CHAPTER-4
OVERHEADS

Q1. **(B4/A26).**Meerut manufacturing company makes several product lines which are processed through three production departments – X, Y, and Z.

The information concerning the relevant data for a year is as follows:

Cost of service	Factory Overheads (including share Department)	Direct Labour Hours	Direct Labour Hours
Department X	Rs. 1,24,000	80,000	Rs. 1,60,000
Department Y	2,30,000	1,15,000	2,41,500
Department Z	5,46,000sm	1,05,000	1,99,500

Production records at the end of the year indicated the following for the product line 'Krish', Unit produced 20,000

	Deptt. X	Deptt. Y	Deptt. Z
	Rs.	Rs.	Rs.
Prime Cost	45,000	10,500	59,500
Direct Labour Hours	10,000	5,000	30,000

You are required to:

Calculate the departmental and plant-wise over-head rates based on direct labour hours.

Q2. **(SMN10/SMO).** A company which sells four products, some of them unprofitable proposes discontinuing the sale of one of them. The following information is available regarding income, costs and activity for the year ended 31st March, 2012.

	Products			
	A	B	C	D
Sales (Rs.)	3,00,000	5,00,000	2,50,000	4,50,000
Cost of sales (Rs.)	2,00,000	4,50,000	2,10,000	2,25,000
Area of storage (Sq.ft.)	50,000	40,000	80,000	30,000
Number of parcels sent	1,00,000	1,50,000	75,000	1,75,000
Number of invoices sent	80,000	1,40,000	60,000	1,20,000

Selling and Distribution overheads and the basis of allocation are:

		Basis of allocation to products
Fixed Costs	(Rs.)	
Rent & Insurance	30,000	Sq. Ft.
Depreciation	10,000	Parcel
Salesmen's salaries	60,000	Sales Volume
Administrative wages and salaries	50,000	No. of invoices
Variable Costs:		
Packing wages & materials	Rs. 0.20 per parcel	
Commission	4% of sales	
Stationery	Rs. 0.10 per invoice	

You are required to prepare Profit & Loss Statement showing the percentage of profit or loss to sales for each product. **[Amt. Changed]**

Q3. **(C6).**A company is making a study of the relative profitability of the two products — A and B. In addition to direct costs, indirect selling and distribution costs to be allocated between the two products are as under:

	Rs.
Insurance Charges for inventory (finished)	78,000
Storage Costs	1,40,000
Packing and Forwarding Charges.	7,20,000
Salesmen Salaries	8,50,000
Invoicing Costs	4,50,000

Other details are:	**Product A**	**Product B**
Selling Price per unit	(Rs.) 500	1,000
Cost per unit (exclusive of indirect selling and distribution costs)	(Rs.) 300	600
Annual Sales in units	10,000	8,000
Average inventory	(units) 1,000	800
Number of invoices	2,500	2,000

One unit of product A requires a storage space twice as much as product B. The cost to pack and forward one unit is the same for both the products. Salesmen are paid salary plus commission @ 5% on sales and equal -amount of efforts are put forth on the sales of each of the products.

Required:

(i) Set up a schedule showing the apportionment of the indirect selling and distribution costs between the two products.

(ii) Prepare a statement showing the relative profitability of the two products.**(May 1996)**

UNDER / OVER ABSORPTION OVERHEADS

Q4. **[SMP7]**In a factory, overheads of a particular department are recovered on the basis of Rs. 5 per machine hour. The total expenses incurred and the actual machine hours for the department for the month of August were Rs. 80,000 and 10,000 hours respectively. Of the amount of Rs.80, 000, Rs.15,000 became payable due to an award of the Labour Court and Rs. 5,000 was in respect of expenses of the previous year booked in the current month (August). Actual production was 40,000 units, of which 30,000 units were sold. On analyzing the reasons, it was found that 60% of the under-absorbed overhead was due to defective planning and the rest was attributed to normal cost increase. How would you treat the under-absorbed overhead in the cost accounts?

Q5. **[SMP8]** In a manufacturing unit, factory overhead was recovered at a pre-determined rate of Rs.25 per man-day. The total factory overhead expenses incurred and the man- days actually worked were Rs. 41.50 lakhs and 1.5 lakh man-days respectively. Out of the 40,000 units produced during a period, 30,000 were sold.

On analysing the reasons, it was found that 60% of the unabsorbed overheads were due to defective planning and the rest were attributable to increase in overhead costs.

Q6. **(SMP10/C20(19).**The total overhead expenses of a factory are Rs.4,46,380. Taking into account the normal working of the factory, overhead was recovered in production at Rs. 1.25 per hour. The actual hours worked were 2,93,104. How would you proceed to close the books of accounts, assuming that besides 7,800 units produced of which 7,000 were sold, there were 200 equivalent units in work-in-progress? On investigation, it was found that 50% of the unabsorbed overhead was on account of increase in the cost of indirect materials and indirect labour and the remaining 50% was due to factory inefficiency. Also give the profit implication of the method suggested. **(Nov, 2000)**

Q7. ABC Ltd. manufactures a single product and absorbs the production overheads at a pre-determined rate of Rs.10 per machine hour.

At the end of financial year 20X1-X2, it has been found that actual production overheads incurred were Rs.6,00,000. It included Rs. 45,000 on account of 'written off' obsolete stores and Rs.30,000 being the wages paid for the strike period under an award.

The production and sales data for the year 20X1 -X2 is as under:

Production:

Finished goods	20,000 units
Work-in-progress	8,000 units
(50% complete in all respects)	

Sales:

Finished goods	18,000 units

The actual machine hours worked during the period were 48,000 It has been found that one-third of the under-absorption of production overheads was due to lack of production planning and the rest was attributable to normal increase in costs.

(i) Calculate the amount of under-absorption of production overheads during the year 20X1-X2; and

(ii) Show the accounting treatment of under-absorption of production overheads.

Q8. **[SMP11]** ABC Ltd. Manufactures a single product and absorbs the production overheads at a pre-determined rate of Rs.10 per machine hour.

At the end of financial year 20X1-X2, it has been found that actual production overheads incurred were Rs.6,00,000. It included Rs.45,000 on account of 'written off' obsolete stores and Rs. 30,000 being the wages paid for the strike period under an award.

The production and sales data for the year 20X1-X2 is as under :

Production :

Finished goods	20,000units
Work-in-progress	8,000units
(50% complete in all respects)	

Sales :

Finished goods	18,000units

The actual machine hours worked during the period were 48,000. It has been found that one-third of the under-absorption of production overheads was due to lack of production planning and the rest was attributable to normal increase in costs.

(i) Calculate the amount of under-absorption of production overheads during the year 20X1-X2;and

(ii) Show the accounting treatment of under-absorption of production overheads.

Q9. **(C16(15).**Sweet Dreams Ltd. uses a historical cost system and absorb overheads on the basis of predetermined rate. The following data are available for the year ended 31st March, 20X2:

	Rs.
Manufacturing overheads:	
Amount actually spent	1,70,000
Amount absorbed	1,50,000
Cost of goods sold	3,36,000
Stock of finished goods	96,000
Works-in-progress	48,000

Using two methods of disposal of under-absorbed overheads show the implication on the profits of the company under each method. (Nov, 1997)

Q10. **(C18(17).**A manufacturing company has four production departments. Overhead is absorbed to its production departments by means of departmental rates per direct labour hour. In a particular year there was a large difference between the overhead incurred and overhead absorbed. On analysis you get the following information.

Particulars	Departments			
	1	2	3	4
Overhead incurred	Rs. 12,320	Rs. 44,385	Rs. 18,180	Rs. 16,720
Actual direct labour hours worked	30,800	80,700	40,400	30,400
Estimated overheads rate used	0.50	0.45	0.40	0.50
Total overhead absorbed	15,400	36,315	16,160	15,200
Direct labour hours contained in:				
Work-in-progress	3,000	10,400	1,900	7,200
Finished goods	4,300	8,300	4,000	2,900

Required: (a) Calculate for each Deptt. the labour hour rates of overhead incurred (b) Calculate the extent to which the values of work-in-progress and finished goods be increased or decreased for each department for the year in view of correct rates; (c) what will be the impact on total profit of the company in view of the correction in (b) above?

Q11. **(SMP9/C12(11/SM).**A factory has three production departments. The policy of the factory is to recover the production overheads of the entire factory by adopting a single blanket rate based on the percentage of total factory overheads to total factory wages. The relevant data for a month are given below:

Departments	Direct Materials	Direct Wages	Factory Overheads	Direct Labour Hours	Machine Hours
Budget					
Machining	6,50,000	80,000	3,60,000	20,000	80,000
Assembly	1,70,000	3,50,000	1,40,000	1,00,000	10,000
Packing	1,00,000	70,000	1,25,000	50,000	-
Actual :					
Machining	7,80,000	96,000	3,90,000	24,000	96,000
Assembly	1,36,000	2,70,000	84,000	90,000	11,000
Packing	1,20,000	90,000	1,35,000	60,000	-

The details of one of the representative jobs produced during the month are as under:

Job No. CW 7083:

Department	Direct Materials	Direct Wages (Rs.)	Direct Labour Hours	Machine Hour
Machine	1,200	240	60	180
Assembly	600	360	120	30
Packing	30	60	40	-

The factory adds 30% on the factory cost to cover administration and selling overheads and profit.

Required:

(i) Calculate the overhead absorbtion rate as per the current policy of the company and determine the selling price of the job No, CW 7083.

(ii) Suggest any suitable alternative method(s) of absorption of the factory overheads and calculate the overhead recovery rates based on the method(s) so recommended by you.

(iii) Determine the selling price of job CW 7083 based on the overhead application rates calculated In (ii) above.

(iv) Calculate the department wise and total under or over recovery of overheads based on the company's current policy and the method (s) recommended by you. (Imp.)

Q12.(C7). From the particulars furnish below, prepare a consolidated cost sheet, transfer service department expenses to production departments on a suitable basis and indicate the final cost of Products P, Q and R.

Sr. No.	Expenditure	Total	Production Deptts.		Service Deptts.	
		Rs.	A Rs.	B Rs.	X Rs.	Y Rs.
1.	Direct material	20,000	9,500	10,500	---	---
2.	Direct labour	30,000	13,900	16,100	---	---
3.	Indirect material	4,000	2,000	1,000	700	300
4.	Indirect labour	6,000	850	920	2,730	1,500
5.	Depreciation on plant and machinery	10,000	5,000	3,000	1,500	500
6.	Depreciation on building	12,000	7,000	2,500	1,000	1,500
7.	Insurance	3,000	1,200	800	300	700
8.	Overtime	3,000	750	250	1,200	800
9.	Other factory expenses	10,500	4,500	2,500	2,300	1,200
	Total	**98,500**	**44,700**	**37,570**	**9,730**	**6,500**

Notes:

(i) Rs. 2,500 of service department charges incurred in department Y have to be transferred to service department X. The balance to be charged to departments A, B and X at the rate of 45, 35 and 20 per cent respectively.

(ii) Expenses incurred in service department X have to be charged to departments A and B in the proportion of 3 : 2.

(iii) 4,000 Units of product P is processed through department A , the attention to all the products being continuous and uniform.

(iv) Department B manufacture 3,000 units of product Q and 2,000 units of product R, the direct materials consumed being in the ratio of 3:2.

The work in this department is mainly manual and direct labour hours involved are:

	Ordinary Time	Over Time
Product Q	12,000	40
Product R	4,100	85 [CA]

Q13. (C14(13). The preliminary budget for a company with four departments was as under:

Department	Direct Overheads Allocation (Rs.)	Apportioned Overheads	Direct Labour Hours
1	14,200	10%	60,000
2	7,200	30%	2,00,000
3	16,400	20%	1,20,000
4	22,600	40%	1,50,000
Total	**Rs. 60,400**	**Rs. 1,76,000**	**5,30,000**

It was decided to establish a new department (5) and to slightly re-organise the existing departments. The following alterations were agreed to in making a revised budget:

(a) A sum of Rs. 15,000 being additional overheads will be allocated directly to department (5).

(b) An amount of Rs. 6,600 being overheads previously allocated directly to deptt. (3) will now be transferred to department (5).

(c) Rs. 30,000 additional overheads expected to be incurred due to re-organisation, will be apportioned as follows:

Department	1	2	3	4	5
Proportion (%)	10	20	—	10	60

(d) Revised direct labour hours are expected to be:

Deptt.	Hours	Deptt.	Hours
1.	69,600	4	1,60,000
2.	2,00,000	5	90,000
3.	1,00,000		

You are required to calculate:

(a) The departmental direct labour hour rates of overhead, based on the preliminary budget.

(b) The departmental direct labour hour rates of overhead, based on the revised budget.

(c) The overhead chargeable at the revised rates to one unit of product 'X for which the following hours are spent in each department:

Deptt.	1	2	3	4	5	
Hours	6	—	4	8	3	**(Imp)**

Q14. (PM16). PQR Ltd has its own power plant, which has two users, Cutting Department and Welding Department. When the plans were prepared for the power plant, top management decided that its practical capacity should be 1,50,000 machine hours. Annual budgeted practical capacity fixed costs are Rs. 9,00,000 and budgeted variable costs are Rs. 4 per machine-hour. The following data are available:

	Cutting Department	**Welding Department**	**Total**
Actual Usage in 2012-13 (Machine hours)	60,000	40,000	1,00,000
Practical capacity for each department (Machine hours)	90,000	60,000	1,50,000

Required

(i)Allocate the power plant's cost to the cutting and the welding department using a single rate method in which the budgeted rate is calculated using practical capacity and costs are allocated based on actual usage.

(ii)Allocate the power plant's cost to the cutting and welding departments, using the dual -rate method in which fixed costs are allocated based on practical capacity and variable costs are allocated based on actual usage.

(iii)Allocate the power plant's cost to the cutting and welding departments using the dual-rate method in which the fixed-cost rate is calculated using practical capacity, but fixed costs are allocated to the cutting and welding department based on actual usage.

Variable costs are allocated based on actual usage.

(iv) Comment on your results in requirements (i), (ii) and (iii).

Q14 **(SMP3/C4/SMO).**X Ltd. has three departments which are regarded as production departments. Service departments costs are distributed to these production departments using the "Step Ladder Method" of distribution. Estimates of factory overhead costs to be incurred by each department in the forthcoming year are as follows. Data required for distribution is also shown against each department.

Departments	Factory Overhead Rs.	Direct Labour Hours	No. of Employees	Area in sq. m.
Production:				
X	1,93,000	4,000	100	3,000
Y	64,000	3,000	125	1,500
Z	83,000	4,000	85	1,500
Service:				
P	45,000	1,000	10	500
Q	75,000	5,000	50	1,500
R	1,05,000	6,000	40	1,000
S	30,000	3,000	50	1,000

The overhead costs of the four service departments are distributed in the same order, viz, P, Q, R and S respectively on the following basis:

Department		Basis
P	—	Number of Employees
Q	—	Direct Labour Hours
R	—	Area in Square Metres
S	—	Direct Labour Hours

You are required to:

(a) Prepare a schedule showing the distribution of overhead costs of the four service departments to the three production departments; and

(b) Calculate the overhead recovery rate per direct labour hour for each of the three production departments.

Q15 **(SMN2/SMO).** Suppose the expenses of two production departments A and B and two service departments X and Y are as under:

Amount	(Rs.)	Apportionment Basis		
		Y	A	B
X	2,000	25%	40%	35%
Y	1,500	--	40%	60%
A	3,000			
B	3,200			

[Amt: 100 Times in SM]

Q16 **(SMN1/SMO).** XL Ltd., has three production departments and four service departments. The expenses for these departments as per Primary Distribution Summary are as follows :

Production Departments :	(Rs.)	(Rs.)
A	30,000	
B	26,000	
C	24,000	80,000
Service Departments :	(Rs.)	(Rs.)
Stores	4,000	
Time -keeping and Accounts	3,000	
Power	1,600	
Canteen	1,000	9,600

The following information is also available in respect t of the production departments:

	Dept A	Dept B	Dept C
Horse power of Machine	300	300	200
Number of workers	20	15	15
Value of stores requisition in (Rs.)	2,500	1,500	1,000

Apportion the costs of service departments over the production departments.**[Amt: 100 Times in SM]**

Q.13 DT Ltd. is a manufacturing company having three production departments, 'A', 'B' and 'C' and two service departments 'X' and 'Y'. The following budget is for December 20X8:

	Total (Rs.)	A (Rs.)	B (Rs.)	C (Rs.)	X (Rs.)	Y(Rs.)
Direct Material		20,00,000	40,00,000	80,00,000	40,00,000	20,00,000
Direct wages		1,00,00,000	40,00,000	1,60,00,000	20,00,000	40,00,000
Factory rent	80,00,000					
Power	50,00,000					
Depreciation	20,00,000					
Other overheads	1,80,00,000					
Additional information :						
Area (Sq. ft)		500	250	500	250	500
Capital value of assets (Rs. lakhs)		400	800	400	200	200
Machine hours		1,000	2,000	4,000	1,000	1,000
Horse power of machines		50	40	20	15	25

A technical assessment of the apportionment of expenses of service departments is as under:

	A	B	C	X	Y
Service Dept. 'X' (%)	45	15	30	-	10
Service Dept. 'Y'(%)	60	35	-	5	-

Required:

(i) PREPARE a statement showing distribution of overheads to various departments.

(ii) PREPARE a statement showing re-distribution of service departments expenses to production departments.

(iii) CALCULATE machine hour rates of the production departments 'A', 'B' and 'C'.

Q19.(SMP2/SMO). Modern Manufactures Ltd. has three Production Departments P_1, P_2, P_3 and two Service Departments S_1 and S_2 details pertaining to which are as under:

	P_1	P_2	P_3	S_1	S_2
Direct wages (Rs.)	3,000	2,000	3,000	1,500	195
Working hours	3,070	4,475	2,419	--	--
Value of machines (Rs.)	60,000	80,000	1,00,000	5,000	5,000
H.P. of machines	60	30	50	10	--
Light points	10	15	20	10	5
Floor space (sq. ft.)	2,000	2,500	3,000	2,000	500

The following figures extracted from the Accounting records are relevant:

	(Rs.)
Rent and Rates	5,000
General Lighting	600
Indirect Wages	1,939
Power	1,500
Depreciation on Machines	10,000
Sundries	9,695

The expenses of the Service Departments are allocated as under :

	P_1	P_2	P_3	S_1	S_2
S_1	20%	30%	40%	--	10%
S_2	40%	20%	30%	10%	--

Find out the total cost of product X which is processed for manufacture in Departments P1, P_2 and P_3 for 4, 5 and 3 hours respectively given that its Direct Material Cost is Rs. 50 and Direct Labour Cost is Rs. 30.

Q20. Delta Ltd. is a manufacturing concern having two production departments P_1 and P_2 and two service departments S_1 and S_2. After making a primary distribution of factory overheads, the total overheads of all departments are as under :

	(in Rs.)
P_1	4,02,000
P_2	2,93,000
S_1	3,52,000
S_2	33,000

Overheads of service departments are reapportioned as below:

	P_1	P_2	S_1	S_2
S_1	40%	50%	-	10%
S_2	50%	40%	10%	-

A product 'Z' passes through all the two production departments – P_1 and P_2 each unit of product remain there in process for 2 and 3 hours respectively. The material and labour cost of one unit of product 'Z' is Rs. 500 and Rs. 350 respectively.

The company run for all the 365 days of the year and 16 hours per day.

You are required :

(i) To make secondary distribution of overheads of service departments by applying Simultaneous Equation method and

(ii) Determine the total cost of one unit of product Z. **[IPC-M18/6(A)][M-8]**

Q21. (SMN3/SMO). Service departments' expenses

	(Rs.)
Boiler House	3,000
Pump Room	600
	3,600

The allocation is :

	Production Departments		Boiler House	Pump Room
	A	B		
Boiler House	60%	35%	--	5%
Pump Room	10%	40%	50%	--

[Amt: 100 Times in SM]

Q22 **(SMN4/5-Similar/C2/SMO).**PH Ltd. is a manufacturing company having three production departments, 'A', B' and 'C' and two service departments 'X' and 'Y'. The following is the budget for April 20X8:

	Total	A	B	C	X	Y
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Direct Material		1,000	2,000	4,000	2,000	1,000
Direct Wages		5,000	2,000	8,000	1,000	2,000
Factory Rent	4,000					
Power	2,500					
Depreciation	1,000					
Other Overheads	9,000					
Additional Information						
Area (sq. ft.)	500	250	500	250	500	
Capital Value of assets (Rs. lacs)	20	40	20	10	10	
Machine-Hours	1,000	2,000	4,000	1,000	1,000	
Horse Power of machines	50	40	20	15	25	

A technical assessment of the apportionment of expenses of service departments is as under:

	A	B	C	X	Y
	%	%	%	%	%
Service Deptt. 'X'	45	15	30	—	10
Service Deptt. 'Y'	60	35	—	5	—

Required:

(i) A Statement showing distribution of overheads to various departments

(ii) A statement showing re-distribution of service departments expenses to production Departments.

(i) Machine hour Rates of the production departments 'A'. 'B' and 'C'.

Note: Prepare statement showing re-distribution under "Trial and Error Method".**[Amt: 100 Times in SM]**

Q23. **(C8).**RST Ltd. has two production departments: Machining and Finishing. There are three service departments: Human Resource (HR), Maintenance and Design. The budgeted costs in these service departments are as follows:

Particulars	HR Rs.	Maintenance Rs.	Design Rs.
Variable	1,00,000	1,60,000	1,00,000
Fixed	4,00,000	3,00,000	6,00,000
	5,00,000	4,60,000	7,00,000

The usage of these Service Departments' output during the year just completed is as follows:
Provision of Service Output (in hours of service).

Provider of Services

Users of Service	HR	Maintenance	Design
HR	---	---	---
Maintenance	500	---	---
Design	500	500	---
Machining	4,000	3,500	4,500
Finishing	5,000	4,000	1,500
Total	**10,000**	**8,000**	**6,000**

Required:

(i) Use the direct method to re-apportion RST Ltd service department cost to its production departments.

(ii) Determine the proper sequence to use in re-apportioning the firm's service department cost by step-down method.

(iii) Use the step-down method to reapportion the firm's service department cost. **(Nov, 2006)**

Q24.(SMP1/SM6). The ABC Company has the following account balances and distribution of direct charges on 31st March, 2011.

	Total	Production Depts.		Service Depts.	
		Machine Shop	Packing	General Plant	Stores & Maintenance
Allocated Overheads:	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Indirect labour	14,650	4,000	3,000	2,000	5,650
Maintenance material	5,020	1,800	700	1,020	1,500
Misc. supplies	1,750	400	1,000	150	200
Superintendent's salary	4,000	--	--	4,000	--
Cost & payroll salary	10,000	--	--	10,000	
Overheads to be apportioned:					
Power	8,000				
Rent	12,000				
Fuel and heat	6,000				
Insurance	1,000				
Taxes	2,000				
Depreciation	1,00,000				
	1,64,420	6,200	4,700	17,170	7,350

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

	Floor Space	Radiator Sections	No. of Employees	Investment (Rs.)	H.P. hours
Machine Shop	2,000 Sq. Ft.	45	20	6,40,000	3,500
Packing	800 Sq. Ft.	90	10	2,00,000	500
General Plant	400 Sq. Ft.	30	3	10,000	--
Store &Maint.	1,600 Sq. Ft.	60	5	150,000	1,000
	4,800 Sq. Ft.	225	38	1,000,000	5,000

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

Machine shop 50%; Packing 20%; General Plant 30%; General Plant overheads' is distributed on the basis of number of employees:

(a) Prepare an overhead distribution statement with supporting schedules to show compilations and basis of distribution including distribution of the service department expenses.

(b) Determine the service department distribution by the method of continued distribution. Carry through 3 cycles. Show all calculations to the nearest rupee. **[R-M-15/3]**

Q25. **(C32(30/PM).**A company has three production departments (M1, M2, and A1) and three service departments, one of which Engineering service department, servicing the M1 and M2 only. The relevant informations are as follows:

	Product X	**Product Y**
M1	10 Machine hours	6 Machine hours
M2	4 Machine hours	14 Machine hours
A1	4 Direct Labour hours	18 Direct Labour hours

The amount budgeted overhead cost for the year are:

	Indirect wages	**Consumable supplies**
M1	46,520	12,600
M2	41,340	18,200
A1	16,220	4,200
Stores	8,200	2,800
Engineering Service	5,340	4,200
General service	7,520	3,200

		Rs.
Depreciation on Machinery		39,600
Insurance of Machinery		7,200
Insurance of Building	3,240	
(Total building insurance cost for M1 is one third of annual premium)		
Power	6,480	
Light	5,400	
Rent	12,675	

(the general service deptt. Is located in a building owned by the company. It is valued at Rs. 6,000 and is charged into cost at notional value of 8% per annum. The cost is additional to the rent shown above).

The value of issues of material s to the production departments are in the same proportion As above for the consumable supplies.

The following data are also available:

Department	Book value Machinery (Rs.)	Area (Sq. ft.)	Effective H.P. hours %	Production Direct Labour hour	Capacity Machine Hour
M1	1,20,000	5,000	50	2,00,000	40,000
M2	90,000	6,000	35	1,50,000	50,000
A1	30,000	8,000	05	3,00,000	-
Stores	12,000	2,000	-	-	-
Engg. Service	36,000	2,500	10	-	-
General Service	12,000	1,500	-	-	-

Required :

(i) Prepare a overhead analysis sheet, showing the bases of apportionment of overhead to departments.

(ii) Allocate service department overheads to production department ignoring the apportionment of service department costs among service departments.

(iii) Calculate suitable overhead absorption rate for the production departments.

(iv) Calculate the overheads to be absorbed by two products X and Y. **(Imp)**

Ascertainment of works costs

Q26.(SMP6/SMO). Job No. 198 was commenced on October 10, 2011 and completed on November 1, 2011. Materials used were Rs. 600 and labour charged directly to the job was Rs. 400 Other information is as follows:

Machine No. 215 used for 40 hours, the machine hour rate being Rs. 3.50.

Machine No. 160 used for 30 hours, the machine hour rate being Rs. 4.00. 6 welders worked on the job for five days of 8 hours each : the Direct labour hour per welder is 20P.

Expenses not included for Calculating the machine hour or direct labour hour rate totalled Rs. 2,000 total direct wages for the period being Rs. 20,000. Ascertain the works costs of job No 198.

Reverse calculation of Factory overhead and Administrative overheads

Q27. (SMN9/SMO). In an engineering company, the factory overheads are recovered on a Fixed percentage basis on direct wages and the administrative overheads are absorbed on a fixed percentage basis on factory cost.
The company has furnished the following data relating to jobs undertaken by it in a period:

	Job 101 (Rs.)	Job 102 (Rs.)
Direct materials	54,000	37,500
Direct wages	42,000	30,000
Selling Price	1,66,650	1,28,250
profit percentage on Total cost	10%	20%

Required:

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

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

(iii) Using the above recovery rates fix the selling price of job 103. The additional data being:

Direct materials	Rs. 24,000
Direct wages	Rs. 20,000
Profit percentage on selling price	12-½ %

[R-M-16/3]

Calculation of Overheads and Selling Price

Q28.(PM). In the current quarter, a company has undertaken two jobs. The data relating to these jobs are as under:

	Job 1102	Job 1108
Selling price	Rs. 1,07,325	Rs. 1,57,920
Profit as percentage on cost	8%	12%
Direct Materials	Rs. 37,500	Rs. 54,000
Direct Wages	Rs. 30,000	Rs. 42,000

It is the policy of the company to charge Factory overheads as percentage on direct wages and Selling and Administration overheads as percentage on Factory cost.

The company has received a new order for manufacturing of a similar job. The estimate of direct materials and direct wages relating to the new order are Rs. 64,000 and Rs. 50,000 respectively. A profit of 20% on sales is required.

You are required to compute

(i) The rates of Factory overheads and Selling and Administration overheads to be charged.

(ii) The Selling price of the new order.

Q29. M.L. Auto Ltd. is a manufacturer of auto components and the details of its expenses for the year 2014 are given below:

		(Rs.)
(i)	Opening Stock of Material	1,50,000
(ii)	Closing Stock of Material	2,00,000
(iii)	Purchase of Material	18,50,000
(iv)	Direct Labour	9,50,000
(v)	Factory Overhead	3,80,000
(vi)	Administrative Overhead	2,50,400

During 2015, the company has received an order from a car manufacturer where it estimates that the cost of material and labour will be Rs. 8,00,000 and Rs. 4,50,000 respectively. M.L. Auto Ltd. charges factory overhead as a percentage of direct labour and administrative overhead as a percentage of factory cost based on previous year's cost.

Cost of delivery of the components at customer's premises is estimated at Rs. 45,000. You are required to:

(i) Calculate the overhead recovery rates based on actual costs for 2014.

(ii) Prepare a detailed cost statement for the order received in 2015 and the price to be quoted if the company wants to earn a profit of 10% on sales. **[ICAI-N15/2(A)]**

MACHINE HOUR RATE METHOD

Machine Hour Rate is the cost of running a machine for one hour. Under this method machines hours are used as basis for production overhead absorption rate. The rate is calculated as follows:

$$Production\ \ Overhead\ rate\ (MHR) = \frac{Amount\ \ of Produciton\ Overheads}{Machine\ Hours}$$

CALCULATION OF MACHINE HOUR RATE

Step 1 → Treat each Machine or Group of Similar Machines, as a separate Cost Centre.

Step 2 → Calculate Total Fixed or Standing Charges (i.e. those do not vary with the use of machine) of each Machine Cost Centre for a particular period (say year; quarter, month or week). Some of the fixed charges may be apportioned on the basis suggested below:

Fixed Standing Charges	Basis of Apportionment
1. Rent & Rates	Floor Area occupied
2. Heating & lighting	No. of light points, (if given) or Floor area occupied
3. Supervision	Time devoted by the supervisor
4. Insurance	Insured value of e ach machine
5. Lubricating oil & consumable stores	Machine hours or past experience
6. Cleaning Materials	No. of Machines or past experience
7. Miscellaneous expenses	Equitable basis based on facts.

Step 3 → Calculate Effective Machine Hours of each Machine Cost Centre for a particular period (say year, quarter, month or week) as follows:

A. No. of Working Days (365- Holidays like Festivals, Sundays)	.....
B. No. of Working Hours available per day	.....
C. Total No. of Working Hours (A×B)	.....
D. Less: Hours required for maintenance	.....
E. Productive Machine Hours (if set up time is assumed to be productive)	.....
F. Less: Unproductive Set up time (if assumed to be unproductive)	.....
G. Productive Machine Hours (E – F)	.....

Step 4 → Calculate Fixed/Standing Charges per Machine Hour as follows:

$$Fixed\ /StandingCharges\ per\ hour = \frac{Total\ Fixed/Standing\ Charges\ (as\ per\ Step2)}{Effective\ Machine\ Hours\ (as\ per\ Step3)}$$

Step 5 → Calculate each of the Machine Expenses for each Machine Cost Centre. Some of the Machine Expenses may be apportioned on the basis suggested below:

Machine Expenses	Basis of Apportionment
(a) Depreciation	$= \frac{Original\ Cost + Installation\ Exp. - Scrap\ Value}{Effe\ tive\ useful\ life\ (in\ hours)}$
(b) Power	Power Consumption units per hour ×(Working Hours – Maintenance Hours – Set up hours during which no power is consumed) × Rate of power per unit Working Hours – Maintenance Hours – Unproductive Setup Hours.
(c) Repairs & Maintenance	Machine Hours
(d) Miscellaneous expenses	Equitable basis based on facts

Step 6 → Calculate hourly rate for each of the Machine expenses as follow:

$$Machine\ Epense\ per\ Hour\ = \frac{Individual\ Machine\ Epense}{Effective\ Machine\ Hours}$$

Step 7 → Calculate Machine Hour Rate as follows:

Fixed / Standing charges per hour
Depreciation per hour
Power per hour
Repairs & Maintenance per hour
Any other Machine Expense per hour
Machine Hour Rate

FORMAT OF STATEMENT SHOWING THE COMPUTATIN OF MACHINE HOUR RATE

STATEMENT SHOWING THE COMPUTATION OF MACHINE HOUR RATE

	Total per Machine Rs	Per hour Rs
A. Fixed/Standing Charges:		
(a) Rent & Rates	...	
(b) Heating & lighting	...	
(c) Supervision	...	
(d) Insurance	...	
(e) Department & general overheads	...	
(f) Sundry shop Supplies	...	
Total fixed/Standing Charges	...	
$Fixed/StandingCharges\ per\ hour = \frac{Total\ Fixed/StandingCharges}{Effective\ Machine\ Hours}$		...
B. Machine Expenses per hour:		
(a) Depreciation = $\frac{Original\ Cost+Installation\ Exp.-Scrap\ Value}{Effective\ useful\ life\ (in\ hours)}$		...
(b) Power Power Consumption units per hour ×(Working hours – Maintenance Hours – Set up hours during which no power is consumed) ×Rate of Power per unit / Working Hours- Maintenance Hours – Unproductive Setup Hours		...
(c) Repair & Maintenance		...
(d) Lubricating oil & Consumable Stores		...
(e) Other running expenses (e.g. Special Chemical Solution)		...
C. Machine Hour Rate		...

Working Note:

A. No. of working Days (365-Holidays like Festivals, Sundays)	...
B. No. of Working Hours available per day	...
C. Total No. of Working Hours (A×B)	...
D. Less: Hours required for maintenance	...
E. Productive Machine Hours (if set up time is assumed to be productive)	...
F. Less: Unproductive Set up time (if assumed to be unproductive)	...
G. Productive Machine Hours (E-F)	...

Q30.(SMN7/SMO). A machine costing Rs. 10,000 is expected to run for 10 years. At the end of this period its scrap value is likely to be Rs. 900. Repairs during the whole life of the. Machine are expected to be Rs. 18,000 and the machine is expected to run 4,380 hours per year on the average. Its electricity consumption is 15 units per hour, the rate per unit will being 5 paisa. The machine occupies one-forth of the area of the department and has two points out of a total of ten for lighting. The foreman has to devote about one sixth of his time to the machine. The monthly rent of the department is Rs. 300 and the lighting charges amount to Rs. 80 per month. The foreman is paid a monthly salary of Rs. 960. Find out the machine hour rate, assuming insurance is @ 1% p.a. and the expenses on oil, etc., are Rs. 9 per month.

[Amt: 1000 Times in SM]

Q31.(PM). A Machine costing Rs. 10 Lakhs, was purchased on 1-4-2014. The expected life of the machine is 10 years. At the end of this period its scrap value is likely to be Rs. 10,000. The total cost of all the machines including new one was Rs. 90 lakhs.

The other information is given as follows:

(i) Working hours of the machine for the year was 4,200 including 200 non-productive hours.

(ii) Repairs and maintenance for the new machine during the year was Rs. 5,000.

(iii) Insurance Premium was paid for the entire machines Rs. 9,000.

(iv) New machine consumes 8 units of electricity per hour, the rate per unit being Rs. 3.75

(v) The new machine occupies 1/10 area of the department. Rent of the department is Rs. 2,400 per month.

(vi) Depreciation is charged on straight line basis.

Compute machine hour rate for the new machine.

Q32.(PM). A manufacturing company has purchased and installed a new machine of Rs. 12,70,000 to its fleet of 7 existing machines. The new Machine has an estimated life of 12 years and is expected to realiseRs. 70,000 as scrap at the end of its working life. Other relevant data are as follows:

(i) Budgeted working hours are 2,592 based on 8 hours per day for 324 days. This includes 300 hours for plant maintenance and 92 hours for setting up of plant.

(ii) Estimated cost of maintenance of the machine is RS. 25,000 pa.

(iii) The machine requires a special chemical solution, which is replaced at the end of each week (6 days in a week) at a cost of Rs. 400 each time.

(iv) Four operators control operation of 8 machines and the average wages per person amounts to Rs. 420 per week plus 15% fringe benefits.

(v) Electricity used by the machine during the production is 16 units per hour at a cost of Rs. 3 per unit. No electricity is consumed during unproductive maintenance and setting up time.

(vi) Departmental and general works overhead allocated to the operation during last year was Rs. 50,000. During the current year it is estimated to increase by 10% of this amount.

Calculate machine hour rate, if (a) setting up time is unproductive; (b) setting up time is productive.

[IPC/M19/1(B)-Similar]

Q33. The following particulars refer to process used in the treatment of material subsequently, incorporated in a component forming part of an electrical appliance:

(i) The original cost of the machine used (Purchased in June 2008) was Rs. 10,000. Its estimated life is 10 years, the estimated scrap value at the end of its life is Rs. 1,000, and the estimated working time per year (50 weeks of 44 hours) is 2,200 hours of which machine maintenance etc., is estimated to take up 200 hours.
No other loss of working time expected, setting up time, estimated at 100 hours, is regarded as productive time. (Holiday to be ignored).

(ii) Electricity used by the machine during production is 16 units per hour at cost of a 9 paisa per unit. No current is taken during maintenance or setting up.

(iii) The machine required a chemical solution which is replaced at the end of week at a cost of Rs. 20 each time.

(iv) The estimated cost of maintenance per year is Rs. 1,200.

(v) Two attendants control the operation of machine together with five other identical machines. Their combined weekly wages, insurance and the employer's contribution to holiday pay amount Rs. 120.

(vi) Departmental and general works overhead allocated to this machine for the current year amount to Rs. 2,000.

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

[ICAI-M16/1(A)][MTP2/M18/1(C)]

Q34. (PM)[IMP]. You are given the following information of the three machines of a manufacturing department of X Ltd.:

	Preliminary estimates of expenses (per annum)			
	Total (Rs.)	Machines		
		A (Rs.)	B (Rs.)	C (Rs.)
Depreciation	20,000	7,500	7,500	5,000
Spare parts	10,000	4,000	4,000	2,000
Power	40,000			
Consumable stores	8,000	3,000	2,500	2,500
Insurance of machinery	8,000			
Indirect labour	20,000			
Building maintenance expenses	20,000			
Annual interest on capital outlay	50,000	20,000	20,000	10,000
Monthly charge for rent and rates	10,000			
Salary of foreman (per month)	20,000			
Salary of Attendant (per month)	5,000			

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

The following additional information is also available:

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

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

You are required to:

Calculate predetermined machine hour rates for the above machines after taking into consideration the following factors:

- An increase of 15% in the price of spare parts.
- An increase of 25% in the consumption of spare parts for machine 'B' & 'C' only.
- 20% general increase in wages rates. **[MTP-OCT18/3(B)]**

Q35. **(SMP5/C22(21/SM).**A Machine shop has 8 identical drilling machines manned by 6 Operators. The machines cannot be worked without an operator wholly engaged on it. The original cost of all these machines works out to Rs. 8 lakh. These particulars are furnished for a 6 month period:

Normal available hours per month	208
Absenteeism (without pay) hours	18
Leave (with pay) hours	20
Normal Idle Time unavoidable hours	10
Average rate of wages per day of 8 hours	Rs 20
Production bonus estimated	15% on wages
Value of power consumed	Rs 8,050
Supervision and Indirect Labour	Rs. 3,300
Lighting and Electricity	Rs. 1,200

The following particulars are for a year:

Repairs and maintenance (including consumables) 3% on value of machines.
Insurance Rs. 40,000.
Depreciation 10% on original cost
Other Sundry Works expenses Rs. 12,000.
General Management expenses allocated Rs. 54,530.

Required: Work out a Comprehensive Machine Hour Rate for the Machine Shop.

Q36. **(P34)**In a Factory there are three machines A, B and C. The expenses allocated to these machines are A: Rs. 63,900, B: Rs. 60,700 and C: Rs. 95,100. In addition, there is an Overhead Crane to bring materials to the machines as necessary. The expenses allocated to this Crane are Rs. 57,000.

During the period of this expenditure, the Machines were used as follows:

Particulars	Machine A (in Hrs)	Machine B (in Hrs)	Machine C (in Hrs)
With use of Crane	160	130	480
Without use of Crane	428	577	--
Total	**588**	**707**	**480**

Calculate a Machine Hour Rate for each Machine, distinguishing between the hours in which the Crane is used and those in which it is not.

Q37. (SMP4/C23(22/SM). Gemini Enterprises undertakes three different jobs A, B and C. All of them require the use of a special machine and also the use of a computer. The computer is hired and the hire charges work out to Rs. 4,20,000 per annum. The expenses regarding the machine are estimated as follows.

	Rs.
Rent for the quarter	17,500
Depreciation per annum	2,00,000
Indirect charges per annum	1,50,000

During the first month of operation the following details were taken from the job register:

	Job	A	B	C
	Number of hours the machine was used:			
(a)	Without the use of the Computer	600	900	—
(b)	With the use of the Computer	400	600	1,000

You are required to compute the machine hour rate:

(a) For the firm as a whole for the month when the computer was used and when the computer was not used.

(b) For the individual jobs A, B and C.

Q38.(C25(23/PM). In a factory, a machine is considering to work for 208 hours in a month. It includes maintenance time of 8 hours and set up time of 20 hours.

The expenses data relating to the machine are as under:

— Cost of the machine is Rs 5,00,000. Life 10 years. Estimated scrap value at the end of life is Rs 20,000.

	Rs.
— Repairs and maintenance per annum	60,480
— Consumable stores per annum	47 520
— Rent of building per annum (The machine under reference occupies 1/6 of the area)	72,000
—Supervisor's salary per month (Common to three machines)	6,000
— Wages of operator per month per machine	2 500
— General lighting charges per month allocated to the machine	1,000
— Power 25 units per hour at Rs.2 per unit	

Power is required for productive purposes only. Set up time, though productive, does not require power. The Supervisor, and Operator are permanent.

Repairs and maintenance and consumable stores vary with the running of the machine.

Required: Calculate a two-tier machine hour rate for (a) set up time, and (b) running time.

(May, 2002)[MTP-AUG18/3(B)]

Q39.(C26(24/PM). From the details furnished below you are required to compute a comprehensive machine-hour rate:

Particulars	Rs.
Original purchase price of the machine (subject to depreciation at 10% p.a. on original cost)	3,24,000
Normal working hours for the month (The machine works to only 75% of capacity)	200 hours
Wages of Machine man	Rs. 125 per day (of 8 hours).
Wages for Helper (machine attendant)	Rs.75 per day (of 8 hours)
Power cost for the month for the time worked	Rs. 15,000

Supervision charges apportioned for the machine centre for the month	Rs. 3,000
Electricity and Lighting for the month	Rs. 7,500
Repairs and maintenance (machine) including Consumables stores per month	Rs. 17,500
Insurance of Plant and Building (apportioned) for the year	Rs. 16,250
Other general expense per annum	Rs. 27,500

The workers are paid a fixed Dearness allowance of Rs 1,575 per month. Production bonus payable to workers in terms of an award is equal to 33.33% of basic wages and dearness allowance Add 10% of the basic wage and dearness allowance against leave wages and holidays with pay to arrive at a comprehensive labour-wage for debit to production. **(Nov, 2005)[MTP-MAR19/4(A)-Similar]**

Q40.(C31(29/PM).A machine shop cost centre contains three machines of equal capacities. Three operators are employed on these machines, payable Rs. 20 per hour each. The factory works for forty-eight hours in a week which includes 4 hours set up time. The work is jointly done by operators. The operators are paid fully for the forty-eight hours. In additions they are paid a bonus of 10 per cent of productive time. Costs are reported for this company on the basis of thirteen four-weekly period.

The company for the purpose of computing machine hour rate includes the direct wages of the operator and also recoups the factory overheads allocated to the machines. The following details of factory overheads applicable to the cost centre are available:

- Depreciation 10 % per annum on original cost of the machine. Original cost of the each machine is Rs. 52,000.
- Maintenance and repairs per week per machine is Rs. 60.
- Consumable stores per week per machine are Rs. 75.
- Power: 20 units per hour per machine at the rate of 80 paise per unit.
- Apportionment to the cost centre: Rent per annum Rs. 5,400, Heat and Light per annum Rs. 9,720 and foreman's salary per annum Rs. 12,960.

Required:

(i) Calculate the cost of running one machine for a four week period.

(ii) Calculate machine hour rate. **[MTP-MAR18/3(B)][ICAI-M15/6(A)][M-8](May 2007)**

Q41. A textile company purchases cotton from the farmers and produces shirtings as final product. Cotton is processed into two departments namely weaving department and dying department. The following are the cost details for the two departments for the month of January, 2013.

	Weaving Deptt.	**Dying Deptt.**
Capacity	7200 hours	3000 hours
	(Rs.)	(Rs.)
Direct Labour	1,72,800	72,000
Material consumed	1,80,000	64,000
Depreciation	30,000	10,000
Overhead apportioned	15,000	3,200
Power consumption per hour @ Rs.3.20 per unit	96	32

During the month both departments worked at 80% of their capacity and out of these 400 hours were expected to be lost due to unavoidable reasons. The normal processing time to process 100 meter of raw product is 3.5 hours and 2 hours in Weaving department and Dying department respectively.

At the end of the month 1,00,000 meter of completed shirting were produced and 50,000 meter of the shirting were in incomplete condition on which processing in Dying department is needed. There was no stock at the beginning of the month. No power is consumed during idle time.

You are required to calculate:

(i) Machine hour rate for the two departments.

(ii) Cost of 1,00,000 meter of completed shirting.

(iii) Cost of abnormal idle time to be charged to costing profit and loss account. **[R-M-13/3]**

Concept Related to CAPACITY

Capacity of a plant refers to its ability to produce with the available present resources and facilities. It may be expressed in terms of :

(a) Units of product (for example, 100 cars per day, 1000 tonne coal per day)

(b) Production Hours (for example, 100 hours per day)

(c) Value in rupee (for example, total direct wages Rs. 40,000 per day hence capacity is Rs. 40,000 per day)

Types of Capacity:

I. **Installed/Rated capacity:** It refers to the maximum capacity of producing goods or providing services. Installed capacity is determined either on the basis of technical specification or through a technical evaluation. It is also known as theoretical capacity and if could not be achieved in normal operating circumstances.

II. **Practical capacity:** It is defined as actually utilised capacity of a plant. It is also known as operating capacity. This capacity takes into account loss of time due to repairs, maintenance, minor breakdown, idle time, set up time, normal delays, Sunday and holidays, stock taking etc. Generally, practical capacity is taken between 80 to 90 % of the rated capacity. It is also used as a base for determining overhead rates. Practical capacity is also called net capacity or available capacity.

III. **Normal capacity :** Normal capacity is the volume of production or services achieved or achievable on an average over a period under normal circumstances taking into account the reduction in capacity resulting from planned maintenance. Normal capacity is determined as under:

Installed Capacity		**XXX**
Adjustment for :		
(i)	Time lost due to scheduled preventive or planned maintenance	xxx
(ii)	Number of shifts or machine hours or man hours	
(iii)	Holidays, normal shut down days, normal idle time	xxx
(iv)	Normal time lost in batch change over	xxx xxx
		Xxx

Normal Capacity

IV. **Actual capacity:** It is the capacity actually achieved during a given period. It is presented as a percentage of installed capacity.

V. **Idle capacity:** It is that part of the capacity of a plant, machine or equipment which cannot be e effectively utilized in production.

(a) Normal Idle Capacity : It is the difference between installed capacity and normal capacity.

(b) Abnormal idle capacity: It is different between Normal capacity and actual capacity utilization where the actual capacity in lower than the normal capacity.

The idle capacity may arise due to lack of product demand, non-availability of raw materials, shortage of skilled labour, absenteeism, shortage of power full or supplies, seasonal nature of product etc.

Installed Capacity Normal Capacity Actual Capacity	Normal Idle Capacity Abnormal Idle Capacity

Treatment of idle capacity costs: idle capacity cost can be treated in product costing in the following ways:

a. If the idle capacity cost is due to unavoidable reasons such as repairs, maintenance, changeover of jobs etc. A supplementary overheads rates may be use to recover the idle capacity cost. In this case, the cost are charge to the production capacity utilize.

b. If the idle capacity cost is due to avoidable reason such as faulty planning, power failure etc.; the cost should be charge to costing profit and loss account

c. If the idle capacity cost is due to seasonal factors, then, the cost should be charged to the cost of production by inflating overhead rates.

Q42.(A35(39) (A)Calculate Idle capacity cost from the following:
Practical capacity of plant 2120 hours, Actual capacity of plant 1800 hours
Fixed overheads of plant for the year Rs 5,30,000.

Q43. (C30(28).A manufacturing unit produces electronic circuits at the rate of 6 pieces an hour. The unit work in single shift of 8 hours during a six-day week and remains closed for 18 days a year, on account of holidays. Average idle hours per month is 20 for cleaning and maintenance of equipments. Against the average annual output of 12,000 pieces during last ten years, the actual output achieved during the year was 10,800 pieces. The fixed overheads for the year amounted to Rs 5,40,000.
Required: Calculate Idle Capacity Cost.

Q44.(C31/PM)A machinery was purchased from a manufacturer who claimed that his machine could produce 36.5 tonnes in a year consisting of 365 days. Holidays, break-down, etc., were normally allowed in the factory for 65 days. Sales were expected to be 25 tonenes during the year and the plant actually produced 25.2 tonnes during the year. You are required to state the following figures:
(a) Rated capacity (b) Practical capacity (c) Normal capacity (d) Actual capacity

Q45.(T) A Co. produces a product at the rate of 10 pieces per hour. The co. has been producing & selling 330000 units annually during previous 6 yrs. However during this year the co. was able to produce 316000 units only. The company's overheads for this year Rs. 675000 co. has 15 machines (of same type) and works an single shift only , i.e. 8 hrs. per day . 65 holidays are expected during year. The quarterly preventive maintenance & repairs work can be taken 250 hrs.

Calculate: (i) Max. Capacity (ii) Practical capacity (iii) Normal Capacity
(iv) Actual Capacity (v) Idle Capacity in hrs. & units
(vi) Hourly overhead recovery rate for (i) , (ii) , (iii) & (iv). (vii) Idle capacity cost.

Methods of Segregating Semi-Variable Costs into Fixed and Variable Costs

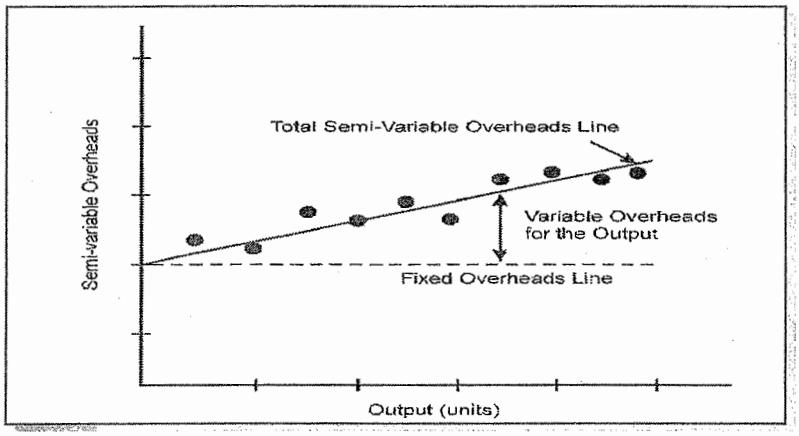
The segregation of semi-variable costs into fixed and variable costs can be carried out by using the following methods:

(a) Graphical method
(b) High points and low points method
(c) Analytical method
(d) Comparison by period or level of activity method
(e) Least squares method

(a) **Graphical Method:** Under this method, the following steps are followed:

(i) A large number of observations regarding the total costs at different levels of output are plotted on a graph with the output on the X-axis.
(ii) The total cost is plotted on the Y-axis.
(iii) Then, by judgment, a line of "best-fit", which passes through all or most of the points, is drawn.
(iv) The point at which this line cuts the Y-axis indicates the total fixed cost component in the total cost.
(v) If a line is drawn at this point parallel to the X-axis, this indicates the fixed cost.
(vi) The variable cost, at any level of output, is derived by deducting this fixed cost element from the total cost.

The following graph illustrates this:



(b) **High points and Low Points Method:** Under this method difference between the total cost at highest and lowest volume is divided by the difference between the sales value at the highest and lowest volume. The quotient thus obtained gives us the rate of variable cost in relation to sales value.

ILLUSTRATION 1: (Segregation of fixed cost and variable cost)

	Sales Value	Total cost
	(Rs.)	(Rs.)
At the Highest volume	1,40,000	72,000
At the Lowest volume	80,000	60,000
	60,000	12,000

Thus, Variable Cost (Rs. 12,000/Rs.60,000)
= 1/5 or 20% of sales value = Rs. 28,000 (at highest volume)
Fixed Cost Rs. 72,000 – Rs. 28,000 i.e., (20% of Rs. 1,40,000) = Rs. 44,000.
Alternatively, Rs. 60,000 – Rs. 16,000 (20% of Rs. 80,000) = Rs. 44,000.

(c) **Analytical Method:** Under this method, an experienced cost accountant tries to judge empirically what proportion of the semi-variable cost would be variable and what would be fixed. The degree of variability is ascertained for each item of semi-variable expenses. For example, some semi-variable expenses may vary to the extent of 20% while others may vary to the extent of 80%. Although it is very difficult to estimate the extent of variability of an expense, the method is easy to apply. (Go through the following illustration for clarity).

Q46. **(SM2)**Suppose, last month the total semi-variable expenses amounted to Rs. 3,000. If the degree of variability is assumed to be 70%, then variable cost = 70% of Rs. 3,000 = Rs. 2,100. Fixed cost = Rs. 3,000 – Rs. 2,100 = Rs. 900.Now in the future months, the fixed cost will remain constant, but the variable cost will vary according to the change in production volume. Thus, if in the next month production increases by 50%, the total semi-variable expenses will be: Fixed cost of Rs. 900, plus variable cost viz., Rs. 3,150 i.e., (Rs. 2,100(V.C.) plus 50% increase of V.C. i.e., Rs. 1,050) i.e., Rs. 4,050.

Comparison by period or level of activity method: Under this method, the variable overhead may be determined by comparing two levels of output with the amount of expenses at those levels. Since the fixed element does not change, the variable element may be ascertained with the help of the following formula.

$$\frac{\text{Change in the amount of expense}}{\text{Change in the quantity of output}}$$

Suppose the following information is available:

	Production Units	Semi-variable expenses
		(Rs.)
January	100	260
February	140	300
Difference	40	40

The variable cost:

$$\frac{\text{Change in Semi – Variable expenses}}{\text{Change in production volume}} = \frac{\text{Rs. } 40}{40 \text{ units}} = Rs.1 / unit$$

Thus, in January, the variable cost will be 100 × Rs. 1 = Rs. 100 and the fixed cost element will be (Rs. 260 – Rs. 100) or Rs. 160. In February, the variable cost will be 140 × Rs. 1 = Rs. 140 whereas the fixed cost element will remain the same, i.e., Rs. 160.

(d) **Least Square Method:** This is the best method to segregate semi-variable costs into its fixed and variable components. This is a statistical method and is based on finding out a line of best fit for a number of observations.

The method uses the linear equation $y = mx + c$, where

'm' represents the variable element of cost per unit, 'c' represents the total fixed cost, 'y' represents the total cost, 'x' represents the volume of output. The total cost is thus split into its fixed and variable elements by solving this equation.

Q47. **(PM20).** Following information is available for the first and second quarter of the year 2013-14 of ABC Limited:

	Production (in units)	Semi-variable cost (Rs.)
Quarter I	36,000	2,80,000
Quarter II	42,000	3,10,000

You are required to segregate the semi-variable cost and calculate:

(a) Variable cost per unit; and

(b) Total fixed cost.

Q48. **(C1).**The Standard Departmental overhead rate is Rs. 15 per hour. Based on the following details provided to you, work out the activity level at which the overhead rate has been fixed.

Activity Level	Overhead Allowance
6,000 Hours	Rs. 1,20,000
8,000 Hours	Rs. 1,44,000
10,000 Hours	Rs. 1,68,000

Q49. (C33). Compute (1) the rate of cost variability and (2) total fixed cost from the data provided below:

	Activity Indices (Machine hours)	Repairs & Maintenance Cost Rs.
April '09	400	3125
May' 09	600	3750
June' 09	800	4200
July' 09	1000	4375
August' 09	1200	7450

Q50. (PM18). Maximum production capacity of JK Ltd. is 5,20,000 units per annum. Details of estimated cost of production are as follows:

- Direct material Rs. 15 per unit.
- Direct wages Rs. 9 per unit (subject to a minimum of Rs. 2,50,000 per month).
- Fixed overheads Rs. 9,60,000 per annum.
- Variable overheads Rs. 8 per unit.
- Semi-variable overheads are Rs. 5,60,000 per annum up to 50 per cent capacity and additional Rs. 1,50,000 per annum for every 25 per cent increase in capacity or a part of it.

JK Ltd. worked at 60 per cent capacity for the first three months during the year 2013-14, but it is expected to work at 90 per cent capacity for the remaining nine months.

The selling price per unit was Rs. 44 during the first three months.

You are required, what selling price per unit should be fixed for the remaining nine months to yield a total profit of Rs. 15,62,500 for the whole year.

Exclusive Questions

Q51. (SMN6/SMO9). A Ltd., manufactures two products A and B. The manufacturing division consists of two production departments P_1 and P_2 and two service departments S_1 and S_2.

Budgeted overhead rates are used in the production departments to absorb factory overheads to the products. The rate of Department P_1 is based on direct machine hours, while the rate of Department P_2 is based on direct labour hours. In applying overheads, the pre-determined rates are multiplied by actual hours.

For allocating the service department costs production departments, the basis adopted is as follows:

(i) Cost of Department S_1 to Department P_1 and P_2 equally and

(ii) Cost of Department S_2 to Department P_1 and P_2 in the ratio of 2 : 1 respectively.

The following budgeted and actual data are available:

Annual profit plan data :

Factory overheads budgeted for the year

Departments	P_1	25,50,000	S_2	6,00,000
	P_2	21,75,000	S_2	4,50,000

Budgeted output in units :

Product A 50,000; B 30,000.

Budgeted raw-material cost per unit:

Product A Rs. 120; Product B Rs. 150.

Budgeted time required for production per unit :

Department P_1 : Product A : 1.5 machine hours

Product B : 1.0 machine hour

Department P_2 : Product A : 2 Direct labour hours

Product B: 2.5 Direct labour hours

Average wage rates budgeted in Department P_2 are :

Product A - Rs. 72 per hour and Product B - Rs. 75 per hour.

All materials are used in Department P_1 only.

Actual data : (for the month of July, 2011)

Units actually produced: Product A : 4,000 units

Product B : 3,000 units

Actual direct machine hours worked in Department P_1 :

On product A 6,100 hours, Product B 4,150 hours.

Actual direct labour hours worked in Department P_2:

on product A 8,200 hours, Product B 7,400 hours.

Costs actually incurred:

	Product A Rs.	Product B Rs.
Raw materials	4,89,000	4,56,000
Wages	5,91,900	5,52,000

		Rs.		Rs.
Overheads: Department	P_1	2,31,000	S_2	60,000
	P_2	2,04,000	S_2	48,000

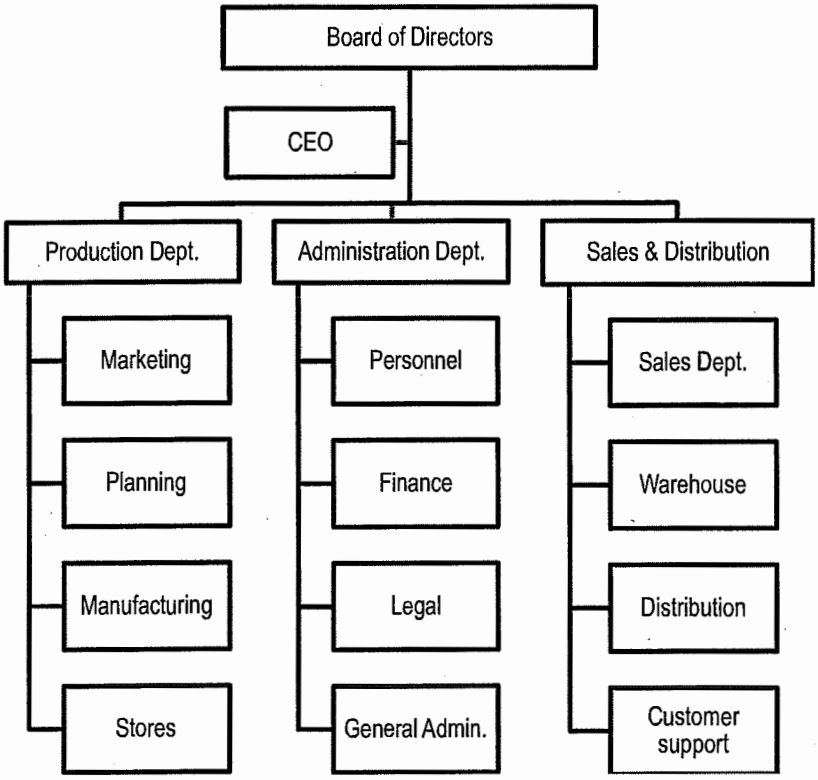
You are required to :

(i) Compute the pre-determined overhead rate for each production department.

(ii) Prepare a performance report for July, 2011 that will reflect the budgeted costs and actual costs.

[R-N-16/3]

Q52. Arnav Ltd. manufactures and sells three products namely A, B and C. The organisational structure of the company is as follows:



The work of Board of Directors and CEO is also known as General Management.

The extract from the budget for the next financial year is as follows:

	Explanations
Raw Material Cost Rs.4,25,00,000	Consumed in manufacturing of all three products in the ratio of 2:3:2
Indirect Material Cost Rs.10,36,000	Manufacturing – Rs.6,00,000, Stores - Rs.10,000, Planning - Rs.6,000, General administration - Rs.3,20,000, Personnel - Rs.80,000 and Sales - Rs.20,000
Salary & wages Rs.3,40,00,000	It includes direct wages paid to manufacturing workers (not on roll) Rs.1,40,00,000.
Rent & Property tax Rs.1,00,000	Warehouse rent of Rs.80,000 and Property tax Rs.20,000.
Depreciation on non-current assets (on WDV basis) Rs.22,50,000	It includes Rs.9,00,000 for factory and office building, Rs.1,50,000 on Air Conditioner, Rs.12,00,000 on Machinery.
Power & Fuel Rs. 4,10,000	It consists of Rs.4,00,000 for manufacturing activities and others related with fuel cost of delivery vans.
Insurance premium on machinery	4% of the opening written down value of the machinery.
Insurance premium on employees group insurance (excluding direct workers and General management) Rs.2,50,000	Premium amount depends on the gross salary of the employees on roll.
Printing & Stationery Rs. 7,00,800	Planning Dept.- Rs.4,800, Marketing- Rs.12,000, Finance- Rs.4,80,000, Legal- Rs.24,000 and Sales Dept. Rs.1,80,000

Audit fee Rs. 1,20,000	For statutory and concurrent audit.
Electricity expenses Rs.3,20,000	Each division has separate meters. The expected electricity consumption (in units, 1 unit = 1,000 kWh) will be as follows: Production Dept.- 4,800, Administration Dept.- 9,600, Sales & Distribution- 3,600 and General Management - 1,200.
Telephone & Mobile expenses Rs.4,23,000	Marketing- Rs.1,10,000, Personnel- Rs.42,000, General Management – Rs.26,000, Sales Dept. Rs.65,000 and Customer support- Rs.1,80,000
Travelling expenses Rs.20,33,000	Marketing- Rs.4,80,000, General Management Rs.10,25,000, Sales Dept. Rs.5,28,000.
Subsidy for meal couponsRs.1,83,000	It is given uniformly to all employees on roll @ Rs.3,000.
Software licence renewal fee Rs.14,24,000	Planning- Rs.7,20,000, Finance- Rs.1,20,000, Store- Rs.24,000, Customer support- Rs.5,60,000.
Other miscellaneous expenditure Rs.8,05,085	

Other Information:

No. of employees on roll	Production Dept. 18; Administration Dept. 19 and Sales & Distribution Dept. 24
Average Gross Salary	Production Dept. Rs.6,00,000, Administration Dept. Rs.3,50,000, Sales & Distribution Rs.3,00,000 and General Management Rs.2,50,000.
Building floor area	Production dept- 9,000 sq. mtr., Administration dept- 3,000 sq. mtr., S&D – 2,500 sq. mtr., General management- 1,500 sq. mtr.
Air Conditioner	Production dept- 6,000 RT, Administration dept- 3,000 RT, S& D – 2,800 RT, General management- 1,200 RT
Rate of Depreciation	Building- 5%, Air Conditioner- 15%, Machinery- 10%
Other miscellaneous expenditure	It may be apportioned on the basis of direct allocated expenses.

General Management devotes their 70% time for Sales strategy, 20% for Production and marketing and 10% for internal administration.

Administration department works 45% for production and 55% for sales department.

Required:

(i) Prepare a schedule of Cost Allocation for Production Dept., Administration Dept., Sales & Distribution Dept. and General Management.

(ii) Prepare a schedule of Cost Apportionment (Primary Distribution) for Production Dept., Administration Dept., Sales & Distribution Dept. and General Management.

(iii) Prepare a schedule of Secondary distribution of Administration Dept. and General Management costs. **(R-M-17/3)**

Q53. (SMN8/SMO). A light engineering factory fabricates machine parts to customers. The factory commenced fabrication of 12 Nos. machine rates to customers' specifications and the expenditure incurred on the job for the week ending 21st August, 2011 is given below:

	(Rs.)	(Rs.)
Direct materials (all items)		78.00
Direct labour (manual) 20 hours @		
Rs. 1.50 per hour		30.00
Machine facility:		
Machine No. I : 4 hours @ Rs. 4.50	18.00	
Machine No. II : 6 hours @ Rs. 6.50	39.00	57.00
Total		165.00
Overheads @ Rs. 0.80 per hour on 20 manual hours		16.00
Total cost		181.00

The overhead rate of Rs. 0.80 per hour is based on 3,000 man hours per week; similarly, the machine hour rates are based on the normal working of Machine Nos. I and II for 40 hours out of 45 hours per week.

After the close of each week, the factory levies a supplementary rate for the recovery of full overhead expenses on the basis of actual hours worked during the week. During the week ending 21st August, 2011, the total labour hours worked was 2,400 and Machine Nos. I and II had worked for 30 hours and 32½ hours respectively.

Prepare a Cost Sheet for the job for the fabrication of 12 Nos. machine parts duly levying the supplementary rates. **[Amt: 10 Times in SM]**

Q54. (Segregation of fixed cost and variable cost)

	Level of activity	
Capacity %	60%	80%
Volume (Labour hours) or 'x'	150	200
Semi-variable expenses (maintenance of plant)or 'y'	Rs. 1,200	Rs. 1,275

Substituting the values of 'x' and 'y' in the equation, y = mx + c, at both the levels of activity, we get

$$1{,}200 = 150\ m + c$$

$$1{,}275 = 200\ m + c$$

On solving the above equations, we get the value of 'c'

Fixed cost or 'c' = Rs. 975 and Variable cost or 'm' = Rs. 1.50 per labour hour.

ADDITIONAL QUESTIONS FOR PRACTICE

Q55. **(A33(36).**XYZ Ltd. a manufacturing company, having an extensive marketing network throughout the country, sells its products throughout four zonal sales offices viz., A,B,C, and D. The budgeted expenditure for the year are given below:

		Rs.	Rs.
Sales Manager' salary			1,20,000
Expenses relating to Sales Manager's Office			80,000
Travelling Salesmen's salaries			3,20,000
Travelling Expenses			36,000
Advertisements			30,000
Godown Rent:	Zone 'A'	15,000	
	'B'	25,200	
	'C'	9,800	
	'D'	18,000	68,000
Insurance on inventories			20,000
Commission on sales			6,00,000

The following further particulars are also available:

Zone	Sales in(Rs. Lakhs)	No. of Salesmens	Total Mileage Covered	Allocation of Advertisement	Average Stock (Rs. Lakhs)
A	36	5	6,000	30%	6
B	48	6	14,000	30%	8
C	16	2	4,500	20%	4
D	20	3	5,500	20%	2

Required : compute Zonewise selling overheads, as percentage to sales.

Q56. **(A34(37).**A factory sells its goods in four district zones – south, North, East and West. You have been given the particulars in respect of each zone mentioned as follow:

Zones	Net sales (in lakhs) Rs.	No. of Salesmen	Average mileage covered	Advertising budget	Stock held at a time (in lakhs) Rs.	Transportation Charges
South	5.00	30	3,000	25%	2.00	25%
North	13.50	50	4,500	30%	5.00	50%
East	3.50	20	2,700	25%	1.50	15%
West	3.00	25	2,400	20%	1.50	10%

The following are the expenses of the previous year:		Rs.
Sales Manager and his establishment		62,000
Travelling Representatives' Salaries		36,000
Travelling Representatives' Travelling Allowance		12,000
Advertising		24,000
Insurance on inventories at out-stations		12,200
Commission on sales @ 2 ½ %		62,500
Transportation charges outward		36,000
Godown rent at out-stations:	Rs.	
South zone	7,500	
North zone	10,500	
East zone	4,800	
West zone	3,600	
Total Expenses	26,400	

Required : Compute Selling & Distribution Overhead Rates as a percentage of sales.

Q57. **(C34).**PQR manufacturers –a small scale enterprise produces a single product and has adopted a policy to recover the production overheads of the factory by adopting a single blanket rate based on machine hours. The budgeted production overheads of the factory are Rs. 10,08,000 and budgeted machine hours are 96,000.

For a period of first six months of the financial year 2007-2008, following information were extracted from the books:

Actual production overheads	Rs. 6,79,000
Amount included in the production overheads:	
Paid as per court's order	Rs. 45,000
Expenses of previous year booked in current year	Rs. 10,000
Paid to workers for strike period under an award	Rs. 42,000
Obsolete stores written off	Rs. 18,000

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

Production:

Finished goods	22,000 units
Works-in-progress (50% complete in every respect)	16,000 units
Sale: Finished goods	18,000 units

The actual machine hours worked during the period were 48,000 hours. It is revealed from the analysis of information that 25% of the under-absorption was due to defective production policies and the balance was attributable to increase in costs.

You are required:

(I) to determine the amount of under absorption of production overheads for the period,

(II) to show the accounting treatment of under-absorptio of production overheads, and

(III) to apportion the unabsorbed overheads over the items.

[R-N-15, M-18&N-19/3-Similar]

Q58. (C9).[IMP.] E-books is an online book retailer. The Company has four departments. The two sales departments are Corporate Sales and Consumer Sales. The two support — departments are Administrative (Human Resources Accounting) and Information Systems. Each of the sales departments conducts merchandising and marketing operations independently.

The following data are available for October, 2008:

Departments	Revenues	Number of Employees	Processing time used (in minutes)
Corporate Sales	Rs. 16,67,750	42	2,400
Consumer Sales	Rs. 8,33,875	28	2,000
Administrative	---	14	400
Information System	---	21	1,100

Cost incurred in each of four departments for October, 2008, are as follows:

Corporate Sales	Rs. 12,97,751
Consumer Sales	Rs. 6,36,818
Administrative	Rs. 94,510
Information Systems	Rs. 3,04,720

The company uses number of employees as a basis to allocate Administrative costs and processing time as a basis to allocate Information systems costs.

Required:

(i) Allocate the support department costs to the sales departments using the direct method.

(ii) Rank the support departments based on percentage of their services rendered to other support departments. Use this ranking to allocate support costs based on the step-down allocation method.

(iii) How could you have ranked the support departments differently?

(iv) Allocate the support department costs to two sales departments using the reciprocal allocation method. (Nov, 2003)

Q59. Vision Ltd. manufactures luggage trolleys for airports. The factory, in which the company undertakes all of its production, has two production departments- 'Fabrication' and 'Assembly', and two service departments- 'Stores' and 'Maintenance'.

The following information have been extracted from the company's budget for the financial year ended 31st March, 2014:

Allocated Overhead Costs	**Rs.**
Fabrication Department	15,52,000
Assembly Department	7,44,000
Stores Department	2,36,000
Maintenance Department	1,96,000
Other Overheads	**Rs.**
Factory rent	15,28,000
Factory building insurance	1,72,000
Plant & machinery insurance	1,96,000
Plant & Machinery Depreciation	2,65,000
Subsidy for staffs' canteen	4,48,000

Direct Costs	Rs.	Rs.
Fabrication Department		
Material	63,26,000	
Labour	8,62,000	71,88,000
Assembly Department:		
Material	1,42,000	
Labour	13,06,000	14,48,000

The following additional information is also provided:

	Fabrication Department	Assembly Department	Stores Department	Maintenance Department
Floor area (square meters)	24,000	10,000	2,500	3,500
Value of plant & machinery (Rs.)	16,50,000	7,50,000	75,000	1,75,000
No. of stores requisitions	3,600	1,400	—	—
Maintenance hours required	2,800	2,300	400	—
No. of employees	120	80	38	12
Machine hours	30,00,000	60,000		
Labour hours	70,000	26,00,000		

Required:

(a) Prepare a table showing the distribution of overhead costs of the two service departments to the two production departments using step method; and

(b) Calculate the most appropriate overhead recovery rate for each department

(c) Using the rates calculated in part (b) above, calculate the full production costs of the following job order:

Direct Materials	Rs.1,15,200
Direct Labour:	
Fabrication Department	240 hours @ 18 per hour
Assembly Department	180 hours @ 18 per hour
Hours required:	
Fabrication Department	210 hours
Assembly Department	180 hours

[R-N-14/3][MTP-OCT19/3(B)]

Q60.(PM). The following account balances and distribution of indirect charges are taken from the accounts of a manufacturing concern for the year ending on 31st March, 2014:

Item	Total Amount	Production Departments			Service Departments	
	(Rs.)	X(Rs.)	Y (Rs.)	Z (Rs.)	A (Rs.)	B (Rs.)
Indirect Material	1,25,000	20,000	30,000	45,000	25,000	5,000
Indirect Labour	2,60,000	45,000	50,000	70,000	60,000	35,000
Superintendent's Salary	96,000	--	--	96,000	--	--
Fuel & Heat	15,000					
Power	1,80,000					
Rent & Rates	1,50,000					
Insurance	18,000					
Meal Charges	60,000					
Depreciation	2,70,000					

The following departmental data are also available.

	Production Departments			Service Departments	
	X	Y	Z	A	B
Area (Sq. ft,)	4,400	4,000	3,000	2,400	1,200
Capital Value of Assets (Rs.)	4,00,000	6,00,000	5,00,000	1,00,000	2,00,000
Kilowatt Hours	3,500	4,000	3,000	1,500	--
Radiator Sections	20	40	60	50	30
No. of Employees	60	70	120	30	20

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

	X	Y	Z	A	B
Department A (%)	30	30	20	--	20
Department B (%)	25	40	25	10	--

Prepare an overhead distribution statement to show the total overheads of production departments after re-apportioning service departments' overhead by using simultaneous equation method. Show all the calculations to the nearest rupee.

Q61. **(C10/PM).**ABC Ltd. has three production departments P_1, P_2 and P_3 and two service departments S_1 and S_2. The following data are extracted from the records of the Company for the month of October, 2007:

	Rs.
Rent and rates	62,500
General Lighting	7,500
Indirect Wages	18,750
Power	25,000
Depreciation on machinery	50,000
Insurance of machinery	20,000

Other information:

	P_1	P_2	P_3	S_1	S_2
Direct Wages (Rs.)	37,500	25,000	37,500	18,750	6,250
H.P. of Machines used	60	30	50	10	—
Cost of Machinery (Rs)	3,00,000	4,00,000	5,00,000	25,000	25,000
Floor space (Sq. Ft.)	2,000	2,500	3,000	2,000	500
Number of light points	10	15	20	10	5
Production hours worked	6,225	4,050	4,100	—	—

The expenses of the service departments S_1 and S_2 are reapportioned as below:

	P_1	P_2	P_3	S_1	S_2
S_1	20%	30%	40%	—	10%
S_2	40%	20%	30%	10%:	—

Required:

(i) Compute overhead absorption rate per production hour of each production Department.

(ii) Determine the total cost of product X which is processed for manufacture in department P_1, P_2 and P_3 for 5 hours, 3 hours and 4 hours respectively, given that its direct material cost is Rs.625 and direct labour cost is Rs.375. **(Nov, 2007)**

Q62. **(C5).**A company has two production departments and two service departments. The data relating to a period are as under:

		Production Departments		Service Departments	
Particulars		PD_1	PD_2	SD_1	SD_2
Direct Materials	(Rs.)	80,000	40,000	10,000	20,000
Direct Wages	(Rs.)	95,000	50,000	20,000	10,000
Overheads	(Rs.)	80,000	50,000	30,000	20,000
Power Requirement at normal capacity operations	(Kwh)	20,000	35,000	12,500	17,500
Actual Power Consumption during the period	(Kwh)	13,000	23,000	10,250	10,000

The power requirement of these departments are met by a power generation plant. The said plant incurred an expenditure, which is not included above of Rs. 1,21,875 out of which a sum of Rs. 84,375 was variable and the rest fixed.

After apportionment of power generation plant costs to the four departments, the service department overheads are to be redistributed on the following basis:

	PD_1	PD_2	SD_1	SD_2
SD_1	50%	40%	---	10%
SD_2	60%	20%	20%	---

You are required to:

(i) Apportion the power generation plant costs to the four departments.

(ii) Re-apportion service department cost to production departments.

(i) Calculate the overhead rates per direct labour hour of production departments, given that the direct wages rate of PD_1 and PD_2 and Rs. 5 and Rs 4 per hour respectively.

Q63.(PM). In a manufacturing company factory overheads are charged as fixed percentage basis on direct labour and office overheads are charged on the basis of percentage of factory cost The following information are available related to the year ending 31st March, 2014:

	Product A (Rs.)	Product B (Rs.)
Direct Materials	Rs. 19,000	Rs. 15,000
Direct Labour	Rs. 15,000	Rs. 25,000
Sales	Rs. 60,000	Rs. 80,000
Profit	25% on cost	25 % on sales price

You are required to find out:

(i) The percentage of factory overheads on direct labour.

(ii) The percentage of office overheads on factory cost.

Q64. The Union Ltd. has the following account balances and distribution of direct charges on 31st March,2017.

	Total	Production Depts.		Service Depts.	
		Machine Shop	Packing	General Plant	Stores
Allocated Overheads:	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Indirect labour	2,90,000	80,000	60,000	40,000	1,10,000
Maintenance Material	99,000	34,000	16,000	21,000	28,000
Misc. supplies	59,000	15,000	29,000	9,000	6,000
Supervisor's salary	1,60,000	--	--	1,60,000	--
Cost & payroll salary	8,00,000	--	--	8,00,000	--

Overheads to be apportioned:

Power	7,80,000
Rent	7,20,000
Fuel and Heat	6,00,000
Insurance	1,20,000
Taxes	84,000
Depreciation	12,00,000

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

	Floor Space	Radiator Section	No. of employees	Investment	H.P. hours
Machine Shop	2,000 Sq. ft.	45	20	80,00,000	3,500
Packing	800 Sq. ft.	90	12	24,00,000	500
General Plant	400 Sq. ft.	30	4	8,00,000	-
Stores & maintenance	1,600 Sq. ft.	60	8	16,00,000	1,000

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

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

General Plant overheads is distributed on the basis of number of employees.

(a) Prepare an overhead distribution statement with supporting schedules to show computations and basis of distribution.

(b) Determine the service department distribution by simultaneous equation method.

[R-M-15/3][R-N-17/3]

Q65 M/s. Zaina Private Limited has purchased a machine costing Rs. 29,14,800 and it is expected to have a salvage value of Rs. 1,50,000 at the end of its effective life of 15 years. Ordinarily the machine is expected to run for 4500 hours per annum but it is estimated that 300 hours per annum will be lost for normal repair & maintenance. The other details in respect of the machine are as follows :

(i) Repair & Maintenance during the whole life of the machine are expected to be Rs. 5,40,000.

(ii) Insurance premium (per annum) 2% of the cost of the machine.

(iii). Oil and Lubricants required for operating the machine (per annum) Rs. 87,384.

(iv). Power consumptions : 10 units per hour @ Rs. 7 per unit. No power consumption during repair and maintenance.

(v). Salary to operator per month Rs. 24,000. The operator devotes one-third of his time to the machine.

You are required to calculate comprehensive machine hour rate.

[INTER/M19/5(B)]

Q66. Sree Ajeet Ltd. having fifteen different types of automatic machines furnishes information as under for 20X8-20X9

(i) Overhead expenses: Factory rent Rs. 1,80,000 (Floor area 1,00,000 sq. ft.), Heat and gas Rs. 60,000 and supervision Rs. 1,50,000.

(ii) Wages of the operator are Rs. 200 per day of 8 hours. Operator attends to one machine when it is under set up and two machines while they are under operation.

In respect of machine B (one of the above machines) the following particulars are furnished:

(i) Cost of machine Rs. 1,80,000, Life of machine- 10 years and scrap value at the end of its life Rs. 10,000

(ii) Annual expenses on special equipment attached to the machine are estimated as Rs. 12,000.

(iii) Estimated operation time of the machine is 3,600 hours while set up time is 400 hours per annum.

(iv) The machine occupies 5,000 sq. ft. of floor area.

(v) Power costs Rs. 5 per hour while machine is in operation.

ESTIMATE the comprehensive machine hour rate of machine B. Also find out machine costs to be absorbed in respect of use of machine B on the following two work orders

	Work order-1	**Work order-2**
Machine set up time (Hours)	15	30
Machine operation time (Hours)	100	190

[R-N18/3]

Q67. ABS Enterprises produces a product and adopts the policy to recover factory overheads applying blanket rate based on machine hours. The cost records of the concern reveal following information:

Budgeted production overheads	Rs. 10,35,000
Budgeted machine hours	90,000
Actual machine hours worked	45,000
Actual production overheads	Rs. 8,80,000
Production overheads (actual) include -	
Paid to worker as per court's award	Rs. 50,000
Wages paid for strike period	Rs. 38,000
Stores written off	Rs. 22,000
Expenses of previous year booked in current year	Rs. 18,500
Production -	
Finished goods	30000 units
Sale of finished goods	27000 units

The analysis of cost information reveals that 1/3 of the under absorption of overheads was due to defective production planning and the balance was attributable to increase in costs.

You are required:

(i) To find out the amount of under absorbed production overheads.

(ii) To give the ways of treating it in Cost Accounts.

(iii) To apportion the under absorbed overheads over the items. **[INTER/N19/2(B)]**

Q68. M/s. NOP Limited has its own power plant and generates its own power. Information regarding power requirements and power used are as follows:

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

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

Service department X renders services to departments A, B and Y in the ratio of 6:4:2 whereas department Y renders services to department A and B in the ratio of 4:1. The direct labour hours of department A and B are 67,500 hours and 48750 hours respectively.

Required:

(i) Prepare overheads distribution sheet.

(ii) Calculate factory overheads per labour hour for the dept. A and dept. B.

[INTER/N18/5(B)(ii)]

Q69. Madhu Ltd. has calculated a predetermined overhead rate of Rs. 22 per machine hour for its Quality Check (QC) department. This rate has been calculated for the budgeted level of activity and is considered as appropriate for absorbing overheads. The following overhead expenditures at various activity levels had been estimated.

Total overheads	Number of machine hours
Rs. 3,38,875	14,500
Rs. 3,47,625	15,500
Rs. 3,56,375	16,500

You are required to:

(i) CALCULATE the variable overhead absorption rate per machine hour.

(ii) CALCULATE the estimated total fixed overheads.

(iii) CALCULATE the budgeted level of activity in machine hours.

(iv) CALCULATE the amount of under/over absorption of overheads if the actual machine hours were 14,970 and actual overheads were Rs. 3,22,000.

(v) ANALYSE the arguments for and against using departmental absorption rates as opposed to a single or blanket factory wide rate. **[MTP-APR-19/1(B)]**

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Home Work