

**CRASH BATCH MAIN MATERIAL / CA INTER / GR. 1 / BOOK / COSTING – PART / 42.5E**

CHAPTERS INCLUDED – COST ACCOUNTING SYSTEMS

(APPLICABLE TO MAY 2020 ATTEMPT OF CA INTER. SYNCHRONISED WITH JULY 2019 EDITION OF ICAI SM.

ISSUED ON 7/12/19)

**4. OVERHEADS - ABSORPTION COSTING METHOD**

NO. OF PROBLEMS IN 41.5E OF CA INTER: CLASS ROOM - 15, ASSIGNMENT - 29

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

NO. OF PROBLEMS IN 42.5E OF CA INTER: CLASS ROOM - 15, ASSIGNMENT - 15

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

No.	MODEL NAME	N-09 TO 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 (N&O)	N-19 (O)	N-19 (N)
1.	Direct Re-Distribution Method	-	-	-	-	-	-	-	-	-	-	-	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	-	-	-	-	10
7.	OHRR Based on different Capacities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8.	Machine Hour & Comprehensive Machine Hour Rate	8	8	-	-	5	-	-	-	-	-	-	-	5	-	-
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	-	-	-	-	-	-	M-18	
CR 5	ILL-6	ILL-9	ILL-20	-	M-16	-	-	
CR 6	-	-	-	-	-	-	-	
CR 7	-	-	-	-	-	-	N-19	
CR 8	-	-	-	-	N-19	-	-	
CR 9	-	-	-	Q.NO-8	-	M-19-ii	-	
CR 10	-	-	-	-	-	-	-	
CR 11	-	-	-	Q.NO-21	-	-	M-19(N)	
CR 12	-	-	-	-	-	-	-	
CR 13	P.NO-5	P.NO-5	ILL-12	Q.NO-3	-	-	-	
CR 14	P.NO-4	P.NO-4	ILL-11	-	-	-	-	
CR 15	-	-	-	-	-	N-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	-	-	-	-	-	M-19	-	
ASG 12	-	-	-	-	-	-	-	
ASG 13	-	-	-	Q.NO 15	-	-	-	
ASG 14	-	-	-	-	N-18	-	-	
ASG 15	-	-	-	-	-	-	-	

**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**

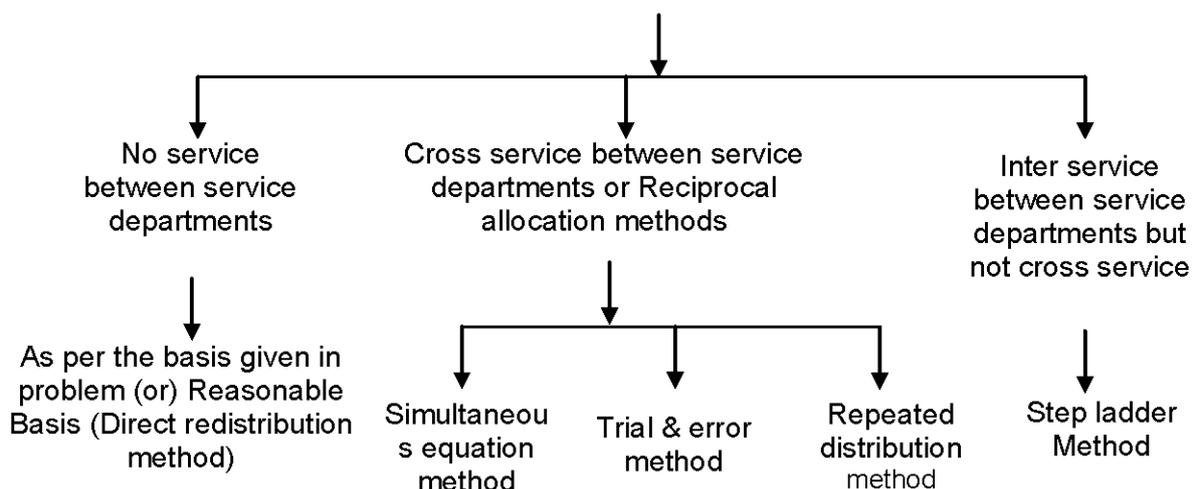
**Step 1: Preparation of Primary overhead distribution statement:** This is prepared by apportioning or allocating the given overheads using an appropriate base to all the production and service departments.

**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		✓		x	x	✓	✓
Direct Labour		✓		x	x	✓	✓
<b>Totals:</b>		<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>

**Step 2: Preparation of secondary overhead distribution statement:** This is a statement prepared 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.

**Redistribution of Service department overheads**

**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
	<b>Total (A):</b>					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:

<b>Cost of the Service Departments:</b>	<b>Basis</b>
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 1<sup>st</sup> service department and 'Y' be the cost of the 2<sup>nd</sup> 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.

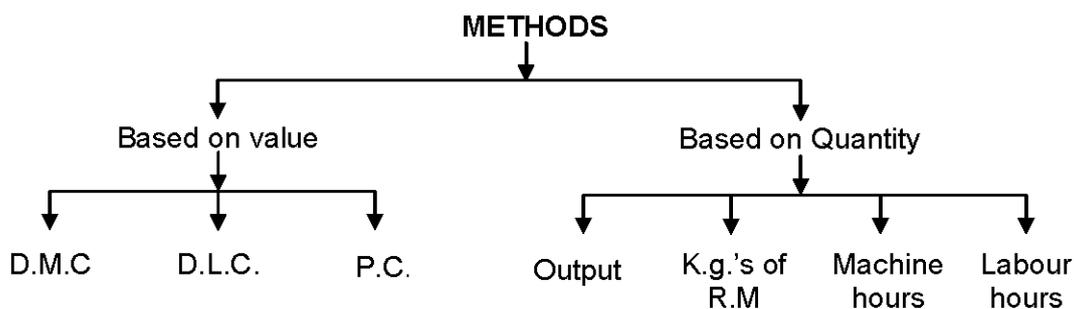
**Step 3:** Re-apportion the 2<sup>nd</sup> service department overheads to all other departments including 1<sup>st</sup> service department in the given service ratio.

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

$$\begin{array}{l} \text{OHRR (D.L.C.)} : \frac{\text{E.O.H.}}{\text{D.L.C.}} \\ \text{OHRR (Output)} : \frac{\text{E.O.H.}}{\text{Output}} \\ \text{OHRR (M.Hr's)} : \frac{\text{E.O.H.}}{\text{Machine hour's}} \end{array} \qquad \begin{array}{l} \text{OHRR (P.C.)} : \frac{\text{E.O.H.}}{\text{P.C.}} \\ \text{OHRR (K.g.'s)} : \frac{\text{E.O.H.}}{\text{K.g's}} \\ \text{OHRR (L.Hr's)} : \frac{\text{E.O.H.}}{\text{L.Hr's}} \end{array}$$

### **BLANKET VS. DEPARTMENTAL RECOVERY RATES (V.IMPI)**

**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:

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

(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.

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

**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:**

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

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

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	90,000
Less: OH's recovered (90,000 × 1)	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	1,00,000
Less: OH's Recovered (1,00,000 × Re.1)	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 breakdown, 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:  $\frac{\text{Step 2}}{\text{Step 1}}$

Step 4: Compute specific hours.

Step 5: Compute specific cost.

Step 6: Compute specific cost per hour:  $\frac{\text{Step 5}}{\text{Step 4}}$

Step 7: Multiple OHRR.

- a) For Common Work: Step 3 Ans.
- b) For Specific Work: Step 3 Ans. + Step 6 Ans.

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To **MASTER MINDS**, Guntur

## **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 <sub>1</sub> - Rs. 2,800	P <sub>2</sub> - Rs. 1,400	
Service dept :	S <sub>1</sub> - Rs. 1,700	S <sub>2</sub> - Rs. 3,500	S <sub>3</sub> - Rs. 1,600

**Indirect Wages:**

Production dept.:	P <sub>1</sub> - Rs. 3,240	P <sub>2</sub> - Rs. 3,120	
Service dept.:	S <sub>1</sub> - Rs. 2,960	S <sub>2</sub> - Rs. 1,900	S <sub>3</sub> - 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.

**CA Inter\_42.5(2nd)\_Costing (P)\_Overheads - Absorption costing method\_\_\_\_\_4.9**

- a) From the above information and following departmental data, prepare overhead recovery rates for the production departments P<sub>1</sub> & P<sub>2</sub> on the basis of direct labour hours. The expenses of the service department S<sub>1</sub> shall be apportioned based on Direct labour hour's, S<sub>2</sub> - based on Direct labour hours & S<sub>3</sub> - No. of requisitions.

Departmental data:

Particulars	P <sub>1</sub>	P <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>
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<sub>1</sub> - RS. 48,325; P<sub>2</sub> - 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
<b>Production:</b>				
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
<b>Service:</b>				
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:

- Prepare a schedule showing the distribution of overhead costs of the four service departments to the three production departments.
- 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

CA Inter\_42.5(2nd)\_Costing (P)\_Overheads - Absorption costing method \_\_\_\_\_ 4.10

**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.,

- Repeated distribution method.
- Simultaneous equation method.
- Trial & error method.

(A) (OLD PM, MTP - N15) (ANS: M = 154.77, N = 160.57, O = 132.72)

(SOLVE PROBLEM NO 3,4 OF 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:** Delta Ltd. is a manufacturing concern having two production departments P<sub>1</sub> and P<sub>2</sub> and two service departments S<sub>1</sub> and S<sub>2</sub>. After making a primary distribution of factory overheads, the total overheads of all departments are as under:

	(in Rs)
P <sub>1</sub>	4,02,000
P <sub>2</sub>	2,93,000
S <sub>1</sub>	3,52,000
S <sub>2</sub>	33,000

Overheads of service departments are reapportioned as below:

	P <sub>1</sub>	P <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>
S <sub>1</sub>	40%	50%	-	10%
S <sub>2</sub>	50%	40%	10%	-

A product "Z" passes through all the two production departments - P<sub>1</sub> and P<sub>2</sub> 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:

- To make secondary distribution of overheads of service departments by applying Simultaneous Equation method and
- 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 S<sub>1</sub> overheads are apportioned in the ratio of 40%,45%,15%

Note: \_\_\_\_\_

#### **MODEL 4: METHODS OF OVERHEAD RECOVERY RATES**

**PROBLEM 5: (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:

- Computation of percentage recovery rates of factory overheads and administrative overheads.
- Calculation of the amount of factory overheads, administrative overheads and profit for Each of the two jobs.
- 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 6:** 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
<b>Direct Labour:</b>	
Department A	120
Department B	280
Department C	200
Indirect manufacturing costs	600
<b>Total</b>	<b>2,200</b>

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 7:** 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	10,35,000
Budgeted machine hours	90,000
Actual machine hours worked	45,000
Actual production overheads	8,80,000
Production overheads (actual) include –	
Paid to worker as per court's award	50,000
Wages paid for strike period	38,000
Stores written off	22,000
Expenses of previous year booked in current year Production	18,500
Finished goods	30,000 units
Sale of finished goods	27,000 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.

(N19 (N) - 10M)

Concept Question: What is the impact on the question, if budgeted machine hours are 95,000.

(SOLVE PROBLEM NO 8 OF ASSIGNMENT PROBLEMS AS REWORK)

Note: \_\_\_\_\_

**PROBLEM 8: (PRINTED SOLUTION AVAILABLE):** PLR Ltd. manufacturers a single product and recovers the overheads by adopting a single blanket rate based on machine hours. The budgeted production overheads of the factory for the FY 2019-20 are Rs. 50,40,000 and budgeted machine hours are 6,000.

For a period of first six months of the financial year 2019-20, following information were extracted from the books:

Actual production overheads	34,08,000
Amount included in the production overheads:	
Paid as per court's order	4,50,000
Expenses of previous year booked in current year	1,00,000
Paid to workers for strike period under an award	4,20,000
Obsolete stores written off	36,000

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

Production:

Finished goods	1,10,000 units
Works-in-progress (50% complete in every respect)	80,000 units

Sale:

Finished goods	90,000 units
----------------	--------------

The actual machine hours worked during the period were 3,000 hours. It is revealed from the analysis of information that 40% of the over/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 over/ under absorption of production overheads for the period,
- ii) to show the accounting treatment of over/ under-absorption of production overheads, and
- iii) to apportion the over/ under-absorbed overheads over the items.

(RTP NOV 19)

(ANS: I) 1,18,000 II) AMOUNT TO BE CREDITED TO COSTING PROFIT AND LOSS ACCOUNT = 47,200; III) 11,800, 32,450, 26,550)

Concept question: what is the impact on the question, if actual production overheads 35,00,000

(SOLVE PROBLEM NO 9 OF ASSIGNMENT PROBLEMS AS REWORK)

Note: \_\_\_\_\_

**PROBLEM 9:** 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.

**CA Inter\_42.5(2nd)\_Costing (P)\_Overheads - Absorption costing method \_\_\_\_\_ 4.14**

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:

- Calculate the variable overhead absorption rate per machine hour.
- Calculate the estimated total fixed overheads.
- Calculate the budgeted level of activity in machine hours.
- 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) (MTP2 M19 (N&O))

(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 10:** 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:

- Rated Capacity.
- Practical Capacity.
- Normal Capacity.
- 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 RAT**

**PROBLEM 11:** 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 (The machine works to only 75% of capacity)	200 hours
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 11 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

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

Note: \_\_\_\_\_

**PROBLEM 12:** 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.

(NEW SM) (ANS:RS.23.87) (SOLVE PROBLEM NO 12 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

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

Note: \_\_\_\_\_

**PROBLEM 13 (PRINTED SOLUTION AVAILABLE):**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 per 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 200 sq ft. and area occupied by other machines is 2800 sq. ft.

**Required:** Compute the comprehensive machine hour rate.

(M19 (O) - 8M) (ANS.: RS. 180.00) (SOLVE PROBLEM NO. 13 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: if purchase cost of machine is 13,00,000

Note: \_\_\_\_\_

### **MODEL 9: TWO TIER RATE**

**PROBLEM 14:** 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)

(SOLVE PROBLEM NO. 14 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question:

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

Note: \_\_\_\_\_

**PROBLEM:15 (PRINTED SOLUTION AVAILBLE):**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.

(MTP1 N18 (N&O)) (ANS: I)52.5 II)152.5) (SOLVE PROBLEM NO. 15 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:** \_\_\_\_\_

## PRINTED SOLUTIONS TO SOME SELECTIVE PROBLEMS

**PROBLEM NUMBERS TO WHICH SOLUTIONS ARE PROVIDED: 3,5,8,13,15**

### PROBLEM NO. 3

#### Primary Distribution Summary

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

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

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

$$P = 13,836 + 0.15 Q$$

$$Q = 23,051 + 0.10 P$$

Substituting the value of Q in P we get

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

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

$$0.985 P = 17,293.65$$

$$P = \text{Rs. } 17,557$$

$$Q = 23,051 + 0.10 * 17,557$$

$$= \text{Rs. } 24,806.70 \text{ or } 24,807$$

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 <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	S <sub>1</sub>	S <sub>1</sub>
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 <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	S <sub>1</sub>	S <sub>1</sub>
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 <sub>1</sub>	S <sub>2</sub>
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. 5**

- 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 :**

$$\text{Job 101} = 96,000 + 42,000F$$

$$\text{Job 102} = 67,500 + 30,000F$$

Total Cost of Jobs:

$$\text{Job 101} = (96,000 + 42,000F) + (96,000 + 42,000F)A = 1,51,500$$

$$\text{Job-102} = (67,500 + 30,000F) + (67,500 + 30,000F)A = 1,06,875$$

*(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

<b>Factory overheads:</b>		
60% of direct wages	25,200	18,000
Factory cost	1,21,200	85,500
<b>Administrative overheads:</b>		
25% of factory cost	30,300	21,375
<b>Total cost</b>	<b>1,51,500</b>	<b>1,06,875</b>
<i>Profit</i>	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. 8**

- i) Amount of over/ under absorption of production overheads during the period of first six months of the year 2019-20:

	Amount (Rs.)	Amount (Rs.)
Total production overheads actually incurred during the period		34,08,000
Less: Amount paid to worker as per court order	4,50,000	
Expenses of previous year booked in the current year	1,00,000	
Wages paid for the strike period under an award	4,20,000	
Obsolete stores written off	36,000	10,06,000
		24,02,000
Less: Production overheads absorbed as per machine hour rate (3,000 hours × Rs.840*)		25,20,000
Amount of over absorbed production overheads		1,18,000

$$\text{*Budgeted Machine hour rate (Blanket rate)} = \frac{\text{Rs. } 50,40,000}{6,000 \text{ hours}} = \text{Rs. } 840 \text{ per hour}$$

- ii) **Accounting treatment of over absorbed production overheads:** As, 40% of the over absorbed overheads were due to defective production policies, this being abnormal, hence should be credited to Costing Profit and Loss Account.

Amount to be credited to Costing Profit and Loss Account = Rs.1,18,000 × 40% = Rs.47,200.

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

Amount to be distributed = Rs.1,18,000 × 60% = Rs.70,800

$$\text{Supplementary Rate: } \frac{\text{Rs. } 70,800}{2,40,000 \text{ units}} = \text{Rs. } 0.295 \text{ per unit}$$

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

Particulars	Equivalent completed units	Amount (Rs.)
Work-in-Progress (80,000 units × 50% × 0.295)	40,000	11,800
Finished goods (1,10,000 units × 0.295)	1,10,000	32,450
Cost of sales (90,000 units × 0.295)	90,000	26,550
Total	2,40,000	70,800

### PROBLEM NO. 13

Computation of Comprehensive Machine hour Rate

Particulars	Per Annum (Rs.)	Per hour (Rs.)
<b>Fixed costs (Standing Charges)</b>		
Depreciation $\left( \frac{\text{Rs. } 1,22,000}{2,220 \text{ hours}} \right)$	1,22,000	54.95
Operators wages $\left( \frac{\text{Rs. } 5,94,000}{12 \text{ machines}} \times \frac{1}{2,220 \text{ hours}} \right)$	49,500	22.30
Insurance premium	12,600	5.68
Annual maintenance cost	32,500	14.64
Apportioned cost of factory rent	19,200	8.65
	2,35,800	106.22
<b>Variable costs:</b>		
Electricity (12 units × 2,100 hours × Rs. 6.5)	1,63,800	73.78
<b>Comprehensive Machine Hour rate</b>	<b>3,99,600</b>	<b>180.00</b>

#### Working Notes:

1. Effective machine hour:

= Budgeted working hours – maintenance time

= (2,400 - 180) hours = 2,220 hours.

2. Electricity consumption hours:

= Budgeted working hours – Maintenance time – Set-up time

= (2,400 – 180 – 120) hours = 2,100 hours.

3. Operators' wages per annum

Basic wages (3 operators × Rs. 600 × 300 days) = Rs. 5,40,000

Add: Production bonus (10% of Rs. 5,40,000) = Rs. 54,000

= Rs. 5,94,000

4. Depreciation per annum

$\frac{\text{Rs. } (12,70,000 + 40,000) - 90,000}{10 \text{ years}}$  = Rs. 1,22,000

5. Apportioned cost for factory rent:

$\frac{\text{Rs. } 24,000 \times 12}{3,000 \text{ sq.ft}} \times 200 \text{ sq.ft} = \text{Rs. } 19,200$

**PROBLEM NO: 15****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 $\left(\frac{\text{Rs.6,000}}{3\text{machines}}\right)$	2,000	10.00
Rent of building $\left(\frac{1}{6} \times \frac{\text{Rs.72,000}}{12\text{ months}}\right)$	1,000	5.00
General lighting	1,000	5.00
<b>Total Standing Charges</b>	<b>4,000</b>	<b>20.00</b>

**3. Machine running expenses per hour**

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

**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
<b>Machine expenses :</b>		
Depreciation	20.00	20.00
Repair and maintenance	-	28.00
Consumable stores	-	22.00
Power	-	50.00
<b>Machine hour rate of overheads</b>	<b>40.00</b>	<b>140.00</b>
Wages	12.50	12.50
<b>Comprehensive machine hour rate</b>	<b>52.50</b>	<b>152.50</b>

## 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 <sub>1</sub> - Rs. 1,000	P <sub>2</sub> - Rs. 1,500	
Service dept.:	S <sub>1</sub> - Rs. 2,000	S <sub>2</sub> - Rs. 3,000	S <sub>3</sub> - Rs.1,000

**Indirect Wages:**

Production dept.:	P <sub>1</sub> - Rs. 2,500	P <sub>2</sub> -Rs.3000	
Service dept.:	S <sub>1</sub> - Rs. 2,000	S <sub>2</sub> - Rs. 1,000	S <sub>3</sub> - 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<sub>1</sub> & P<sub>2</sub> on the basis of direct labour hours. The expenses of the service department S<sub>1</sub> shall be apportioned based on Direct labour hours, S<sub>2</sub> - based on Direct labour hours & S<sub>3</sub> - No. of requisitions.  
(B) (ANS.:p1=2.104.P2=17.727))

a) Departmental data:

Particulars	P <sub>1</sub>	P <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>
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
<b>Production:</b>				
X	200000	7000	50	1000
Y	150000	9000	25	2000
Z	50000	8000	5	1000
<b>Service:</b>				
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 S	Area in square meter's Direct labour hours
--------	-----------------------------------------------

You are required to:

- Prepare a schedule showing the distribution of overhead costs of the four service departments to the three production departments.
- Calculate overhead recovery rate per direct labour hour for each of 3 production departments.

(B) (NEW SM, OLD SM) (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.,

- Repeated distribution method.
- Simultaneous equation method.
- 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.

	Total	Production Depts.		Service Depts.	
		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	--

<b>Overheads to be apportioned:</b>	
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.

- Prepare an overhead distribution statement with supporting schedules to show computations and basis of distribution.
- Determine the service department distribution by simultaneous equation method.

**PROBLEM 5:** Delta Ltd. is a manufacturing concern having two production departments P<sub>1</sub> and P<sub>2</sub> and two service departments S<sub>1</sub> and S<sub>2</sub>. After making a primary distribution of factory overheads, the total overheads of all departments are as under:

	(in Rs)
P <sub>1</sub>	5,00,000
P <sub>2</sub>	7,00,000
S <sub>1</sub>	2,00,000
S <sub>2</sub>	1,00,000

Overheads of service departments are reapportioned as below:

	P <sub>1</sub>	P <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>
S <sub>1</sub>	30%	50%	-	20%
S <sub>2</sub>	50%	45%	5%	-

A product "Z" passes through all the two production departments - P<sub>1</sub> and P<sub>2</sub> 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:

- To make secondary distribution of overheads of service departments by applying Simultaneous Equation method and
- 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

- The rates of Factory overheads and Selling and Administration overheads to be charged.
- 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
<b>Direct Labour:</b>	
Department A	200
Department B	500
Department C	700
Indirect manufacturing costs	1,400
<b>Total</b>	<b>4,000</b>

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

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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:

- Rated Capacity.
- Practical Capacity.
- Normal Capacity.
- 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:** 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.

(MTP1 M19 (N&O)) (ANS:RS.1037.87)

**PROBLEM 12:**

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.42.18)

**PROBLEM 13:** 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:

- 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.
- Estimated cost of maintenance of the machine is Rs. 25,000 (p.a.).
- 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.
- Four operators control operation of 8 machines and the average wages per person amounts to Rs.420 per week plus 15% fringe benefits.
- 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.
- 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.

(A) (OLD PM)(ans:123.69,120.65)

**MODEL 9: TWO TIER RATE**

**PROBLEM 14:** Sree Ajeet Ltd. having fifteen different types of automatic machines furnishes information as under for 20X8-20X9

- 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.
- 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:

- Cost of machine Rs.1,80,000, Life of machine- 10 years and scrap value at the end of its life Rs. 10,000
- Annual expenses on special equipment attached to the machine are estimated as Rs. 12,000
- Estimated operation time of the machine is 3,600 hours while set up time is 400 hours per annum
- The machine occupies 5,000 sq. ft. of floor area.
- 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 NO 15:

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 P1, P2, P3 and two Service Departments S1 and S2 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 :

	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>S1</b>	<b>S2</b>
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) - 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:**

- Prepare overheads distribution sheet.
- 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	<u>390.00</u>	<u>570.00</u>
<b>Total</b>		<b>1,650.00</b>
Overheads @ Rs.8 per hour on 20 manual hours		<u>160.00</u>
<b>Total</b>		<b><u>1,810.00</u></b>

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
<b>Apportionment to the cost centre:</b>	
Rent per annum	- Rs.5,400
Heat and Light per annum	- Rs.9,720
Foreman's Salary per annum	- Rs.12,960

**Calculate:**

- The cost of running one machine for a four week period.
- 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:

- 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, foreman's salary per annum Rs.12,960 and other miscellaneous expenditure per annum Rs.18,000.0

Required:

- Calculate the cost of running one machine for a four week period.
- 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:

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

(B) (OLD PM))

**PROBLEM NO 11:** V 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, 2019:

Particulars	Rs.
Allocated Overhead Costs	
Fabrication Department	15,52,000
Assembly Department	7,44,000
Stores Department	2,36,000
Maintenance Department	1,96,000
Other Overheads	
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
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:**

- PREPARE a table showing the distribution of overhead costs of the two service departments to the two production departments using step method; and
- CALCULATE the most appropriate overhead recovery rate for each department.

(iii) Using the rates calculated in part (ii) above, CALCULATE the full production costs of the following job order:

Job number IGI2019

Direct Materials	Rs. 2,30,400	
Direct Labour:		
Fabrication Department	240 hours @ Rs. 50 per hour	
Assembly Department		180 hours
@ Rs. 50 per hour		
Machine hours required:		
Fabrication Department	210 hours	
Assembly Department	180 hours	

(MTP2 N19 (N)) (ANS:I) 1,07,89,649 31,83,351 II) 3.60 PER MACHINE HOUR, 1.22 PER LABOUR HOUR III) 2,52,376

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To **MASTER MINDS**, Guntur

**THE END**