by supplementary rate (40% of ₹ 10,000) ₹ 4,000

₹ 10,000

₹ 4,000 may be distributed over Finished Goods and Cost of Sales as follows :

Finished Goods	*₹ 1,000
Cost of Sales	*₹ 3,000

***Working notes**

Under-absorbed overhead	:	₹ 4,000
Units produced	:	40,000
Rate of under-absorbed overhead recover		₹ 0.10 per unit
Amount of under-absorbed overheads charged to finished goods (10,000 × ₹ 0.10)		₹ 1,000
Amount of under-absorbed overheads charged to cost of sales : (30,000 × ₹ 0.10)		₹ 3,000

PROBLEM NO: 13

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 = $\frac{\text{Rs.}160{,}000}{(35{,}000+5000)\text{units}}$ = 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: 14

(i) Amount of under absorption of production overheads during the period of first six months of the year 2013-2014:

	Amount (₹)	Amount (₹)
Total production overheads actually incurred during the period		6,79,000
Less: Amount paid to worker as per court order	45,000	
Expenses of previous year booked in the current year	10,000	
Wages paid for the strike period under an award	42,000	
Obsolete stores written off	18,000	1,15,000
		5,64,000
Less: Production overheads absorbed as per machine hour rate (48,000 hours × ₹10.50*)		5,04,000
Amount of under absorbed production overheads		60,000

$$\text{Budgeted Machine hour rate (Blanket rate)} = \frac{₹\ 10,08,000}{96,000 \text{ hours}} = ₹\ 10.50 \text{ per hour}$$

(ii) **Accounting treatment of under absorbed production overheads:** As, one fourth of the under absorbed overheads were due to defective production policies, this being abnormal, hence should be debited to Costing Profit and Loss Account.

Amount to be debited to Costing Profit and Loss Account = (60,000 * ¼) ₹15,000.

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

Amount to be distributed = (60,000 * ¾) ₹45,000.

$$\text{Supplementary rate} = \frac{₹\ 45,000}{30,000 \text{ units}} = ₹\ 1.50 \text{ per unit}$$

(iii) Apportionment of under absorbed production overheads over WIP, Finished goods and Cost of sales:

	Equivalent completed units	Amount (₹)
Work-in-Progress (16,000 units × 50% ×1.50)	8,000	12,000
Finished goods (4,000 units × 1.50)	4,000	6,000
Cost of sales (18,000 units × 1.50)	18,000	27,000
Total	30,000	45,000

PROBLEM NO: 15

(i) Amount of under/ over absorption of production overheads during the period of first six months of the year 2015-2016:

	Amount (₹)	Amount (₹)
Total production overheads actually incurred during the period		24,88,200
Less: Amount paid to worker as per court order	1,28,000	
Expenses of previous year booked in the current year	1,200	
Wages paid for the strike period under an award	44,000	
Obsolete stores written off	6,700	(1,79,900)
		23,08,300
Less: Production overheads absorbed as per machine hour rate (1,16,000 hours × ₹20*)		23,20,000
Amount of over absorbed production overheads		11,700

*Budgeted Machine hour rate (Blanket rate) = $\frac{₹44,00,000}{2,20,000 \text{ hours}}$ = ₹ 20 per hour

(ii) **Accounting treatment of over absorbed production overheads:** As, one fourth of the over absorbed overheads were due to defective production policies, this being abnormal, hence should be transferred to Costing Profit and Loss Account.

Amount to be transferred to Costing Profit and Loss Account = (11,700 * ¼) ₹ 2,925

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

Amount to be distributed = (11,700 * ¾) ₹ 8,775

Supplementary rate = $\frac{₹ 8,875}{33,000 \text{ units}}$ = ₹ 0.2689 per unit

(iii) Apportionment of under absorbed production overheads over WIP, Finished goods and Cost of sales:

	Equivalent completed units	Amount (₹)
Work-in-Progress (18,000 units × 50% × ₹ 0.2689)	9,000	2,420
Finished goods (2,400 units × ₹ 0.2689)	2,400	646
Cost of sales (21,600 units × ₹ 0.2689)	21,600	5,809
Total	33,000	8,875

PROBLEM NO: 16

	Amount (₹)
Total factory overheads incurred	51,00,000
Less: Absorbed factory overheads (₹ 30 × 1,50,000)	(45,00,000)
Under-absorption of Overheads	6,00,000

60% of ₹ 6,00,000 i.e. ₹ 3,60,000 would be transferred to Costing P/L Account

40% of ₹ 6,00,000 i.e. ₹ 2,40,000 would be apportioned over Sales unit and Stock by using supplementary overheads rate.

$$\text{Supplementary overheads Rate} = \frac{₹\ 2,40,000}{50,000 + 5,000 + 5,000} = ₹\ 4$$

On Sales (50,000 units × ₹ 4)	2,00,000
On Finished Goods (5,000 units × ₹ 4)	20,000
On Work in Progress (10000 × 50% × ₹ 4)	20,000
	2,40,000

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
= 520,00 x 15
= 780,000

AHW = Actual hours worked
BAR = Budgeted absorption rate

(-) net overhead = 693,000

Under absorptionOH = 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.

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

= 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

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

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

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

= 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: 19

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: 20

Effective Machine hour for four-week period

= Total working hours – unproductive set-up time

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

= (192 – 16) hours) =176 hours.

i) Computation of cost of running one machine for a four week period

		( )	( )
(A)	Standing charges (per annum)		
	Rent	5,400.00	
	Heat and light	9,720.00	
	Forman's salary	12,960.00	
	Standing charges (per annum) Total expenses for one machine for four week period	28,080.00	720.00

	$\left(\frac{28,000}{3\text{machines} \times 13\text{four} - \text{weekperiod}}\right)$		
	Wages (48 hours × 4 weeks × 20 × 3 operators) ÷ 3 machines)		3,840.00
	Bonus (176 hours × 20 × 3 operators) ÷ 3 machines)× 10%		352.00
	Total standing charges		4,912.00
(B)	Machine Expenses		
	Depreciation = $\left(52,000 \times 10\% \times \frac{1}{13\text{four} - \text{weekperiod}}\right)$		400.00
	Repairs and maintenance (60 × 4 weeks)		240.00
	Consumable stores (75 × 4 weeks)		300.00
	Power (176 hours × 20 units × 0 .80)		2,816.00
	Total machine expenses		3,756.00
(C)	Total expenses (A) + (B)		8,668.00

ii) Machine hour rate = $\frac{8,668}{176\text{hours}}$ = 49.25

PROBLEM NO: 21

Computation of machine hour rate of new Machine

	Total (₹)	Per hour (₹)
A. Standing Charges I. Insurance Premium ₹ 9,000 × $\frac{1}{9}$	1,000	
II. Rent $\frac{1}{10}$ × ₹2,400 ×12 months	2,880	
	3,880	0.97*
B. Machine expenses I. Repairs and Maintenance (₹5,000 ÷ 4,000 hours)		1.25
II. Depreciation $\left[\frac{₹10,00,000 - ₹10,000}{10\text{ years} \times 4,000\text{ hours}}\right]$		24.75
III. Electricity (8 units x ₹ 3.75)		30.00
Machine hour rate		56.97

Working Note

1 Calculation of productive Machine hour rate

Total hours	4,200
Less: Non-Productive hours	200
Effective machine hours	4,000

* ₹ 3,880 ÷ 4,000 hours = ₹ 0.97

PROBLEM NO: 22

Computation of Machine Hour Rate

Particulars	*Setting-up time is 'Unproductive' (Machine hour- 2,407*)*	*Setting-up time is 'Productive' (Machine hour- 2,600)*
	₹	₹
Fixed Charges (Standing Charges):		
Overhead Chargeable ₹ 18,000 × 12 = ₹ 2,16,000 $\left(\frac{₹\ 2,16,000}{2,407\ \text{hours}}\right);\left(\frac{₹\ 2,16,000}{2,600\ \text{hours}}\right)$	89.74	83.08
Operator's Salary: $\frac{₹\ 18,500 \times 12 \times 2\ \text{Operators}}{4\ \text{machines}} = ₹\ 1,11,000$ $\left(\frac{₹\ 1,11,000}{2,407\ \text{hours}}\right);\left(\frac{₹\ 1,11,000}{2,600\ \text{hours}}\right)$	46.12	42.69
Insurance: 2% of ₹25,00,000 = ₹50,000	20.77	19.23
	156.63	145.00
Variable Expenses (Machine Expenses) per hour		
Depreciation : $\frac{₹\ 25,00,000 - ₹\ 1,25,000}{25,000\ \text{hours}}$	95.00	95.00
Power: (25 units × ₹ 5)	125.00	125.00
Repairs and Maintenance : $\left(\frac{₹\ 26,000}{2,407\ \text{hours}}\right);\left(\frac{₹\ 26,000}{2,600\ \text{hours}}\right)$	10.80	10.00
Chemical : $\left(\frac{₹\ 2,600 \times 12}{2,407\ \text{hours}}\right);\left(\frac{₹\ 2,600 \times 12}{2,600\ \text{hours}}\right)$	12.96	12.00
Machine Hour Rate	**400.39**	**387.00**

*

	(Hours)
Working Hours	3,000
Less: Maintenance hours	400
	2,600
Less: Setting-up hours	193
Actual working hours $\left(\frac{2,600\ \text{hours}}{108} \times 100\right)$	2,407

Assumptions:

1. Working hours (i.e. 3,000 hours) are inclusive of maintenance and setting-up time.
2. It is assumed that no power is consumed by the machine during unproductive hours i.e. during maintenance and unproductive setting-up hours.
3. Depreciation is calculated on the basis of estimated life of the machine hours. Hence per unit machine hour rate of depreciation will be same.

Note: As this numerical problem does not specifically mention about the nature of setting-up time; means whether setting-up time is unproductive or productive is not clear. The problem can be solved assuming setting-up time either as productive or as unproductive. The question may be solved based on logical assumption regarding the nature of setting-up time (i.e. unproductive or productive) and for furnishing any one or both the situation.

PROBLEM NO: 23

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: 24

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: 25

Statement of Cost and Sales for the year 2013-14

(Maximum production capacity = 5,20,000 units per annum)

Particulars	First 3 months	Next 9 months	Total
Capacity utilized	60%	90%	
Production	$\frac{5,20,000 \times 3 \times 60\%}{12}$ = 78,000 units	$\frac{5,20,000 \times 9 \times 90\%}{12}$ = 3,51,000 units	4,29,000 units

	(₹)	(₹)	(₹)
Direct materials @ ₹15 per unit	11,70,000	52,65,000	64,35,000
Direct wages @ ₹ 9 per unit or ₹2,50,000 per month whichever is higher.	7,50,000	31,59,000	39,09,000
Prime cost (A)	19,20,000	84,24,000	1,03,44,000
Overheads			
Fixed	2,40,000	7,20,000	9,60,000
Variable @ ₹8 per unit	6,24,000	28,08,000	34,32,000
Semi Variable *(Refer to Working Note-1)*	1,77,500	6,45,000	8,22,500
Total overheads (B)	10,41,500	41,73,000	52,14,500
Total Cost (C) [(A + B)]	29,61,500	1,25,97,000	1,55,58,500
Profit during first 3 months (Bal. figure)	4,70,500		
Sales @ ₹44 per unit (78,000 x ₹ 44)	34,32,000		
Desired profit during next 9 months (₹15,62,500 – ₹4,70,500) (D)		10,92,000	
Sales required for next 9 months ..... (E) [(C + D)]		1,36,89,000	
Total profit			15,62,500
Total Sales			1,71,21,000

$$\text{Required selling price per unit for last 9 months} = \frac{\text{Total sales required for last 9 months}}{\text{Units produced during last 9 months}}$$

$$= \frac{₹\,1,36,89,000}{3,51,000\ \text{units}} = ₹\ 39\ \text{per unit.}$$

Workings:

(1) Semi-variable overheads:

(a) For first 3 months at 60% capacity = ₹(5,60,000 + ₹1,50,000) × 3/12
= ₹7,10,000 × 3/12
= ₹1,77,500.

(b) For remaining 9 months at 90% capacity = ₹(5,60,000 + ₹3,00,000) × 9/12
= ₹8,60,000 × 9/12
= ₹ 6,45,000

PROBLEM NO: 26

Installed capacity 1,50,000 per annum.	
Per month capacity 1,50,000 ÷ 12	= 12,500 units
75% for 3 months (12,500 X 3X 75%)	28,125
80% for 6 months (12,500 X 6 X 80%)	60,000
90% for 3 months (12,500 X 3 X 90%)	33,750
Total production	1,21,875

Labour cost:

For 3 months (Rs. 2,81,250 or Rs. 3,00,000) Whicherver is higher	3,00,000
For 6 months	6,00,000
For 3 months	3,37,500
Labour cost	12,37,500

Semi - variable costs:

Rs.60,000 P.A. 75% capacity utilization i.e. Rs. 5,000 P.M.

For 1st 3 months	15,000
For next 6 months (5,000 X 6 ÷ 2,000)	32,000
For next 3 months (5,000 X 3 ÷ 3,000)	18,000
	65,000

Calculation of Selling Price:

Total production	1,21,875 units
Material (1,21,875 X 10)	12,18,750.00
Labor	12,37,500.00
Overhead (1,21,875 X 4)	4,87,500.00
Fixed Overhead	1,92,300.00
Variable overhead	65,000.00
	32,01,050.00
Add: Profit (20% on S.P.)	8,00,262.50
(i.e. 25% on cost price)	40,01,312.50
Selling price/unit	= 40,01,312.50/1,21,875
	= 32.83% unit.

PROBLEM NO: 27

Working Notes:

1. (i) Effective hours for standing charges (208 hours – 8 hours) = 200 hours
   (ii) Effective hours for variable costs (208 hours – 28 hours) = 180 hours

2. Standing Charges per hour

	Cost per month (₹)	Cost per hour (₹) (Cost per month ÷ 200 hours)
Supervisor's salary $\left(\frac{₹6,000}{3 \text{ machines}}\right)$	2,000	10.00
Rent of building $\left(\frac{1}{6} \times \frac{₹72,000}{12 \text{ months}}\right)$	1,000	5.00
General lighting	1,000	5.00
Total Standing Charges	4,000	20.00

3. Machine running expenses per hour

	Cost per month (₹)	Cost per hour (₹)
Depreciation $\left(\frac{₹(5,00,000-20,000)}{10\,years}\times\frac{1}{12\,months}\right)$	4,000	20.00 $\left(\frac{₹4,000}{200\,hours}\right)$
Wages	2,500	12.50 $\left(\frac{₹2,500}{200\,hours}\right)$
Repairs & Maintenance $\left(\frac{₹60,480}{12\,months}\right)$	5,040	28.00 $\left(\frac{₹5,040}{180\,hours}\right)$
Consumable stores $\left(\frac{₹47,520}{12\,months}\right)$	3,960	22.00 $\left(\frac{₹3,960}{180\,hours}\right)$
Power (25 units × ₹2 × 180 hours)	9,000	50.00
Total Machine Expenses	24,500	132.50

Computation of Two – tier machine hour rate

	Set up time rate per machine hour (₹)	Running time rate per machine hour (₹)
Standing Charges	20.00	20.00
Machine expenses :		
Depreciation	20.00	20.00
Repair and maintenance	–	28.00
Consumable stores	–	22.00
Power	–	50.00
Machine hour rate of overheads	40.00	140.00
Wages	12.50	12.50
Comprehensive machine hour rate	52.50	152.50

PROBLEM NO: 28

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

$$\text{Common Machine hour rate} = \frac{\text{CommonCost}}{\text{Totalhours(Commonhours)}}$$

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

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

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

b) Calculation of Machine hour rate with use of crane

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

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

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

THE END