4. OVERHEADS - ABSORPTION COSTING METHOD

NO. OF PROBLEMS IN 40E OF CA INTER: CLASS ROOM - 20, ASSIGNMENT - 32

NO. OF PROBLEMS IN 41E OF CA INTER: CLASS ROOM - 20, ASSIGNMENT - 35

NO. OF PROBLEMS IN 42E OF CA INTER: CLASS ROOM - 18, ASSIGNMENT - 16

MODEL WISE ANALYSIS OF PAST EXAM PAPERS OF IPCC & CA INTER

No.	MODEL NAME	N-09 TO M-12	N-12	M-13 TO N-14	M-15	N-15	M-16	N-16	M - 17	N - 17	M- 18 (O)	M - 18 (N)	N - 18 (O)	N - 18 (N)	M - 19 (o)	M - 19 (n)
1.	DIRECT RE DISTRIBUTION MEHOD	-	-	-	-	-	-	-	-	-	-	-	-	5	-	
2.	STEP LADDER OR NON RECIPROCAL METHOD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3.	RECIPROCAL SERVICE METHOD	-	-	-	-	-	-	-	-	-	8	-	-	-	-	
4.	METHODS OF OVERHEAD RECOVERY RATES	-	8	-	-	8	-	-	-	-	-	-	-	-	-	
5.	BLANKET VS. DEPARTMENTAL RECOVERY RATE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
6.	UNDER / OVER RECOVERY AND ITS TREATMENT	8	-	-	-	-	-	-	-	8	-	-	8	-	-	
7.	OHRR BASED ON DIFFERENT CAPACITIES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
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9.	TWO TIER RATE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

SIGNIFICANCE OF EACH PROBLEM COVERED IN THIS MATERIAL

Problem No. in this material	Problem No. in NEW SM		Problem No. in OLD SM	Problem No. in OLD PM	RTP	MTP	Previous Exams	Remarks
	July 2017	July 2019						
CR 1	-	-	-		-	-	-	
CR 2	P.NO-3	P.NO-3	ILL-8	-	-	-	-	
CR 3	-	-	-	-	-	N-15	-	
CR 4	P.NO-3	P.NO-1	ILL-6	Q.NO-6	MAY19	-	-	
CR 5	-	-	-	-	-	-	M-18	
CR 6	ILL-6	ILLU-9	ILL-20	-	M-16	-	-	
CR 7	-	-	-	-	-	-	-	
CR 8	P.NO-10	P.NO-10	ILL-18	-	-	-	-	
CR 9	P.NO-11	P.NO-11	ILL-19	-	-	-	-	
CR 10	-	-	-	Q.NO-8	-	M-19-ii	-	
CR 11	P.NO-9	P.NO-9	ILL-17	-	-	-	-	
CR 12	-	-	-	-	-	-	-	
CR 13	-	-	-	-	-	-	M-19(o)	
CR 14	-	-	-	Q.NO-21	-	-	M-19(N)	
CR 15	-	-	-	-	-	-	-	
CR 16	P.NO-5	P.NO-5	ILL-12	Q.NO-3	-	-	-	
CR 17	P.NO-4	P.NO-4	ILL-11	-	-	-	-	
CR 18	-	-	-	-	-	NOV-18-ii	-	
ASG 1	-	-	-	-	-	-	-	
ASG 2	-	-	-	-	-	-	-	
ASG 3	-	-	-	-	-	NOV-15	-	

ASG 4	-	-	-	-	M-15,N-17	-	-	
ASG 5	-	-	-	-		-	M-18	
ASG 6	-	--	-	Q.NO-7	-	-	-	
ASG 7	-	-	-	-	-	-	-	
ASG 8	P.NO-8	P.NO-8	ILL-16	-	-	-	-	
ASG 9	-	-	-	-	-	-	-	
ASG 10	-	-	-	-	-	-	-	
ASG 11	-	-	-	-	-	-	-	
ASG 12	-	-	-	-	-	M-19	-	
ASG 13	-	-	-	-	-	-	-	
ASG 14	-	-	-	Q.NO 15	-	-		
ASG 15	-	-	-	-	N-18	-	-	
ASG 16	-	-	-	-	-	-	-	

Meaning: Overheads are the expenditure which cannot be conveniently traced to or identified with any particular cost unit. Such expenses are incurred for output generally and not for a particular work order e.g., wages paid to watch and ward staff, heating and lighting expenses of factory etc.

CLASSIFICATION OF OVERHEADS

a) **By Function**
   - i) Factory or Manufacturing or Production Overhead
   - ii) Office and Administrative Overheads
   - iii) Selling and Distribution Overheads

b) **By Nature**
   - i) Fixed Overhead
   - ii) Variable Overhead
   - iii) Semi-Variable Overheads

c) **By Element**
   - i) Indirect materials
   - ii) Indirect employee cost
   - iii) Indirect expenses

d) **By Control**
   - i) Controllable costs
   - ii) Uncontrollable costs

DEFINITIONS [V.IMP]

Cost Allocation:

I) The term 'allocation' refers to the direct assignment of cost to a cost object which can be traced directly.

II) It implies relating overheads directly to the various departments.

III) The estimated amount of various items of manufacturing overheads should be allocated to various cost centres or departments.

IV) For example- if a separate power meter has been installed for a department, the entire power cost ascertained from the meter is allocated to that department.

Cost Apportionment:

I) There are some items of estimated overheads (like the salary of the works manager) which cannot be directly allocated to the various departments and cost centres.

II) apportionment implies "the allotment of proportions of items of cost to cost centres or departments".

Re-apportionment:

I) Service departments are those departments which do not directly take part in the production of goods or providing services.

II) Such departments provide auxiliary services across the entity and renders services to other cost centres

III) Examples of such departments are engineering, quality control and assurance, laboratory, canteen, stores, time office, dispensary etc.

IV) The overheads of these departments are to be shared by the production departments since service departments operate primarily for the purpose of providing services to production departments.

V) The process of assigning service department overheads to production departments is called reassignment or re-apportionment.

VI) At this stage, all the factory overheads are collected under production departments

Absorption:

I) The overheads charged to department are to be recovered from the output produced in respective departments.

II) This process of recovering overheads of a department or any other cost center from its output is called recovery or absorption

COMPUTING OVERHEAD RECOVERY RATE (OHRR) OR OH ABSORPTION RATE

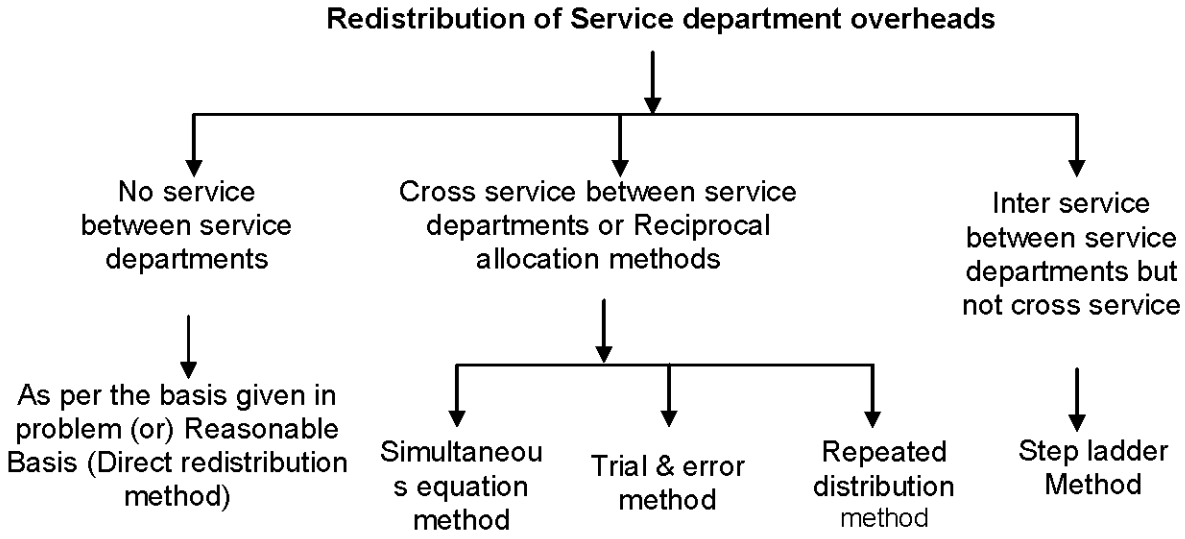
Step 1: Preparation of Primary overhead distribution statement: This is prepared by apportioning or allocating the given overheads using an appropriate base to all the production and service departments.

PRIMARY OVERHEAD DISTRIBUTION STATEMENT

Particulars	Basis of Distribution	Total	Production Departments			Service Departments	
			Tractors	M. Cycles	Electricals	Stores	Personnel
Factory rent	Apportion/ Allocation	✓	✓	✓	✓	✓	✓
Depreciation		✓	✓	✓	✓	✓	✓
Supervision		✓	✓	✓	✓	✓	✓
Power		✓	✓	✓	✓	✓	✓
Light		✓	✓	✓	✓	✓	✓
Welfare exp.'s		✓	✓	✓	✓	✓	✓
Direct Materials		✓	×	×	×	✓	✓
Direct Labour		✓	×	×	×	✓	✓
Totals:		**C**	**D**	**E**	**F**	**G**	**H**

Step 2: Preparation of secondary overhead distribution statement: This is a statement repared for diverting the cost incurred in service departments to production departments i.e. redistribution of service department overheads to production departments.

Procedure: This depends upon whether there is a cross service between service departments or not.



Secondary Overhead distribution statement

Particulars	Basis of Distribution	Total	Tractors	M. Cycles	Electricals	Stores	Personnel
Totals as per primary O.H. distribution Statement		C	D	E	F	G	H
	Total (A):					Nil	Nil

Note: The Amounts called G & H will be totally distributed to Production departments so that they will get reduced to NIL.

Step 3: Overhead Recovery Rate:

	Tractors	Motor cycles	Electricals
Base for Recovery (B)	XXX	XXX	XXX
OHRR(A/B)	XXX	XXX	XXX

BASES ADOPTED FOR THE APPORTIONMENT OF EXPENSES

Overhead Cost Overhead Cost	Bases of Apportionment
1. **i)** Rent and other building expenses **ii)** Lighting and heating (conditioning) **iii)** Fire precaution service **iv)** Air- conditioning	Floor area, or volume of department
2. **i)** Perquisites **ii)** Labour welfare expenses **iii)** Time keeping **iv)** Personnel office **v)** Supervision	Number of workers
3. **i)** Compensation to workers **ii)** Holiday pay **iii)** ESI and PF contribution **iv)** Perquisites	Direct wages
4. General overhead	Direct labour hour, or Direct wages, or Machine hours.

5. **i)** Depreciation of plant and machinery **ii)** Repairs and maintenance of plant and machinery **iii)** Insurance of stock	Capital values
6. **i)** Power/steam consumption **ii)** Internal transport **iii)** Managerial salaries	Technical estimates
7. Lighting expenses (light)	No. of light points, or Area or Metered Units
8. Electric power (machine operation)	Horse power of machines, or Number of machine hour, or value of machines or units consumed.
9. **i)** Material handling **ii)** Stores overhead	Weight of materials, or volume of materials, or value of materials or unit of materials.

RE - APPORTIONING SERVICE DEPARTMENT OVERHEADS OVER PRODUCTION DEPARTMENT

The re-apportionment of the service department cost to the production department is known as secondary distribution. The suggestive bases that may be adopted for reapportionment are given below:

Cost of the Service Departments:	Basis
1. Maintenance and Repair shop	Direct labour hours, Machine hours, Direct labour wages, Asset value × Hours worked.
2. Planning and progress	
3. Tool room	
4. Canteen and Welfare	No. of direct workers, No. of employees etc.
5. Hospital and Dispensary	
6. Personnel Department	
7. Time-keeping	No. of card punched, No. of employees
8. Computer Section	Computer hours, Specific allocation to departments
9. Power House (electric lighting cost)	Floor area, Cubic content, No. of electric Points, Wattage.
10. Power House (electric power cost)	Horse power, kWh, Horse power × Machine hours, kWh × Machine hours
11. Stores Department	No. of requisitions, Weight or value of Materials issued.
12. Transport Department	Crane hours, Truck hours, Truck mileage, Truck tonnage, Truck ton- hours, Tonnage handled. No. of packages of Standard size
13. Fire Protection	Capital values
14. Inspection	Inspection hours

DIRECT RE-DISTRIBUTION METHOD

Service department costs under this method are apportioned over the production departments only, ignoring the services rendered by one service department to the other.

STEP LADDER METHOD (OR) NON-RECIPROCAL METHOD

This method gives cognizance to the services rendered by service department to another service department. Therefore, as compared to previous method, this method is more complicated because a sequence of apportionments has to be selected here. The Sequence here begins with the department that renders maximum number of services to the other service department(s). In other words, the cost of the service department that serves the largest number of services to the other service department(s) and production department(s) is distributed first. After this, the cost of service department serving the next largest number of departments is apportioned.

This process continues till the cost of last service department is apportioned. The cost of last service department is apportioned among production departments only

The rules to be followed while apportioning the overheads are:

1. Service departments are to be taken in preference to production departments while taking the headings of secondary overhead distribution statement.
2. Ignore the service department the cost of which was already apportioned.
3. The order to be followed for distribution of service department overheads is:
   a) As per the instructions given the problem.
   b) Preference shall be given to that department which is serving the highest number of departments (including production & service departments).

RECIPROCAL SERVICE METHOD

This method recognizes the fact that where there are two or more service department They may render services to each other and, therefore, these inter-departmental Services are to be given due weight while re-distributing the expenses of the service Departments.

The methods available for dealing with reciprocal services are:

a) Simultaneous equation method;

b) Trial and error method;

c) Repeated distribution method.

a) **Simultaneous Equation Method:** According to this method firstly, the costs of service departments are ascertained. These costs are then re-distributed to production departments on the basis of given percentages.

   Step 1: Form the cost equations for the service departments. Assuming that 'X' be the cost of the 1st service department and 'Y' be the cost of the 2nd service department.

   Step 2: Solve the cost equations.

   Step 3: Re-distribute the answer in Step 2, only to production departments as if all the departments are in existence.

   Note: All the 3 Methods will result the same answer

b) **Repeated Distribution Method:** Under this method, service departments' costs are distributed to other service and production departments on agreed percentages and this process continues to be repeated, till the figures of service departments are either exhausted or reduced to too small a figure.

   Step 1: Apportion the overheads of the first service department to the all other production and service departments in the given service ratio.

   Step 2: Get the totals.

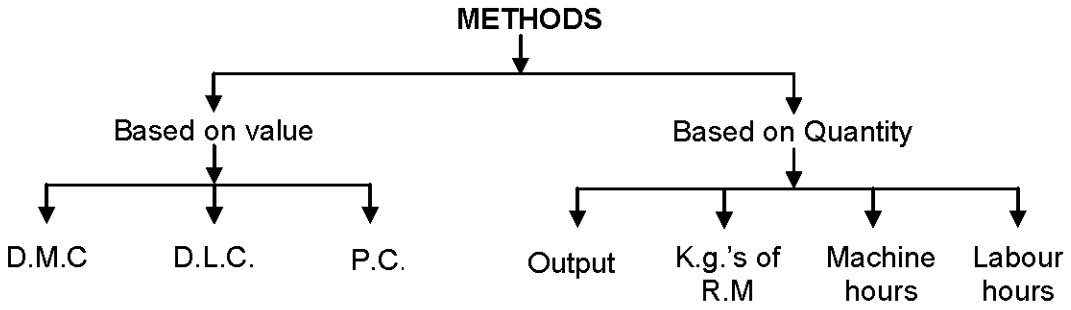
   Step 3: Re-apportion the 2nd service department overheads to all other departments including 1st service department in the given service ratio.

   Step 4: Get the totals.

Step 5: Repeat this procedure until the amount to be redistributed gets reduced to single digit (i.e. up to Rs.9).

Step 6: The answer so obtain in step 5 is to be completely allocated to the production department getting the highest service.

RECOVERY OF OH'S



Note: Of the all, Overheads recovery based on labour hours is suggestable.

Formula's:

OHRR (D.M.C.) : $\frac{\text{E.O.H.}}{\text{D.M.C.}}$ As per secondary overhead distribution statement.

OHRR (D.L.C.) : $\frac{\text{E.O.H.}}{\text{D.L.C.}}$ OHRR (P.C.) : $\frac{\text{E.O.H.}}{\text{P.C.}}$

OHRR (Output) : $\frac{\text{E.O.H.}}{\text{Output}}$ OHRR (K.g.'s) : $\frac{\text{E.O.H.}}{\text{K.g's}}$

OHRR (M.Hr's) : $\frac{\text{E.O.H.}}{\text{Machine hour's}}$ OHRR (L.Hr's) : $\frac{\text{E.O.H.}}{\text{L.Hr's}}$

BLANKET VS. DEPARTMENTAL RECOVERY RATES (V.IMP)

Blanket recovery rate - Meaning: Blanket overhead rate is single overhead absorption rate for the whole factory. It may be computed by using the following formulae:

Formulae: $\frac{\text{Overhead costs for the whole factory}}{\text{Total of the selected base for the whole factory}} \times 100$

(Like units, machine hours etc.)

When it can be used:

a) Where only one major product is being produced.

b) Where several products are produced, but

- All products pass through all departments; and
- All products are processed for the same length of time in each department.

Where these conditions do not exist, departmental rates should be used.

Disadvantage: A single recovery rate is computed for the whole factory, ignoring the special features of each department.

Departmental / Multiple overhead rates - Meaning: It involves computation of separate rates for each production department/cost centre. It is in opposite to single overhead rate, in which a single recovery rate is computed for the whole factory. It takes into care the special features of each department. It may be computed as follows:

Formulae: $\frac{\text{Overhead allocated / approtioned to each department}}{\text{Corresponding base}}$

Advantage: The main advantage of this method is it recognizes the special qualities of each production department while computing the overhead recovery rate. For e.g. for computing the overhead recovery rates of two departments say labour department and machine department, we will take labour hours and machine hours as the base respectively, since the labour department is labour hours intensive and machine department is machine hours intensive.

ILLUSTRATIONS

Q.1. Calculate Blanket Recovery Rate (Based on DLC) & Departmental Recovery Rate (Based on DLC)

	Overheads	Labour Cost
Department A	1,00,000	50,000
Department B	1,00,000	1,00,000

Ans:

B.R.R: $\frac{EOH}{DLC} : \frac{1,00,000+1,00,000}{56,000+1,00,000}$ = 1.33 per Re. of DLC.

DRR: Dept. A. : $\frac{EOH}{DLC} : \frac{1,00,000}{50,000}$: 2 Re. of DLC & Dept. B $\frac{EOH}{DLC} : \frac{1,00,000}{1,00,000}$: 1 Re. of DLC

Q.2. Find out the cost of the job, which requires direct materials of Rs.200 & direct labour of dept. A & Dept. B in 1:1 Rs. 200.

Ans: **Statement showing the cost of the job**

	B.R.R.	D.R.R.
D.M.C	200	200
D.L.C	200	200
O.H.	266	300
	(200 × 1.33)	(100 × 2 +100 ×1)
	666	700

UNDER/OVER RECOVERY OF OH'S

Different cases when the under/over recovery of OH's will result: E.g.: Estimated production is 1 Lakh units. Estimated OH's - Rs.1 Lakh. O.H.R.R.: Re.1 per unit.

Case 1: Actual Production is 90,000 units & Actual OH's is Rs.1,00,000.

Actual OH's Incurred	1,00,000
Less: OH's recovered (90,000 Units × Re.1)	90,000
Under recovery of OH's	10,000

Case 2: Actual Production is 1,00,000 units & Actual OH's incurred is 90,000.

Actual OH's Incurred	90,000
Less: OH's recovered (1,00,000 × Re.1)	1,00,000
Over recovery of OH's	10,000

Case 3: Actual Production is 85,000 units & Actual Overheads is 90,000.

Actual OH's Incurred	90,000
Less: OH's recovered (85,000 × Re.1)	85,000
Under recovery of OH's	5,000

Case 4: Actual Production is 90,000 units & Actual Overheads incurred is Rs.90,000.

Actual OH's Incurred **Less:** OH's recovered (90,000 × 1)	90,000 90,000
No over/under recovery	0

Case 5: Actual production is 1,00,000 units & Actual Overheads is 1,00,000.

Actual OH's Incurred **Less:** OH's Recovered (1,00,000 × Re.1)	1,00,000 1,00,000
No over/under recovery	0

Treatment of over and under Absorption: The various alternatives available are: (V.IMP)

1. **Use of Supplementary Rate:** Computation of supplementary rates is nothing but a process of correction whereby an over absorption is brought down and under absorption is pushed up to the correct figure of actual overhead cost. Accordingly there are two types of absorption rates:

   Positive Supplementary Rate (in case of under absorption):

$$= \frac{\text{Actual Overheads} - \text{Absorbed Overheads}}{\text{Actual base}}$$

   Negative Supplementary Rate (in case of over absorption):

$$= \frac{\text{Absorbed Overheads} - \text{Actual Overheads}}{\text{Actual base}}$$

   Under absorption is corrected by using positive supplementary rate, i.e., the un recovered amount of overhead cost is added to the cost of sales, work-in-progress and unsold stock. Over absorption is corrected by using negative supplementary rate, i.e., the excess recovery of overhead cost is deducted from the cost of sales, work-in-progress and unsold stock.

2. **Carry Over of Overheads:** In the following circumstances over and under absorption of overheads may be carried forward to the next year in the hope that an over absorption in the current period will be neutralized by under absorption in the next period:

   a) In case of seasonal industries over absorption of one season may be carried forward to the next season for neutralization over a period of one year.

   b) In case of new projects, under absorption of initial years may be carried forward in the hope of neutralization later years.

3. **Transfer to Costing Profit and Loss Account:** In the following two cases the amount of over or under absorption of overheads should be credited or debited to Costing Profit & Loss Account:

   a) In case over or under absorption is of small value, it may be totally unnecessary to adjust value of cost of sales, work-in-progress and finished stock by such insignificant amount.

   b) In case over or under absorption arises due to abnormal factors, e.g., heavy machine break-down, fire accidents, strikes, lock outs etc.

COMPUTATION OF MULTIPLE MACHINE HOUR RATE / TWO - TIER MACHINE HOUR RATE:

Step 1: Compute Common hours.

Step 2: Compute common cost.

Step 3: Compute Common Cost Per hour: $\frac{\text{Step2}}{\text{Step1}}$

Step 4: Compute specific hours.

Step 5: Compute specific cost.

Step 6: Compute specific cost per hour: $\frac{\text{Step5}}{\text{Step4}}$

Step 7: Multiple OHRR.

a) For Common Work: Step 3 Ans.

b) For Specific Work: Step 3 Ans. + Step6 Ans.

PROBLEMS FOR CLASSROOM DISCUSSION

MODEL 1: DIRECT REDISTRIBUTION METHOD

PROBLEM 1: The following figures are extracted from the books of a Company, for May month.

Indirect Material:

Production dept :	P_1 - Rs. 2,800	P_2 - Rs. 1,400	
Service dept :	S_1 - Rs. 1,700	S_2 - Rs. 3,500	S_3 - Rs.1,600

Indirect Wages:

Production dept.:	P_1 - Rs. 3,240	P_2 - Rs. 3,120	
Service dept.:	S_1 - Rs. 2,960	S_2 - Rs. 1,900	S_3 - Rs. 2,180

Power and light: Rs.30,000, Rent & Taxes: Rs.5,000, Supervision charges Rs.22,000, Insurance on assets: Rs.600, Depreciation @ 12% p.a. on capital value of assets.

a) From the above information and following departmental data, prepare overhead recovery rates for the production departments P_1 & P_2 on the basis of direct labour hours. The expenses of the service department S_1 shall be apportioned based on Direct labour hour's, S_2 - based on Direct labour hours & S_3 - No. of requisitions.

Departmental data:

Particulars	P_1	P_2	S_1	S_2	S_3
Area (Sq. feet)	400	200	100	200	100
Capital Value of assets	8,000	4,000	7,000	5,000	6,000
Kilowatt hours	4,000	3,000	1,000	1,000	1,000
Number of employees	150	100	75	100	125
Direct labour hours	5,000	5,000	--	---	---
Number of requisitions	1,000	300	--	---	---

(B) (ANS.: A) P_1 - RS. 48,325; P_2 - RS. 33,975)

(SOLVE PROBLEM NO 1 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

What will be the impact on the question, If kilowatt hours are not available.

Note:_____

MODEL 2: STEP LADDER OR NON RECIPROCAL METHOD

PROBLEM 2: Deccan Manufacturing Ltd., have 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:

Department	Factory overhead Rs.	Direct labour hours	No. of employees	Area in sq.mt
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 4 service departments are distributed in the same order, viz., P, Q, R & S respectively on the following basis.

Department	Basis
P	Number of employees
Q	Direct labour hours
R	Area in square meter's
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.

b) Calculate overhead recovery rate per direct labour hour for each of 3 production departments.

(B) (NEW SM, OLD SM) (ANS.: X - 75, Y - 45, Z - 40) (SOLVE PROBLEM NO 2 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

What will be the impact on the question, If, basis of distribution of service department overheads are net given

Note:_____

MODEL 3: RECIPROCAL SERVICE METHOD

PROBLEM 3: (PRINTED SOLUTION AVAILABLE) Arnav Ltd. has three production departments M, N and O and two service departments P and Q. The following particulars are available for the month of September, 2014:

Particulars	(Rs.)
Lease rental	35,000
Power & Fuel	4,20,000
Wages to factory supervisor	6,400
Electricity	5,600
Depreciation on machinery	16,100
Depreciation on building	18,000
Payroll expenses	21,000
Canteen expenses	28,000
ESI and Provident Fund Contribution	58,000

Followings are the further details available:

Particulars	M	N	O	P	Q
Floor space (square meter)	1,200	1,000	1,600	400	800
Light points (nos.)	42	52	32	18	16
Cost of machines (Rs.)	12,00,000	10,00,000	14,00,000	4,00,000	6,00,000
No. of employees (nos.)	48	52	45	15	25
Direct Wages (Rs.)	1,72,800	1,66,400	1,53,000	36,000	53,000
HP of Machines	150	180	120	-	-
Working hours (hours)	1,240	1,600	1,200	1,440	1,440

The expenses of service department are to be allocated in the following manner:

	M	N	O	P	Q
P	30%	35%	25%	-	10%
Q	40%	25%	20%	15%	-

You are required to calculate the overhead absorption rate per hour in respect of the three production departments, under each method of reciprocal service method i.e.,

i) Repeated distribution method.

ii) Simultaneous equation method.

iii) Trial & error method.

(A) (OLD PM, MTP - N15) (ANS: M = 154.77, N =160.57, O = 132.72)
(SOLVE PROBLEM NO 3OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

What will be the impact on the question, If, no of employees are not given in the problem

Note:_____

_____

PROBLEM 4: (PRINTED SOLUTION AVAILABLE) The following account balances and distribution of direct charges on31st March, 2011.

	Total	Production Depts.		Service Depts.	
		Machine Shop (Rs.)	Packing (Rs.)	Gen. Plant (Rs.)	Store & Maintenance (Rs.)
Allocated Overheads:					
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	-	-	10,00	-
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 Section	No. of employees	Investment	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	-
Stores & maintenance	1,600 Sq. ft.	60	5	1,50,000	1,000
	4800 Sq. ft.	225	38	10,00,000	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 computations and basis of distribution including distribution of the service department expenses to producing department.

b) Determine the service department distribution by the method of continued distribution (repeated distribution method). Show all calculations to the nearest rupee.

(A) (NEW SM,OLD SM) (RTP MAY19 OLD) (ANS: (A) RS. 77,720, RS. 25,800, RS. 2,830,RS. 22,650, (B) RS. 1,18,396, RS. 46,024)

(SOLVE PROBLEM NO 4 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

What will be the impact on the question,

If, stores & maintainance department overheads to be distributed based on maintains material

Note:_____

_____

PROBLEM 5: 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 and 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. *(A) (M18 (O) - 8M)*

(ANS.: I) RS. 5,80,001, RS. 5,00,001; II) RS. 1305.5) (SOLVE PROBLEM NO 5 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

What will be the impact on the question, If S1 overheads are appointed in the ratio of 40%,45%,15%

Note:_____

_____

MODEL 4: METHODS OF OVERHEAD RECOVERY RATES

PROBLEM 6: (PRINTED SOLUTION AVAILABLE) 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 two jobs undertaken by it in a period.

Particulars	Job 101	Job 102
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:

a) Computation of percentage recovery rates of factory overheads and administrative overheads.

b) Calculation of the amount of factory overheads, administrative overheads and profit for Each of the two jobs.

c) 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%

(A) (NEW SM, OLD SM, RTP-M16) (ANS.: A) FOH - 60%, AOH - 25%; B) JOB101-RS. 15,150, JOB 102 - RS. 21,375, C) RS. 80,000)

(SOLVE PROBLEM NO 6 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

What will be the impact on the question, If,% of profit on sales is 25%

Note:_____

MODEL 5: BLANKET VS. DEPARTMENT RECOVERY RATE

PROBLEM 7: A manufacturing company is divided into three production departments - A, B and C. All production is to customers' orders. All orders are dissimilar and they go through all the three departments. Manufacturing costs for a given period were as follows:

Particulars	A	B	C	Total
Direct Material	-	-	-	1,80,000
Direct Labour	40,000	20,000	30,000	90,000
Indirect manufacturing costs	20,000	40,000	30,000	90,000

The cost of producing a particular order was determined as follows:

Direct material	1,000
Direct Labour:	
Department A	120
Department B	280
Department C	200
Indirect manufacturing costs	600
Total	2,200

The General Manager had a hazy idea that the jobs executed on orders of this nature are underpriced. So, the services of a firm of cost accountants, of which you are a member, have been acquired for a thorough investigation. Can you detect, the fundamental fallacy of the company's method assuming that the direct labour cost is an acceptable basis for distributing indirect costs? Prepare a revised cost statement for the order distributing indirect manufacturing costs in a manner you consider appropriate. *(C) (ANS: TOTAL COST - RS. 2,420)*

(SOLVE PROBLEM NO 7 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

What will be the impact on the question, If direct material Rs.2400

Note:_____

MODEL 6: UNDER / OVER RECOVERY AND ITS TREATMENT

PROBLEM 8: 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. *(A) (NEW SM, OLD SM)*

(ANS: COS-35,000; WIP-1,000; FG- 4,000) (SOLVE PROBLEM NO 8 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

What will be the impact on the question, If, equivalent units are 800

Note:_____

_____

PROBLEM 9: ABC Ltd. manufactures a single product and absorbs the production overheads at a predetermined rate of Rs. 10 per machine hour. At the end of financial year 2011-12, 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 2011-12 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 2011-12; and

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

(A) (NEW SM, OLD SM, OLD PM) (ANS: (I) 45,000(II) WIP-5,000; FG- 2,500; COS- 22,500)

(SOLVE PROBLEM NO 9 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

What will be the impact on the question, If, actual production overheads were Rs.75000

Note:_____

_____

PROBLEM 10: ABC ltd has calculated a predetermined overhead rate of Rs 22 per machine hour for its Testing 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
3,38,875	14,500
3,47,625	15,500
3,56,375	16,500

You are required to:

a) Calculate the variable overhead absorption rate per machine hour.

b) Calculate the estimated total fixed overheads.

c) Calculate the budgeted level of activity in machine hours.

d) Calculate the amount of under/over-recovery of overheads if the actual machine hours were 15,850 and actual overheads were Rs 3,55,050. *(A)(MTP 2019 OLD)(NEW MAY SERIES -2)*

(ANS.: A) RS. 8.75, B) RS. 2,12,000, C) 16,000 HRS. D) RS. 6,350)

Concept question:

What will be the impact on the question, If, predetermined over heads rate is 25

Note:_____

MODEL 7: OHRR BASED ON DIFFERENT CAPACITIES

PROBLEM 11: (PRINTED SOLUTION AVAILABLE) 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:

Department	Direct Materials	Direct wages	Factory over head	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:

	Direct material (Rs)	Direct wages (Rs)	Direct labour hours	Machine hours
Machining	1,200	240	60	180
Assembly	600	360	120	30
Packing	300	60	40	-

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

Required:

i) Calculate the overhead absorption 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.

(C) (NEW SM, OLD SM) (ANS: (I) 125% OF DW; 4,660.50 (II)4,50; 1.40; 2.50; (III) 4,989.40; (IV)MACHINING-(2,70,000),42,000)

Concept question:

What will be the impact on the question,

The factory adds 50% on the factory cost to cover administration and selling overheads and profit.

Note:_____

PROBLEM 12: A machine 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 tonnes 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. *(OLD PM) (ANS: (A)36.5 TONNES(B)30 TONNES(C)25 TONNES(D)25.2 TONNES)*

(SOLVE PROBLEM NO 10 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

What will be the impact on the question, If, the 19 days , breakdown are 100days

Note:_____

MODEL 8: MACHINE AND COMPREHENSIVE MACHINE HOUR RATE

PROBLEM 13 M/s Zaian Private limited has purchased a machine costing Rs29,14,800 and it is expected to have a salvage value of Rs 1,50,000 at the end of its life of 15 years. Ordinarily the machine is expected to run for 4,500 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 fallows

(i) Repair and 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 consumption 10 units per hour @ 7 per unit. No power consumption during repair and maintenance

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

You are require to calculate the machine hour rate.

(ans:300)(may 19 new)

(SOLVE PROBLEM NO 11 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

What will be the impact on the question, If the power required during repairs and maintenance

Note:_____

PROBLEM 14: From the details furnished below you are required to compute comprehensive machine-hour rate:

Original purchase price of the machine (subject to depreciation at 10% per annum on original cost)	Rs.3,24,000
Normal working hours for the month	200 hours
(The machine works to only 75% of capacity)	
Wages of Machine man (per day of 8 hours)	Rs.125
Wages for Helper (machine attendant) (per day of 8 hours)	Rs.75
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 & Lighting for the month	Rs.7,500
Repairs & maintenance (machine) including Consumable stores per month	Rs.17,500
Insurance of Plant & 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. *(A) (OLD PM) (ANS.: RS. 406.85)*

(SOLVE PROBLEM NO 12 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

What will be the impact on the question, If the machine weeks 90% of capacity

Note:_____

_____

PROBLEM 15 (PRINTED SOLUTION AVAILABLE):

A machine shop has 8 identical Drilling machines manned by 6 operators. The machine cannot be worked without an operator wholly engaged on it. The

original cost of all these machines works out to Rs. 8 lakhs. These particulars are furnished for a 6 months 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 worker for 8 hours a day.	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

These particulars are for a year

Repairs and maintenance including consumables 3% of value of machines.

Insurance Rs. 40,000

Depreciation 10% of original cost.

Other sundry works expenses Rs. 12,000

General management expenses allocated Rs. 54,530.

You are required to WORK OUT a comprehensive machine hour rate for the machine shop.

(ans:Rs.23.87) (New sm)

(SOLVE PROBLEM NO 13 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

What will be the impact on the question, If operator are 8

Note:_____

_____

PROBLEM 16

A manufacturing company has added a new machine to its fleet of eleven existing machines. New machine is purchased for Rs.12,70,000 with installation cost of Rs.40,000. The Machine has an estimated life of 10 years and is expected to realize Rs.90,000 as scrap at the end of its useful life . Other relevant data are as follows:

i) Budgeted annual working hours are 2400 based on 8 hours per day for 300 days. This includes 180 hours for plant maintenance and 120 hours of productive set –up time.

ii) Electricity used by the new machine is 12 units per hour at a cost of Rs.6.50 per unit .No current is drawn during maintenance and setup.

iii) Three operators control the operations of all the twelve machines and average rate of wages per operator par day is Rs.600 and production bonus is 10% of wages.

iv) Annual insurance premium for the new machine is Rs.12,600.

v) Annual Maintenance cost of new machine including consumable stores is Rs.32,500.

vi) Rent of factory is Rs.24,000 per month . Area occupied by new machine 200sq ft. and area occupied by other machines is 2800 sq. ft.

Required: Compute the comprehensive machine hour rate.

(may19 old)(SOLVE PROBLEM NO. 14 OF ASSIGNMENT PROBLEMS AS REWORK)(ans:184.22)

MODEL 9: TWO TIER RATE

PROBLEM 17: Gemini Enterprises undertakes 3 different Jobs A, B and C. All of them require the use of a special machine and also the use of the computer. The computer is hired and the hire charges work out to Rs.4,20,000 p.a. The expenses regarding the machine are estimated as follows:

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 - No. of hours the machine was used:

	A	B	C
Without the use of the computer	600	900	-
With the use of the computer	400	600	1,000

You are required to compute machine hour rate (Dual rate or two tier 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 individual Jobs A, B and C.

(A) (NEW SM, OLD SM) (ANS.: A) WITH COMPUTER - RS. 27.5, WITHOUT COMPUTER - RS. 10; B) A - 17, B - 17, C - 27.5)

Concept question:

What will be the impact on the question, If rent for the quarter is Rs.70,000

Note:_____

PROBLEM:18(PRINTED SOLUTION AVAILABLE)

In a factory, a machine is considered to work for 208 hours in a month. It includes maintenance time of 8 hours and set up time of 20 hours.

The expense 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

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

(ANS:I)52.5 II)152.5) (MTP NOV 18 SERIES 1) (SOLVE PROBLEM NO. 15,16, OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

What will be the impact on the question, If the power is required during the set up time also.

Note:_____

_____

ASSIGNMENT PROBLEMS

MODEL 1: DIRECT REDISTRIBUTION METHOD

PROBLEM 1: The following figures are extracted from the books of a Company, for May month.

Indirect Material:

Production dept.:	P_1 - Rs. 1,000	P_2 - Rs. 1,500	
Service dept.:	S_1 - Rs. 2,000	S_2 - Rs. 3,000	S_3 - Rs.1,000

Indirect Wages:

Production dept.:	P_1 - Rs. 2,500	P_2 -Rs.3000	
Service dept.:	S_1 - Rs. 2,000	S_2 - Rs. 1,000	S_3 - Rs. 2,000

Power and light: Rs.10,000, Rent & Taxes: Rs.5,00, Supervision charges Rs.10,000, Insurance on assets: Rs.5000, Depreciation @ 12% p.a. on capital value of assets.

From the above information and following departmental data, prepare overhead recovery rates for the production departments P_1 & P_2 on the basis of direct labour hours. The expenses of the service department S_1 shall be apportioned based on Direct labour hour's, S_2 - based on Direct labour hours & S_3 - No. of requisitions. *(B) (ANS.:p1=2.104.P2=17.727))*

a) Departmental data:

Particulars	P_1	P_2	S_1	S_2	S_3
Area (Sq. feet)	15	10	25	10	5
Capital Value of assets	1000	2000	3000	1000	4000
Kilowatt hours	5000	4000	3000	3000	4000
Number of employees	20	30	35	15	25
Direct labour hours	8000	1,000	--	---	---
Number of requisitions	5,000	8000	--	---	---

MODEL 2: STEP LADDER OR NON RECIPROCAL METHOD

PROBLEM 2: Deccan Manufacturing Ltd., have 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:

Department	Factory overhead Rs.	Direct labour hours	No. of employees	Area in sq.mt
Production:				
X	200000	7000	50	1000
Y	150000	9000	25	2000
Z	50000	8000	5	1000
Service:				
P	25000	2000	15	500
Q	50000	3000	10	500
R	75000	1000	25	1000
S	50000	4000	10	5000

The overhead costs of the 4 service departments are distributed in the same order, viz., P, Q, R & S respectively on the following basis.

Department	Basis
P	Number of employees
Q	Direct labour hours
R	Area in square meter's
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.

b) Calculate overhead recovery rate per direct labour hour for each of 3 production departments.

(B) (NEW SM, OLD SM) (SOLVE PROBLEM NO 2 OF ASSIGNMENT PROBLEMS AS REWORK)

(Ans: a)x-2,62,152 y-2,28,544 z-1,18,304 , b)x-37.45 y-25.40 z-14.788)

MODEL 3: RECIPROCAL SERVICE METHOD

PROBLEM 3: Arnav Ltd. has three production departments M, N and O and two service departments P and Q. The following particulars are available for the month of September, 2014:

Particulars	(Rs.)
Lease rental	30000
Power & Fuel	300000
Wages to factory supervisor	5000
Electricity	10000
Depreciation on machinery	20000
Depreciation on building	7000
Payroll expenses	30000
Canteen expenses	50000
ESI and Provident Fund Contribution	70000

Followings are the further details available:

Particulars	M	N	O	P	Q
Floor space (square meter)	1000	1200	1600	400	800
Light points (nos.)	40	50	10	20	10

Cost of machines (Rs.)	12,00,000	10,00,000	14,00,000	4,00,000	6,00,000
No. of employees (nos.)	50	10	20	30	50
Direct Wages (Rs.)	1,72,800	1,66,400	1,53,000	36,000	53,000
HP of Machines	150	180	120	-	-
Working hours (hours)	1,240	1,600	1,200	1,440	1,440

The expenses of service department are to be allocated in the following manner:

	M	N	O	P	Q
P	30%	30%	25%	-	15%
Q	40%	20%	20%	20%	-

You are required to calculate the overhead absorption rate per hour in respect of the three production departments, under each method of reciprocal service method i.e.,

i) Repeated distribution method.

ii) Simultaneous equation method.

iii) Trial & error method. *(A) (OLD PM, MTP - N15) (ans:M-146.87 N-127.12 O-113.64)*

PROBLEM 4: The Union Ltd. has the following account balances and distribution of direct charges on 31st March, 2014.

		Production Depts.		Service Depts.	
	Total	Machine shop	Packing	General plant	Stores
Allocated Overheads:	**(Rs.)**	**(Rs.)**	**(Rs.)**	**(Rs.)**	**(Rs.)**
Indirect labour	29,000	8,000	6,000	4,000	11,000
Maintenance Material	9,900	3,400	1,600	2,100	2,800
Misc. supplies	5,900	1,500	2,900	900	600
Supervisor's salary	16,000	--	--	16,000	--
Cost & payroll salary	80,000	--	--	80,000	--

Overheads to be apportioned:	
Power	78,000
Rent	72,000
Fuel and Heat	60,000
Insurance	12,000
Taxes	8,400
Depreciation	1,20,000

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	8,00,000	3,500
Packing	800 Sq. ft.	90	12	2,40,000	500
General Plant	400 Sq. ft.	30	4	80,000	-
Stores & maintenance	1,600 Sq. ft.	60	8	1,60,000	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 are distributed on the basis of number of employees.

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

Determine the service department distribution by simultaneous equation method.

(B) (RTP M15, N 17)
(ANS: RS. 3,38,072, RS. 1,53,128)

PROBLEM 5: 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	5,00,000
P_2	7,00,000
S_1	2,00,000
S_2	1,00,000

Overheads of service departments are reapportioned as below:

	P_1	P_2	S_1	S_2
S_1	30%	50%	-	20%
S_2	50%	45%	5%	-

A product "Z" passes through all the two production departments - P_1 and P_2 and 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.

(A) (M18 (O) - 8M)
(ANS :i)6,32,828 ii)8,67,172)

MODEL 4: METHODS OF OVERHEAD RECOVERY RATES

PROBLEM 6: 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

(B) (OLD PM) (ANS.: (I) 40%, 25%, (II). RS.2,09,375)

MODEL 5: BLANKET VS. DEPARTMENT RECOVERY RATE

PROBLEM 7: A manufacturing company is divided into three production departments - A, B and C. All production is to customers' orders. All orders are dissimilar and they go through all the three departments. Manufacturing costs for a given period were as follows:

Particulars	A	B	C	Total
Direct Material	-	-	-	1,80,000
Direct Labour	20,000	80,000	30,000	2,00,000
Indirect manufacturing costs	10,000	1,60,000	30,000	2,00,000

The cost of producing a particular order was determined as follows:

Direct material	1,200
Direct Labour:	
Department A	200
Department B	500
Department C	700
Indirect manufacturing costs	1,400
Total	4,000

The General Manager had a hazy idea that the jobs executed on orders of this nature are underpriced. So, the services of a firm of cost accountants, of which you are a member, have been acquired for a thorough investigation. Can you detect, the fundamental fallacy of the company's method assuming that the direct labour cost is an acceptable basis for distributing indirect costs? Prepare a revised cost statement for the order distributing indirect manufacturing costs in a manner you consider appropriate. *(C) (ANS: TOTAL COST - RS. 4,400)*

(SOLVE PROBLEM NO 14 OF ASSIGNMENT PROBLEMS AS REWORK)

MODEL6: UNDER/ OVER RECOVERY AND ITS TREATMENT

PROBLEM 8: 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 analyzing 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. How would unabsorbed overheads be treated in Cost Accounts? *(A)(NEW SM, OLD SM) (ANS: COST - 1,20,000; FG - 40,000)*

PROBLEM 9: APP Limited is a manufacturing concern and recovers overheads at a pre-determined rate of 30 per man-day.

The following additional information of a period are also available for you:

Total factory overheads incurred	Rs.51,00,000
Man-days actually worked	Rs.1,50,000
Sales (in units)	50,000
Stock at the end of the period:	
Completed units	5,000
In completed units (50% completed)	10,000

There was no opening stock of finished goods and works in progress.

On analyzing the situation, it was discovered that 60% of the unabsorbed overheads were due to defective planning and balance were attributable to increase in overhead costs.

How would you treat unabsorbed overheads in cost accounts? (

MODEL 7: OHRR BASED ON DIFFERENT CAPACITIES

PROBLEM 10: A machine was purchased from a manufacturer who claimed that his machine could produce 72 tonnes in a year consisting of 360 days. Holidays, break-down, etc., were normally allowed in the factory for 30 days. Sales were expected to be 30 tonnes during the year and the plant actually produced 30 tonnes during the year. You are required to state the following figures:

e) Rated Capacity.

f) Practical Capacity.

g) Normal Capacity.

h) Actual Capacity. *(OLD PM) (ANS: (A)72TONNES (B)60TONNES (C)30 TONNES(D)27 TONNES)*

MODEL 8: MACHINE AND COMPREHENSIVE MACHINE HOUR RATE

PROBLEM 11:A machine costing Rs.1,00,00,000 is expected to run for 10 years. At the end of this period its scrap value is likely to be Rs 9,00,000. Repairs during the whole life of the machine are expected to be Rs ` 18,00,000 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 being ` Rs 5. The machine occupies one-fourth 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 30,000 and the lighting charges amount to ` Rs 8,000 per month. The foreman is paid a monthly salary of ` Rs 19,200. FIND OUT the machine hour rate, assuming insurance is @ 1% p.a. and the expenses on oil, etc., are ` 900 per month. *(Ans:362.10), (NEW SM, OLD SM)*

PROBLEM:12

From the details furnished below you are required to COMPUTE a comprehensive machine-hour rate:

Original purchase price of the machine (subject to depreciation at 10% per annum on original cost)	Rs. 6,48,000
Normal working hours for the month (The machine works for only 75% of normal capacity)	200 hours
Wages to Machine-man	Rs. 400 per day (of 8 hours)
Wages to Helper (machine attendant)	Rs. 275 per day (of 8 hours)
Power cost for the month for the time worked	Rs. 65,000
Supervision charges apportioned for the machine centre for the month	Rs. 18,000
Electricity & Lighting for the month	Rs. 9,500
Repairs & maintenance (machine) including Consumable stores per month	Rs. 17,500
Insurance of Plant & Building (apportioned) for the year	Rs. 18,250
Other general expense per annum	Rs. 17,500

The workers are paid a fixed Dearness allowance of Rs. 4,575 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. (may 19 MTP Series1)(Ans:Rs.1037.87)

PROBLEM 13

A machine shop has 10 identical Drilling machines manned by 7 operators. The machine cannot be worked without an operator wholly engaged on it. The

original cost of all these machines works out to Rs.10 lakhs. These particulars are furnished for a 6 months period:

Normal available hours per month	210
Absenteeism (without pay) hours	10

Leave (with pay) hours	10
Normal idle time unavoidable-hours	5
Average rate of wages per worker for 8 hours a day.	Rs. 32
Production bonus estimated	10% on wages
Value of power consumed `	Rs. 8,000
Supervision and indirect labour	Rs. 5000
Lighting and electricity `	Rs.2000

These particulars are for a year

Repairs and maintenance including consumables 5% of value of machines.

Insurance Rs.80,000

Depreciation 5% of original cost.

Other sundry works expenses 10,000

General management expenses allocated Rs.70,000.

You are required to WORK OUT a comprehensive machine hour rate for the machine shop.

(Ans:Rs.22.98)

PROBLEM 14: A manufacturing unit 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 realize Rs.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 (p.a.).

iii) Rs. 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 current is taken during maintenance and setting up.

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 10% of this amount.

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

(ANS.: A - RS. 123.69, B - RS. 120.65) (A) (OLD PM)

MODEL 9: TWO TIER RATE

PROBLEM 15: Sree Ajeet Ltd. having fifteen different types of automatic machines furnishes information as under for 20X8-20X9

a) 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.

b) 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

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

(RTP N18 (N&O)) (ANS.: SET UP RATE PER HR.: RS. 38.00; OPERATIONAL RATE PER HOUR: RS. 30.50)

PROBLEM:16

In a factory, a machine is considered to work for 230 hours in a month. It includes maintenance time of 8 hours and set up time of 30 hours.

The expense data relating to the machine are as under:

Cost of the machine is Rs. 2,00,000. Life 10 years. Estimated scrap value at the end of life is Rs. 20,000.

particulars	Rs.
– Repairs and maintenance per annum	30,000
– Consumable stores per annum	20,000
– Rent of building per annum (The machine under reference occupies 1/6 of the area)	30,000
– Supervisor's salary per month (Common to three machines)	10,000
– Wages of operator per month per machine	2,500
– General lighting charges per month allocated to the machine	10,000
– 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

COMPUTE a two-tier machine hour rate for (a) set up time, and (b) running time. **(Ans: i)79.97 ii)151.67)**

ADDITIONAL QUESTION BANK FOR STUDENTS SELF PRACTICE

PROBLEM 1

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:

	P1	P1	P1	S1	S1
Direct wages (Rs.)	3,000	2,000	3,000	1500	195
Working hours	3,070	4,475	2,419	-	-
Value of machines	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.)	2000	2500	3000	2000	500

The following figures extracted from the Accounting records are relevant:

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 :

	P1	P2	P3	S1	S2
S1	20%	30%	40%	-	10%
S2	40%	20%	30%	10%	-

FIND OUT the total cost of product X which is processed for manufacture in Departments P1, P2 and P3 for 4, 5 and 3 hours respectively, given that its Direct

Material Cost is Rs.50 and Direct Labour Cost is Rs. 30.

PROBLEM 2: You are given the following information of the three machines of a manufacturing department of X Ltd.:

Particulars	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 employee cost	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 attendant control all the three machines and spend equal time on each of them.)

The following additional information is also available:

Particulars	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. *(B) (MTP2 N18 (N) (MTP SERIES 2 NOV 2018 NEW) - 10M))*

PROBLEM 3: M/s. NOP Limited has its own power plant and generates its own power. Information regarding power requirements and power used are as follows:

Particulars	Production Dept.		Service Dept.	
	A	B	X	Y
	(Horse power 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 48,750 hours respectively.

Required:

i) Prepare overheads distribution sheet.

ii) Calculate factory overhead per labour hour for the dept. A and dept. B. *(A) (N18 (N) - 5M)*

PROBLEM 4: The monthly budget of a department is as under:

Direct Material	1,50,000
Direct Wages	2,00,000
Over heads	3,00,000
Direct Labour	50,000 Hr.'s
Machine	1,00,000 Hr.'s
Production	1,50,000 units
Direct Material	50,000 Kg's

The details of Job X are as under:

Direct Material	Rs. 45
Direct Wages	Rs. 50
Direct Labour	15 Hours
Machine	20 Hours
Production	32 units
Direct Material	20 Kgs

Calculate the total cost of Job X using the different methods of recovery of overheads.

PROBLEM 5: A company uses a historical cost system and applies overheads on the basis of "predetermined" rates. The following are the figure from the Trial Balance as at 30-9-83:-

Manufacturing overheads	Rs. 4,26,544 Dr.
Manufacturing overheads applied	Rs. 3,65,904 Cr.
Work-in-progress	Rs. 1,41,480 Dr.
Finished goods stocks	Rs. 2,30,732 Dr.
Cost of goods sold	Rs. 8,40,588 Dr.

Give two methods for the disposal of the unabsorbed overheads and show the profit implications of each method. *(B) (OLD PM)*

PROBLEM 6: A light engineering factory fabricates machine parts to customers. The factory commenced fabrication of 12 Nos. machine parts to customers' specifications and the expenditure incurred on the job for the week ending 21st August, 2002 is given below:

Direct Materials (all items)		780.00
Direct Labour (Manual) 20 hours @ Rs. 15 per hour		300.00
Machine facilities:		
Machine No. I: 4 hours @ Rs. 45	180.00	
Machine No. II: 6 hours @ Rs. 65	390.00	570.00
Total		**1,650.00**
Overheads @ Rs.8 per hour on 20 manual hours		160.00
Total		**1,810.00**

The overhead rate of Re.8 per hour is based on 3,000 man hours per week; similarly, the machine hour rates are based on the normal working of Machine No's. 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, 2002, the total labour hours worked was 2,400 and Machine Nos. I and II had worked for 30 hours and 32 ½ hours respectively. Prepare a Cost Sheet for the job for the fabrication of 12 Nos. machine parts duly levying the supplementary rates. *(B) (NEW SM,OLD SM)*

PROBLEM 7: A machine shop cost centre contains three machines of equal capacities. Three operators are employed on each machine, payable Rs. 20 per hour each. The factory works for 48 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 48 hours. In addition, they are also paid a bonus of 10% 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:

Original Cost of each machine	- Rs.52,000
Depreciation on the original cost of the machine	- 10% p.a.
Maintenance & Repair per week per machine	- Rs.60
Consumable Stores per week per machine	- Rs.75
Power: 20 units per hour per machine	- 80 paise per unit
Apportionment to the cost centre:	
Rent per annum	- Rs.5,400
Heat and Light per annum	- Rs.9,720
Foreman's Salary per annum	- Rs.12,960

Calculate:

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

ii) Machine hour rate. *(B) (OLD PM ,M15 - 8M)*

PROBLEM 8: A machine shop cost centre contains three machines of equal capacities. To operate these three machines nine operators are required i.e. three operators on each machine. Operators are paid Rs.20 per hour. 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:

a) Depreciation 10% per annum on original cost of the machine. Original cost of the each machine is Rs.52,000.

b) Maintenance and repairs per week per machine is Rs.60.

c) Consumable stores per week per machine are Rs.75.

d) Power: 20 units per hour per machine at the rate of 80 paise per unit.

e) Apportionment to the cost centre : Rent per annum Rs.5,400, Heat and Light per annum Rs.9,720, foreman's salary per annum Rs.12,960 and other miscellaneous expenditure per annum Rs.18,000.0

Required:

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

ii) Calculate machine hour rate. *(B) (OLD PM,MTP1 M18(N))*

PROBLEM 9: 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.)	30,00,000	50,00,000	25,00,000	45,00,000
Cost of sales (Rs.)	20,00,000	45,00,000	21,00,000	22,50,000
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	3,00,000	Sq. Ft.
Depreciation	1,00,000	Parcel
Salesmen's salaries & expenses	6,00,000	Sales Volume
Administrative wages and salaries	5,00,000	No. of invoices

Packing wages & materials	Rs. 2 per parcel
Commission	4% of sales
Stationery	Rs.1 per invoice

You are required to prepare Profit & Loss Statement, showing the percentage of profit or loss to sales for each product. *(B) (NEW SM, OLD SM)*

PROBLEM 10: 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:

Particulars	Cutting Department	Welding Department	Total
Actual Usage in 2002-03 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). *(B) (OLD PM))*

PRINTED SOLUTIONS TO SOME SELECTIVE PROBLEMS

PROBLEM NUMBERS TO WHICH SOLUTIONS ARE PROVIDED: 3,4,6,11,15,18

PROBLEM NO. 3

Primary Distribution Summary

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

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

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

P = 13,836 + 0.15 Q

Q = 23,051 + 0.10 P

Substituting the value of Q in P we get

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

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

0.985 P = 17,293.65

P = Rs. 17,557

Q = 23,051 + 0.10 *17,557

= Rs. 24,806.70 or ` 24,807

Secondary Distribution Summary

Particulars	Total	M	N	o
	Rs.	Rs	Rs	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 17,557)	15,801	5,267	6,145	4,389
Q (85% of 24,807)	21,086	9,923	6,202	4,961
		1,91,909	2,56,909	1,59,282

Overhead rate per hour

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

Repeated distribution method:

Secondary distribution method

particulars	basis	Production dept.			Service dept.	
		P_1	P_2	P_3	S_1	S_1
Overheads as per primary Distribution		1,76,719	2,44,562	1,49,932	13,836	23,051
Application of service department p	30:35:25:10	4151	4843	3459	(13836)	1383
Application of service department q	40:25:20:15	9774	6109	4887	3665	(24434)
Application of service department p	30:35:25:10	1100	1283	916	(3665)	367
Application of service department q	40:25:20:15	147	92	73	55	(367)
Application of service department p	30:35:25:10	22	19	14	(55)	-
Estimated overhead(A)		191913	256908	159281	nil	nil
Estimated hours(B)		1240	1600	1200		
OHRR(A/B)		154.77	160.57	132.74		

Secondary distribution method

Trial And Error Method:

particulars	basis	Production dept.			Service dept.	
		P_1	P_2	P_3	S_1	S_1
Overheads as per primary Distribution		1,76,719	2,44,562	1,49,932	13,836	23,051
Application of service department p	30:35:25:10	5267	6145	4389	(17556)	1755
Application of service department q	40:25:20:15	9923	6202	4961	3720	(24801)
Estimated overhead(A)		191909	256909	159282	nil	nil
Estimated hours(B)		1240	1600	1200		
OHRR(A/B)		154.77	160.57	132.74		

Working note:1

particulars	basis	Service dept.	
		S_1	S_2
Overhead as per primary overhead	-	13,836	23,051
Application of service department p	30:35:25:10	(13,836)	1383
Application of service department q	40:25:20:15	3665	(24434)
Application of service department p	30:35:25:10	(3665)	367
Application of service department q	40:25:20:15	55	(367)
		17,556	24,801

PROBLEM NO. 4

Overhead Distribution statement

Allocated expenses	Production Dept		Service Dept	
	Machine Shop (Rs.)	Packing (Rs.)	General plant (Rs.)	Stores and maintenance (Rs.)
Indirect labour	4,000	3,000	2,000	5,650
Maintenance material	1,800	700	1,020	1,500
Superintendent's salary	-	-	4,000	-
Miscellaneous supplies	400	1,000	150	200
Cost and payroll salaries		-	10,000	-
Total	6,200	4,700	17,170	7,350
Apportioned expenses (See schedule below)	77,720	25,800	2,830	22,650
Total	83,920	30,500	20,000	30,000

Schedule of Apportioned expenses

Item	Basis	Machine shop (Rs.)	Packing (Rs.)	General plant (Rs.)	Stores & maintenance (Rs.)
Power	House power houses	5,600	800	-	1,600
Rent	Floor Space	5,000	2,000	1,000	4,000
Fuel & Heat	Radiator secs.	1,200	2,400	800	1,600
Taxes	Investment	1,280	400	20	300
Insurance	Investment	640	200	10	150
Depreciation	Investment	64,000	20,000	1,000	15,000
Total		77,720	25,800	2,830	22,650

Distribution of service Dept. Expenses

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

PROBLEM NO. 6

a) Let factory overhead recovery rate, as percentage of direct wages be F and administrative overheads recovery rate, as percentage of factory cost be A.

Factory Cost of Jobs :

Job 101=96,000 + 42,000F

Job 102=67,500 + 30,000F

Total Cost of Jobs:

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

Job-102 = (67,500 + 30,000F) + (67,500+ 30,000F)A = 1,06,875

(Refer to working note)

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

Hence, percentage recovery rates of factory overheads and administrative overheads are 60% and 25% respectively.

Working note :

	Job 101	Job 102
Total cost (`Rs.)	1,51,500	1,06,875
(Selling price/100%+percentage of profit)	(1,66,650/110%)	(128250/120%)

b) **Statement of jobs, showing amount of factory overheads, administrative overheads and profit**

	Job 101	*Job 102*
Direct materials	54,000	37,500
Direct wages	42,000	30,000
Prime cost	96,000	67,500
Factory overheads:		
60% of direct wages	25,200	18,000
Factory cost	1,21,200	85,500
Administrative overheads:		
25% of factory cost	30,300	21,375
Total cost	1,51,500	1,06,875
Profit	15,150	21,375
Selling price	1,66,650	1,28,250

c) Selling price of Job 103

Particulars	Amt.
Direct materials	24,000
Direct wages	20,000
Prime cost	44,000
(+)Factory overheads (60% of Direct Wages)	12,000
Factory cost	56,000
(+)Administrative overheads (25% of factory cost)	14,000
Total cost	70,000
(+)Profit margin (balancing figure)	10,000
Selling price(total cost/87.5%)	80,000

PROBLEM NO: 11

i) **Computation of overhead absorption rate (as per the current policy of the company)**

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

Overhead absorption rate =Budgeted factory overheads/Budgeted direct wages × 100 = 6,25,000/5,00,000 × 100 = 125% of Direct wages

Selling Price of the Job No. CW-7083

Direct materials (Rs.1,200 + Rs.600 + Rs.300)	2,100.00
Direct wages (Rs. 240 + Rs. 360 + Rs. 60)	
Overheads (125% × Rs. 660)	660.00
Total factory cost	825.00
Add: Mark-up (30% × Rs.3,585)	3,585.00
Selling price	1,075.50
	4,660.50

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

a) **Machining Department:** In the machining department, the use of machine time is the predominant factor of production. Hence machine hour rate should be used to recover overheads in this department. The overhead recovery rate based on machine hours has been calculated as under:

Machine hour rate = Budgeted factory overheads/Budgeted machine hours

= 3,60,000/80,000 hours = Rs. 4.50 per hour

b) **Assembly Department:**

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

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

c) **Packing Department:**

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

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

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

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

Working Note: Overhead Summary Statement

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

iii) Department - wise statement of total under / over recovery of overheads

a) Under current policy

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

b) As per methods suggested

Basis of overhead recovery

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

PROBLEM NO: 15

Computation of comprehensive machine hour rate of machine shop

Operator's wages (Refer to working note 2)	17,100
Production bonus (15% on wages)	2,565
Power consumed	8,050
Supervision and indirect labour	3,300
Lighting and electricity	1,200
Repairs and maintenance	12,000
Insurance	20,000
Depreciation	40,000
Sundry works expenses	6,000
General management expenses	27,265
	1,37,480

$$\text{Machine hour rate} = \frac{\text{Total overheads of machine shop}}{\text{Hours of machines operation}}$$

$$= \frac{\text{Rs.1,37,480}}{\text{5,760 hours}} \text{ (Refer to working note 1)} = \text{Rs.23.87}$$

Working notes:

1. Computation of hours, for which 6 operators are available for 6 months.

Normal available hours p.m. per operator.		208
Less: Absenteeism hours	18	
Less: Leave hours	20	
Less: Idle time hours	10	
		48
Utilisable hours p.m. per operator		160

Total utilisable hours for 6 operators and for 6 months are = 160 × 6× 6 = 5,760

As machines cannot be worked without an operator wholly engaged on them therefore, hours for which 6 operators are available for 6 months are the hours for which machines can be used. Hence 5,760 hours represent total machine hours.

2. Computation of operator's wages

Average rate of wages : $\frac{Rs.20}{8}$ = Rs.2.50 per hour

Hours per month for which wages are paid to a worker (208 hours – 18 hours) = 190 hours.

Total wages paid to 6 operators for 6 months = 190 hours × 6 × 6 × Rs.2.50 = Rs.17,100

PROBLEM NO: 18

Working Notes:

1. (i) Effective hours for standing charges (208 hours – 8 hours) = 200 hours.

   (ii) Effective hours for variable costs (208 hours – 28 hours) = 180 hours.

2. Standing Charges per hour

	Cost per month (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 $\left(\frac{Rs.(5,00,000-20,000)}{10 years} x \frac{1}{12}\right)$	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 $\frac{Rs.60,480}{12 months}$	5,040	28.00 $\left(\frac{Rs.5,040}{180 hours}\right)$
Consumable stores $\frac{Rs.47,520}{12 months}$	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**

THE END