

5. ACTIVITY BASED COSTING

ASSIGNMENT SOLUTIONS

PROBLEM NO. 1

i) Statement Showing Overhead Cost per unit "Traditional Method"

	Gel Pen (Rs.)	Ball Pen (Rs.)
Units	5,500	24,000
Overheads (Rs.) (Refer to W.N.)	4,80,000 (20 x 24,000 hrs.)	10,80,000 (20 x 54,000 hrs.)
Overhead Rate per unit (Rs.)	87.27 (Rs. 4,80,000 / 5,500 units)	45 (Rs. 10,80,000 / 24,000 units)

Working Notes:

Overhead Rate per Machine Hour: $\frac{\text{Total Overhead incurred by the Company}}{\text{Total Machine Hours}}$

$$= \frac{4,75,020 + 5,79,988 + 5,04,992}{24,000 \text{ hours} + 54,000 \text{ hours}} = \frac{\text{Rs. } 15,60,000}{78,000 \text{ hours}} = \text{Rs. } 20 \text{ per machine hour}$$

ii) Statement Showing "Activity Based Overhead Cost":

Activity Cost Pool	Cost Driver	Ratio	Total Amount (Rs.)	Gel Pen (Rs.)	Ball Pen (Rs.)
Volume Related Activity Costs	Machine hours	24:54	4,75,020	1,46,160	3,28,860
Setup Related Costs	No. of Setups	30:56	5,79,988	2,02,321	3,77,667
Purchase Related Costs	No. of Purchase Orders	240:448	5,04,992	1,76,160	3,28,832
Total Cost				5,24,641	10,35,359
Output (units)				5,500	24,000
Unit Cost (Overheads)				95.39	43.13

iii)

	Gel Pen (Rs.)	Ball Pen (Rs.)
Overheads Cost per unit (Rs.) (Traditional Method)	87.27	45
Overheads Cost per unit (Rs.) (ABC)	95.39	43.13
Difference per unit	-8.12	+1.87

(Volume related activity cost, set up related costs and purchase related cost can also be calculated under Activity Base Costing using Cost driver rate. However, there will be no changes in the final answer.)

PROBLEM NO. 2

i) Calculation of cost driver rate:

Cost pool	Budgeted overheads (Rs.)	Cost driver	Cost driver rate (Rs.)
Material procurement	18,42,000	1,200	1,535.00
Material handling	8,50,000	1,240	685.48
Maintenance	24,56,000	17,550	139.94
Set-up	9,12,000	1,450	628.97
Quality control	4,42,000	1,820	242.86

ii) Calculation of cost for the batch:

Particulars	Amount (Rs.)	Amount (Rs.)
Material cost		24,62,000.00
Wages		4,68,500.00
Overheads:		
- Material procurement (Rs.1,535×56 orders)	85,960.00	
- Material handling (Rs.685.48×84 movements)	57,580.32	
- Maintenance (Rs.139.94×1,420 hours)	1,98,714.80	
- Set-up (Rs.628.97×60 set-ups)	37,738.20	
- Quality control (Rs.242.86×18 inspections)	4,371.48	3,84,364.80
Total Cost		33,14,864.80
No. of units		7,600
Cost per unit		436.17

PROBLEM NO. 3

i) Absorption Costing System

Operating Income:-

Particulars	Lemon	Grapes	Papaya	Total
Revenue	79,350	2,10,060	1,20,990	4,10,400
Less:- Cost of Goods sold	60,000	1,50,000	90,000	3,00,000
Less:- Store Support Cost	18,000	45,000	27,000	90,000
Operating Income	1,350	15,060	3,990	20,400
Operating Income (%)	1.70	7.17	3.30	4.97

ii) ABC system

Overhead Allocation Rate:-

Activity	Total costs	Quantity of cost Allocation Base	Overhead allocation rate
Ordering	15,600	156 Purchase Orders	100.00
Delivery	25,200	315 Purchase Orders	80.00
Shelf stocking	17,280	864 purchase Orders	20.00
Customer Support	30,720	1,53,600 Items Sold	0.20

Store Support Cost

Particulars	Cost Driver	Lemon	Grapes	Papaya	Total
Bottle returns	Direct	1,200	0	0	1,200
Ordering	Purchase Orders	3,600	8,400	3,600	15,600
Delivery	Deliveries	2,400	17,520	5,280	25,200
Self- stocking	Hours of time	1,080	10,800	5,400	17,280
Customer support	Items sold	2,520	22,080	6,120	30,720
Grand Total		10,800	58,800	20,400	90,000

Operating Income:-

Particulars	Lemon	Grapes	Papaya	Total
Revenue	79,350	2,10,060	1,20,990	4,10,400
Less:- Cost of Goods sold	60,000	1,50,000	90,000	3,00,000
Less:- Store Support Cost	10,800	58,800	20,400	90,000

Operating Income	8,550	1,260	10,590	20,400
Operating Income (%)	10.78	0.60	8.75	4.97

Comparison:-

Particulars	Lemon	Grapes	Papaya	Total
Under Traditional Costing System	1.70%	7.17%	3.30%	4.97%
Under ABC System	10.78%	0.60%	8.75%	4.97%

PROBLEM NO. 4

Working note:

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

	Customers				
	A (RS)	B (RS)	C (RS)	D (RS)	E (RS)
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	11,250	18,750	22,500	18,750	22,500
(No. of purchase × RS750)	1,200	1,800	3,600	1,200	1,800
11,250 18,750 22,500 18,750 22,500					
Customer visits costs (RS)					
(No. of customer visits × Rs.600)	1,150	1,035	1,725	2,300	3,450
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.)					
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

	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	31,150	95,415	5,40,825	2,90,563	62,906

activities costs (Refer to working note)					
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 ` 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

PROBLEM NO. 5**i) Statement Showing "Activity Rate":**

Activity	Activity Cost [a] (Rs.)	Activity Driver	No. of Units of Activity Driver [b]	Activity Rate [a] / [b] (Rs.)
Providing ATM Service	1,00,000	No. of ATM Transactions	2,00,000	0.50
Computer Processing	10,00,000	No. of Computer Transactions	25,00,000	0.40
Issuing Statements	8,00,000	No. of Statements	5,00,000	1.60
Customer Inquiries	3,60,000	Telephone Minutes	6,00,000	0.60

ii) Statement Showing "Cost of Product":

Activity	Checking Accounts (Rs.)	Personal Loans (Rs.)	Gold Visa (Rs.)
Providing ATM Service	90,000 (1,80,000 tr. × Rs. 0.50)	---	10,000 (20,000 tr. × Rs. 0.50)
Computer Processing	8,00,000 (20,00,000 tr. × Rs. 0.40)	80,000 (2,00,000 tr. × Rs. 0.40)	1,20,000 (3,00,000 tr. × Rs. 0.40)
Issuing Statements	4,80,000 (3,00,000 st. × Rs. 1.60)	80,000 (50,000 st. × Rs. 1.60)	2,40,000 (1,50,000 st. × Rs. 1.60)
Customer Inquiries	2,10,000 (3,50,000 min. × Rs. 0.60)	54,000 (90,000 min. × Rs. 0.60)	96,000 (1,60,000 min. × Rs. 0.60)
Total Cost [a]	Rs. 15,80,000	Rs. 2,14,000	Rs. 4,66,000
Units of Product [b]	30,000	5,000	10,000
Cost of each Product [a] / [b]	52.67	42.80	46.60

PROBLEM NO. 6

i) Overheads application base : Direct Labour hours

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

*Predetermined rate = Budgeted Overheads / Budgeted direct labour hours

= 12,42,500/20,000 hours = 62.125

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	Equipment
	Y	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		
	976.80	1,266.16

	Equipment	Equipment
	Y	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

Low volume product Y is under – Costed and high volume product Z is over costed using direct labour hours for overhead absorption.

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PROBLEM NO. 7

(i) Overheads application base: Direct labour hours

	Equipment A (Rs.)	Equipment B(Rs.)
Direct material cost	350	400
Direct labour cost	360	480
Overheads*	180	240
	890	1120

$$\text{*Pre-determined rate} = \frac{\text{Budgeted overheads}}{\text{Budgeted direct labour hours}} = \frac{15,00,000}{25,000 \text{ hours}} = \text{RS } 60$$

(ii) Estimation of Cost-Driver rate:

Activity	Overhead cost Rs	Cost-driver level	Cost driver rate Rs.
Order processing	3,00,000	600 Orders processed	500
Machine processing	10,00,000	50,000 Machine hours	20
Inspection	2,00,000	15,000 Inspection hours	10
		Equipment A (RS)	Equipment B (RS)
Direct material cost		350	400
Direct labour cost		360	480
Prime Cost(A)		710	880
Overhead Cost			
Order processing 400: 200		2,00,000	1,00,000
Machine processing 22,500: 27,500		4,50,000	5,50,000
Inspection 5,000: 15,000		50,000	1,50,000
Total overhead cost		7,00,000	8,00,000

(Overheads cost per unit for each overhead can also be calculated)

Per unit cost	A (RS)	B (RS)
7,00,000 / 3,200 (B)-A	218.75	
8,00,000 / 3,850 (B)-B		207.79
Unit manufacturing cost (A+B)	928.75	1,087.79

(iii) Calculation of Cost Distortion

	Equipment A (RS)	Equipment B (RS)
Unit manufacturing cost—using direct labour hours as an application base	890.00	1,120.00
Unit manufacturing cost-using activity based costing	928.75	1,087.79
Cost distortion	-38.75	32.21

PROBLEM NO. 8

The total production overheads are Rs.26,00,000:

Product A: 10,000 × Rs. 30 = Rs. 3,00,000

Product B: 20,000 × Rs. 40 = Rs. 8,00,000

Product C: $30,000 \times \text{Rs. } 50 = \text{Rs. } 15,00,000$

On the basis of ABC analysis this amount will be apportioned as follows:

Statement Showing "Activity Based Production Cost"

Activity Cost Pool	Cost Driver	Ratio	Total Amount (Rs.)	A (Rs.)	B (Rs.)	C (Rs.)
Stores Receiving	Purchase Requisition	6:9:10	2,96,000	71,040	1,06,560	1,18,400
Inspection	Production Runs	5:7:8	8,94,000	2,23,500	3,12,900	3,57,600
Dispatch	Orders Executed	6:9:10	2,10,000	50,400	75,600	84,000
Machine Setups	Setups	12:13:15	12,00,000	3,60,000	3,90,000	4,50,000
Total Activity Cost				7,04,940	8,85,060	10,10,000
Quantity Produces				10,000	20,000	30,000
Unit Cost (Overheads)				70.49	44.25	33.67
Add: Conversion Cost (Material + Labour)				80	80	90
Total				150.49	124.25	123.67

THE END

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