MAIN MATERIAL / CA INTER / GR. 1 / BOOK 48 / COSTING – PART 8 / 42E

CHAPTERS INCLUDED – ACTIVITY BASED COSTING, BUDGETARY CONTROL

(APPLICABLE TO MAY2020 ATTEMPT OF CA INTER. SYNCHRONISED WITH JULY 2019 EDITION OF ICAI SM. ISSUED ON 22/10/19)

12. ACTIVITY BASED COSTING

NO. OF PROBLEMS IN 40E OF CA INTER: CLASSROOM - 7, ASSIGNMENT - 4

NO. OF PROBLEMS IN 41E OF CA INTER: CLASSROOM - 7, ASSIGNMENT – 6

NO. OF PROBLEMS IN 42E OF CA INTER: CLASSROOM - 7, ASSIGNMENT - 8

SIGNIFICANCE OF EACH PROBLEM COVERED IN THIS MATERIAL

Problem No. in this material	Problem No. in NEW SM	Problem No. in OLD SM	Problem No. in OLD PM	PQ	RTP	MTP	Previous Exams	Remarks
CR 1	-	-	-	1	-	-	-	
CR 2	-	-	-	-	-	-	N18 (N)-10M	
CR 3	ILL 1	-	-	-	-	-	-	
CR 4	ILL 2	-	-	-	-	-	-	
CR 5	PQ 1	-	-	-	-	-	-	
CR 6	PQ 2	-	-	-	-	-	-	
CR 7	-	-	-	-	-	-	M19 (N)-10M	
AS 1	-	-	-	-	-	-	M18 (N) - 10M	
AS 2	-	-	-	-	-	-	-	
AS 3	-	-	-	-	M18 (N)	-	-	
AS 4	-	-	-	-	M19 (N)	-	-	
AS 5	-	-	-	-	-	N 19(N)	-	
AS 6	-	-	-	-		M18 (N) - 5M	-	
AS 7	ILL 3	-	-	-	-	-	-	
AS 8	-	-	-	-	N19 (N)	-	-	

Definition: Activity based costing is an accounting methodology that assigns costs to activities rather than products or services. This enables resources & overhead costs to be more accurately assigned to products & services that consume them.

Steps in ABC include:

a) Identification of activities and their respective costs

b) Identification of cost driver of each activity and computation of an allocation Rate per activity

c) Allocation of overhead cost to products/ services based on the activities involved

MEANING OF TERMS USED IN ABC

i) Activity - Activity, here, refers to an event that incurs cost.

ii) A Cost Object-It is an item for which cost measurement is required e.g. a product or a customer.

iii) A Cost Driver-It is a factor that causes a change in the cost of an activity. There are two categories of cost driver. Example Production runs

- **A Resource Cost Driver-** It is a measure of the quantity of resources consumed by an activity. It is used to assign the cost of a resource to an activity or cost pool.
- **An Activity Cost Driver-**It is a measure of the frequency and intensity of demand, placed on activities by cost objects. It is used to assign activity costs to cost objects.

iv) **Cost Pool-** It represents a group of various individual cost items. It consists of Costs that have same cause effect relationship. Example: Machine set-up.

Examples of Cost Drivers:

Business functions	Cost Driver
Research and Development	• Number of research projects • Personnel hours on a project
Design of products, services and procedures	• Number of products in design • Number of parts per product • Number of engineering hours
Customer Service	• Number of service calls • Number of products serviced • Hours spent on servicing products
Marketing	• Number of advertisements • Number of sales personnel • Sales revenue
Distribution	• Number of units distributed • Number of customers

LEVEL OF ACTIVITIES UNDER ABC METHODOLOGY:

Unit level activities, batch level activities, product level activities and facility level activities are the categories of activities helps to determine the type of activity cost driver required.

STAGES IN ACTIVITY BASED COSTING (ABC):

The different stages in ABC calculations are listed below:

1. **Identify the different activities within the organization:** Usually the numbers of cost centers that a traditional overhead system uses are Small, say up to fifteen. In ABC the number of activities will be much more, say 200; the exact number will depend on how the management subdivides the organization's activities.
2. **Relate the overheads to the activities,**
3. **Support activities are then spread across the primary activities**
4. **Determine the activity cost drivers**
5. **Calculate activity cost driver rates for each activity,** just as an overhead absorption rate would be calculated in the traditional system.

$$\text{Activity cost driver rate} = \frac{\text{Total cost of activity}}{\text{Activity driver}} \left[\frac{\text{cost Pool}}{\text{volume of cost driver}} \right]$$

The activity driver rate can be used to cost products, as in traditional absorption costing, but it can also cost other cost objects such as customers/customer segments and distribution channels. The possibility of costing objects other than products is part of the benefit of ABC. The activity cost driver rates will be multiplied by the different amounts of each activity that each product/other cost object consumes.

Overhead Drivers **Cost Allocation under ABC**

PROBLEMS FOR CLASSROOM DISCUSSION

PROBLEM 1: A company manufactures three products namely A, B and C in a factory. The following cost data for the month of March, 20X8 are as under:

Activity	A	B	C
Unit produced	10,000	15,000	20,000
Direct labour hour per unit	3	4.5	4
Machine hour per unit	6	4	5
Set-up of machines	20	25	30
Number of orders	15	12	10
Machine operating cost (Rs.)			34,50,000
Machine set-up cost (Rs.)			4,36,000
Order processing cost (Rs.)			2,56,000

Required:

i) Identify Cost pool, Cost drivers.

ii) Calculate cost driver rate.

iii) Calculate overheads rate per unit using activity- based costing method.

(B) (PQ) (ANS.: II) RATE PER COST DRIVER: RS. 15.68, RS. 5,813.33, RS. 6,918.92; III) O.R.P.U: 78.40, 8.72, 3.46)

(SOLVE PROBLEM NO. 1 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: what is the impact on the question, if production of products A, B, and C are 5000 units,8,000 units, and 10,000 units respectively.

Note:_____

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PROBLEM 2: M/s. HMB Limited is producing a product in 10 batches each of 15,000 units in a year and incurring following overheads their on:

Particulars	Amount (Rs.)
Material procurement	22,50,000
Maintenance	17,30,000
Set-up	6,84,500
Quality control	5,14,800

The prime costs for the year amounted to Rs. 3,01,39,000.

The company is using currently the method of absorbing overheads on the basis of prime cost. Now it wants to shift to activity-based costing. Information relevant to Activity drivers for a year are as under:

Activity Driver	Activity Volume
No. of purchase orders	1500
Maintenance hours	9080
No. of set-ups	2250
No. of inspections	2710

The company has produced a batch of 15000 units and has incurred Rs. 26,38,700 and Rs. 3,75,200 on materials and wages respectively.

The usage of activities of the said batch are as follows:

Materials orders	48 orders
Maintenance hours	810 hours
No. of set-ups	40
No. of inspections	25

You are required to:

a) Find out cost of product per unit on absorption costing basis for the said batch.

b) Determine cost driver rate, total cost and cost per unit of output of the said batch on the basis of activity based costing. *(A) (N18 (N) - 10M)*

(ANS.: A) COST PER UNIT: RS. 235.46; B) COST DRIVER RATE: 1,500, 190.53, 304.22, 189.96; TOTAL COST: RS. 32,57,146; COST PER UNIT OF OUTPUT: RS. 217.14)

(SOLVE PROBLEM NO. 2 ,3 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: what is the impact on the question, if no.of units are used to recovers the over heads.

Note:_____

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PROBLEM 3: (PRINTED SOLUTION AVAILABLE) ABC Ltd. is a multiproduct company, manufacturing three products A, B and C. The budgeted costs and production for the year ending 31st March, 20X8 are as follows:

	A	B	C
Production quantity (Units)	4,000	3,000	1,600
Resources per Unit:			
- Direct Materials (Kg.)	4	6	3
- Direct Labour (Minutes)	30	45	60

The budgeted direct labour rate was Rs10 per hour, and the budgeted material cost was 2 per kg. Production overheads were budgeted at Rs 99,450 and were absorbed to products using the direct labor hour rate. ABC Ltd. followed an Absorption Costing System.

ABC Ltd. is now considering to adopt an Activity Based Costing system. The following additional information is made available for this purpose.

1. **Budgeted overheads were analyzed into the following:**

	Amount (Rs.)
Material handling	29,100
Storage costs	31,200
Electricity	39,150

2. **The cost drivers identified were as follows:**

Material handling	Weight of material handled
Storage costs	Number of batches of material
Electricity	Number of Machine operations

3. **Data on Cost Drivers was as follows:**

Particulars	A	B	C
For complete production: Batches of material	10	5	15
Per unit of production: Number of Machine operators	6	3	2

You are requested to:

1. Prepare a statement for management showing the unit costs and total costs of each product using the absorption costing method.

2. Prepare a statement for management showing the product costs of each product using the ABC approach.
3. What are the reasons for the different product costs under the two approaches? *(A) (NEW SM)*

(ANS.: UNIT COSTS UNDER ABSORPTION COSTING: A-86,000, B-96,750, C-52,800; ABC COSTING: A-1,00,360, B- 86,940, C-48,256)

Concept question: what is the impact on the question, if production of product A,B&C are 1000,5000&2000 units respectively.

Note:_____

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PROBLEM 4: 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	Rs.2,00,000
Quality Inspections	Number of Inspections	10,000 Inspections	Rs. 3,00,000

The company makes three products M, S and T. For the year ended March 31, 20X4, 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. *(A) (NEW SM)*

(ANS.: COST ALLOCATION: POWER-1, 80,000, QUALITY INSPECTIONS- 2, 70,000, COST OF UNUSED CAPACITY- 50,000)

(SOLVE PROBLEM NO. 4 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: what is the impact on the question, if if power is Rs.50,000.

Note:_____

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PROBLEM 5: (PRINTED SOLUTION AVAILABLE) 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, 20X7 in respect of RST Limited has been reported:

Particulars	General Supermarket Chains (Rs.)	Drugstore Chains (Rs.)	Chemist Shops (Rs.)
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:

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, 20X7 operating costs (other than cost of goods sold) of RST Limited are Rs. 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, 20X7 are as follows:

Activity Area	Total costs in April, 20X7 (Rs.)	Total Units of Cost Allocation Base used in April, 20X7
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, 20X7 include the following:

Particulars	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, 20X7 gross-margin percentage for each of its three distribution channels and compute RST Limited's operating income.

ii) Compute the April, 20X7 rate per unit of the cost-allocation base for each of the five activity areas.

iii) Compute the operating income of each distribution channel in April, 20X7 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, 20X7 operating costs of Rs.8,27,970 to five activity areas. *(A) (NEW SM - TYK)*

(ANS.: I) 2.91%, 4.76%, 9.09%, 3.72; II) 40 ORDERS, 3 LINE ITEM ORDER, 50 DELIVERY, 1 DISPATCH, 16 HOURS)

(SOLVE PROBLEM NO. 5 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: what is the impact on the question, if if average revenue per delivery are Rs.80,000 40,000 & 20,000 for the three markets.

Note:_____

PROBLEM 6: (PRINTED SOLUTION AVAILABLE) Alpha Limited has decided to analyse the profitability of its five new customers. It buys bottled water at Rs. 90 per case and sells to retail customers at a list price of Rs. 108 per case. The data pertaining to five customers are:

Particulars	Customers				
	A	B	C	D	E
Cases sold	4,680	19,688	1,36,800	71,550	8,775
List Selling Price	Rs.108	Rs.108	Rs.108	Rs.108	Rs.108
Actual Selling Price	Rs.108	Rs.106.20	Rs.99	Rs.104.40	Rs.97.20
Number of Purchase orders	15	25	30	25	30
Number of Customer visits	2	3	6	2	3
Number of deliveries	10	30	60	40	20
Kilometers travelled per delivery	20	6	5	10	30
Number of expedited deliveries	0	0	0	0	1

Its five activities and their cost drivers are:

Activity	Cost Driver Rate
Order taking	Rs.750 per purchase order
Customer visits	Rs.600 per customer visit
Deliveries	Rs.5.75 per delivery Km travelled
Product handling	Rs.3.75 per case sold
Expedited deliveries	Rs.2,250 per expedited delivery

Required:

i) Compute the customer-level operating income for each of five retail customers now being examined (A, B, C, D and E). Comment on the results.

ii) What insights are gained by reporting both the list selling price and the actual selling price for each customer *(A) (NEW SM - TYK)*

(ANS.: I) 53,090; 2,23,531; 6,90,375; 7,39,787; 274 II) THE REASONS FOR 10.80 DISCOUNT PER CASE FOR CUSTOMER E SHOULD BE EXPLORED)

(SOLVE PROBLEM NO. 6 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept question: what is the impact on the question, if actual price for customer A is Rs.95

Note:_____

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PROBLEM 7: MNO Ltd manufactures two types of equipment A and B and absorbs overheads on the basis of direct labour hours the budgeted overheads and direct labour hours for the month of march 2019 are Rs 15,00,000 and 25,000 hours respectively. The information about the company's product is as follows

Particulars	Equipment	
	A	B
Budgeted Production volume	3200 units	3850 units
Direct Material cost	Rs 350 per unit	Rs 400 per unit
Direct Labour cost		
A : 3hours @ Rs 120 per hour	Rs 360	
B: 4hours @ 120 per hour		Rs 480

Overheads of Rs 15,00,000 can be identified with the fallowing three major activities

Order processing: Rs3,00,000

Machine Processing: Rs10,00,000

Product inspection: 2,00,000

These activities are driven by the number of orders processed, machine hours worked and inspection hours respectively.

The data relevant to these activities is as fallows

	Orders processed	Machine hours worked	Inspection hours
A	400	22,500	5,000
B	200	27,500	15,000
Total	**600**	**50,000**	**20,000**

Required:

a) Prepare a statement showing the manufacturing cost per unit so each product using the absorption costing method assuming the budgeted manufacturing volume is attained

b) Determine cost driver rates and prepare a statement showing the manufacturing volume is attained

c) MNO Ltd.'s selling prices are based heavily on cost by using direct labour hour as an application base calculate the amount of cost of distortion (undercosted or overcosted) for each equipment.

(may 19 new 10m)(ans:i)A 190,B=1120 ii) 500 Rs/Order, 20/machine hour, 10/ inspection hour iii)A= (101.75),B= 32.2)

(SOLVE PROBLEM NO. 7,8 OFASSIGNMENT PROBLEMS AS REWORK)

Concept question: what is the impact on the question, if budget labour hours are 40,000.

Note:_____

PRINTED SOLUTIONS FOR SELECTIVE PROBLEMS

PROBLEM NUMBERS TO WHICH SOLUTIONS ARE PROVIDED: 3,5,6

PROBLEM NO. 3

1. Traditional Absorption Costing

	Particulars	A	B	C	TOTAL
a)	Quantity (units)	4,000	3,000	1,600	8,600
b)	Direct labour (minutes)	30	45	60	-
c)	Direct labour hours (a × b) /60 minutes	2,000	2,250	1,600	5,850

Overhead rate per direct labour hour:

= Budgeted overheads ÷Budgeted labour hours

= 99,450 ÷ 5,850 hours

= 17 per direct labour hour

Unit Costs:

Particulars	A	B	C
Direct Costs:			
Direct labour	5.00	7.50	10.00
Direct material	8.00	12.00	6.00

Production Overhead:	8.50 (17x30)/60	12.75 (17x45)/60	17.00 (17x60)/60
Total unit costs	21.50	32.25	33.00
Number of units	4,000	3,000	1,600
Total costs	86,000	96,750	52,800

2. Activity Based Costing

	Particulars	A	B	C	TOTAL
a)	Quantity (units)	4,000	3,000	1,600	--
b)	Weight per unit	4	6	3	-
c)	Total weight	16,000	18,000	4,800	38,000
	Machine operations per unit	6	3	2	-
	Total operations	24,000	9,000	3,200	36,200
	Total batches of Material	10	5	15	30

Material handling rate per kg. = 29,000 ÷ 38,800 kg. = 0.75 per kg.

Electricity rate per machine operations = 39,150 ÷ 36,200

= 1,082 per machine operations

Storage rate per batch = 31,200 ÷ 30 batches

= 1,040 per batch

Unit Costs:

Particulars	A	B	C
Direct Costs:			
Direct Labour	5.00	7.50	10.00
Direct material	8.00	12.00	6.00
Production Overheads:			
Material Handling	3.00 (0.75X4)	4.50 (0.75X6)	2.25 (0.75X3)
Electricity	6.49 (1.082X6)	3.25 (1.082X3)	2.16 (1.082X2)
Storage	2.60	1.73	9.75
Total unit costs	25.09	28.98	30.16
Number of units	4,000	3,000	1,600
Total costs	1,00,360	86,940	48,256

3. Comments: The difference in the total costs under the two systems is due to the differences in the overheads borne by each of the products. The Activity Based Costs appear to be more precise.

PROBLEM NO. 5

RST Limited's

Statement of operating income and gross margin percentage for each of its three distribution channels

Particulars	General Super Market Chains	Drugstore Chains	Chemist Shops	Total
Revenues: (Rs.)	2,80,41,750 (330× Rs. 84,975)	2,38,21,875 (825 × Rs. 28,875)	1,49,73,750 (2,750 × Rs. 5,445)	6,68,37,375
Less: Cost of goods sold: (Rs.)	2,72,25,000 (330× Rs. 82,500)	2,26,87,500 (825 × Rs. 27,500)	1,36,12,500 (2,750 × Rs. 4,950)	6,35,25,000
Gross Margin: (Rs.)	8,16,750	11,34,375	13,61,250	33,12,375
Less: Other operating costs:				8,27,970

(Rs.)				
Operating income: (Rs.)				24,84,405
Gross Margin	2.91%	4.76%	9.09%	4.96%
Operating income (%)				3.72

i) Computation of rate per unit of the cost allocation base for each of the five activity areas for April 20X7

Particulars	Amount (Rs.)
Customer purchase order processing (Rs. 2,20,000/ 5,500 orders)	40 order
Line item ordering (Rs. 1,75,560/ 58,520 line items)	3 line item order
Store delivery (Rs. 1,95,250/ 3,905 store deliveries)	50 delivery
Cartons dispatched (Rs. 2,09,000/ 2,09,000 dispatches)	1 dispatch
Shelf-stocking at customer store (Rs.) (Rs. 28,160/ 1,760 hours)	16 hour

ii) Operating Income Statement of each distribution channel in April-20X7 (Using the Activity based Costing information)

Particulars	General Super Market Chains	Drugstore Chains	Chemist Shops
Gross margin (Rs.) : (A) (Refer to (i) part of the answer)	8,16,750	11,34,375	13,61,260
Operating cost (Rs.) : (B) (Refer to working note)	1,62,910	1,90,410	4,74,650
Operating income (Rs..) : (A - B)	6,53,840	9,43,965	8,86,600
Operating income (in %) (Operating income/ Revenue) × 100	2.33	3.96	5.96

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

Working note: Computation of operating cost of each distribution channel:

	General Super Market Chains (Rs.)	Drugstore Chains (Rs.)	Chemist Shops (Rs.)
Customer purchase order processing	15,400 (Rs. 40 × 385 orders)	39,600 (Rs. 40 × 990 orders)	1,65,000 (Rs. 40 ×4125 orders)
Line item ordering	16,170 (Rs. 3 × 14 x 385)	35,640 (Rs. 3 × 12 x 990)	1,23,750 (Rs. 3 × 10 × 4125)
Store delivery	16,500 (Rs. 50 × 330 deliveries)	41,250 (Rs. 50 × 825 deliveries)	1,37,500 (Rs. 50 × 2750 deliveries)
Cartons dispatched	99,000 (Rs. 1 × 300 cartons × 300 deliveries)	66,000 (Rs. 1 × 80 cartons × 825 deliveries)	44,000 (Rs.1 × 16 cartons × 2,750 deliveries)
Shelf stocking	15,840 (Rs. 16 × 330 deliveries × 3 Av. hrs.)	7,920 (Rs. 16 × 825 deliveries × 0.6 Av. hrs.)	4,400 (Rs. 16 × 2,750 deliveries × 0.1 Av. hrs)
Operating cost	1,62,910	1,90,410	4,74,650

iii) Challenges faced in assigning total operating cost of Rs. 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.

PROBLEM NO. 7

Working note: Computation of revenues (at listed price), discount, cost of goods sold and customer level operating activities costs:

Particulars	Customers				
	A	B	C	D	E
Cases sold: (a)	4,680	19,688	1,36,800	71,550	8,775
Revenues (at listed price) (Rs.): (b) {(a) × Rs. 108)}	5,05,440	21,26,304	1,47,74,400	77,27,400	9,47,700
Discount (Rs.): (c) {(a) × Discount per case}	-	35,438 (19,688 cases × Rs. 1.80)	12,31,200 (1,36,800 cases × Rs. 9)	2,57,580 (71,550 cases × Rs. 3.60)	94,770(8,775 cases × Rs. 10.80)
Cost of goods sold (Rs.) : (d) {(a) × Rs. 90}	4,21,200	17,71,920	1,23,12,000	64,39,500	7,89,750
Customer level operating activities costs:					
Order taking costs (Rs.): (No. of purchase × Rs.750)	11,250	18,750	22,500	18,750	22,500
Customer visits costs (Rs.) (No. of customer visits × Rs. 600)	1,200	1,800	3,600	1,200	1,800
Delivery vehicles travel costs (Rs.) (Rs. 5.75 per km) (Kms travelled by delivery vehicles × Rs. 5.75 per km.)	1,150	1,035	1,725	2,300	3,450
Product handling costs (Rs.) {(a) × Rs. 3.75}	17,550	73,830	5,13,000	2,68,313	32,906
Cost of expediting deliveries (Rs.) {No. of expedited deliveries × Rs. 2,250}	-	-	-	-	2,250
Total cost of customer level operating activities (Rs.)	31,150	95,415	5,40,825	2,90,563	62,906

i) Computation of Customer level operating income

Particulars	Customers				
	A (Rs.)	B (Rs.)	C (Rs.)	D (Rs.)	E (Rs.)
Revenues (At list price) (Refer to working note)	5,05,440	21,26,304	1,47,74,400	77,27,400	9,47,700
Less: Discount (Refer to working note)	-	35,438	12,31,200	2,57,580	94,770
Revenue (At actual price)	5,05,440	20,90,866	1,35,43,200	74,69,820	8,52,930
Less: Cost of goods sold (Refer to working note)	4,21,200	17,71,920	1,23,12,000	64,39,500	7,89,750

Gross margin	84,240	3,18,946	12,31,200	10,30,320	63,180
Less: Customer level operating activities costs (Refer to working note)	31,150	95,415	5,40,825	2,90,563	62,906
Customer level operating income	53,090	2,23,531	6,90,375	7,39,757	274

Comment on the results:

Customer D is the most profitable customer, despite having only 52.30% of the unit volume of customer C. The main reason is that C receives a Rs. 9 per case discount while customer D receives only a Rs. 3.60 discount per case.

Customer E is less profitable, in comparison with the small customer A being profitable. Customer E received a discount of Rs. 10.80 per case, makes more frequent orders, requires more customer visits and requires more delivery kms. in comparison with customer A.

ii) Insight gained by reporting both the list selling price and the actual selling price for each customer:

Separate reporting of both-the listed and actual selling prices enables Alpha Ltd. To examine which customer has received what discount per case, whether the discount received has any relationship with the sales volume. The data given below provides us with the following information;

Sales volume	Discount per case (Rs.)
C (1,36,800 cases)	9.00
D (71,550 cases)	3.60
B (19,688 cases)	1.80
E (8,775 cases)	10.80
A (4,680 cases)	0

The above data clearly shows that the discount given to customers per case has a direct relationship with sales volume, except in the case of customer E. The reasons for 10.80 discount per case for customer E should be explored.

ASSIGNMENT PROBLEMS

PROBLEM 1: PQR Pens Ltd. manufactures two products - 'Gel Pen' and 'Ball Pen'. It furnishes the following data for the year 2017:

Product	Annual Output (Units)	Total Machine Hours	Total number of Purchase orders	Total number of set-ups
Gel Pen	5,500	24,000	240	30
Ball Pen	24,000	54,000	448	56

The annual overheads are as under:

Particulars	Amount (Rs.)
Volume related activity costs	4,75,020
Set up related costs	5,79,988
Purchase related costs	5,04,992

Calculate the overhead cost per unit of each Product - Gel Pen and Ball Pen on the basis of:

i) Traditional method of charging overheads

ii) Activity based costing method and

iii) Find out the difference in cost per unit between both the methods. *(A) (M18 (N) - 10M)*

(ANS.: I) OH RATE (P.U.): RS. 87.27, RS. 45; II) OH RATE (P.U.): RS. 95.39; RS. 43.13; III) DIFFERENCE: RS. (8.12), RS. 1.87)

PROBLEM 2: G-2020 Ltd. is a manufacturer of a range of goods. The cost structure of its different products is as follows:

Particulars	Product A	Product B	Product C	Unit of measurement
Direct Materials	50	40	40	Rs./u
Direct Labour @ Rs. 10/ hour	30	40	50	Rs./u
Production Overheads	30	40	50	Rs./u
Total Cost	110	120	140	Rs./u
Quantity Produced	10,000	20,000	30,000	Units

G-2020 Ltd. was absorbing overheads on the basis of direct labour hours. A newly appointed management accountant has suggested that the company should introduce ABC system and has identified cost drivers and cost pools as follows:

Activity Cost Pool	Cost Driver	Associated Cost (Rs.)
Stores Receiving	Purchase Requisitions	2,96,000
Inspection	Number of Production Runs	8,94,000
Dispatch	Orders Executed	2,10,000
Machine Setup	Number of Setups	12,00,000

The following information is also supplied:

Details	Product A	Product B	Product C
No. of Setups	300	390	450
No. of Orders Executed	180	270	300
No. of Production Runs	750	1,050	1,200
No. of Purchase Requisitions	300	450	500

Required: Calculate activity based production cost of all the three products.

(B) (RTP M18 (N)) (ANS.: PRODUCT A: RS. 150.49; PRODUCT B: 124.25; PRODUCT C: RS. 123.67)

PROBLEM 3: CDE Ltd. is following Activity based costing. Budgeted overheads, cost drivers and volume are as follows:

Cost pool	Budgeted overheads (Rs.)	Cost driver	Budgeted volume
Material procurement	18,42,000	No. of orders	1,200
Material handling	8,50,000	No. of movement	1,240
Maintenance	24,56,000	Maintenance hours	17,550
Set-up	9,12,000	No. of set-ups	1,450
Quality control	4,42,000	No. of inspection	1,820

The company has produced a batch of 7,600 units, its material cost was Rs.24,62,000 and wages Rs.4,68,500. Usage activities of the said batch are as follows:

Material orders 56

Material movements 84

Maintenance hours 1,420 hours

Set-ups 60

No. of inspections 18

Required:

i) Calculate cost driver rates.

ii) Calculate the total and unit cost for the batch. *(B) (PQ)*

(ANS.: I) COST DRIVER RATE: 1,535; 685.48; 139.94; 628.97; 242.86; II) TOTAL COST: RS. 33,14,864.80; UNIT COST: RS. 436.17)

PROBLEM 4: 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 (Rs.)
Power	Kilowatt hours	50,000 kilowatt hours	40,00,000
Quality Inspections	Number of Inspections	10,000 Inspections	60,00,000

The company makes three products M, S and T. For the year ended March 31, 20X9, 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:

a) PREPARE a statement showing cost allocation to each product from each activity.

b) CALCULATE the cost of unused capacity for each activity.

c) STATE the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate.

(B) (RTP M 19 (N)) (ANS.: A) POWER: M: RS. 8,00,000; S: RS. 16,00,000; T: RS. 12,00,000; QUALITY INSPECTIONS: M: RS. 21,00,000; S: RS. 15,00,000, T: RS. 18,00,000; B) RS. 10,00,000)

PROBLEM 5: Asian Mfg. Co. has decided to increase the size of the store. It wants the information about the probability of the individual product lines : Lemon, Grapes and Papaya. It provides the following data for the 2018 for each product line:

Particulars	Lemon	Grapes	Papaya
Revenues (Rs.)	79,350	2,10,060	1,20,990
Cost of goods sold (Rs.)	60,000	1,50,000	90,000
Cost of bottles returned (Rs.)	1,200	0	0
Number of purchase orders placed	36	84	36
Number of deliveries received	30	219	66
Hours of shelf stocking time	54	540	270
Items sold	12,600	1,10,400	30,600

Asian Mfg. Co. also provides the following information for the year 2018:

Activity	Description of Activity	Total Costs (Rs.)	Cost Allocation Basis
Bottle returns	Returning of empty bottles to the store	1,200	Direct tracing to product line
Ordering	Placing of orders of purchases	15,600	156 purchase orders
Delivery	Physical delivery and the receipts of merchandise	25,200	315 deliveries
Self- stocking	Stocking of merchandise on store shelves and ongoing	17,280	864 hours of time

	restocking		
Customer support	Assistance provided to customers including bagging and checkout	30,720	1,53,600 items sold

Required:

(i) Asian Mfg. Co. currently allocates store support costs (all costs other than the cost of goods sold) to the product line on the basis of the cost of goods sold of each product line. CALCULATE the operating income and operating income as the percentage of revenue of each product line.

(ii) If Asian Mfg. Co. allocates store support costs (all costs other than the cost of goods sold) to the product lines on the basis of ABC system, CALCULATE the operating income and operating income as the percentage of revenue of each product line.

(iii) SHOW a comparison statement.

(MTP N19)(ANS:i)20,400,4.97%,ii)20,400,4.97%iii)4.97%)

PROBLEM 6: Bank of Surat operated for years under the assumption that profitability can be increased by increasing Rupee volume. But that has not been the case. Cost analysis has revealed the following:

Activity	Activity Cost (Rs.)	Activity Driver	Activity Capacity
Providing ATM Service	1,00,000	No. of Transactions	2,00,000
Computer Processing	10,00,000	No. of Transactions	25,00,000
Issuing Statements	8,00,000	No. of Statements	5,00,000
Customer Inquiries	3,60,000	Telephone Minutes	6,00,000

The following annual information on three products was also made available:

Activity Driver	Checking Accounts	Personal Loans	Gold Visa
Units of Product	30,000	5,000	10,000
ATM Transactions	1,80,000	0	20,000
Computer Transactions	20,00,000	2,00,000	3,00,000
Number of Statements	3,00,000	50,000	1,50,000
Telephone Minutes	3,50,000	90,000	1,60,000

Required:

i) Calculate rates for each activity.

ii) Using the rates computed in requirement (i), Calculate the cost of each product.

(C) (MTP1 M18 (N) - 5M) (ANS.: I) 0.50, 0.40, 1.60, 0.60; II) 52.67; 42.80; 46.60)

PROBLEM 7: ABC Ltd. Manufactures two types of machinery equipment 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, 20X6 are Rs.12,42,500 and 20,000 hours respectively.

The information about Company's products is as follows:

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

ABC Ltd.'s overheads of Rs.12,42,500 can be identified with three major activities: Order Processing (Rs.2,10,000), machine processing (Rs.8,75,000), and product inspection (Rs.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 equipment Y and Z, if the budgeted manufacturing volume is attained.

ii) Assuming use of activity-based costing, compute the unit manufacturing costs of the equipment 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.

(A) (NEW SM) (ANS.: DL HOURS Y-936.38, Z-1,298.50; TOTAL OH COST: Y-5, 67,000, Z-6, 75,500, COST DISTORTION: Y: (-40.42, Z-+32.34)

PROBLEM 8: SMP Pvt. Ltd. manufactures three products using three different machines. At present the overheads are charged to products using labour hours. The following statement for the month of September 2019, using the absorption costing method has been prepared:

Particulars	Product X (using machine A)	Product Y (using machine B)	Product Z (using machine C)
Production units	45,000	52,500	30,000
Material cost per unit (Rs.)	350	460	410
Wages per unit @ Rs. 80 per hour	240	400	560
Overhead cost per unit (Rs.)	300	500	700
Total cost per unit (Rs.)	890	1,360	1,670
Selling price (Rs.)	1,112.50	1,700	2,087.50

The following additional information is available relating to overhead cost drivers.

Cost driver	Product X	Product Y	Product Z	Total
No. of machine set-ups	40	160	400	600
No. of purchase orders	400	800	1,200	2,400
No. of customers	1,000	2,200	4,800	8,000

Actual production and budgeted production for the month is same. Workers are paid at standard rate. Out of total overhead costs, 30% related to machine set-ups, 30% related to customer order processing and customer complaint management, while the balance proportion related to material ordering.

Required:

i) Compute overhead cost per unit using activity based costing method.

ii) Determine the selling price of each product based on activity-based costing with the same profit mark-up on cost. *(RTP NOV 19 new)(ANS: i) X=129.60, Y=268.46, Z=955.80 ii) x=899.50, y=1410.57, z=2407.25)*

ADDITIONAL QUESTION BANK FOR STUDENTS SELF PRACTICE

PROBLEM wholesale-channel customers and two retail channel customers. MNP suits has developed the following Activity Based costing system.

Activity	Cost Driver	ABC Rate(Rs.)
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 the last year, to explore opportunities for increasing profitability of his Company in the next year. The following data are available for the next year.

Particulars	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	Rs.700	Rs. 800	Rs.850	Rs.900

Required:

1. Calculate the customer - level Operating Income in the last year.
2. What do you recommend to CEO of MNP Suits to do, to increase the Company's Operating Income in the next year?
3. Assume MNP Suits' Distribution Channel Costs are Rs. 17,50,000 for its Wholesale Customers and Rs. 10,50,000 for the Retail Customers. Also, assume that its Corporate Sustaining Costs are Rs. 12,50,000. Prepare Income Statement of MNP Suits.

(A) (ANS.: 1) 24,54,650, 28,06,750, 10,46,500, 11,98,250; 3) OPERATING INCOME: 34,56,150)

THE END