4
Overheads

Question 1

MST Limited has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity.

Activity	*Cost Driver*	*Capacity*	*Cost*
Power	*Kilowatt hours*	*50,000 kilowatt hours*	*₹2,00,000*
Quality Inspections	*Number of Inspections*	*10,000 Inspections*	*₹3,00,000*

The company makes three products, M, S and T. For the year ended March 31, 2004, the following consumption of cost drivers was reported:

Product	*Kilowatt Hours*	*Quality Inspections*
M	*10,000*	*3,500*
S	*20,000*	*2,500*
T	*15,000*	*3,000*

Required:

(i) Compute the costs allocated to each product from each activity.

(ii) Calculate the cost of unused capacity for each activity.

(iii) Discuss the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate. (6 Marks, May 2004)

(Out of Syllabus for the student of Intermediate (IPC), shifted to Advanced Management Accounting, Chartered Accountancy Final Course)

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Answer

(i) Statement of cost allocation to each product from each activity

	Product			
	M ₹	S ₹	T ₹	Total ₹
Power (Refer to working note)	40,000 (10,000 kwh x ₹ 4)	80,000 (20,000 kwh x ₹ 4)	60,000 (15,000 kwh x ₹ 4)	1,80,000
Quality inspections (Refer to working note)	1,05,000 (3,500 Inspections x ₹ 30)	75,000 (2,500 Inspections x ₹ 30)	90,000 (3,000 Inspections x ₹ 30)	2,70,000

Working note:

Rate per unit of cost driver:

Power : (₹ 2,00,000 ÷ 50,000 kwh) = ₹ 4/kwh

Quality inspection : (₹ 3,00,000 ÷ 10,000 inspections) = ₹ 30 per inspection

(ii) Computation of cost of unused capacity for each activity:

	₹
Power (₹2,00,000 – ₹1,80,000)	20,000
Quality inspections (₹3,00,000 – ₹2,70,000)	30,000
Total cost of unused capacity	50,000

(iii) Factors management consider in choosing a capacity level to compute the budgeted fixed overhead cost rate :

- Effect on product costing & capacity management.
- Effect on pricing decisions.
- Effect on performance evaluation.
- Effect on financial statements.
- Regulatory requirements.
- Difficulties in forecasting chosen capacity level concepts..

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Question 2

Discuss the treatment of under-absorbed and over-absorbed factory overheads in cost accounting. (4 Marks, May 2004; November 2010) (6 Marks, May 2006) (3 Marks, May 2010)

Answer

Treatment of under absorbed and over absorbed factory overheads in cost accounting:

Factory overheads are usually applied to production on the basis of pre-determined rate

$$= \frac{\text{Estimated normal overheads for the period}}{\text{Budgeted No. of units during the period}}$$

The possible options for treating under / over absorbed overheads are

- Use supplementary rate in the case of substantial amount of under / over absorption
- Write it off to the costing profit & loss account in the event of insignificant amount / or abnormal reasons.
- Carry forward to next accounting period if operating cycle exceeds one year.

Question 3

RST Limited specializes in the distribution of pharmaceutical products. It buys from the pharmaceutical companies and resells to each of the three different markets:

(i) General Supermarket Chains

(ii) Drugstore Chains

(iii) Chemist Shops

The following data for the month of April, 2004 in respect of RST Limited has been reported:

	General Supermarket Chains	*Drugstore Chains*	*Chemist Shops*
Average revenue per delivery	*₹ 84,975*	*₹ 28,875*	*₹ 5,445*
Average cost of goods sold per delivery	*₹ 82,500*	*₹ 27,500*	*₹ 4,950*
Number of deliveries	*330*	*825*	*2,750*

In the past, RST Limited has used gross margin percentage to evaluate the relative profitability of its distribution channels.

The company plans to use activity-based costing for analysing the profitability of its distribution channels.

The Activity analysis of RST Limited is as under:

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Activity Area	*Cost Driver*
Customer purchase order processing	*Purchase orders by customers*
Line-item ordering	*Line-items per purchase order*
Store delivery	*Store deliveries*
Cartons dispatched to stores	*Cartons dispatched to a store per delivery*
Shelf-stocking at customer store	*Hours of shelf-stocking*

The April, 2004 operating costs (other than cost of goods sold) of RST Limited are ₹8,27,970. These operating costs are assigned to five activity areas. The cost in each area and the quantity of the cost allocation basis used in that area for April, 2004 are as follows:

Activity Area	*Total costs in April, 2004*	*Total Units of Cost Allocation Base used in April, 2004*
Customer purchase order processing	*₹2,20,000*	*5,500 orders*
Line-item ordering	*₹1,75,560*	*58,520 line items*
Store delivery	*₹1,95,250*	*3,905 store deliveries*
Cartons dispatched to store	*₹2,09,000*	*2,09,000 cartons*
Shelf-stocking at customer store	*₹28,160*	*1,760 hours*

Other data for April, 2004 include the following:

	General Supermarket Chains	*Drugstore Chains*	*Chemist Shops*
Total number of orders	*385*	*990*	*4,125*
Average number of line items per order	*14*	*12*	*10*
Total number of store deliveries	*330*	*825*	*2,750*
Average number of cartons shipped per store delivery	*300*	*80*	*16*
Average number of hours of shelf-stocking per store delivery	*3*	*0.6*	*0.1*

Required:

(i) Compute for April, 2004 gross-margin percentage for each of its three distribution channels and compute RST Limited's operating income.

(ii) Compute the April, 2004 rate per unit of the cost-allocation base for each of the five activity areas.

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(iii) Compute the operating income of each distribution channel in April, 2004 using the activity-based costing information. Comment on the results. What new insights are available with the activity-based cost information?

(iv) Describe four challenges one would face in assigning the total April, 2004 operating costs of ₹ 8,27,970 to five activity areas. *(12 Marks, May 2004)*

(Out of Syllabus for the student of Intermediate (IPC), shifted to Advanced Management Accounting, Chartered Accountancy Final Course.)

Answer

(i) RST Limited's

Statement of operating income and gross margin percentage

for each of its three distribution channel

	General Super Market chains	Drugstore Chains	Chemist Shops	Total
Revenues: (₹)	2,80,41,750 (330 x ₹84,975)	2,38,21,875 (825 x ₹28,875)	1,49,73,750 (2,750x ₹5,445)	6,68,37,375
Less: Cost of goods sold: (₹)	2,72,25,000 (330 x ₹82,500)	2,26,87,500 (825 x ₹27,500)	1,36,12,500 (2,750 x ₹4,950)	6,35,25,000
Gross margin: (₹)	8,16,750	11,34,375	13,61,250	33,12,375
Less: Other operating costs: (₹)				8,27,970
Operating income: (₹)				24,84,405
Gross margin %	2.91%	4.76%	9.09%	4.96%
Operating income %				3.72

(ii) Computation of rate per unit of the cost allocation base for each of the five activity areas for April 2004

		₹
Customer purchase order processing	(₹ 2,20,000÷ 5,500 orders)	40/ order
Line item ordering	(₹ 1,75,560 ÷ 58,520 line items)	3/line item order

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Store delivery	(₹ 1,95,250 ÷ 3,905 store deliveries)	50/delivery
Cartons dispatched	(₹ 2,09,000 ÷ 2,09,000 dispatches)	1/ dispatch
Shelf-stocking at customer store (₹)	(₹ 28,160 ÷ 1,760 hours	16/hour

(iii) Operating Income Statement of each distribution channel in April-2004 (Using the Activity based Costing information)

	General Supermarket Chains	Drugstore Chains	Chemist Shops
Gross margin (₹) : (A) (Refer to (i) part of the answer)	8,16,750	11,34,375	13,61,260
Operating cost (₹) : (B) (Refer to working note)	1,62,910	1,90,410	4,74,650
Operating income (₹) : (A –B)	6,53,840	9,43,965	8,86,600
Operating income (in %) (Operating income/Revenue) x 100	2.33%	3.96%	5.92%

Comments and new insights: The activity-based cost information highlights, how the 'Chemist Shops' uses a larger amount of RST Ltd's resources per revenue than do the other two distribution channels. Ratio of operating costs to revenues, across these markets is:

General supermarket chains (₹1,62,910 / ₹2,80,00,750) x 100	0.58%
Drug store chains (₹1,90,410 / ₹2,38,21,875) x 100	0.80%
Chemist shops (₹4,74,650 / ₹1,49,73,750) x 100	3.17%

Working note:

Computation of operating cost of each distribution channel:

	General Supermarket Chains	Drugstore Chains	Chemist Shops
	₹	₹	₹
Customer purchase order processing	15,400 (₹40 × 385 orders)	39,600 (₹40 × 990 orders)	1,65,000 (₹40 × 4125 orders)
Line item ordering	16,170	35,640	1,23,750

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	(₹ 3 × 14 × 385 orders)	(₹3 × 12× 990 orders)	(₹3 × 10 × 4125 orders)
Store delivery	16,500	41,250	1,37,500
	(₹ 50 × 330 deliveries)	(₹ 50 × 825 deliveries)	(₹ 50 × 2750 deliveries)
Cartons dispatched	99,000	66,000	44,000
	(₹ 1× 300 cartons × 330 deliveries)	(₹ 1 × 80 cartons × 825 deliveries)	(₹ 1 × 16 cartons × 2,750 deliveries)
Shelf stocking	15,840	7,920	4,400
	(₹ 16 × 330 deliveries × 3 Av. hrs.)	(₹ 16 × 825 deliveries ×. 0.6 Av. hrs)	(₹ 16 × 2,750 deliveries × 0.1 Av. hrs)
Operating cost	1,62,910	1,90,410	4,74,650

(iv) Challenges faced in assigning total operating cost of ₹8,27,970 :

- Choosing an appropriate cost driver for activity area.
- Developing a reliable data base for the chosen cost driver.
- Deciding, how to handle costs that may be common across several activities.
- Choice of the time period to compute cost rates per cost driver.
  - Behavioural factors.

Question 4

MNP suits is a ready-to-wear suit manufacturer. It has four customers: two wholesale-channel customers and two retail-channel customers.

MNP suits has developed the following activity-based costing system:

Activity	*Cost driver*	*Rate in 2004*
Order processing	*Number of purchase orders*	*₹1,225 per order*
Sales visits	*Number of customer visits*	*₹7,150 per visit*
Delivery-regular	*Number of regular deliveries*	*₹1,500 per delivery*
Delivery-rushed	*Number of rushed deliveries*	*₹4,250 per delivery*

List selling price per suit is ₹1,000 and average cost per suit is ₹550. The CEO of MNP suits wants to evaluate the profitability of each of the four customers in 2003 to explore opportunities for increasing profitability of his company in 2004. The following data are available for 2003:

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Item	Wholesale customers		Retail customers	
	W	H	R	T
Total number of orders	44	62	212	250
Total number of sales visits	8	12	22	20
Regular deliveries	41	48	166	190
Rush deliveries	3	14	46	60
Average number of suits per order	400	200	30	25
Average selling price per suit	₹ 700	₹ 800	₹ 850	₹ 900

Required:

(i) Calculate the customer-level operating income in 2003

(ii) What do you recommend to CEO of MNP suits to do to increase the company's operating income in 2004?

(iii) Assume MNP suits' distribution channel costs are ₹ 17,50,000 for its wholesale customers and ₹ 10,50,000 for the retail customers. Also, assume that its corporate sustaining costs are ₹ 12,50,000. Prepare Income statement of MNP suits for 2003.

(10 Marks, November 2004)

(Out of Syllabus for the student of Intermediate (IPC), shifted to Advanced Management Accounting, Chartered Accountancy Final Course)

Answer

(i) Customer Profitability Analysis, Customer cost hierarchy

Item	W	H	R	T
Revenues	₹	₹	₹	₹
At list price (₹)				
44×400 = 17,600				
62×200 = 12,400				
212×30 = 6,360				
250×25 = 6,250				
17,600×1,000,12,400×1,000,				
6,360×1,000, 6,250×1,000				
	1,76,00,000	1,24,00,000	63,60,000	62,50,000
Discount				
1,000-700=300				
1,000-800=200				
1,000-850=150				
1,000-900=100				

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17,600×300,12,400×200, 6,360×150,6,250×100				
	52,80,000	24,80,000	9,54,000	6,25,000
Revenues at actual prices	1,23,20,000	99,20,000	54,06,000	56,25,000
Cost of Goods Sold				
17,600×550				
12,400×550				
6,360×550				
6,250×550				
	96,80,000	68,20,000	34,98,000	34,37,500
Gross Margin	26,40,000	31,00,000	19,08,000	21,87,500

	W	H	R	T
Customer level operating costs:				
Order processing (44,62,212,250) × (₹ 1,225)	53,900	75,950	2,59,700	3,06,250
Sales Visits (8,12,22,20)× (₹ 7,150)	57,200	85,800	1,57,300	1,43,000
Delivery regular (41,48,166,190) × (₹ 1,500)	61,500	72,000	2,49,000	2,85,000
Delivery rushed (3,14,46,60) × (₹ 4,250)	12,750	59,500	1,95,500	2,55,000
Total customer level operating cost	1,85,350	2,93,250	8,61,500	9,89,250
Customer level operating income	24,54,650	28,06,750	10,46,500	11,98,250
Customer level operating income as %age on revenues at actual prices	19.92	28.29	19.35	21.30

(ii) Key Challenges facing CEO are—

(i) Reduce level of price discounting, especially by W

(ii) Reduce level of customer –level costs, especially by R & T

The ABC cost system highlights areas where R&T accounts are troublesome

They have

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- high number of orders
- high number of customer visits,
- high number of rushed deliveries

The CEO needs to consider whether this high level of activity can be reduced without reducing customer revenues.

(iii) Income Statement of MNP suits for 2003 (in ₹)

	Wholesale Customers ₹	Retail customers ₹	Total ₹
Customer level operating income	52,61,400	22,44,750	75,06,150
Less: distribution channel cost	17,50,000	10,50,000	28,00,000
Distribution channel level operating income	35,11,400	11,94,750	47,06,150
Less: Corporate sustaining costs			12,50,000
Operating Income			34,56,150

Question 5

Discuss the step method and reciprocal service method of secondary distribution of overheads. *(4 Marks, November 2004)*

Answer

Step method and Reciprocal Service method of secondary distribution of overheads

Step method: This method gives cognisance to the service rendered by service department to another service dep't, thus sequence of apportionments has to be selected. The sequence here begins with the dep't that renders service to the max number of other service dep't. After this, the cost of service dep't serving the next largest number of dep't is apportioned.

Reciprocal service method : This method recognises the fact that where there are two or more service dep't, they may render service to each other and, therefore, these inter dep't services are to be given due weight while re-distributing the expense of service dep't. The methods available for dealing with reciprocal servicing are:

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

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Question 6

Explain: Single and multiple overhead rate. *(2 Marks, May 2005)*

Answer

Single and multiple overhead rate: A single overhead rate, when computed for the entire factory is known as the blanket rate.

Blanket rate = Overhead cost of entire factory / total quantum of the base selected

The blanket rates can be utilised in the following cases;

- Where only one major product is being produced.
- Where several products are produced but: (a) all products pass through all departments and (b) all products require the same length of time in each department.

When the above conditions are not applicable, separate departmental rates should be used.

Multiple rates involve computation of separate rates for each production department, service department, cost-centre, each product or line and each production factor.

Question 7

Discuss the treatment of research and development expenditures in cost accounting.

(3 Marks, May 2005)

Answer

If research is conducted in the methods of production, the expenses should be charged to production overhead. If the research relates to administration, the expenses are charged to administration overheads. If it is related to market research, the expenses are charged to S&D overheads. Development costs incurred in connection with a particular product should be charged directly to that product. Such expenses are usually treated as deferred revenue expenditure and recovered as cost per unit of the product when production is fully established. Routine nature research expenses are charged to general overheads.

Question 8

A manufacturing unit has purchased and installed a new machine of ₹ 12,70,000 to its fleet of 7 existing machines. The new machine has an estimated life of 12 years and is expected to realise ₹ 70,000 as scarp at the end of its working life. Other relevant data are as follows:

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

(ii) Estimated cost of maintenance of the machine is ₹ 25,000 (p.a.).

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

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

(v) Electricity used by the machine during the production is 16 units per hour at a cost of ₹ 3 per unit. No current is taken during maintenance and setting up.

(vi) Departmental and general works overhead allocated to the operation during last year was ₹ 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. *(5 Marks, May 2005)*

Answer

Computation of Machine hour Rate

	Per year	Per hour (unproductive)	Per hour (productive)
Standing charges			
Operators wages			
4× 420 × 54	90,720		
Add: Fringe Benefits 15%	13,608		
	1,04,328		
Departmental and general overhead			
(50,000 + 5,000)	55,000		
Total Std. Charging for 8 machines	1,59,328		
Cost per Machine 1,59,328/8	19,916		
Cost per Machine hour 19,916/2,200		9.05	
19,916/2,292			8.69
Machine hours:			
Setting time unproductive (2,592-300-92)= 2200			
Setting time productive (2,592-300) = 2,292			
Machine expenses			
Depreciation (12,70,000 -70,000)/(12 ×2,200)		45.45	
(12,70,000-70,000)/(12 × 2,292)			43.63
Electricity (16× 3)		48.00	
(16×3×2,200)/2,292)			46.07
Special chemical solution (400×54)/2,200/ 2,292		9.82	9.42

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Maintenance (25,000/2,200)		11.36	
(25,000/2,292)			10.91
Machine Hour Rate		123.68	118.72

Question 9

An engine manufacturing company has two production departments: (i) Snow mobile engine and (ii) Boat engine and two service departments: (i) Maintenance and (ii) Factory office. Budgeted cost data and relevant cost drivers are as follows:

Departmental costs:	*₹*
Snow mobile engine	*6,00,000*
Boat engine	*17,00,000*
Factory office	*3,00,000*
Maintenance	*2,40,000*
Cost drivers:	
Factory office department:	*No. of employees*
Snow mobile engine department	*1,080 employees*
Boat engine department	*270 employees*
Maintenance department	*150 employees*
	1,500
Maintenance department:	*No. of work orders*
Snow mobile engine department	*570 orders*
Boat engine department	*190 orders*
Factory office department	*40 orders*
	800

Required:

(i) Compute the cost driver allocation percentage and then use these percentage to allocate the service department costs by using direct method.

(ii) Compute the cost driver allocation percentage and then use these percentage to allocate the service department costs by using non-reciprocal method/step method.

(5 Marks, May 2005)

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Answer

(i) Cost Driver Allocation percentage

Factory office dept.	Number of employees	Percent used
Snowmobile engine	1,080	80%
Boat engine	270	20%
Total	1,350	100%
Maintenance dept	Number of work orders	
Snowmobile engine	570	75%
Boat engine	190	25%
	760	100

Service department allocation:

	Factory office dept.	Maintenance dept.	Snowmobile engine	Boat engine
Departmental Cost	₹ 3,00,000	₹ 2,40,000	₹ 6,00,000	₹ 17,00,000
Allocated costs (₹):				
Factory office Dept.	(3,00,000)	-	2,40,000	60,000
Maintenance Dept.	-	(2,40,000)	1,80,000	60,000
Total	0	0	10,20,000	18,20,000

(ii) Cost Driver allocation percentage

Factory office dept	Number of employees	Percent used
Snowmobile engine	1,080	72%
Boat engine	270	18%
Maintenance dept	150	10%
	1,500	100%
Maintenance dept	Work order	Percent used
Snowmobile engine	570	75%
Boat engine	190	25%
	760	100%

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Service department allocation:				
	Factory office Dept.	Maintenance Dept.	Snowmobile engine	Boat engine
Departmental costs	₹ 3,00,000	₹ 2,40,000	₹ 6,00,000	₹ 17,00,000
Allocated costs (₹):				
Factory office	(3,00,000)	30,000	2,16,000	54,000
Maintenance dept	-	(2,70,000)	20,2500	67,500
Total cost	0	0	10,18,500	18,21,500

Question 10

A B C D Co. Ltd. produces and sells four products A, B, C and D. These products are similar and usually produced in production runs of 10 units and sold in a batch of 5 units. The production details of these products are as follows:

Product	*A*	*B*	*C*	*D*
Production (Units)	*100*	*110*	*120*	*150*
Cost per unit:				
Direct material (₹)	*30*	*40*	*35*	*45*
Direct labour (₹)	*25*	*30*	*30*	*40*
Machine hour (per unit)	*5*	*4*	*3*	*4*

The production overheads during the period are as follows:

	₹	*₹*
Factory works expenses	*22,500*	
Stores receiving costs	*8,100*	
Machine set up costs	*12,200*	
Cost relating to quality control	*4,600*	
Material handling and dispatch	*9,600*	*57,000*

The cost drivers for these overheads are detailed below:

Cost	*Cost drivers*
Factory works expenses	*Machine hours*
Stores receiving costs	*Requisitions raised*
Machine set up costs	*No. of production runs*
Cost relating to quality control	*No. of production runs*
Material handling and dispatch	*No. of orders executed*

The number of requisitions raised on the stores was 25 for each product and number of orders executed was 96, each order was in a batch of 05 units.

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Required:

(i) Total cost of each product assuming the absorption of overhead on machine hour basis;

(ii) Total cost of each product assuming the absorption of overhead by using activity base costing; and

(iii) Show the differences between (i) and (ii) and comment.

(12 Marks, May, 2005)

(Out of Syllabus for the student of Intermediate (IPC), shifted to Advanced Management Accounting, Chartered Accountancy Final Course.)

Answer

(i) Statement showing total cost of each product assuming absorption of overheads on Machine Hour Rate Basis.

Particulars	A	B	C	D	Total
Output (units)	100	110	120	150	480
Direct material (₹)	30	40	35	45	150
Direct Labour (₹)	25	30	30	40	125
Direct labour- Machine hrs	5	4	3	4	
Overhead @ ₹ 30/- per Machine hr	150	120	90	120	480
Total cost per unit (₹)	205	190	155	205	755
Total cost (₹)	20,500	20,900	18,600	30,750	90,750

$$\text{Overhead Rate} = \frac{\text{Total Overhead Cost}}{\text{Total MHrs.}} = \frac{₹\,57,000}{1,900} = ₹\ 30 \text{ per unit}$$

(ii)

Total Overheads	₹		
Factory works expenses	22,500	Factory exp per unit	22,500 / 1,900 = ₹ 11.84
Stores receiving cost	8,100	Stores receiving cost	8100 / 100 = ₹ 81
Machine set up costs	12,200	Machine set-up cost	12,200 / 48 = ₹ 254.1
Costs relating to quality control	4,600	Cost relating to QC	4,600/48 =₹ 95.83
Expense relating to material	9,600	Material handling &	9,600 / 96

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handling & dispatch Total	57,000/-	dispatch	= ₹ 100/-

Statement showing total cost of each product assuming activity based costing.

Particulars	A	B	C	D	Total
Output (Units)	100	110	120	150	480
No. of production runs	10	11	12	15	48
No. of stores requisition	25	25	25	25	100
No. of sales orders	20	22	24	30	96
Unit costs - Direct material (₹)	30.00	40.00	35.00	45.00	
Unit costs - Direct labour (₹)	25.00	30.00	30.00	40.00	
Unit costs - Factory works expenses (₹)	59.20	47.36	35.52	47.36	
Unit costs - Stores receiving cost (₹)	20.25	18.41	16.88	13.50	
Unit costs - Machine set-up cost (₹)	25.42	25.42	25.42	25.42	
Unit costs – QC (₹)	9.58	9.58	9.58	9.58	
Unit costs – Material Handling (₹)	20.00	20.00	20.00	20.00	
Unit cost (₹)	189.45	190.77	172.40	200.86	
Total cost (₹)	18,945	20,984.7	20,688.00	30,129	

(iii) Statement showing differences (in ₹)

Particulars	A	B	C	D
Unit cost MHR	205	190	155	205
Unit cost ABC	189.45	190.77	172.40	200.86
Unit cost - difference	15.55	-0.77	-17.40	4.14
Total cost MHR	20,500	20,900	18,600	30,750
Total cost ABC	18,945	20,985	20,688	30,128

The difference is that A consumes comparatively more of Machine hours.

The use of activity based costing gives different product costs than what were arrived at by utilising traditional costing. It can be argued that Product costs using ABC are more precise as overheads have been identified with specific activities.

Question 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)		*₹ 3,24,000*

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Normal working hours for the month (The machine works to only 75% of capacity)		*200 hours*
Wages of Machine man	*₹125 per day (of 8 hours)*	
Wages for Helper (machine attendant)	*₹75 per day (of 8 hours)*	
Power cost for the month for the time worked		*₹15,000*
Supervision charges apportioned for the machine centre for the month		*₹3,000*
Electricity & Lighting for the month		*₹7,500*
Repairs & maintenance (machine) including Consumable stores per month		*₹17,500*
Insurance of Plant & Building (apportioned) for the year		*₹16,250*
Other general expense per annum		*₹27,500*

The workers are paid a fixed Dearness allowance of ₹ 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.

(14 Marks, May 2005)

Answer

Computation of Comprehensive Machine Hour Rate

	Per month(₹)	Per hour(₹)
Fixed cost		
Supervision charges	3,000	
Electricity and lighting	7,500	
Insurance of Plant and building (16,250×1/12)	1,354.17	
Other General Expenses (27,500×1/12)	2,291.67	
Depreciation (32,400×1/12)	2,700	
	16,845.84	112.31
Variable Cost		
Repairs and maintenance	17,500	116.67
Power	15,000	100.00
Wages of machine man		44.91

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Wages of Helper		32.97
Machine Hour rate (Comprehensive)		₹ 406.86

Effective machine working hour's p.m.

200 hrs. × 75% = 150 hrs.

Wages per machine hour

	Machine man	Helper
Wages for 200 hours		
(₹ 125× 25)	₹ 3,125	
(₹ 75× 25)		₹ 1,875
D.A.	₹ 1,575	₹ 1,575
	₹ 4,700	₹ 3,450
Production bonus (1/3 of above)	1,567	1,150
	6,267	4,600
Leave wages (10%)	470	345
	6,737	4,945
Effective wage rate per machine hour (150 hrs in all)	₹ 44.91	₹ 32.97

Question 12

ABC Limited manufactures two radio models, the Nova which has been produced for five years and sells for ₹ 900, and the Royal, a new model introduced in early 2004, which sells for ₹ 1,140. Based on the following Income statement for the year 2004-05, a decision has been made to concentrate ABC Limited's marketing resources on the Royal model and to begin to phase out the Nova model.

ABC Limited

Income Statement for the year ending March 31, 2005

	Royal Model	*Nova Model*	*Total*
	₹	*₹*	*₹*
Sales	*45,60,000*	*1,98,00,000*	*2,43,60,000*
Cost of Goods sold	*31,92,000*	*1,25,40,000*	*1,57,32,000*
Gross margin	*13,68,000*	*72,60,000*	*86,28,000*
Selling & Administrative Expenses	*9,78,000*	*58,30,000*	*68,08,000*
Net Income	*3,90,000*	*14,30,000*	*18,20,000*
Unit Produced and sold	*4,000*	*22,000*	
Net Income per unit sold	*97.50*	*65*	

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The standard unit costs for the Royal and Nova models are as follows:

	Royal Model ₹	*Nova Model* ₹
Direct materials	*584*	*208*
Direct Labour		
Royal (3.5 hrs x ₹12)	*42*	
Nova (1.5 hrs x ₹12)		*18*
Machine usage		
Royal (4 hrs x ₹18)	*72*	
Nova (8 hrs x ₹ 18)		144
Manufacturing overheads (applied on the basis of machine hours at a pre-determined rate of ₹ 25 per hour)	100	200
Standard Cost	798	570

ABC Ltd.'s Controller is advocating the use of activity-based costing and activity-based cost management and has gathered the following information about the company's manufacturing overheads cost for the year ending March 31, 2005.

Activity centre (Cost driver)	*Traceable Costs* ₹	*Number of Events*		
		Royal	*Nova*	*Total*
Soldering (Number of solder joints)	*9,42,000*	*3,85,000*	*11,85,000*	*15,70,000*
Shipments (Number of shipments)	*8,60,000*	*3,800*	*16,200*	*20,000*
Quality control (Number of Shipments)	*12,40,000*	*21,300*	*56,200*	*77,500*
Purchase orders (Number of orders)	*9,50,400*	*1,09,980*	*80,100*	*1,90,080*
Machine Power (Machine hours)	*57,600*	*16,000*	*1,76,000*	*1,92,000*
Machine setups (Number of setups)	*7,50,000*	*14,000*	*16,000*	*30,000*
Total Traceable costs	*48,00,000*			

Required:

(i) Prepare a Statement showing allocation of manufacturing overheads using the principles of activity-based costing.

(ii) Prepare a Statement showing product cost profitability using activity-based costing.

(iii) Should ABC Ltd. continue to emphasize the Royal model and phase out the Nova model? Discuss. *(10 Marks, November, 2005)*

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Answer

(i) Statement Showing Allocation of Manufacturing Overheads Using Principles of Activity Based Costing.

Activity Center	Traceable cost ₹	Cost allocation basis	Cost Allocation	
			Royal ₹	Nova ₹
Soldering	9,42,000	385:1185	2,31,000	7,11,000
Shipments	8,60,000	38:162	1,63,400	6,96,600
Quality control	12,40,000	213:562	3,40,800	8,99,200
Purchase orders	9,50,400	109980:80100	5,49,900	4,00,500
Machine lower	57,600	16:176	4,800	52,800
Machine set ups	7,50,000	14:16	3,50,000	4,00,000
	48,00,000		16,39,900	31,60,100
Units produced and sold			4,000	22,000
Manufacturing Overheads Cost per unit			₹ 409.98	₹ 143.64

(ii) Statement Showing Product Cost and Profitability using Activity Based Costing

	Royal	Nova	Total
	Per Unit Cost ₹	Per Unit Cost ₹	₹
Standard cost other than manufacturing OHs cost	698	370	
Manufacturing OHs using activity-based costing	409.98	143.64	
Cost	1,107.98	513.64	
Selling Price/unit	1,140	900	
Gross Margin / unit	32.02	386.36	
Gross Margin	1,28,080	84,99,920	86,28,000
Selling & Adm. Expenses	9,78,000	58,30,000	68,08,000
Net Income	(8,49,920)	26,69,920	18,20,000

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(iii) Novo Model should continue to be bread and butter product and Royal model should not be over-emphasized; rather it's pricing is required to be corrected.

Question 13

Discuss the accounting of Selling and Distribution overheads. *(4 Marks, May 2006)*

Answer

Accounting of Selling and Distribution Overheads

It is difficult to determine an entirely satisfactory basis for computing the overhead rate for absorbing selling and distribution overheads. The basis usually adopted is:

- Sales value of goods
- Cost of goods sold
- Gross profit on sales
- Number of orders or units sold

Expenses	Basis for allocation
Salaries in Sales Department.	Estimated time devoted to the sale of various products.
Advertisements	Actual amount incurred for each product
Show room expenses	Average space occupied by each product
Rent of finished goods, go downs and expenses on own delivery vans.	Average quantities delivered during a period

Question 14

ABC Bank is examining the profitability of its Premier Account, a combined Savings and Cheque account. Depositors receive a 7% annual interest on their average deposit. ABC Bank earns an interest rate spread of 3% (the difference between the rate at which it lends money and rate it pays to depositors) by lending money for home loan purpose at 10%.

The Premier Account allows depositors unlimited use of services such as deposits, withdrawals, cheque facility, and foreign currency drafts. Depositors with Premier Account balances of ₹ 50,000 or more receive unlimited free use of services. Depositors with minimum balance of less than ₹ 50,000 pay ₹ 1,000-a-month service fee for their Premier Account.

ABC Bank recently conducted an activity-based costing study of its services. The use of these services in 2005-06 by three customers is as follows:

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	Activity- Based Cost Per Transaction	*Account Usage*		
		Customer X	*Customer Y*	*Customer Z*
Deposits/withdrawal with teller	*₹125*	*40*	*50*	*5*
Deposits/withdrawal with automatic teller machine (ATM)	*₹40*	*10*	*20*	*16*
Deposits/withdrawal on pre-arranged monthly basis	*₹25*	*0*	*12*	*60*
Bank Cheques written	*₹400*	*9*	*3*	*2*
Foreign Currency drafts	*₹600*	*4*	*1*	*6*
Inquiries about Account balance	*₹75*	*10*	*18*	*9*
Average Premier Account balance for 2005-06		*₹ 55,000*	*₹40,000*	*₹12,50,000*

Assume Customer X and Z always maintains a balance above ₹50,000, whereas Customer Y always has a balance below ₹50,000.

Required:

(i) Compute the 2005-06 profitability of the customers X, Y and Z Premier Account at ABC Bank.

(ii) What evidence is there of cross-subsidisation among the three Premier Accounts? Why might ABC Bank worry about this Cross-subsidisation, if the Premier Account product offering is Profitable as a whole?

(iii) What changes would you recommend for ABC Bank's Premier Account?

(11 Marks, May 2006)

(Out of Syllabus for the student of Intermediate (IPC), shifted to Advanced Management Accounting, Chartered Accountancy Final Course.)

Answer

(i) Customer Profitability Analysis

ABC Bank – Premier Account

Activity	Activity based cost	Customers		
		X	Y	Z
	₹	₹	₹	₹
Deposits/withdrawal with teller	125	5,000 (40 × 125)	6,250 (40 × 125)	625 (5 × 125)
Deposits/withdrawal with ATM	40	400 (10 × 40)	800 (20 × 40)	640 (16 × 40)

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Deposits/withdrawal on prearranged monthly basis	25	0 (0 × 25)	300 (12 × 25)	1,500 (60 × 25)
Bank cheques written	400	3,600 (9 × 400)	1,200 (3 × 400)	800 (2 × 400)
Foreign currency drafts	600	2,400 (4 × 600)	600 (1 × 600)	3,600 (6 × 600)
Inquiries about Account balance	75	750 (10 × 75)	1,350 (18 × 75)	675 (9 × 75)
Customer cost (A)		12,150	10,500	7,840
Spread on Average balance maintained	3%	1,650 (3% × 55,000)	1,200 (3% × 40,000)	37,500 (3% × 12,50,000)
Service fee	₹ 1,000 p.m.		12,000	
	Customer benefit	1,650	13,200	37,500

	Customers		
	X	Y	Z
Customer Profitability (Benefits – Costs)	₹ (10,500)	₹ 2,700	₹ 29,660

(ii) Customer Z is most profitable and is cross-subsidising the most demanding customer X. Customer Y is paying for the services used, because of not being able to maintain minimum balance. No doubt, 'Premier Account' product offering is profitable as a whole, but the worry is of not finding customers like customer Z who will maintain a balance higher than the stipulated minimum. It appears, the minimum balance stipulated is inadequate considering the services availed by depositors in 'Premium Account'.

(iii) The changes suggested to ABC Bank's 'Premier Account' are as follows:

- Increase the requirement of minimum balance from ₹ 50,000 to ₹ 1,00,000.
- Charge for value added services like Foreign Currency Drafts.
- Do not allow deposits/withdrawal below ₹ 10,000 at the teller. Only ATM machine withdrawal be allowed.
- Inquiries about account balance to be entertained only through Phone Banking/ATM.

Question 15

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

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	HR ₹	*Maintenance* ₹	*Design* ₹
Variable	*1,00,000*	*1,60,000*	*1,00,000*
Fixed	*4,00,000*	*3,00,000*	*6,00,000*
	5,00,000	*4,60,000*	*7,00,000*

The usage of these Service Departments' output during the year just completed is as follows:

Provision of Service Output (in hours of service)

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

Required:

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

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

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

(7 Marks, November 2006)

Answer

(i) Apportionment of Service Department Overheads amongst production departments using Direct Method:

	Production Deptts.		Service Deptts.		
	Machining ₹	Finishing ₹	HR ₹	Maintenance ₹	Design ₹
Overhead as per primary distribution			5,00,000	4,60,000	7,00,000
Apportionment design 4,500 : 1,500	5,25,000	1,75,000			
Maintenance	2,14,667	2,45,333			

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3,500 : 4,000					
HR 4,000 : 5,000	2,22,222	2,77,778			
	9,61,889	6,98,111			

(ii) The proper sequence for apportionment of service department overheads is

First	HR
Second	Maintenance
Third	Design

The sequence has been laid down based on service provided.

(iii) Apportionment of Service Department overheads amongst production departments using step-down method.

	Production Department		Service Department		
	Machining ₹	Finishing ₹	HR ₹	Maintenance ₹	Design ₹
Overhead as per primary distribution	–	–	5,00,000	4,60,000	7,00,000
Apportionment HRD 4 : 5 : – : 0.5 : 0.5	2,00,000	2,50,000	(–)5,00,000	25,000	25,000
Maintenance 7 : 8: –: 1	2,12,188	2,42,500	–	(–)4,85,000	30,312
Design 3 : 1	5,66,484	1,88,828	–	–	(–)7,55,312
	9,78,672	6,81,328			

Question 16

ABC Ltd. Manufactures two types of machinery equipments Y and Z and applies/absorbs overheads on the basis of direct-labour hours. The budgeted overheads and direct-labour hours for the month of December, 2006 are ₹ 12,42,500 and 20,000 hours respectively. The information about Company's products is as follows:

	Equipment Y	*Equipment Z*
Budgeted Production volume	*2,500 units*	*3,125 units*
Direct material cost	*₹ 300 per unit*	*₹ 450 per unit*
Direct labour cost		
Y : 3 hours @ ₹ 150 per hour		
X : 4 hours @ ₹ 150 per hour	*₹ 450*	*₹ 600*

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ABC Ltd.'s overheads of ₹ 12,42,500 can be identified with three major activities:

Order Processing (₹ 2,10,000), machine processing (₹ 8,75,000), and product inspection (₹ 1,57,500). These activities are driven by number of orders processed, machine hours worked, and inspection hours, respectively. The data relevant to these activities is as follows:

	Orders processed	*Machine hours worked*	*Inspection hours*
Y	*350*	*23,000*	*4,000*
Z	*250*	*27,000*	*11,000*
Total	*600*	*50,000*	*15,000*

Required:

(i) Assuming use of direct-labour hours to absorb/apply overheads to production, compute the unit manufacturing cost of the equipments Y and Z, if the budgeted manufacturing volume is attained.

(ii) Assuming use of activity-based costing, compute the unit manufacturing costs of the equipments Y and Z, if the budgeted manufacturing volume is achieved.

(iii) ABC Ltd.'s selling prices are based heavily on cost. By using direct-labour hours as an application base, calculate the amount of cost distortion (under-costed or over-costed) for each equipment.

(iv) Discuss, how an activity-based costing might benefit ABC Ltd.

(10 Marks, November 2006)

(Out of Syllabus for the student of Intermediate (IPC), shifted to Advanced Management Accounting, Chartered Accountancy Final Course.)

Answer

(i) Overheads application base: Direct labour hours

	Equipment- Y ₹	Equipment - Z ₹
Direct material cost	300	450
Direct labour cost	450	600
Overheads*	186.38	248.50
	936.38	1,298.50

$$\text{*Pre-determined rate} = \frac{\text{Budgeted overheads}}{\text{Budgeted direct labour hours}}$$

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$$= \frac{₹\,12,42,500}{20,000\text{ hours}} = ₹\,62.125$$

(ii) Estimation of Cost-Driver rate

Activity	Overhead cost ₹	Cost-driver level	Cost driver rate ₹
Order processing	2,10,000	600 Orders processed	350
Machine processing	8,75,000	50,000 Machine hours	17.50
Inspection	1,57,500	15,000 Inspection hours	10.50

	Equipment- Y ₹	Equipment- Z ₹
Direct material cost	300	450
Direct labour cost	450	600
Prime cost	750	1,050
Overhead cost		
Order processing 350 : 250	1,22,500	87,500
Machine processing 23,000 : 27,000	4,02,500	4,72,500
Inspection 4,000 : 11,000	42,000	1,15,500
Total overhead cost	5,67,000	6,75,500
Per unit cost		
= 5,67,000/2,500	226.80	₹ 216.16
= 6,75,500/3,125		
Unit manufacturing cost	₹ 976.80	₹ 1,266.16

(iii)

	Equipment- Y ₹	Equipment -Z ₹
Unit manufacturing cost–using direct labour hours as an application base	936.38	₹ 1,298.50
Unit manufacturing cost–using activity based costing	976.80	₹ 1,266.16
Cost distortion	(–)40.42	(+)32.34

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Low volume product Y is under-costed and high volume product Z is over-costed using direct labour hours as a basis for overheads absorption. It is due to the limitation of traditional costing system.

(iv) Activity-based costing system is suitable in case of ABC Ltd because it is a multi-product company and overheads costs are substantial portion of total cost. The use of activity based costing will avoid cost distortion as ABC Ltd has a large proportion of non-unit-level activities such as orders processed and inspection hours.

Question 17

Explain briefly the conditions when supplementary rates are used. (2 Marks, May 2007)

Answer

When the amount of under absorbed and over absorbed overhead is significant or large, because of differences due to wrong estimation, then the cost of product needs to be adjusted by using supplementary rates (under and over absorption/actual overhead) to avoid misleading impression.

Question 18

A company has three production departments (M_1, M_2 and A_1) and three service department, one of which Engineering service department, servicing the M_1 and M_2 only. The relevant informations are as follows:

	Product X	*Product Y*
M_1	*10 Machine hours*	*6 Machine hours*
M_2	*4 Machine hours*	*14 Machine hours*
A_1	*14 Direct Labour hours*	*18 Direct Labour hours*

The annual budgeted overhead cost for the year are

	Indirect Wages (₹)	*Consumable Supplies (₹)*
M_1	*46,520*	*12,600*
M_2	*41,340*	*18,200*
A_1	*16,220*	*4,200*
Stores	*8,200*	*2,800*
Engineering Service	*5,340*	*4,200*
General Service	*7,520*	*3,200*

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	₹	
- Depreciation on Machinery	*39,600*	
-Insurance of Machinery	*7,200*	
-Insurance of Building	*3,240*	*(Total building insurance cost for M_1 is one third of annual premium*
-Power	*6,480*	
-Light	*5,400*	
-Rent	*12,675*	*(The general service deptt. is located in a building owned by the company. It is valued at ₹ 6,000 and is charged into cost at notional value of 8% per annum. This cost is additional to the rent shown above)*

The value of issues of materials to the production departments are in the same proportion as shown above for the Consumable supplies.

The following data are also available:

Department	*Book value Machinery (₹)*	*Area (Sq. ft.)*	*Effective H.P. hours %*	*Production Direct Labour hour*	*Capacity Machine hour*
M_1	*1,20,000*	*5,000*	*50*	*2,00,000*	*40,000*
M_2	*90,000*	*6,000*	*35*	*1,50,000*	*50,000*
A_1	*30,000*	*8,000*	*05*	*3,00,000*	
Stores	*12,000*	*2,000*	*–*		
Engg. Service	*36,000*	*2,500*	*10*		
General Service	*12,000*	*1,500*	*–*		

Required:

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

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

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

(iv) Calculate the overheads to be absorbed by two products, X and Y. (15 Marks, May 2007)

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Answer

(i) Summary of Apportionment of Overheads

(₹)

Items	Basis of Apportionment	Total Amount	Production Deptt.			Service Deptt.		
			M_1	M_2	A_1	Store Service	Engineering Service	General Service
Indirect wages	Allocation given	1,25,140	46,520	41,340	16,220	8,200	5,340	7,520
Consumable stores	Allocation given	45,200	12,600	18,200	4,200	2,800	4,200	3,200
Depreciation	Capital value of machine	39,600	15,840	11,880	3,960	1,584	4,752	1,584
Insurance of Machine	Capital value of machine	7,200	2,880	2,160	720	288	864	288
Insurance on Building	$\frac{1}{3}$ to MI Balance area basis	3,240	1,080	648	864	216	270	162
Power	HP Hr%	6,480	3,240	2,268	324	–	648	–
Light	Area	5,400	1,080	1,296	1,728	432	540	324
Rent	Area	12,675	2,535	3,042	4,056	1,014	1,268	760
Rent of general service	Direct 8% of 6,000	480	–	–	–	–	–	480
Total		2,45,415	85,775	80,834	32,072	14,534	17,882	14,318

(ii) Allocation of service departments overheads

Service Deptt.	Basis of Apportionment	Production Deptt.			Service Deptt.		
		M_1	M_2	A_1	Store Service	Engineering Service	General Service
Store	Ratio of consumable value (126 :182 : 42)	5,232	7,558	1,744	(14,534)	–	–
Engineering service	In Machine hours Ratio of M_1 and M_2 (4 : 5)	7,948	9,934	–	–	(17,882)	–
General service	LHR Basis 20 : 15 : 30	4,406	3,304	6,608	–	–	(14,318)

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Production Department allocated in (i)	_____	85,775	80,834	32,072			
Total	2,45,415	1,03,361	1,01,630	40,424			

(iii) Overhead Absorption rate

	M_1	M_2	A_1
Total overhead allocated	1,03,361	1,01,630	40,424
Machine hours	40,000	50,000	–
Labour hours	–	–	3,00,000
Rate per MHR	2.584	2.033	
Rate per Direct labour	–	–	.135

(iv) Statement showing overhead absorption for Product X and Y

Machine Deptt.	Absorption Rate	Product X		Product Y	
		Hours	₹	Hours	₹
M_1	2.584	10	25.84	6	15.50
M_2	2.033	4	8.13	14	28.46
A_1	.135	14	.54	18	2.43
			34.51		46.39

Question 19

Explain Blanket overhead rate. *(2 Marks, November, 2007)*

Answer

Blanket overhead rate refers to the computation of one single overhead rate for the entire factory. This is also known as plant wise or the single overhead rate for the entire factory. It is determined as follows:

$$\text{Blanket overhead rate} = \frac{\text{Overhead cost for the entire factory for the period}}{\text{Base for the period (Labour Hours, Machine Hours)}}$$

It is useful in companies producing the main product in continue process, e.g. chemical plant, glass plant etc.

Question 20

A machine shop cost centre contains three machines of equal capacities. Three operators are employed on each machine, payable ₹ 20 per hour each. The factory works for fortyeight 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 fortyeight hours. In additions they are paid a bonus of 10

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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.*
- *Apportionment to the cost centre : Rent per annum ₹ 5,400, Heat and Light per annum ₹ 9,720, and foreman's salary per annum ₹ 12,960.*

Required:

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

(ii) Calculate machine hour rate. *(8 Marks, November 2007)*

Answer

Computation of cost of running one machine for a four week period

	₹
Standing charges	Per annum
Rent	5,400
Heat and light	9,720
Forman's salary	12,960
	28,080

	₹
Total expenses for one machine for four week period = $\frac{28,080 \times 4}{3 \times 13}$	2,880
Wages: Hours per week = 48 and hours for 4 weeks = 48 × 4 = 192 Wages 192 × 20	3,840
Bonus (192 – 16) = 176 × 20 × .10	352
Total standing charges	7,072

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Machine Expenses:

		₹
	Depreciation = $\left(52{,}000 \times 10\% \times \frac{4}{13}\right)$	1,600
	Repairs and maintenance = (60 × 4)	240
	Consumable stores (75 × 4)	300
	Power (192 – 16) = 176 × 20 × .80	2,816
(ii)	Total machine expenses	4,956
	Total expenses (i) + (ii)	12,028

$$\text{Machine hour rate} = \frac{12{,}028}{176} = 68.34.$$

Question 21

Explain the cost accounting treatment of unsuccessful Research and Development cost.

(2 Marks, November 2007)

Answer

Cost of unsuccessful research is treated as factory overhead, provided the expenditure is normal and is provided in the budget. If it is not budgeted, it is written off to the profit and loss account. If the research is extended for long time, some failure cost is spread over to successful research.

Question 22

Discuss the difference between allocation and apportionment of overhead.

(2 Marks, May 2008)

Answer

The following are the differences between allocation and apportionment.

1. Allocation costs are directly allocated to cost centre. Overhead which cannot be directly allocated are apportioned on some suitable basis.
2. Allocation allots whole amount of cost to cost centre or cost unit where as apportionment allots part of cost to cost centre or cost unit.
3. No basis required for allocation. Apportionment is made on the basis of area, assets value, number of workers etc.

Question 23

A machinery was purchased from a manufacturer who claimed that his machine could produce 36.5 tonnes in a year consisting of 365 days. Holidays, break-down, etc., were normally

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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

(2 Marks, November 2008)

Answer

(a) Rated capacity 36.5 tonnes

(Refers to the capacity of a machine

or a plant as indicated by its manufacturer)

(b) Practical capacity 30 tonnes

[Defined as actually utilised capacity of a plant

i.e. $\frac{36.5}{365} \times (365 - 65)$ tonnes]

(c) Normal capacity 25 tonnes

(It is the capacity of a plant utilized based

on sales expectancy)

(d) Actual capacity 25.2 tonnes

(Refers to the capacity actually achieved)

Question 24

Following information is available for the first and second quarter of the year 2008-09 of ABC Limited:

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

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

(a) Variable cost per unit; and

(b) Total fixed cost. *(2 Marks, May 2009)*

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Answer

	Production (Units)	Semi Variable Cost (₹)
Quarter I	36,000	2,80,000
Quarter II	42,000	3,10,000
Difference	6,000	30,000

$$\text{Variable Cost per Unit} = \frac{\text{Change in Semi Variable Cost}}{\text{Change in Production}}$$

$$= \frac{₹\ 30,000}{6,000 \text{ units}}$$

= ₹5 per units

Total Fixed Cost = Semi Variable Cost – (Production x Variable Cost per Unit)

Total fixed cost in Quarter I :

= 2,80,000 – (36,000 × 5)

= 2,80,000 – 1,80,000

= 1,00,000

Total fixed cost in Quarter II :

= 3,10,000 – (42,000 × 5)

= 3,10,000 – 2,10,000

= 1,00,000

Question 25

Distinguish between Fixed overheads and Variable overheads. *(2 Marks, May 2010)*

Answer

Fixed overheads v/s Variable Overheads

Fixed overheads are not affected by any variation in the volume of activity, e.g., managerial remuneration, rent etc. These remain the same from one period to another except when they are deliberately changed. Fixed overheads are generally variable per unit of output or activity.

On other hand the variable overheads that change in proportion to the change in the volume of activity or output, e.g., power consumed, consumable stores etc. The variable overheads are generally constant per unit of output or activity

Question 26

What are the methods of re-apportionment of service department expenses over the production departments? Discuss. *(4 Marks, November 2010)*

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Answer

Methods of re-apportionment of service department expenses over the production departments

(i) Direct re-distribution method.

(ii) Step method or non-reciprocal method.

(iii) Reciprocal Service method

Direct re-distribution Method: Service department costs under this method are apportioned over the production departments only, ignoring services rendered by one service department to another. The basis of apportionment could be no. of workers. H.P of machines.

Step Method or Non-Reciprocal Method

This method gives cognizance to the service 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 service to the maximum number of other service departments.

Production Department			Service Department		
P_1	P	P_3	S_1	S_2	S_3
↑	↑	↑	↑	↑	↓
↑	↑	↑	↑	↓	
↑	↑	↑	↓		

Reciprocal Service Method

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

The methods available for dealing with reciprocal services are:

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

Question 27

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

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

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

The following additional information is also available:

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

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

You are required to :

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

- *An increase of 15% in the price of spare parts.*
- *An increase of 25% in the consumption of spare parts for machine 'B' & 'C' only.*
- *20% general increase in wages rates.* *(8 Marks, May 2011)*

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Answer

Computation of Machine Hour Rate

		Basis of apportionment	Total	Machines		
				A	B	C
			₹	₹	₹	₹
(A)	Standing Charges					
	Insurance	Depreciation Basis	8,000	3,000	3,000	2,000
	Indirect Labour	Direct Labour	24,000	6,000	9,000	9,000
	Building Maintenance expenses	Floor Space	20,000	8,000	8,000	4,000
	Rent and Rates	Floor Space	1,20,000	48,000	48,000	24,000
	Salary of foreman	Equal	2,40,000	80,000	80,000	80,000
	Salary of attendant	Equal	60,000	20,000	20,000	20,000
	Total standing charges		4,72,000	1,65,000	1,68,000	1,39,000
	Hourly rate for standing charges			84.75	86.29	71.40
(B)	Machine Expenses:					
	Depreciation	Direct	20,000	7,500	7,500	5,000
	Spare parts	Final estimates	13,225	4,600	5,750	2,875
	Power	K.W. rating	40,000	15,000	10,000	15,000
	Consumable Stores	Direct	8,000	3,000	2,500	2,500
	Total Machine expenses		81,225	30,100	25,750	25,375
	Hourly Rate for Machine expenses			15.46	13.23	13.03
	Total (A + B)		553,225	1,95,100	1,93,750	1,64,375
	Machine Hour rate			100.21	99.52	84.43

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Working Notes:

(i) Calculation of effective working hours:

No. of holidays 52 (Sundays) + 12 (other holidays) = 64

Saturday (52 – 2) = 50

No. of days (Work full time) = 365 – 64 – 50 = 251

	Hours
Full days work 251 × 8	= 2,008
Half days work 50 × 4	= 200
	2,208

	Hours	
Effective capacity 90% of 2,208	1,987	(Rounded off)
Less: Normal loss of time (Breakdown) 2%	40	(Rounded off)
Effective running hour	1,947	

(ii) Amount of spare parts is calculated as under:

	A	B	C
	₹	₹	₹
Preliminary estimates	4,000	4,000	2,000
Add: Increase in price @ 15%	600	600	300
	4,600	4,600	2,300
Add: Increase in consumption @ 25%	–	1,150	575
Estimated cost	4,600	5,750	2,875

(iii) Amount of Indirect Labour is calculated as under:

	₹
Preliminary estimates	20,000
Add: Increase in wages @ 20%	4,000
	24,000

(iv) Interest on capital outlay is a financial matter and, therefore it has been excluded from the cost accounts.

Question 28

How do you deal with the following in cost account?

(i) Packing Expenses

(ii) Fringe benefits *(4 Marks, May 2011)*

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Answer

Packing expenses: Cost of primary packing necessary for protecting the product or for convenient handling, should become a part of the prime cost. The cost of packing to facilitate the transportation of the product from the factory to the customer should become a part of the distribution cost. If the cost of special packing is at the request of the customer, the same should be charged to the specific work order or the job. The cost of fancy packing necessary to attract customers is an advertising expenditure. Hence, it is to be treated as a selling overhead.

Fringe benefits: These are the additional payments or facilities provided to the workers apart from their salary and direct cost-allowances like house rent and city compensatory allowances. If the amount of fringe benefit is considerably large, it may be recovered as direct charge by means of a supplementary wage or labour rate; otherwise these may be collected as part of production overheads.

Question 29

X Ltd. recovers overheads at a. pre-determined rate of ₹ 50 per man-day. The total factory overheads incurred and the man-days actually worked were ₹ 79 lakhs and 1.5 lakhs days respectively. During the period 30,000 units were sold. At the end of the period 5,000 completed units were held in stock but there was no opening stock of finished goods. Similarly, there was no stock of uncompleted units at the beginning of the period but at the end of the period there were 10,000 uncompleted units which may be treated as 50% complete.

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

How would unabsorbed overheads be treated in cost accounts? *(8 Marks, November 2011)*

Answer

Absorbed overheads	= Actual Man days x Rate
	= 1,50,000 x 50
	= ₹ 75,00,000
Under absorption of overheads	= Actual overheads – Absorbed overheads
	= 79,00,000 – 75,00,000
	= ₹ 4,00,000

Reasons for under – absorption:

1.	Defective Planning	4,00,000 x 60%	= ₹2,40,000
2.	Increase in overhead cost	4,00,000 x 40%	= ₹1,60,000

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Treatment in Cost Accounts:

(i) The unabsorbed overheads of ₹ 2,40,000 on account of defective planning to be treated as abnormal and thus be charged to costing profit & loss account.

(ii) The balance of unabsorbed overheads i.e. ₹ 1,60,000 be charged as below on the basis of supplementary overhead absorption rate

Supplementary Rate = ₹ 1,60,000 ÷ (30,000 + 5,000 + 50% of 10,000)

= ₹ 4 per unit

(a) To cost of sales Account = 30,000 x 4 = ₹ 1,20,000

(b) To finished stock account = 5,000 x 4 = ₹ 20,000

(c) To WIP account = 50% of 10,000 x 4 = ₹ 20,000

₹ 1,60,000

Question 30

A Machine costing ₹ 10 lacs was purchased on 1-4-2011. the expected life of the machine is 10 years. At the end of this period its scrap value is likely to be ₹ 10,000. the total cost of all the machines including new one was ₹ 90 lacs.

The other information is given as follows:

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

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

(iii) Insurance Premium was paid for all the machine ₹ 9,000.

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

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

(vi) Depreciation is charged on straight line basis

Compute machine hour rate for the new machine. *(5 Marks, May 2012)*

Answer

Computation of machine hour rate of new Machine

	Total (₹)	Per hour(₹)
A. Standing Charges		
I. Insurance Premium 9,000 × $\frac{1}{9}$	1,000	
II. Rent $\frac{1}{10}$ × 2,400x12	2,880	
	3,880	0.97*

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B. Machine expenses		
I. Repairs and Maintenance [5,000/4,000]		1.25
II. Depreciation $\left[\frac{10,00,000-10,000}{10\times 4,000}\right]$		24.75
III. Electricity 8 units x ₹ 3.75		30.00
Machine hour rate		56.97

Working Note

Calculation of productive Machine hour rate

Total hours	4,200
Less: Non-Productive hours	200
	4,000

* 3,880 ÷ 4,000 = 0.97

Question 31

The following account balances and distribution of indirect charges are taken from the accounts of a manufacturing concern for the .year ending on 31st March, 2012:

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

The following departmental data are also available:

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

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

	X	*Y*	*Z*	*A*	*B*
Department A	*30*	*30*	*20*	*-*	*20*
Department B	*25*	*40*	*25*	*10*	*-*

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

(8 Marks, November 2012)

Answer

Primary Distribution of Overheads

Item	Basis	Total Amount (₹)	Production Departments			Service Departments	
			X (₹)	Y (₹)	Z (₹)	A (₹)	B (₹)
Indirect Material	Actual	1,25,000	20,000	30,000	45,000	25,000	5,000
Indirect Labour	Actual	2,60,000	45,000	50,000	70,000	60,000	35,000
Superintendent's Salary	Actual	96,000	-	-	96,000	-	-
Fuel & Heat	Radiator Sections {2:4:6:5:3}	15,000	1,500	3,000	4,500	3,750	2,250
Power	Kilowatt Hours {7:8:6:3:0}	1,80,000	52,500	60,000	45,000	22,500	-
Rent & Rates	Area (Sq. ft.) {22:20:15:12:6}	1,50,000	44,000	40,000	30,000	24,000	12,000

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Insurance	Capital Value of Assets {4:6:5:1:2}	18,000	4,000	6,000	5,000	1,000	2,000
Meal Charges	No. of Employees {6:7:12:3:2}	60,000	12,000	14,000	24,000	6,000	4,000
Depreciation	Capital Value of Assets {4:6:5:1:2}	2,70,000	60,000	90,000	75,000	15,000	30,000
Total overheads		11,74,000	2,39,000	2,93,000	3,94,500	1,57,250	90,250

Re-distribution of Overheads of Service Department A and B

Total overheads of Service Departments may be distributed using simultaneous equation method

Let, the total overheads of A = a and the total overheads of B= b

a = 1,57,250 + 0.10 b (i)

or, 10a - b = 15,72,500 [(i) x10]

b = 90,250 + 0.20 a (ii)

or, -0.20a + b = 90,250

10a - b = 15,72,500

-0.20a + b = 90,250

9.8a = 16,62,750

a = 1,69,668

Putting the value of a in equation (ii), we get

b = 90,250 + 0.20 x 1,69,668

b = 1,24,184

Secondary Distribution of Overheads

	Production Departments		
	X (₹)	Y (₹)	Z (₹)
Total overhead as per primary distribution	2,39,000	2,93,000	3,94,500
Service Department A (80% of 1,69,668)	50,900	50,900	33,934
Service Department B (90% of 1,24,184)	31,046	49,674	31,046
Total	3,20,946	3,93,574	4,59,480

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Question 32

Distinguish between cost allocation and cost absorption. *(4 Marks, May 2013)*

Answer

Distinguish between Cost allocation and Cost absorption:

Cost allocation is the allotment of whole item of cost to a cost centre or a cost unit. In other words, it is the process of identifying, assigning or allowing cost to a cost centre or a cost unit.

Cost absorption is the process of absorbing all indirect costs or overhead costs allocated or apportioned over particular cost center or production department by the units produced.

Question 33

Calculate Machine Hour Rate from the following particulars:

Cost of Machine	-	*₹ 25,00,000*
Salvage Value	-	*₹ 1,25,000*
Estimated life of the machine	-	*25,000 Hours*
Working Hours (per annum)	-	*3,000 Hours*
Hours required for maintenance	-	*400 Hours*
Setting-up time required	-	*8% of actual working hours*

Additional Information:

(i) Power 25 units @ ₹ 5 per unit per hour.

(ii) Cost of repairs and maintenance ₹ 26,000 per annum.

(iii) Chemicals required for operating the machine ₹ 2,600 per month.

(iv) Overheads chargeable to the machine ₹ 18,000 per month.

(v) Insurance Premium (per annum) 2% of the cost of machine

(vi) No. of operators - 02 (looking after three other machines also)

(vii) Salary per operator per month ₹ 18,500 *(8 Marks, November 2013)*

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Answer

Computation of Machine Hour Rate

Particulars	Setting-up time is 'Unproductive' (Machine hour-2,407*)	Setting-up time is 'Productive' (Machine hour-2,600)
	(₹)	(₹)
Fixed Charges (Standing Charges):		
Overhead Chargeable ₹ 18,000 × 12 = ₹ 2,16,000 $\left(\frac{₹\,2,16,000}{2,407 \text{ hours}}\right); \left(\frac{₹\,2,16,000}{2,600 \text{ hours}}\right)$	89.74	83.08
Operator's Salary: $\frac{₹\,18,500 \times 12 \times 2 \text{ Operators}}{4 \text{ machines}} = ₹\,1,11,000$ $\left(\frac{₹\,1,11,000}{2,407 \text{ hours}}\right); \left(\frac{₹\,1,11,000}{2,600 \text{ hours}}\right)$	46.12	42.69
Insurance: 2% of ₹ 25,00,000 = ₹ 50,000	20.77	19.23
	156.63	145.00
Variable Expenses (Machine Expenses) per hour		
Depreciation : $\frac{₹\,25,00,000 - ₹\,1,25,000}{25,000 \text{ hours}}$	95.00	95.00
Power: (25 units × ₹ 5)	125.00	125.00
Repairs and Maintenance : $\left(\frac{₹\,26,000}{2,407 \text{ hours}}\right); \left(\frac{₹\,26,000}{2,600 \text{ hours}}\right)$	10.80	10.00
Chemical : $\left(\frac{₹\,2,600 \times 12}{2,407 \text{ hours}}\right); \left(\frac{₹\,2,600 \times 12}{2,600 \text{ hours}}\right)$	12.96	12.00
Machine Hour Rate	400.39	387.00

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*	(Hours)
Working Hours	3,000
Less: Maintenance hours	400
	2,600
Less: Setting-up hours	193
Actual working hours $\left(\frac{2,600\,\text{hours}}{108}\times 100\right)$	2,407

Assumptions:

1. Working hours (i.e. 3,000 hours) are inclusive of maintenance and setting-up time.
2. It is assumed that no power is consumed by the machine during unproductive hours i.e. during maintenance and unproductive setting-up hours.
3. Depreciation is calculated on the basis of estimated life of the machine hours. Hence per unit machine hour rate of depreciation will be same.

Note: As this numerical problem does not specifically mention about the nature of setting-up time; means whether setting-up time is unproductive or productive is not clear. The problem can be solved assuming setting-up time either as productive or as unproductive. The question may be solved based on logical assumption regarding the nature of setting-up time (i.e. unproductive or productive) and for furnishing any one or both the situation.

Question 34

Distinguish between allocation and apportionment of cost. *(4 Marks, May, 2014)*

Answer

Distinguish between allocation and apportionment of cost.

Cost allocation: The term 'allocation' refers to assignment or allotment of an entire item of cost to a particular cost centre or cost unit. It implies relating overheads directly to the various departments. The estimated amount of various items of manufacturing overheads should be allocated to various cost centres or departments. 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: 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. Such unallocable expenses are to be spread over the various departments or cost centres on an appropriate basis. This is called apportionment.

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Question 35

Explain the treatment of over and under absorption of overheads in cost accounts.

(4 Marks, November, 2014)

Answer

Treatment of over and under absorption of overheads are:-

(i) Writing off to costing P&L A/c:– Small difference between the actual and absorbed amount should simply be transferred to costing P&L A/c, if difference is large then investigate the causes and after that abnormal loss/ gain shall be transferred to costing P&L A/c.

(ii) Use of supplementary Rate: Under this method the balance of under and over absorbed overheads may be charged to cost of W.I.P., finished stock and cost of sales proportionately with the help of supplementary rate of overhead.

(iii) Carry Forward to Subsequent Year: Difference should be carried forward in the expectation that next year the position will be automatically corrected.

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