4. OVERHEADS – ABSORPTION COSTING METHOD (OVERHEADS)

ASSIGNMENT SOLUTIONS

PROBLEM NO: 1

Primary Distribution Summary

Particulars	Basis of apportionment	Total (Rs.)	Production Dept.		Service Dept.		
			P_1 (Rs.)	P_2 (Rs.)	S_1 (Rs.)	S_2 (Rs.)	S_3 (Rs.)
Indirect material	Given		2,800	1,400	1,700	3,500	1,600
Indirect wages	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 in sq. feet (4:2:1:2:1)	5,000	2,000	1,000	500	1,000	500
Supervision charges	No. of employees $\frac{22,000}{550\,emp}$ = Rs. 40 per employee	22,000	6,000	4,000	3,000	4,000	5,000
Insurance	Capital Value of assets $\frac{600}{30,000} \times 100 = 2\%$	600	160	80	140	100	120
Depreciation	Capital Value of assets (1% p.m.)	300	80	40	70	50	60
			26,280	**18,640**	**11,370**	**13,550**	**12,460**

Secondary Distribution Summary:

Particulars	Basis	P_1 (Rs.)	P_2 (Rs.)	S_1 (Rs.)	S_2 (Rs.)	S_3 (Rs.)
Over heads as per primary distribution		26,280	18,640	11,370	13,550	12,460
Apportionment of S_1 OH	DLH (1:1)	5685	5685	(11,370)		
Apportionment of S_2 OH	DLH (1:1)	6,775	6,775	-	(13,550)	-
Apportionment of S_3 OH	Number of requisitions (10:3)	9,585	2,875			(12,460)
a) Total OH		**48,325**	**33,975**	**-**	**-**	**-**
b) DLH		5,000	5,000			
c) OHRR (a/b)		Rs.9.665/L.H	Rs.6.795/L.H			

Calculation of Total Cost of A & B:

Particulars	A	B
Direct material	1,000	1,000
Direct labour	100	100
	1,100	1,100
Add: Overhead		
P_1	86.985 (9h×9.665)	28.95 (3h × 9.665)
P_2	20.385 (3h × 6.795)	61.155 (9h × 6.795)
	1,207.37	**1,190.15**

Working notes:

1. Depreciation rate p.a. = 12%
   Depreciation rate p.m. = 12% / 12 = 1%
2. Power & light kilowatt hour = 4000:3000:1000:1000:1000
   = 4:3:1:1:1
3. Rent & 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 and B Dept. in the ratio (5:8:7)	(2,00,000)	50,000	80,000	70,000
Expenses of Y Dept. apportioned over A and B 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 (Rs.)	Production Dept.			Service Dept	
			M (Rs.)	N (Rs.)	O (Rs.)	P (Rs.)	Q (Rs.)
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
		5,71,100	**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 = Rs.17,557

Q = 23,051 + (0.10 x 17,557)

= Rs.24,806.70 or Rs.24,807

Secondary Distribution Summary

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

Overhead rate per hour

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

PROBLEM NO: 4

Primary Distribution Summary

Item of cost	Basis of apportionment	Total (Rs.)	Production Dept.			Service Dept	
			P_1 (Rs.)	P_2 (Rs.)	P_3 (Rs.)	S_1 (Rs.)	S_2 (Rs.)
Direct wages	Actual	25,000	-	-	-	18,750	6,250
Rent & Rates	Floor area (4 : 5 : 6 : 4 : 1)	62,500	12,500	16,625	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	2,813	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 S2.

$S_1 = 38,380 + 0.10\ S2$

$S_2 = 12,338 + 0.10\ S1$

Substituting the value of S2 in S1 we get

$S_1 = 38,380 + 0.10\ (12,338 + 0.10\ S1)$

$S_1 = 38,380 + 1,233.80 + 0.01\ S1$

$0.99\ S_1 = 39,613.80$

S_1 = Rs.40,014.

$S_2 = 12,338 + 0.10 \times 40,014$ = Rs.16,339

Secondary Distribution Summary

Particulars	Total (Rs.)	P_1 (Rs.)	P_2 (Rs.)	P_3 (Rs.)
Allocated and Apportioned overheads 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:

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

ii) Cost of Product X

Particulars	Amount (Rs.)
Direct material	625.00
Direct labour	375.00
Prime cost	1,000.00
Production on overheads	
P_1 5 hours x Rs.9.75 = 48.75	
P_2 3 hours x Rs.15.78 = 47.34	

P_3 4 hours x Rs.20.52 = 82.08	178.17
Factory cost 3	B1,178.17

PROBLEM NO: 5

i) Statement showing overheads for each department

Particulars	Overheads	Basis	Production Department		Service Department	
			A	B	X	Y
Variable OH's	8,40,000	Actual usage (16:20:12:8)	2,40,000	3,60,000	1,80,000	1,20,000
Fixed OH's	4,20,000	Needed usage (20:25:15:10)	1,20,000	1,50,000	90,000	60,000
			3,60,000	5,10,000	2,70,000	1,80,000

ii) Statement showing Overhead recovery rate

Particulars	Basis	Production Department		Service Department	
		A	B	X	Y
OH's as per Primary Distribution		3,60,000	5,10,000	2,70,000	1,80,000
Apportion of Service Department X	6:4:2	1,35,000	90,000	(2,70,000)	45,000
Apportion of Service Department Y	4:1	1,80,000	45,000	_	(2,25,000)
Overheads (a)		6,75,000	6,45,000	0	0
Labour Hours (b)		67,500	48,750		
Overhead Recovery rate (a/b)		10	13.23		

PROBLEM NO: 6

Statement Showing Distribution of Overheads of Modern Manufactures Ltd.

Particulars	Basis	Total (Rs.)	Production Departments			Service Departments	
			P_1 (Rs.)	P_2 (Rs.)	P_3 (Rs.)	S_1 (Rs.)	S_2 (Rs.)
Direct wages	Actual	1,695	-	-	-	1,500	195
Rent & rates	Area	5,000	1,000	1,250	1,500	1,000	250
General lighting	Light points	600	100	150	200	100	50
Indirect wages	Direct wages	1,939	600	400	600	300	39
Power	H.P	1,500	600	300	500	100	–
Depreciation of machines	Value of machines	10,000	2,400	3,200	4,000	200	200
Sundries	Direct wages	9,695	3,000	2,000	3,000	1,500	195
		30,429	7,700	7,300	9,800	4,700	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	7,700	7,300	9,800	4,700	929
Dept. S1 Overheads Apportioned in the ratio (20 : 30 : 40 : — : 10)	4,700.00 :	940	1,410	1,880	–4,700	470
Dept. S2 overheads Apportioned in the ratio (40 : 20 : 30 : 10 : —)	1,399.00 :	559.60	279.80	419.70	139.90	–1,399.00
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		9,233.52	9,035.02	12,160.46		

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'

	(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

Overhead Distribution Statement

Particulars	Production Departments		Service Departments	
	Machine Shops (Rs.)	Packing (Rs.)	General Plant (Rs.)	Stores (Rs.)
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**

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 (approx.)

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 (Rs.)	Machine Shops (Rs.)	Packing (Rs.)
Allocated and Apportioned overheads as per Primary distribution	2,77,875	1,97,250.00	80,625.00
- General Plant	1,61,745(5 : 3 : 2)	80,872.50	48,523.50
- 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: 8

Statement Showing Primary Distribution Summary

Particulars	Basis	Production Dept.			Service Dept.	
		X (Rs.)	Y (Rs.)	Z (Rs.)	A (Rs.)	B (Rs.)
Indirect Material	Given	20,000	30,000	45,000	25,000	5,000
Indirect Labour	Given	45,000	50,000	70,000	60,000	35,000
Superintendent's Salary	Given	-	-	96,000	-	-
Fuel & heat	Radiator sections	1,500	3,000	4,500	3,750	2,250
Power	KH	52,500	60,000	45,000	22,500	-
Rent & Rates	Area	44,000	40,000	30,000	24,000	12,000
Insurance	Cap. value of assets	4,000	6,000	5,000	1,000	2,000
Meal charges	Employees	12,000	14,000	24,000	6,000	4,000
Depreciation	Capital value	60,000	90,000	75,000	15,000	30,000
Total Overheads		**2,39,000**	**2,93,000**	**3,94,500**	**1,57,250**	**90,250**

A = 1,57,250 + 0.1B → (1)

B = 90,250 + 0.2 A → (2)

Form (1) & (2) ⇒ A = 1,57,250+ 0.1 (90,250 + 0.2A)

= 1,57,250 + 9,025 +0.02 A

$$A = \frac{1,66,275}{0.98} = 1,69,668$$

∴ B = 90,250 + 1,69,668 (0.2) = 1,24,184

Statement showing secondary distribution summary (simultaneous equation)

Particulars	X (Rs.)	Y (Rs.)	Z (Rs.)	A (Rs.)	B (Rs.)
Primary distribution	2,39,000	2,93,000	3,94,500	1,57,250	90,250
Reapportionment					
Department A	50,900	50,900	33,934	(1,69,668)	33,934
Department B	31,046	49,674	31,046	12,410	(1,24,184)
	3,20,946	**3,93,574**	**4,59,480**	-	-

PROBLEM NO: 9

Assume this sum to be done in simultaneous equation method

Expenses of Service Department

B = Rs.3,00,000

P = Rs.60,000

As Per Primary distribution summary

Total over head of B = 3,00,000 + 0.50 P → 1

Total over head of P = 60,000 + 0.05 B → 2

From 1, and 2

B = 3,00,000 + 0.5 (60,000 + 0.05 B)

⇒ B = 3,00,000 + 30,000 + 0.025 B

⇒ 0.975B = 3,30,000

⇒ B = 3,38,462

Substitute B = 3,38,462 in - 2

⇒ P = 60,000+0.05 (3,38,462) = 76,923

Secondary distribution summary

Particulars	Basis	Production Dept.		Service Dept.	
		A	B	Boiler House	Pump Room
Primary distribution summary	-	-	-	3,00,000	60,000
Re apportionment of service charges					
Boiler	60:35:05	2,03,077	1,18,462	(3,38,500)	16,900
Pump	10:40:50	7,692	30,769	38,500	(76,900)
		2,10,769	**1,49,231**		

PROBLEM NO: 10

Computation of Machine Hour Rate

	Basis of apportionment	Total (Rs)	A (Rs.)	B (Rs.)	C (Rs.)
(A) Standing Charges Insurance	Depreciation Basis (3:3:2)	8,000	3,000	3,000	2,000
Indirect employee cost	Direct Labour hours (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

Working Notes:

i) Calculation of effective working hours:

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

= 52 + 12 = 64 days

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

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

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

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

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

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

= 1,987.2 hours – 39.74 hours

= 1947.46 or Rounded up to 1948 hours

ii) Amount of spare parts is calculated as under:

	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

iii) Amount of Indirect employee cost is calculated as under:

	(Rs.)
Preliminary estimates	20,000
Add: Increase in wages @ 20%	4,000
	24,000

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

PROBLEM NO: 11

Working notes:

1. Computation of total cost of jobs

Total cost of Job 1102 when 8% is the profit on Cost = $\left(\frac{1,07,325}{108} \times 100\right)$ = Rs.99,375

Total cost of job 1108 when 12% is the profit on cost = $\left(\frac{1,57,920}{112} \times 100\right)$ = Rs.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

Particulars	Job 1102(Rs.)	Job 1108 (Rs.)
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 Rs.99,375 and Rs.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:

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

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

Hence selling price of the new order = $\left(\frac{1,67,500}{80} \times 100\right)$ = Rs.2,09,375

PROBLEM NO: 12

(i) Calculation of Overhead Recovery Rate:

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

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

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

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

Working Note: Calculation of Factory Cost in 2014

Particulars	**Amount (Rs.)**
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 (Rs.)
Material	8,00,000
Labour	4,50,000
Factory Overhead (40% of Rs.4,50,000)	1,80,000
Factory Cost	14,30,000
Administrative Overhead (8% of Rs.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) (Rs.15,89,400 /0.9)	17,66,000

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

PROBLEM NO: 13

Calculation of Total Cost of Job – X using different methods of Recovery of Overheads:

Particulars	Direct Material Cost	Direct Labour Cost	Prime Cost	Output	Direct Material (Kg's)	Labour Hour	Machine Hour
Direct Material	45	45	45	45	45	45	45
Direct Wages	50	50	50	50	50	50	50
Prime Cost	95	95	95	95	95	95	95
Add: Factory Overhead	90 (WN-1) (45X200%)	75 (WN-2) (50X150%)	82 (WN-3) (95X86%)	64 (WN-4) (32 X 2)	120 (WN-5) (20 X6)	90 (WN-6) (15 X6)	60 (WN-7) (20 X 3)
Total cost of Job X	185	170	177	159	215	185	155

Working Notes: Calculation of Factory Overhead Recovery Rate and Factory Overhead in each case:

W.N	OHRR on the Basis of	Calculations	Overhead Recovery Rate
1.	Direct Material Cost (D.M.C)	$\frac{E.O.H}{D.M.C} = \frac{3,00,000}{1,50,000} \times 100$	= 200% of Direct Material Cost
2.	Direct Labour Cost (D.L.C)	$\frac{E.O.H}{D.L.C} = \frac{3,00,000}{2,00,000} \times 100$	= 150% of Direct Labour Cost
3.	Prime Cost (P.C)	$\frac{E.O.H}{P.C} = \frac{3,00,000}{3,50,000} \times 100$	= 86% of Prime Cost
4.	Output	$\frac{E.O.H}{output} = \frac{3,00,000}{1,50,000 units}$	= Rs. 2 per unit
5.	Raw Material (in Kg's) (R.M)	$\frac{E.O.H}{R.M} = \frac{3,00,000}{50,000 kgs}$	= Rs. 6 per Kg of Raw Material
6.	Labour Hours (L.H)	$\frac{E.O.H}{L.H} = \frac{3,00,000}{50,000}$	= Rs. 6 per Labour Hour
7.	Machine Hours (M.H)	$\frac{E.O.H}{M.H} = \frac{3,00,000}{1,00,000}$	= Rs. 3 per Machine Hour

Note: E.O.H stands for Estimated Overhead and OHRR for Overhead Recovery Rate.

PROBLEM NO: 14

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 = $\frac{\text{Rs. } 900{,}000}{150{,}000 \text{ hrs}}$ = 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. Statement showing Power Plant's cost allocation to the Cutting & Welding departments by using single rate method on actual usage of machine hours.

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

ii. Statement showing Power Plant's cost allocation to the Cutting & Welding departments by using dual rate method.

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 $\left(\frac{\text{Rs. } 9\text{L} \times 3}{5}\right)$	360,000 $\left(\frac{\text{Rs. } 9\text{L} \times 2}{5}\right)$	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. Statement showing Power Plant's cost allocation to the Cutting & Welding Departments using dual rate method

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. Comments

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: 15

Computation of unabsorbed overheads

Man-days worked	1,50,000
	(Rs.)
Overhead actually incurred	41,50,000
Less: Overhead absorbed @ Rs. 25 per man-day	37,50,000
(Rs. 25 × 1,50,000)	
Unabsorbed overheads	4,00,000
Unabsorbed overheads due to defective	
planning (i.e. 60% of Rs 4,00,000)	2,40,000
Balance of unabsorbed overhead	1,60,000

Treatment of unabsorbed overheads in Cost Accounts

(i) The unabsorbed overheads of Rs.2,40,000 due to defective planning to be treated as abnormal and therefore be charged to Costing Profit and Loss Account.

(ii) The balance unabsorbed overheads of Rs. 1,60,000 be charged to production i.e., 40,000 units at the supplementary overhead absorption rate i.e., Rs. 4 per unit (Refer to Working Note)

	(Rs.)
Charge to Costing Profit and Loss Account as part of the cost of unit sold	1,20,000
(30,000 units @ Rs. 4 p.u.)	
Add: To closing stock of finished goods	40,000
(10,000 units @ Rs. 4 p.u.)	
Total	1,60,000

Working Note:

Supplementary overhead absorption rate $= \frac{\text{Rs.}1,60,000}{40,000\text{ units}} = \text{Rs.}4\text{ p.u}$

PROBLEM NO: 16

Under-absorbed overhead expenses during the month of August

	(Rs.)	(Rs.)
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 @ Rs.5 per hour		50,000
Under-absorbed overheads		10,000

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

Finished Goods	*Rs.1,000
Cost of Sales	*Rs.3,000

***Working notes**

Under-absorbed overhead: Rs.4,000

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

PROBLEM NO: 17

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: 18

Calculation of manufacturing overhead under absorbed	**(Rs.)**
Actual overheads	4,26,544
Overhead recovered (applied)	3,65,904
Under absorption (recovery) of overhead	60,640

The two methods for the disposal of the under-absorbed overheads in this problem may be:-

(1) Write off the under – absorbed overhead to Costing Profit & Loss Account.

(2) Use supplementary rate, to recover the under-absorbed overhead.

According to first method, the total unabsorbed overhead amount of Rs.60,640 will be written off to Costing Profit & Loss Account. The use of this method will reduce the profits of the concern by Rs. 60,640 for the period.

According to second method, a supplementary rate may be used to adjust the overhead cost of each cost unit. The under-absorbed amount in total may, at the end of the accounting period, be apportioned on ratio basis to the three control accounts, viz, Work-in-progress, Finished goods stock and Cost of goods sold account. Apportioning of under-absorbed overhead can be carried out by using direct labour hours/ machine hours/ the value of the balances in each of these accounts, as the basis. Prorated figures of under-absorbed overhead over Work-in-progress, Finished goods stock and Cost of goods sold in this question on the basis of values, of the balances in each of these accounts are as follows:-

	Additional Overhead (Under-absorbed) Total		
	(Rs.)	(Rs.)	(Rs.)
Work-in-progress	1,41,480	7,074*	1,48,554
Finished Goods Stock	2,30,732	11,537@	2,42,269
Cost of Goods Sold	8,40,588	42,029#	8,82,617
	12,12,800	60,640	12,73,440

The apportionment of under-absorbed overhead over Work-in-progress, Finished goods stock and Cost of goods sold on the basis of their value in the respective account is as follows:-

*Overhead to be absorbed by work-in-progress $= \frac{Rs.60,640}{12,12,800} \times 1,41,480 = Rs.7,074$

@Overhead to be absorbed by finished goods $= \frac{Rs.60,640}{12,12,800} \times 2,30,732 = Rs.11,537$

#Overhead to be absorbed by cost of goods sold $= \frac{Rs.60,640}{12,12,800} \times 8,40,588 = Rs.42,029$

PROBLEM NO: 19

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

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

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

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

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

PROBLEM NO: 20

Calculation of Net Overhead Incur:

Particulars	Amount (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 = 6,93,000

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

$$\therefore \text{ Supplementary rate } = \frac{Rs.58{,}000}{28{,}000Units\left[25{,}000+(6000x50\%)\right]}$$

= 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: 21

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

	Amount (Rs.)	Amount (Rs.)
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 × Rs.10.50*)		5,04,000
Amount of under absorbed production overheads		60,000

Budgeted Machine hour rate (Blanket rate) = $\frac{Rs.10{,}08{,}000}{96{,}000hours}=Rs.10.50perhour$

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) Rs. 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) Rs.45,000.

Supplementary rate = $\frac{Rs.45{,}000}{30{,}000units}=Rs.1.50perunit$

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

	Equivalent completed units	Amount (Rs.)
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: 22

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

BAR rat*e per hour = $\frac{Rs.44,00,000/-}{2,20,000\,hrs}$ = Rs.20 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/- ($11{,}700 \times \frac{3}{4}$) we have to calculate supplementary rate.

$\therefore$ Supplementary rate = $\frac{Rs.8,775}{33,000\,units\,[24,000 + 9,000]}$ = Rs.0.2689

Statement showing cost to be increase

Particulars	No. of units	Amount (Rs)
Cost of sales	21,600	21,600 x 0.2689 = 5809
Finished goods	2,400	2,400 x 0.2689 = 646
Work in progress	9,000	9,000 x 0.2689 = 2420
	33,000	**8,875**

PROBLEM NO: 23

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

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

= $\frac{Rs.30,000}{6,000\,units}$ = Rs. 5.00

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

= Rs. 3,10,000 – (42,000 x 5)

= Rs. 3,10,000 – Rs. 2,10,000 = Rs. 1,00,000

PROBLEM NO: 24

Calculation of works cost of Job No : 198

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

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
Un apportioned expenses $\left(\frac{Rs.400 x Rs.2000}{Rs.20,000}\right)$ (10% of direct wages)	40
Works cost	1,348

1. 6 welders × 5 days × 8 hours = 240 hours
2. Un apportioned expenses Rs.2,000 which works out at 10% of direct wages.

PROBLEM NO: 25

(a) 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

		(Rs.)	(Rs.)
(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 $\left(\frac{28,000}{3 machines x 13 four-w eek period}\right)$	28,080.00	720.00
	Wages (48 hours × 4 weeks × Rs. 20 × 3 operators) ÷ 3 machines)		3,840.00
	Bonus (176 hours × Rs. 20 × 3 operators) ÷ 3 machines)× 10%		352.00
	Total standing charges		4,912.00
(B)	Machine Expenses		
	Depreciation = $\left(52,000 x 10\% x \frac{1}{13 four-w eek period}\right)$		400.00
	Repairs and maintenance (Rs.60 × 4 weeks)		240.00
	Consumable stores (Rs. 75 × 4 weeks)		300.00
	Power (176 hours × 20 units ×Rs. 0 .80)		2,816.00
	Total machine expenses		3,756.00
(C)	Total expenses (A) + (B)		8,668.00

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

PROBLEM NO: 26

Computation of machine hour rate of new Machine

A. Standing Charges I. Insurance Premium Rs.9,000 $\times \frac{1}{9}$	1,000	
II. Rent $\frac{1}{10} \times 2{,}400 \times 12$ months	2,880	
	3,880	0.97*
B. Machine expenses I. Repairs and Maintenance (Rs.5,000 ÷ 4,000 hours)		1.25
II. Depreciation $\frac{10{,}00{,}000 - 10{,}000}{10\,\text{years} \times 4{,}000\,\text{hours}}$		24.75
III. Electricity (8 units x Rs.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

***** Rs.3,880 ÷ 4,000 hours = Rs.0.97

PROBLEM NO: 27

Sree Ajeet Ltd.

Statement showing comprehensive machine hour rate of Machine B

Particulars	Amount (Rs.)
Standing Charges:	
Factory rent {(Rs. 1,80,000/1,00,000 sq. ft.) * 5,000 Sq. ft.}	9,000
Heat and Gas (Rs. 60,000/15 machines)	4,000
Supervision (Rs. 1,50,000/ 15 machines)	10,000
Depreciation [(Rs. 1,80,000 – Rs. 10,000)/ 10 years]	17,000
Annual expenses on special equipment	12,000
	52,000
Fixed cost per hour (Rs. 52,000/ 4,000 hrs.)	13/-

	Set up rate Per hour (Rs.)	Operational rate Per hour (Rs.)
Fixed cost	13.00	13.00
Power	--	5.00
Wages	25.00	12.50
Comprehensive machine hour rate per hr.	38.00	30.50

Statement of 'B' machine costs to be absorbed on the two work orders

	Work order-1			Work order-2		
	Hours	Rate	Amount	Hours	Rate	Amount
		Rs	Rs		Rs	Rs
Set up time cost	15	38	570	30	38	1,140
Operation time cost	100	30.5	3,050	190	30.5	5,795
Total cost			3,620			6,935

PROBLEM NO: 28

Total number of hours per annum - 4,380

Total number of hours per month - 365

Computation of Machine Hour Rate

	Per month(Rs.)	Per hour (Rs.)
Fixed costs (Standing Charges)		
Depreciation (Refer working note-1)	75,833	
Rent (Rs.30,000 × ¼)	7,500	
Lighting charges {(Rs.8,000 × 2 points) ÷ 10 points}	1,600	
Foreman's salary (Rs.19,200 × 1/6)	3,200	
Sundry expenses (oil etc.)	900	
Insurance {(1% of Rs.9,10,000) ÷ 12 months}	758	
	89,791	246.00
Variable costs :		
Repairs (Refer working note -2)		41.10
Electricity (15 units × Rs.5)		75.00
Machine Hour rate		362.10

Working Notes :

1) Depreciation per month $= \frac{\text{Cost of machine - Scrap value}}{\text{Life of the machine}}$

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

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

2) Repairs for the whole life is Rs.18,00,000 which can be linked to activity level of 43,800 hours.

Thus, Repairs cost per hour = $\frac{\text{Rs. 18,00,000}}{43,800\text{ hours}} = \text{Rs.41.10}$

PROBLEM NO: 29

Computation of Machine Hour Rate

Particulars	Setting-up time is 'Unproductive' (Machine hour- 2,407*)	Setting-up time is 'Productive' (Machine hour- 2,600)
	(Rs.)	(Rs.)
Fixed Charges (Standing Charges):		
Overhead Chargeable Rs. 18,000 × 12 = Rs. 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: $\frac{18,500 \times 12 \times 2\text{ Operators}}{4\text{ machines}} = \text{Rs.1,11,000}$ $\left(\frac{\text{Rs.1,11,000}}{2,407\text{ hours}}\right);\left(\frac{\text{Rs.1,11,000}}{2,600\text{ hours}}\right)$	46.12	42.69
Insurance: 2% of Rs. 25,00,000 = Rs. 50,000	20.77	19.23
	156.63	145.00

Variable Expenses (Machine Expenses) per hour		
Depreciation : $\frac{25,00,000-1,25,000}{25,000 hours}$	95.00	95.00
Power: (25 units × Rs. 5)	125.00	125.00
Repairs and Maintenance : $\left(\frac{26,000}{2,407 hours}\right);\left(\frac{26,000}{2,600 hours}\right)$	10.80	10.00
$\left(\frac{2600\times12}{2,407 hours}\right);\left(\frac{2600\times12}{2,600 hours}\right)$	12.90	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
	2407

Actual working hours $\left(\frac{2,600 hours}{108}\times100\right)$

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: 30

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% break 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: 31

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: 32

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	$\frac{5,20,000 \times 3 \times 90\%}{12}$ = 3,51,000 units	4,29,000 units
	(Rs.)	**(Rs.)**	**(Rs.)**
Direct materials @ Rs.15 per unit	11,70,000	52,65,000	64,35,000
Direct wages @ Rs.9 per unit or Rs.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 @ Rs.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 @ Rs.44 per unit (78,000 x Rs. 44)	34,32,000		
Desired profit during next 9 months (Rs.15,62,500 – Rs.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

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

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

Workings:

(1) Semi-variable overheads:

(a) For first 3 months at 60% capacity = Rs.(5,60,000 + Rs.1,50,000) ×3/12

= Rs.7,10,000 ×3/12

= Rs.1,77,500.

(b) For remaining 9 months at 90% capacity = Rs.(5,60,000 + Rs.3,00,000) ×9/12

= Rs.8,60,000×9/12

= Rs. 6,45,000

PROBLEM NO: 33

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 Whichever 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 per unit.

PROBLEM NO: 34

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 (Rs.)	Cost per hour (Rs.) (Cost per month ÷ 200 hours)
Supervisor's salary $\left(\frac{Rs.6,000}{3 machines}\right)$	2,000	10.00
Rent of building $\left(\frac{1}{6} x \frac{Rs.72,000}{12 months}\right)$	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 (Rs.)	Cost per hour (Rs.)
Depreciation $\left(\frac{(Rs.(5,00,000-20,000)}{10 years} x \frac{1}{12 months}\right)$	4,000	20.00 $\left(\frac{Rs.4,000}{200 hours}\right)$

Wages	2,500	$12.50\left(\frac{Rs.2,500}{200\,hours}\right)$
Repairs & Maintenance $\left(\frac{Rs.60,480}{12\,months}\right)$	5,040	$28.00\left(\frac{Rs.5,040}{180\,hours}\right)$
Consumable stores $\left(\frac{Rs.47,520}{12\,months}\right)$	3,960	$22.00\left(\frac{Rs.3,960}{180\,hours}\right)$
Power (25 units × Rs.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 (Rs.)	Running time rate per machine hour (Rs.)
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: 35

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

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

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

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

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

b) Calculation of Machine hour rate with use of crane

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

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

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

THE END