Chp 4 Overheads

CA INTERMEDIATE NEW SYLLABUS

COST & MGT. ACCOUNTING

CA. PRANAV POPAT

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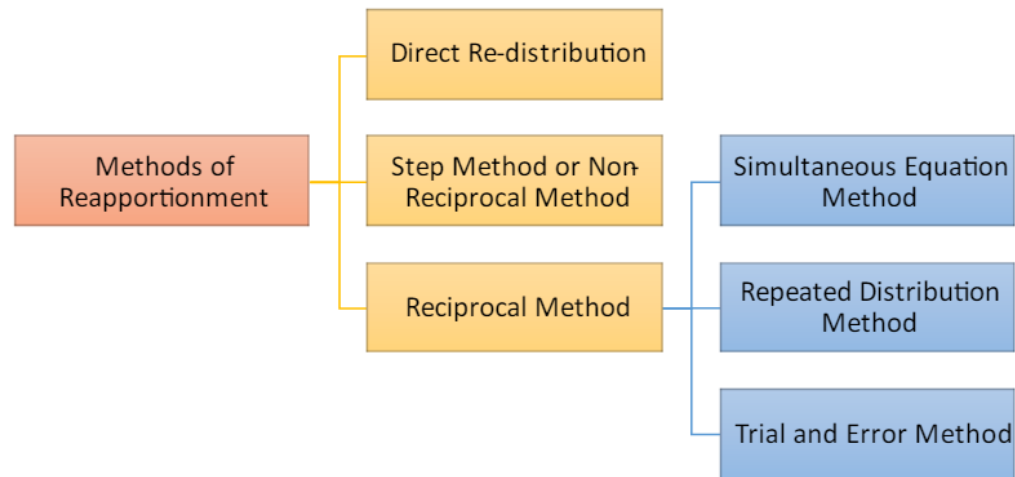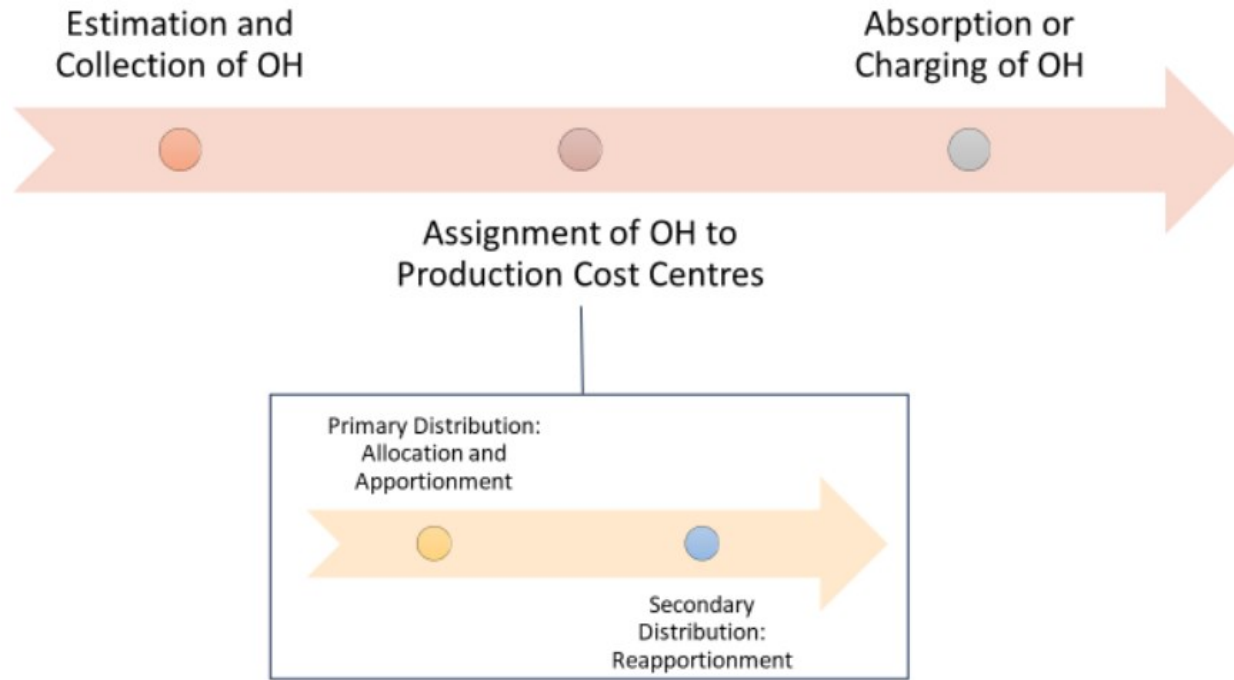**Personal Channel @learnwithpranav**

Concept

OVERHEADS

Meaning	• Overheads are the expenditure which **cannot be conveniently traced** to or identified with any cost object under consideration
	• Expenses on services that **facilitate or make possible** the carrying out of the production process
	• By **themselves**, these services are **not of any use**

Functional Classification of Overheads	Factory/ Production/ Mfg. Overheads	• All expenditures from **procurement** of materials to **completion** of Finished Goods.
		• Example: repair / dep. of factory building, primary packing, repair/ insurance of P&M, indirect labour, admin of factory etc.
	Office & Admin. Overheads	• Expenditures incurred on all activities relating to **General management and admin** of organization.
		• Example: salary to office staff, repair/ dep of office building, postage, stationery, lease rental, accounting and audit expense etc.

Concept

	Selling & Distribution Overheads	Selling: • expenses related to **sales of products** and include all indirect expenses in **sales management** for the organization. • Example: Salesman Commission, Advertisement Cost, Sales office Exp. etc. Distribution • Cost incurred for making product **available** in the market. • Example: delivery van expenses, transit insurance, warehouse, cold storage, secondary packing etc.
Note: Functional Classification is important from accounting point of view		

Concept

ACCOUNTING OF FACTORY OVERHEADS

Estimation and Collection of OH

Absorption or Charging of OH

Assignment of OH to Production Cost Centres

Primary Distribution: Allocation and Apportionment

Secondary Distribution: Reapportionment

Methods of Reapportionment

- Direct Re-distribution
- Step Method or Non-Reciprocal Method
- Reciprocal Method
  - Simultaneous Equation Method
  - Repeated Distribution Method
  - Trial and Error Method

EXAMPLE 1

AXY Ltd is a manufacturing company having three production departments P, Q and R and two service departments X and Y. The following estimated data is available for Nov 2021:

Particulars	P	Q	R	S	T
Area (sq. ft.)	500	500	1000	250	250
Capital value of asset (in lakhs)	40	30	20	6	4
Machine hours	200	600	200	100	0
Horsepower of Machines	60	30	50	50	0
Number of light points	10	12	20	8	10

ILLUSTRATION 1

XL Ltd., has three production departments and four service departments. The expenses for these departments as per Primary Distribution Summary are as follows:

Production Departments:	(₹)	(₹)
Dept.-A	30,00,000	
Dept.-B	26,00,000	
Dept.-C	24,00,000	80,00,000
Service Departments:	**(₹)**	**(₹)**
Stores	4,00,000	
Time-keeping and Accounts	3,00,000	
Power	1,60,000	
Canteen	1,00,000	9,60,000

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

	Dept. A	Dept. B	Dept. C
Horse power of Machine	300	300	200
Number of workers	20	15	15
Value of stores requisition in (₹)	2,50,000	1,50,000	1,00,000

PREPARE a statement apportioning the costs of service departments over the production departments using direct re-distribution method.

SOLUTION

Secondary Overhead Distribution Statement

Items of cost (as per primary distribution summary)	Basis of apportionment	Total (₹)	Production Departments		
			A (₹)	B (₹)	C (₹)
Cost as per primary distribution summary		80,00,000	30,00,000	26,00,000	24,00,000
Stores (5:3:2)	Value of Store requisition	4,00,000	2,00,000	1,20,000	80,000
Time-keeping and Accounts (4:3:3)	No. of workers	3,00,000	1,20,000	90,000	90,000
Power (3:3:2)	H.P. of Machine	1,60,000	60,000	60,000	40,000
Canteen (4:3:3)	No. of workers	1,00,000	40,000	30,000	30,000
		89,60,000	34,20,000	29,00,000	26,40,000

ILLUSTRATION 2

Suppose the expenses of two production departments A and B and two service departments X and Y are as under:

Department	Amount (₹)	Apportionment Basis		
		Y	A	B
Dept.-X	2,00,000	25%	40%	35%
Dept.-Y	1,50,000	—	40%	60%
Dept.-A	3,00,000			
Dept.-B	3,20,000			

PREPARE a statement apportioning the costs of service departments over the production departments using step method.

SOLUTION

Summary of Overhead Distribution

Departments	X (₹)	Y (₹)	A (₹)	B (₹)
Amount as given above	2,00,000	1,50,000	3,00,000	3,20,000
Expenses of service dept.-X is apportioned among other departments- Y, A and B in the ratio (5:8:7)	(2,00,000)	50,000	80,000	70,000
		2,00,000	3,80,000	3,90,000
Expenses of Dept.-Y apportioned between department A and B in the ratio (2:3)	-	(2,00,000)	80,000	1,20,000
Total	Nil	Nil	4,60,000	5,10,000

EXAMPLE 2

Suppose the expenses of two production departments A and B and two service departments X and Y are as under:

Department	Amount ₹	Apportionment Basis			
		X	Y	A	B
Dept X	2,00,000	NA	25%	40%	35%
Dept Y	1,50,000	10%	NA	40%	50%
Dept A	3,00,000				
Dept B	3,20,000				

PREPARE a statement apportioning the costs of service departments over the production departments using **all reciprocal methods.**

ILLUSTRATION 4

Sanz Ltd., is a manufacturing company having three production departments, 'A', 'B' and 'C' and two service departments 'X' and 'Y'. The following is the budget for December 2022:

	Total (₹)	A (₹)	B (₹)	C (₹)	X (₹)	Y (₹)
Direct material		1,00,000	2,00,000	4,00,000	2,00,000	1,00,000
Direct wages		5,00,000	2,00,000	8,00,000	1,00,000	2,00,000
Factory rent	4,00,000					
Power	2,50,000					
Depreciation	1,00,000					
Other overheads	9,00,000					

Additional information:					
Area (Sq. ft.)	500	250	500	250	500
Capital value of assets (₹ lakhs)	20	40	20	10	10
Machine hours	1,000	2,000	4,000	1,000	1,000
Horse power of machines	50	40	20	15	25

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

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

Required:

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

(ii) PREPARE a statement showing re-distribution of service departments expenses to production departments using Trial and error method.

SOLUTION

(i) Overhead Distribution Summary

	Basis	Total (₹)	A (₹)	B (₹)	C (₹)	X (₹)	Y (₹)
Direct materials	Direct	–	–	–	–	2,00,000	1,00,000
Direct wages	Direct	–	–	–	–	1,00,000	2,00,000
Factory rent (2:1:2:1:2)	Area	4,00,000	1,00,000	50,000	1,00,000	50,000	1,00,000
Power (10:16:16:3:5)*	H.P. × Machine Hrs.	2,50,000	50,000	80,000	80,000	15,000	25,000

Depreciation (2:4:2:1:1)	Capital value	1,00,000	20,000	40,000	20,000	10,000	10,000
Other overheads (1:2:4:1:1)	Machine hrs.	9,00,000	1,00,000	2,00,000	4,00,000	1,00,000	1,00,000
		16,50,000	2,70,000	3,70,000	6,00,000	4,75,000	5,35,000

*{(1000×50) : (2000×40) : (4000×20) : (1000×15) : (1000×25)}

(50000 : 80000 : 80000 : 15000 : 25000)

(ii)   Redistribution of Service Department's expenses:

		Service Departments	
		X (₹)	Y (₹)
Overheads as per primary distribution		4,75,000	5,35,000
(i)	Apportionment of Dept-X expenses to Dept-Y (10% of ₹ 4,75,000)	---	47,500
		---	5,82,500
(ii)	Apportionment of Dept-Y expenses to Dept-X [5% of (₹ 5,35,000 + ₹ 47,500)]	29,125	---
(i)	Apportionment of Dept-X expenses to Dept-Y (10% of ₹ 29,125)	---	2,913
(ii)	Apportionment of Dept-Y expenses to Dept-X (5% of ₹ 2,913)	146	---
Total		5,04,271	5,85,413

Distribution of Service departments' overheads to Production departments

	Production Departments		
	A (₹)	B (₹)	C (₹)
Overhead as per primary distribution	2,70,000	3,70,000	6,00,000
Dept- X (90% of ₹ 5,04,300)	2,26,900	75,600	1,51,300
Dept- Y (95% of ₹ 5,85,400)	3,51,300	2,04,900	---
	8,48,200	6,50,500	7,51,300

3. 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 (₹)	Direct labour hours	No. of employees	Area in sq.m.
Production:				
X	1,93,000	4,000	100	3,000
Y	64,000	3,000	125	1,500
Z	83,000	4,000	85	1,500
Service:				
P	45,000	1,000	10	500
Q	75,000	5,000	50	1,500
R	1,05,000	6,000	40	1,000
S	30,000	3,000	50	1,000

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

Department	Basis
P	Number of employees
Q	Direct labour hours
R	Area in square metres
S	Direct labour hours

You are required to:

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

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

3.   (a)   **Deccan Manufacturing Limited**

Schedule Showing the Distribution of Overhead Costs among Departments

	Production			Service			
	X (₹)	Y (₹)	Z (₹)	P (₹)	Q (₹)	R (₹)	S (₹)
Overhead cost	1,93,000	64,000	83,000	45,000	75,000	1,05,000	30,000
Distribution of Dept.P (100:125:85:-:50:40:50)	10,000	12,500	8,500	-45,000	5,000	4,000	5,000
Distribution of Dept.Q (4:3:4:-:-:6:3)	16,000	12,000	16,000	-	-80,000	24,000	12,000
Distribution of Dept.R (6:3:3:-:-:-:2)	57,000	28,500	28,500	-	-	-1,33,000	19,000
Distribution of Dept.S (4:3:4:-:-:-:-)	24,000	18,000	24,000	-	-	-	-66,000
Total	3,00,000	1,35,000	1,60,000				

(b)   Calculation of overhead recovery rate

	Dept-X	Dept-Y	Dept-Z
Total apportioned overheads	₹3,00,000	₹1,35,000	₹1,60,000
Direct labour hours	4,000	3,000	4,000
Overhead recovery rate per labour hour	**₹75**	**₹45**	**₹40**

Concept

ABSORPTION OF FACTORY OVERHEADS

Absorption	process of recovering overheads of a department or any other cost center from its output (unit/ job/ batch) is called recovery or absorption

Methods of Absorption:
- Percentage of direct materials
- Percentage of prime cost
- Percentage of direct labour cost
- Labour hour rate
- Machine hour rate
- Rate per unit of Output
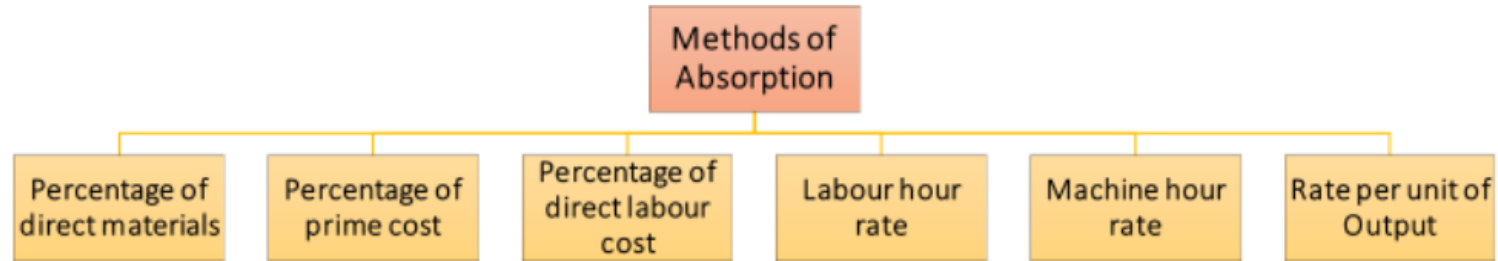
Methods of Absorption	% of Direct Materials	$\dfrac{\text{Total Production Overheads of a department}}{\text{Direct material cost}} \times 100$
	% of Prime Cost	$\dfrac{\text{Total Production Overheads of a department}}{\text{Prime cost}} \times 100$
	% of Direct Wages	$\dfrac{\text{Total Production Overheads of a department}}{\text{Direct Wages}} \times 100$
	Labour Hour Rate	$\dfrac{\text{Total Production Overheads of a department}}{\text{Direct Labour Hour}}$
	Machine Hour Rate	Detailed discussion below
	Per unit of Output	$\dfrac{\text{Total Production Overheads of a department}}{\text{Number of Units produced}}$

Concept

Machine Hour Rate	Direct Machine Hour Rate	• When each **machine or group of machines** is treated as a **cost centre**, overheads apportioned to a production department are further apportioned to machines or group of machines. • These apportioned costs are divided by the estimated productive machine hour of that machine to get machine hour rate. • Formula $$\frac{\text{cost apportioned to machine cost centre}}{\text{estimated productive machine hour of that machine}}$$
	Comprehensive Machine Hour Rate	• When a **single rate** is used for entire dept/ cost centre • here estimated overheads of **department** are divided by entire machine hours of department • Formula $$\frac{\text{Total Production Overheads of a department}}{\text{Estimated Productive machine hours of department}}$$

ILLUSTRATION 6

A machine costing ₹ 1,00,00,000 is expected to run for 10 years. At the end of this period its scrap value is likely to be ₹ 9,00,000. Repairs during the whole life of the machine are expected to be ₹ 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 ₹ 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 ₹ 30,000 and the lighting charges amount to ₹ 8,000 per month. The foreman is paid a monthly salary of ₹ 19,200. FIND OUT the machine hour rate, assuming insurance is @ 1% p.a. and the expenses on oil, etc., are ₹ 900 per month.

SOLUTION

Total number of hours per annum- 4,380

Total number of hours per month- 365

Computation of Machine Hour Rate

	Per month (₹)	Per hour (₹)
Fixed costs (Standing Charges)		
Depreciation (Refer working note-1)	75,833	
Rent (₹30,000 × ¼)	7,500	
Lighting charges {(₹8,000 × 2 points) ÷ 10 points}	1,600	
Foreman's salary (₹19,200 × 1/6)	3,200	
Sundry expenses (oil etc.)	900	
Insurance {(1% of ₹ 1,00,00,000) ÷ 12 months}	8,333	
	97,366	266.76
Variable costs:		
Repairs (Refer working note -2)		41.10
Electricity (15 units × ₹ 5)		75.00
Machine Hour rate		**382.86**

Working Notes:

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

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

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

(2)   Repairs for the whole life is ₹ 18,00,000, which can be linked to activity level of 43,800 hours. Thus, Repairs cost per hour $= \dfrac{₹18,00,000}{43,800 \text{ hours}} = ₹\,41.10$

ILLUSTRATION 7

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 ₹20 per hour. The factory works for fourty 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 fourty 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 ₹52,000.

➢ Maintenance and repairs per week per machine is ₹60.

➢ Consumable stores per week per machine are ₹75.

➢ Power: 20 units per hour per machine at the rate of 80 paise per unit. No power is used during the set-up hours.

➢ *Apportionment to the cost centre: Rent per annum ₹5,400, Heat and Light per annum ₹9,720, foreman's salary per annum ₹12,960 and other miscellaneous expenditure per annum ₹18,000.*

Required:

CALCULATE the cost of running one machine for a four week period.

SOLUTION

Effective Machine hour for four-week period

= Total working hours – unproductive set-up time

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

= (192 – 16 hours) =176 hours.

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

		(₹)	(₹)
(A)	Standing charges (per annum)		
	Rent	5,400	
	Heat and light	9,720	
	Forman's salary	12,960	
	Other miscellaneous expenditure	18,000	
	Standing charges (per annum)	46,080	
	Total expenses for one machine for four week period $\left(\dfrac{₹46,080}{3 \text{ machines} \times 13 \text{ four-week period}} \right)$		1,181.54
	Wages (48 hours × 4 weeks × ₹ 20 × 3 operators)		11,520.00
	Bonus {(176 hours × ₹ 20 × 3 operators) × 10%}		1,056.00
	Total standing charges		13,757.54

(B)	Machine Expenses		
	Depreciation		400.00
	$\left(₹52,000 \times 10\% \times \dfrac{1}{13\,\text{four-week period}}\right)$		
	Repairs and maintenance (₹60 × 4 weeks)		240.00
	Consumable stores (₹75 × 4 weeks)		300.00
	Power (176 hours × 20 units × ₹ 0.80)		
			2,816.00
	Total machine expenses		3,756.00
(C)	Total expenses (A) + (B)		17,513.54

(ii) Machine hour rate = $\dfrac{₹17,513.54}{176 \text{ hours}}$ = ₹99.51

5. 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 ₹ 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.	₹800
Production bonus estimated	15% on wages
Value of power consumed	₹80,500
Supervision and indirect labour	₹33,000
Lighting and electricity	₹12,000

These particulars are for a year

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

Insurance- ₹40,000

Depreciation- 10% of original cost.

Other sundry works expenses- ₹12,000

General management expenses allocated- ₹54,530.

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

5. **Computation of comprehensive machine hour rate of machine shop**

Particulars	(₹)
Operator's wages (*Refer to working note 2*)	7,38,000
Production bonus (15% on wages)	1,10,700
Power consumed	80,500
Supervision and indirect labour	33,000
Lighting and electricity	12,000
Repairs and maintenance (3%× ₹ 8 lakh×½)	12,000
Insurance (₹ 40,000 × ½)	20,000

Depreciation (10%×₹ 8 lakh×½)	40,000
Sundry works expenses (₹12,000 × ½)	6,000
General management expenses (₹54,530 × ½)	27,265
	10,79,465

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

$$= \frac{₹\,10,79,465}{7,200 \text{ hours}} \ (\textit{Refer to working note 1}) = \ ₹149.93$$

Working notes

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

	For 6 months and 6 operators
Normal available hours (208 x 6 months x 6 operators)	7,488
Less: Absenteeism hours (18 x 6 operators)	(108)
Paid hours	**7,380**
Less: Leave hours (20 x 6 operators)	(120)
Less: Idle time hours (10 x 6 operators)	(60)
Effective working hours	**7,200**

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 7,200 hours represent effective working hours.

2. Computation of operator's wages

Average rate of wages: $\dfrac{₹800}{8 \text{hours}}$ = ₹100 per hour

Total wages paid to 6 operators for 6 months = 7,380 hours × ₹ 100
= ₹ 7,38,000

4. Gemini Enterprises undertakes three different jobs A, B and C. All of them require the use of a special machine and also the use of a computer. The computer is hired and the hire charges work out to ₹ 4,20,000 per annum. The expenses regarding the machine are estimated as follows:

	(₹)
Rent for a quarter	17,500
Depreciation per annum	2,00,000
Indirect charges per annum	1,50,000

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

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

You are required to COMPUTE the machine hour rate:

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

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

4. **Working notes:**

(i) Total machine hours used   3,500

(600 + 900 + 400 + 600 + 1,000)

(ii) Total machine hours without the use of computers   1,500

(600 + 900)

(iii) Total machine hours with the use of computer   2,000

(400 + 600 + 1,000)

(iv) Total overheads of the machine per month

Rent (₹ 17,500 ÷ 3 months)   ₹ 5,833.33

Depreciation (₹ 2,00,000 ÷ 12 months)   ₹ 16,666.67

Indirect Charges (₹ 1,50,000 ÷ 12 months)   ₹ 12,500.00

Total   ₹ 35,000.00

(v)   Computer hire charges for a month = ₹ 35,000

(₹ 4,20,000 ÷ 12 months)

(vi)   Overheads for using machines without computer

$$= \frac{₹\, 35,000}{3,500 \text{ hrs.}} \times 1,500 \text{ hrs.} = ₹\, 15,000$$

(vii)   Overheads for using machines with computer

$$= \frac{₹\, 35,000}{3,500 \text{ hrs.}} \times 2,000 \text{ hrs.} + ₹\, 35,000 = ₹\, 55,000$$

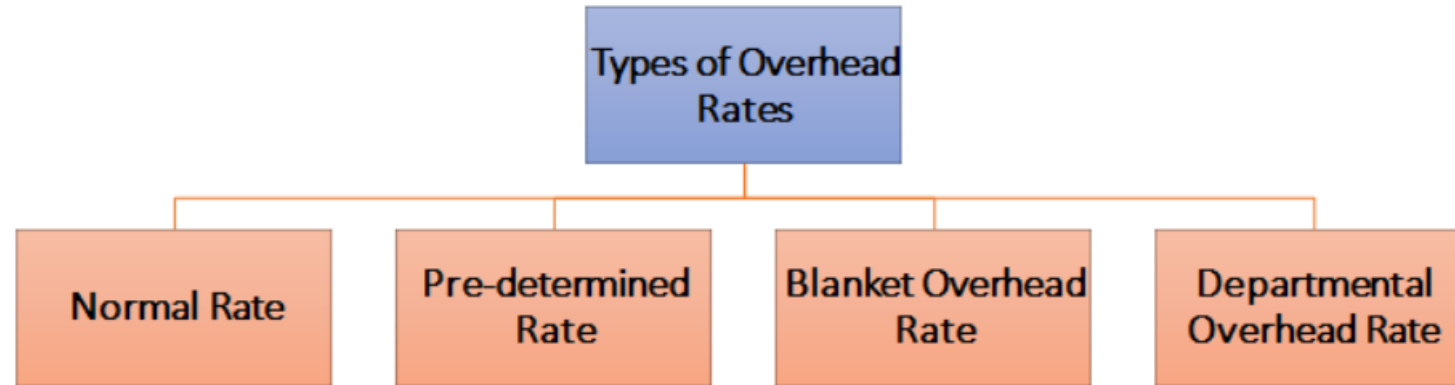**(a)   Computation of Machine hour rate for the firm as a whole for a month.**

(1)   When the Computer was used: $\dfrac{₹\, 55,000}{2,000 \text{ hours}}$ = ₹ 27.50 per hour

(2)   When the computer was not used: $\dfrac{₹\, 15,000}{1,500 \text{ hrs.}}$ = ₹ 10 per hour

(b)   Computation of Machine hour rate for the individual job

	Rate per hour	Job					
		A		B		C	
	(₹)	Hrs.	(₹)	Hrs.	(₹)	Hrs.	(₹)
Overheads							
Without Computer	10.0	600	6,000	900	9,000	-	-
With computer	27.5	400	11,000	600	16,500	1,000	27,500
Total		1,000	17,000	1,500	25,500	1,000	27,500
Machine hour rate			**17**		**17**		**27.5**

Concept

TYPES OF OVERHEAD RATES

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                    Types of Overhead
                         Rates
         ┌──────────────┬──────┴───────┬──────────────┐
   Normal Rate    Pre-determined   Blanket Overhead   Departmental
                      Rate             Rate          Overhead Rate
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Normal Rate	• Overhead Recovery rate which is calculated based on actual figures • Not useful as we require overhead recovery rates at the beginning of the period Formula: $\dfrac{\text{Actual amount of overheads}}{\text{Actual Base}}$
Pre-determined Rate	• Overhead Recovery Rates which is calculated before the period starts and is based on the estimated/ budgeted data Formula: $\dfrac{\text{Estimated amount of overheads}}{\text{Estimated Base}}$
Blanket Overhead Rate	• No department wise split, only one rate for entire factory. • Useful only when either only one department or only one product is produced

Concept

|	
	Formula: $\dfrac{\text{Total Estimated overheads for the Factory}}{\text{Estimated Base for the Factory}}$
Departmental Overhead Rate	• Used when there are multiple production departments Formula: $\dfrac{\text{Estimated overheads of the Dept}}{\text{Corresponding base}}$

UNDER / OVER ABSORBED OVERHEADS

Overheads Absorbed	Amount of Overheads distributed / added to the cost of cost object by way of absorption method.
Overheads Incurred	Actual Overheads Incurred which is known after the period is over.
Under Recovery / Under-absorbed Overheads	When Overheads Incurred > Overheads Absorbed Under-absorbed Overheads = Overheads Incurred - Overheads Absorbed
Over Recovery / Over-absorbed Overheads	When Overheads Incurred < Overheads Absorbed Over-absorbed Overheads = Overheads Absorbed - Overheads Incurred

Concept

Treatment of under/ over-absorbed overheads	• If difference under/ over absorption is **very large** it would be desirable to **adjust** the cost of products manufactured, as otherwise the cost figures would be unreasonable and misleading.
	• The adjustment to the cost can be made by using **supplementary overhead** rate
	• Production of any period can be identified in the three forms
	   – Goods finished and sold
	   – Goods finished and held in stock (not yet sold)
	   – Goods semi-finished (WIP)

Cost Ledgers to be used for adjustment	Type of Goods	Cost Account Name
	Goods finished and sold	Cost of Sales A/c
	Goods finished and held in stock (not yet sold)	Finished Goods A/c
	Semi-finished (WIP)	WIP A/c
Supplementary Rate	$$\dfrac{\text{Under / Overabsorbed OH to be charged to cost accounts}}{\text{Units Produced}}$$	

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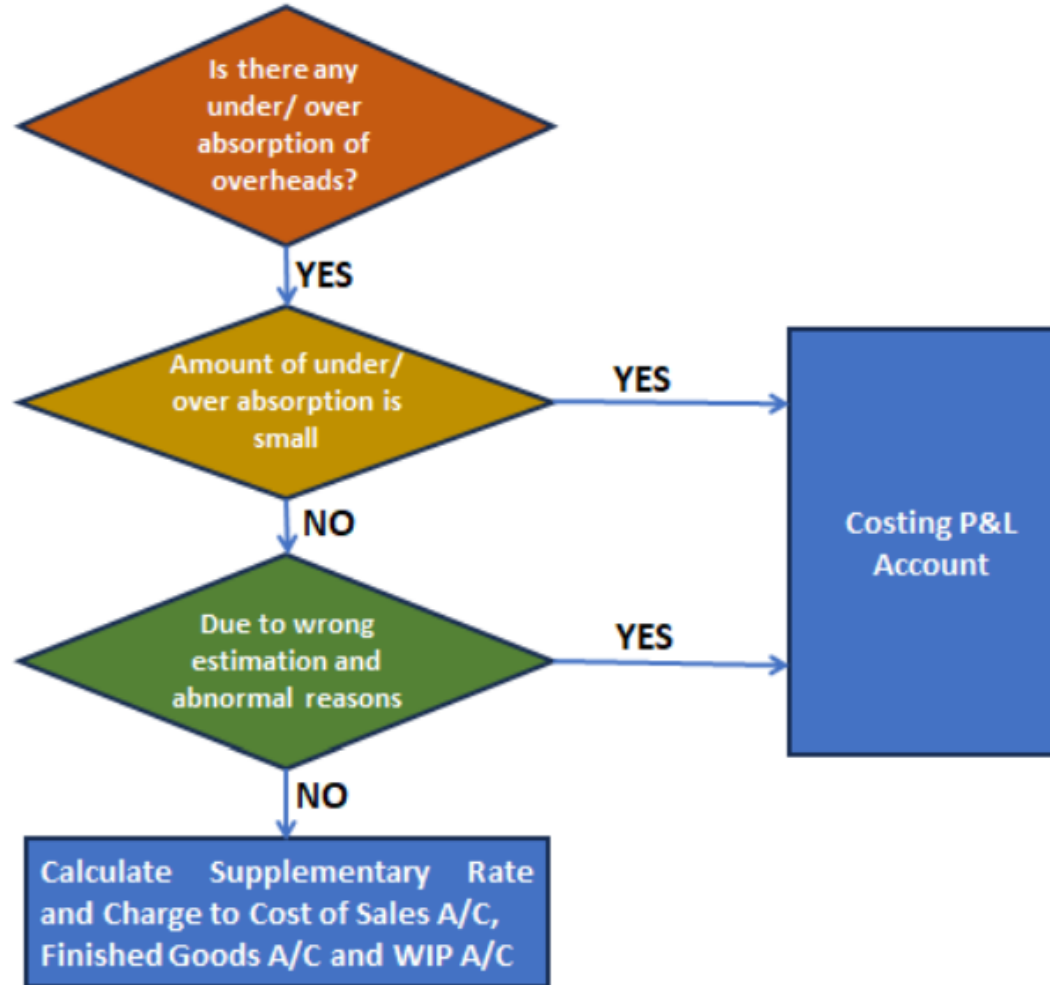
11. ABC Ltd. manufactures a single product and absorbs the production overheads at a pre-determined rate of ₹ 10 per machine hour.

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

The production and sales data for the current year 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 current year; and

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

11. **(i)** **Amount of under-absorption of production overheads during the current year**

		(₹)
Total production overheads actually incurred during the current year		6,00,000
Less : 'Written off' obsolete stores	₹ 45,000	
Wages paid for strike period	₹ 30,000	75,000
Net production overheads actually incurred : (A)		5,25,000
Production overheads absorbed by 48,000 machine hours @ ₹ 10 per hour : (B)		4,80,000
Amount of under – absorption of production overheads : [(A) – (B)]		45,000

(ii) **Accounting treatment of under absorption of production overheads**

It is given in the statement of the question that 20,000 units were completely finished and 8,000 units were 50% complete, one third of the under-absorbed overheads were due to lack of production planning and the rest were attributable to normal increase in costs.

(₹)

1. (33 – 1/3% of ₹ 45,000) i.e., ₹ 15,000 of under-absorbed overheads were due to lack of production planning. This being abnormal, should be debited to the Costing Profit and Loss A/c.   15,000

2. Balance (66–2/3% of ₹ 45,000) i.e., ₹ 30,000 of under-absorbed overheads should be distributed over work-in-progress, finished goods and cost of sales by using supplementary rate.   30,000

Total under-absorbed overheads   45,000

Apportionment of unabsorbed overheads of ₹ 30,000 over, work-in progress, finished goods and cost of sales

	Equivalent Completed Units	(₹)
Work-in-Progress		
(4,000 units × ₹ 1.25)	4,000	5,000
(Refer to working note)		
Finished goods		
(2,000 units × ₹ 1.25)	2,000	2,500
Cost of sales		
(18,000 units × ₹ 1.25)	18,000	22,500
	24,000	30,000

Working Note

$$\text{Supplementary rate per unit} = \frac{₹\,30,000}{24,000} = ₹\,1.25$$

ILLUSTRATION 9 (Reverse Calculation of Factory Overhead and Administrative overheads)

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:

	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:

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

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

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

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

SOLUTION

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

Let the 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:

Direct materials + Direct wages + Factory overhead

For Job 101 = ₹ 54,000 +₹ 42,000 + ₹ 42,000F

For Job 102 = ₹ 37,500 +₹ 30,000 + ₹ 30,000F

Total Cost of Jobs:

Factory cost + Administrative overhead

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

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

The value of F & A can be found using following equations

$$₹\ 96{,}000\ +\ ₹\ 42{,}000F\ +\ ₹\ 96{,}000A\ +\ ₹\ 42{,}000AF\ =\ ₹\ 1{,}51{,}500 \quad \text{...eqn (i)}$$

$$₹\ 67{,}500\ +\ ₹\ 30{,}000F\ +\ ₹\ 67{,}500A\ +\ ₹\ 30{,}000AF\ =\ ₹\ 1{,}06{,}875 \quad \text{...eqn (ii)}$$

Multiply equation (i) by 5 and equation (ii) by 7

$$₹\ 4{,}80{,}000\ +\ ₹\ 2{,}10{,}000F\ +\ ₹\ 4{,}80{,}000A\ +\ ₹\ 2{,}10{,}000AF\ =\ ₹\ 7{,}57{,}500 \quad \text{...eqn (iii)}$$

$$₹\ 4{,}72{,}500\ +\ ₹\ 2{,}10{,}000F\ +\ ₹\ 4{,}72{,}500A\ +\ ₹\ 2{,}10{,}000AF\ =\ ₹\ 7{,}48{,}125 \quad \text{...eqn (iv)}$$

-	-	-	-		-

$$₹\ 7{,}500\ +\ ₹\ 7{,}500A\ =\ ₹\ 9{,}325$$

$$₹\ 7{,}500\ A\ =\ ₹\ 9{,}325\ –\ ₹\ 7{,}500$$

A = 0.25

Now put the value of A in equation (i) to find the value of F

₹ 96,000 + ₹ 42,000F + ₹ 24,000 + ₹ 10,500F = ₹ 1,51,500

₹ 52,500F = ₹ 1,51,500 − ₹ 1,20,000

F = 0.6

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

Hence, percentage recovery rates of:

Factory overheads = 60% of wages and

Administrative overheads = 25% of factory cost.

Working note:

$$\text{Total Cost} = \frac{\text{Selling price}}{(100\% + \text{Percentage of profit})}$$

$$\text{*For Job 101} = \frac{₹1,66,650}{(100\% + 10\%)} = ₹\ 1,51,500$$

$$\text{**For Job 102} = \frac{₹1,28,250}{(100\% + 20\%)} = ₹\ 1,06,875$$

(ii) **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 (10% & 20% respectively)	15,150	21,375
Selling price	1,66,650	1,28,250

(iii) Selling price of Job 103

	(₹)
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 $\left[\dfrac{\text{Total Cost}}{87.5\%}\right]$	80,000

ILLUSTRATION 10

A company which sells four products, some of these are unprofitable. Company proposes to discontinue to sale one of these products. The following information is available regarding income, costs and activity for the year ended 31st March.

	Products			
	A	**B**	**C**	**D**
Sales (₹)	30,00,000	50,00,000	25,00,000	45,00,000
Cost of goods sold (₹)	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:

	Amount (₹)	Basis of allocation to products
Fixed Costs		
Rent & Insurance	3,00,000	Area of storage (Sq.ft.)
Depreciation	1,00,000	No. of Parcels sent
Salesmen's salaries & expenses	6,00,000	Sales Volume
Administrative wages and salaries	5,00,000	No. of invoices sent
Variable Costs:		
Packing wages & materials	₹ 2 per parcel	
Commission	4% of sales	
Stationery	₹ 1 per invoice	

You are required to PREPARE Costing Profit & Loss Statement, showing the percentage of profit or loss to sales for each product.

SOLUTION

Statement of Profit or Loss on Various Products during the year ended March 31st.

	Total (₹)	Products A (₹)	B (₹)	C (₹)	D (₹)
Sales	1,50,00,000	30,00,000	50,00,000	25,00,000	45,00,000
Variable costs:					
Cost of goods sold	1,08,50,000	20,00,000	45,00,000	21,00,000	22,50,000
Commissions 4% of sales	6,00,000	1,20,000	2,00,000	1,00,000	1,80,000
Packing wages & materials @ ₹ 2 per parcel	10,00,000	2,00,000	3,00,000	1,50,000	3,50,000
Stationery @ ₹ 1 per invoice	4,00,000	80,000	1,40,000	60,000	1,20,000
Total variable costs	1,28,50,000	24,00,000	51,40,000	24,10,000	29,00,000

Contribution (Sales – variable cost)	21,50,000	6,00,000	(1,40,000)	90,000	16,00,000
Fixed Costs:					
Rent & Insurance (5:4:8:3)	3,00,000	75,000	60,000	1,20,000	45,000
Depreciation (4:6:3:7)	1,00,000	20,000	30,000	15,000	35,000
Salesmen's salaries & expenses (6:10:5:9)	6,00,000	1,20,000	2,00,000	1,00,000	1,80,000
Administrative wages & salaries (4:7:3:6)	5,00,000	1,00,000	1,75,000	75,000	1,50,000
Total Fixed costs	15,00,000	3,15,000	4,65,000	3,10,000	4,10,000
Profit or Loss (Contribution–fixed Costs)	6,50,000	2,85,000	(6,05,000)	(2,20,000)	11,90,000
Percentage of profit or Loss on sales (%)	4.33	9.50	(12.10)	(8.80)	26.4

Concept

CONCEPT RELATED TO CAPACITY

Installed/ Rated Capacity	• Maximum capacity of producing goods or providing services. • This capacity is unachievable practically hence called as theoretical capacity
Practical Capacity	• This capacity takes into account loss of time due to repairs, maintenance, minor breakdown, idle time, set up time, normal delays, Sundays and holidays, stock taking etc. • Generally it is 80 to 90% of installed capacity.
Normal	• Volume of production or services achieved or achievable on an average over a period under normal circumstances taking into account the reduction in capacity resulting from planned maintenance.
Actual	• It is the capacity actually achieved during a given period. It is presented as a percentage of installed capacity.
Idle	• It is that part of the capacity of a plant, machine or equipment which cannot be effectively utilized in production
Normal Idle Capacity	• It is the difference between Installed capacity and Normal capacity
Abnormal Idle Capacity	• It is the difference between Normal capacity and Actual capacity utilization where the actual capacity is lower than the normal capacity
Relationships	• Installed Capacity – Normal Idle Capacity = Normal Capacity • Normal Capacity – Abnormal Idle Capacity = Actual Capacity

EXAMPLE 5

A machinery 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

ANSWER: a. 36.5, b. 30, c. 25, d. 25.2

Important Questions List

S No.	Source	Que Reference	Requirement	Remark
1	Costing Compendium	Example 1	Apportionment of OH	Practice Apportion
2	ICAI SM	Illustration 1	Statement of Reapportionment	Direct Redistribution Method
3	ICAI SM	Illustration 2	Statement of Reapportionment	Step Method
4	Costing Compendium	Example 2	Statement of Reapportionment by all reciprocal methods	Reciprocal Method
5	ICAI SM	Illustration 4	Statement of Primary Distribution and Redistribution	Treatment of Direct Costs of Service Departments
6	ICAI SM	Practical Problem Q3	Statement of Reapportionment	Step Ladder Method
7	ICAI SM	Illustration 6	Direct Machine Hour Rate	Direct Machine Hour Rate
8	ICAI SM	Illustration 7	Cost of running one machine for four weeks & rate	Hours calculation
9	ICAI SM	Practical Problem Q5	Comprehensive Machine Hour Rate	Operators Wages
10	ICAI SM	Practical Problem Q4	Machine Hour Rate with and without Computer	Expenses Allocation

Important Questions List

S No.	Source	Que Reference	Requirement	Remark
11	ICAI SM	Practical Problem Q11	Underabsorption, Treatment in Accounts	Exhaustive
12	ICAI SM	Illustration 9	Recovery Rates Factory and Admin	Equation based calculation
13	ICAI SM	Illustration 10	Costing P&L	Selling & Distribution OH Schedule
14	Costing Compendium	Example 5	Capacities	Capacity Concept