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CHAPTER

Activity Based Costing

Meaning of Activity Based Costing (ABC)	• According to CIMA London, "ABC Costing is the cost attribution to cost units on the basis of benefits received from indirect activities, e.g. ordering, setting up, assuring quality". • ABC assigns cost to activities based on their use of resources. • It then assigns cost to cost objects, such as products or customers, based on their use of activities.
Meaning of Activity	• It here refers to an event that incurs cost. • It comprises of units of work or tasks. Example, purchase of material is an activity consisting a series of tasks like purchase requisition, follow-up, etc.
Meaning of Cost Object	• Anything for which cost is ascertained is known as cost object. It may be a job, a product or a customer, etc. In the case of product, a cost object may be a car, a TV set, a computer etc.
Meaning of Cost Driver	• It is a factor that causes a change in the cost of an activity. • It shows why resources are consumed by an activity. • Cost drivers are of two types: ➢ Resource cost driver i.e. the measure of the quantity of resources consumed by an activity ➢ Activity cost driver i.e. the measure of the frequency and intensity of demand placed on the activities by cost object.
Meaning of Cost Pool	• It is grouping of individual cost items. A cost pool is created for each activity. Cost pool, also known as cost bucket, is like a cost center for which costs are accumulated.
Factors Prompting the Development of ABC	• Growing overhead costs • Increasing market competition requiring more accurate product cost • Increasing product diversity to secure economies of scope • Decreasing cost of information processing
Usefulness or Suitability of ABC	• High amount of overhead • Wide range of products • Presence of non-volume related activities • Stiff competition

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Benefits of Activity Based Costing	• ABC provides more **accurate and informative product costs**, which lead to more accurate product profitability measurements and to better-informed strategic decisions. • ABC provides more **accurate measurements of activity-driving costs**, which helps managers improve product and process value. • ABC provides managers **easier access to relevant costs** for making business decisions, enabling them to take a more competitive position.
Limitations of Activity Based Costing	• **Allocations –** Even if activity data are available, some costs probably require allocations to departments and products based on arbitrary volume measures. • **Omission of costs –** ABC omits from the analysis some costs identified with specific products. Activities that cause such costs include marketing, advertising, research and development, product engineering, and warranty claims. • **Expense and time –** An ABC system is very expensive to develop and implement and is very time consuming.
Requirement in Implementation of Activity Based Costing	• **Staff Training –** It should be done to create an awareness of the purpose of ABC. • **Process Specification –** Informal, but structure, interviews with key members of personnel will identify the different stages of the production process, the commitment of resources to each, processing times and bottlenecks. • **Activity Definition –** Early activity should be clearly defined the problem must be kept manageable at this state, despite the possibility of information overload from new data, much of which is in need to codification. • **Activity Driver Selection -** Cost driver for each activity shall be selected. • **Assigning Cost –** A single representative activity driver can be used to assign costs from the activity pools to the cost objects.
Practical Applications of Activity Based Costing	• As a decision making tool • As activity based management • Facilitate activity based budgeting
Activity Based Management	• It refers to use of ABC as a costing tool to manage activity level costs. • It involves various analysis which are as follows: ➢ Cost driver analysis ➢ Activity analysis to identify value added activities and non-value added activities. ➢ Performance analysis • It can be used in following ways: ➢ Cost reduction ➢ Business process re-engineering ➢ Benchmarking ➢ Performance measurement

Activity Based Budgeting (ABB)	• ABB analyse the resource input or cost for each activity. • It provides a framework for estimating the amount of resources required in accordance with the budgeted level of activity. • Actual results can be compared with budgeted results to highlight both in financial and non-financial terms those activities with major discrepancies from budget for potential reduction in supply of resources. • The three elements of activity based budgeting are as follows: ➢ Type of work to be done ➢ Quantity of work to be done ➢ Cost of work to be done
Benefits of Activity Based Budgeting (ABB)	• ABB can enhance accuracy of financial forecasts and increasing management understanding • When automated, ABB can rapidly and accurately produce financial plans and models based on varying levels of volume assumptions • ABB eliminates much of the needless rework created by traditional budgeting techniques

PRACTICE QUESTIONS

1. A company manufacturing two products furnishes the following data for a year:

[Similar May 2018, Similar Nov 2022]

Product	Annual Output (Units)	Total Machine hours	Total number of purchase orders	Total number of set-ups
S	5,000	20,000	160	20
K	60,000	1,20,000	384	44

The annual overheads are as under:	₹
Volume related activity costs	5,50,000
Set up related costs	8,20.000
Purchase related costs	6,18,000

You are required to calculate the cost per unit of each product S and K based on:

(i) Traditional method of charging overheads,

(ii) Activity based costing method.

Ans. (i) ₹56.80; ₹28.40; (ii) ₹103.32; ₹24.53.

2. SK Ltd. is a multiproduct company, manufacturing three products S, K and M. the budgeted costs and production for the year ending March 31st, are as follows: **[SM]**

	S	K	M
Production quantity (units)	4,000	3,000	1,600
Resources per unit:			
Direct Material (Kg)	4	6	3
Direct labour (Minutes)	30	45	60

The budgeted direct labour rate was ₹10 per hour and the budgeted materials cost was ₹2 per Kg. Production overheads were budgeted at ₹99,450 and were absorbed to products using the direct labour hour rate. SK Ltd. followed an Absorption Costing System.

SK Ltd. is in consideration to adopt an Activity Based Costing System. The following additional information is made available for this purpose:

(a) Budgeted overheads were analyzed into the following:

Material handling	₹29,100
Storage costs	₹31,200
Electricity	₹39,150

(b) The cost drivers identified were as follows:

Material handling	Weight of material handled
Storage costs	Number of batches of material
Electricity	Number of machine operators

(c) Data on Cost Drivers was as follows:

	S	K	M
For complete production:			
Batches of material	10	5	15
Per unit of production:			
Number of machine operators	6	3	2

You are required to:

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

(b) Prepare a statement for management showing the products costs of each product using the ABC approach

(c) What are the reasons for the different product costs under the two approaches?

Ans. (a) ₹21.50; ₹32.25; ₹33; (b) ₹25.09; ₹28.97; ₹30.16.

3. SK Ltd. has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity: **[Similar MTP May 2024]**

Activity	Cost Driver	Capacity	Cost
Power	Kilowatt hours	50,000 kilowatt hours	₹2,00,000
Quality inspections	No. of inspections	10,000 inspections	₹3,00,000

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

Product	Kilowatt Hours	Quality Inspections
S	10,000	3,500
K	20,000	2,500
M	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.

Ans. (i) Total Power = ₹1,80,000; Total Inspection = ₹2,70,000; (ii) ₹20,000; ₹30,000.

4. 'Humara – Apna' bank offers three products, viz. deposits, Loans and Credit Cards. The bank has selected 4 activities for a detailed budgeting exercise, following activity based costing method. **[SM]**

The bank wants to know the product wise total cost per unit for the selected activities, so that price may be fixed accordingly. The following information is made available to formulate the budget:

Activity	Present Cost (₹)	Estimation for the budget period
ATM Services:		
(a) Machine Maintenance	4,00,000	All fixed, no change
(b) Rents	2,00,000	Fully fixed, no change
(c) Currency replenishment cost	1,00,000	Expected to double during budget
	7,00,000	(This activity is driven by no. of ATM transactions)
Computer Processing	5,00,000	Half this amount is fixed and no change is expected. The variable portion is expected to increase to three times the current level. (This activity is driven by the number of computer transactions)
Issuing Statements	18,00,000	Presently, 3 lakh statements are made. In the budget period, 5 lakh statements are expected. For every, increase of one lakh statement, one lakh rupees is the budgeted increase. (This activity is driven by the number of statements)
Computer Inquiries	2,00,000	Estimated to increase by 80% during the budgeted period. (This activity is driven by telephone minutes)

The activity drivers and their budgeted quantities are given below:

Activity Drivers	Deposits	Loans	Credit Cards
No. of ATM transactions	1,50,000	-	50,000
No. of Computer Processing Transactions	15,00,000	2,00,000	3,00,000
No. of Statements to be issued	3,50,000	50,000	1,00,000
Telephone Minutes	3,60,000	1,80,000	1,80,000

The bank budgets a volume of 58,600 deposit accounts, 13,000 loan accounts and 14,000 credit card accounts.

Required:

(i) Calculate the budgeted rate for each activity

(ii) Prepare the budgeted cost statement activity wise.

(iii) Compute the budgeted product cost per account for each product using (i) and (ii) above.

Ans. (i) ₹4; ₹0.50; ₹4; ₹0.50; (ii) ₹58,600; ₹13,000; ₹14,000; (iii) ₹50; ₹30; ₹60.

5. SK is a global brand created by SK Ltd. The company manufactures three range of beauty soaps i.e. SK-Gold, SK-Pearl, and SK-Diamond. The budgeted costs and production for the month of March, 2021 are as follows: **[SM]**

	SK-Gold		SK-Pearl		SK-Diamond	
Production of soaps (Units)	**4,000**		**3,000**		**2,000**	
Resources per Unit:	**Qty**	**Rate**	**Qty**	**Rate**	**Qty**	**Rate**
- Essential Oils	60 ml	₹200/100 ml	55 ml	₹300/100 ml	65 ml	₹300/100 ml
- Cocoa Butter	20 g	₹200/100 g	20 g	₹200/100 g	20 g	₹200/100 g
- Filtered Water	30 ml	₹15/100 ml	30 ml	₹15/100 ml	30 ml	₹15/100 ml
- Chemicals	10 g	₹30/100 g	12 g	₹50/100 g	15 g	₹60/100 g
- Direct Labour	30 Min.	₹10/hour	40 Min.	₹10/hour	60 Min.	₹10/hour

SK Ltd. followed an Absorption Costing System and absorbed its production overheads, to its products using direct labour hour rate, which were budgeted at ₹1,98,000.

Now, SK Ltd. is considering adopting an Activity Based Costing system. For this, additional information regarding budgeted overheads and their cost drivers is provided below:

Particulars	(₹)	Cost drivers
Forklifting cost	58,000	Weight of material lifted
Supervising cost	60,000	Direct labour hours
Utilities	80,000	Number of Machine operations

The number of machine operations per unit of production are 5, 5, and 6 for SK-Gold, SK-Pearl, and SK-Diamond respectively.

(Consider (i) Mass of 1 litre of Essential Oils and Filtered Water equivalent to 0.8 kg and 1 kg respectively (ii) Mass of output produced is equivalent to the mass of input materials taken together.)

You are requested to:

(i) Prepare a statement showing the unit costs and total costs of each product using the absorption costing method.

(ii) Prepare a statement showing the product costs of each product using the ABC approach.

(iii) State what are the reasons for the different product costs under the two approaches?

Ans. (i) ₹189; ₹244.17; ₹291.50; (ii) ₹192.48; ₹243.70; ₹285.72.

6. The profit margin of BABY Hairclips Company were over 20% of sales producing BROWN and BLACK hairclips. **[RTP Nov 2022]**

During the last year, GREEN hairclips had been introduced at 10% premium in selling price after the introduction of YELLO hairclips earlier five years back at 10/3% premium. However, the manager of the company is disheartened with the sales figure for the current financial year as follows:

Traditional Income Statement (in ₹)

	Brown	Black	Yellow	Green	Total
Sales	1,50,00,000	1,20,00,00	27,90,000	3,30,000	3,01,20,000
Material costs	50,00,000	40,00,000	9,36,000	1,10,000	1,0046,000
Direct labour	20,00,000	16,00,000	3,60,000	40,000	40,00,000
Overheads (3 times of direct labour)	60,00,000	48,00,000	10,80,000	1,20,000	1,20,00,000
Total operating income	20,00,000	16,00,000	4,14,000	60,000	40,74,000
Return on sales (in %)	13.3%	13.3%	14.8%	18.2%	13.5%

It is a known fact that customer are ready to pay premium amount for YELLOW and GREEN hairclips for their attractiveness; and the percentage returns are also high in new products.

At present, all of the Plant's indirect expenses are allocated to the products at 3 times of the direct labour expenses. However, the manager is interested in allocating indirect expenses on the basis of activity cost to reveal real earner. He provides support expenses category-wise as follows:

Support Expenses	(₹)
Indirect labour	40,00,000
Labour Incentives	32,00,000
Computer Systems	20,00,000
Machinery depreciation	16,00,000
Machine maintenance	8,00,000
Energy for machinery	4,00,000
Total	1,20,00,000

He provides following additional information for accomplishment of his interest:

Incentive to be allocated @40% of labour expenses (both direct and indirect).

Indirect labour are involved mainly in three activities. About half of indirect labour is involved in handling production runs. Another 40% is required just for the physical changeover from one color hairclip to another because YELLO hairclips require substantial labour for preparing the machine as compared to other colour hairclips. Remaining 10% of the time is spent for maintaining records of the products in four parts.

Another amount spent on computer system of ₹20,00,000 is for maintenance of documents relating to production runs and record keeping of the four products. In aggregate, approx. 80% of the amount expend is involved in the production run activity and approx. 20% is used to keep records of the products in four parts.

Other overhead expenses i.e. machinery depreciation, machine maintenance and energy for machinery are incurred to supply machine capacity to produce all the hairclips (practical capability of 20,000 hours).

Activity Cost Drivers:

Particulars	Brown	Black	Yellow	Green	Total
Sales volume (units)	1,00,000	80,000	18,000	2,000	2,00,000
Selling price (₹)	150	150	155	165	
Material cost (₹)	50	50	52	55	
Machine hours per unit (Hrs)	0.10	0.10	0.10	0.10	20,000
Production runs	100	100	76	24	300
Setup time per run (Hrs)	4	1	6	4	

You are required to:

(i) Calculate operating income and operating income as per percentage of sales using activity-based costing system

(ii) State the reasons for different operating income under traditional income system and activity based costing system.

Ans. (i) 21.61%; 22,67%; -44%; -200.12%.

7. SK Limited has decided to analyse the profitability of its five new customers. It buys bottled water at ₹90 per case and sells to retail customers at a list price of ₹108 per case. The data pertaining to five customers are: **[SM, Similar Nov 2019]**

	Customers				
	S	K	M	P	J
Cases sold	4,680	19,688	1,36,800	71,550	8,775
List selling price	₹108	₹108	₹108	₹108	₹108
Actual selling price	₹108	₹106.20	₹99	₹104.40	₹97.20
Number of purchase order	15	25	30	25	30
Number of Customer visits	2	3	6	2	3

	Customers				
	S	K	M	P	J
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	₹750 per purchase order
Customer visits	₹600 per customer visit
Deliveries	₹5.75 per delivery km travelled
Product handling	₹3.75 per case sold
Expedited deliveries	₹2,250 per expedited delivery

Required:

(a) Compute the customer level operating income of each of five retail customers now being examined (S, K, M, P and J). Comment on the results.

(b) What insights are gained by reporting both the list selling price and the actual selling price for each customer.

Ans. (a) ₹53,090; ₹2,23,531; ₹6,90,375; ₹7,39,757; 274.

PRACTICE QUESTIONS

8. SK Ltd. manufactures three types of products namely P,Q and R. The data relating to a period are as under: **[SM, Similar May 2022]**

Particulars	S	K	M
Machine hours per unit	10	18	14
Direct Labour hours per unit	4	12	8
Direct Material per unit (₹)	90	80	120
Production (units)	3,000	5,000	20,000

Currently the company uses traditional costing method and absorbs all production overheads on the basis of machine hours. The machine hour rate of overhead is ₹6 per hour. Direct labour hour rate is ₹20 per hour.

The company proposes to use activity based costing system and the activity analysis is as under:

Particulars	S	K	M
Batch size (units)	150	500	1,000
Number of purchase orders per batch	3	10	8
Number of inspections per batch	5	4	3

The total production overheads are analysed as under:

Machine set up costs	20%
Machine operations costs	30%
Inspection costs	40%
Material procurement related costs	10%

Required:

(i) Calculate the cost per unit of each product using traditional method of absorbing all production overheads on the basis of machine hours.

(ii) Calculate the cost per unit of each using activity based costing principles.

Ans. (i) ₹230; ₹428; ₹364; (ii) ₹427; ₹425; ₹335.20.

9. PQR Ltd. is engaged in the production of three products P, Q and R. The company calculates Activity Cost Rates on the basis of Cost Driver capacity which is provided as below: **[July 2021]**

Activity	Cost Driver	Cost Driver Capacity	Cost (₹)
Direct Labour Hours	Labour Hours	30,000 Labour Hours	3,00,000
Production runs	No. of Production runs	600 Production runs	1,80,000
Quality Inspections	No. of Inspections	8000 Inspections	2,40,000

The consumption of activities during the period is as under:

Activity/Products	P	Q	R
Direct Labour hours	10,000	8,000	6,000
Production runs	200	180	160
Quality Inspection	3,000	2,500	1,500

You are required to:

(i) Compute the cost allocated to each Product from each Activity.

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

(iii) A potential customer has approached the company for supply of 12,000 units of net product 'S' to be delivered in lots of 1,500 units per quarter. This will involve an initial design cost of ₹30,000 and per quarter production will involve the following:

Direct Material	₹18,000
Direct Labour hours	1,500 hours
No. of Production runs	15
No. of Quality Inspection	250

Prepare cost sheet segregating direct and indirect cost and compute the sales value per quarter of product 'S' using ABC system considering a markup of 20% on cost.

Ans. (i) ₹2,50,000; ₹2,09,000; ₹1,53,000; (ii) ₹60,000; ₹18,000; ₹30,000; (iii) ₹58,500.

10. ABC Ltd. manufactures three products X, Y and Z using the same plant and resources. It has given the following information for the year ended on 31st March, 2020: **[Jan 2021]**

	X	Y	Z
Production Quantity (units)	1200	1440	1968
Cost per unit:			
Direct Material (₹)	90	84	176
Direct Labour (₹)	18	20	30

Budgeted direct labour rate was ₹4 per hour and the production overheads, shown in table below, were absorbed to products using direct labour hour rate. Company followed Absorption Costing Method. However, the company is now considering adopting Activity Based Costing Method.

	Budgeted Overheads (₹)	Cost Driver	Remarks
Material Procurement	50,000	No. of orders	No. of orders was 25 for each product
Set-up	40,000	No. of Production Runs	All the three products are produced in production runs of 48 units.
Quality Control	28,240	No. of Inspections	Done for each production run.
Maintenance	1,28,000	Maintenance Hours	Total maintenance hours were 6,400 and was allocated in the ratio of 1:1:2 between X, Y and Z.

Required:

(i) Calculate the total cost per unit of each product using the Absorption Costing Method.

(ii) Calculate the total cost per unit of each product using the Activity Based Costing.

Ans. (i) ₹148.50; ₹149; ₹273.50; (ii) ₹163.37; ₹152.60; ₹261.80.

11. SK Ltd. Manufactures two types of machinery equipment S and K and applies/absorbs overheads on the basis of direct-labour hours. The budgeted overheads and direct labour hours for the month of December, are ₹12,42,500 and 20,000 hours respectively. The information about Company's products are as follows: **[SM]**

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

SK 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:

	Order processed	Machine hours worked	Inspection hours
S	350	23,000	4,000
K	250	27,000	11,000
Total	600	50,000	15,000

Required:

(a) Assuming use of direct-labour hours to absorb/apply overheads to production, compute the unit manufacturing cost of the equipment S and K, if the budgeted manufacturing volume is attained.

(b) Assuming use of activity-based costing, compute the unit manufacturing costs of the equipment S and K, if the budgeted manufacturing volume is achieved.

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

Ans. (a) ₹936.38; ₹1,298.50; (b) ₹976.80; ₹1,266.16; (c) -₹40.42; +₹32.34.

12. SK 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 March 2021, using the absorption costing method is been prepared: **[RTP Nov 2019]**

Particulars	Product S (using Machine A)	Product K (using Machine B)	Product P (using Machine C)
Production units	45,000	52,500	30,000
Material cost per unit (₹)	350	460	410
Wages per unit @ ₹80 per hour	240	400	560
Overhead cost per unit (₹)	240	400	560
Total cost per unit (₹)	830	1,260	1,530
Selling price (₹)	1,037.50	1,575	1,912.50

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

Cost driver	Product S	Product K	Product P	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.

Required:

(a) Compute overhead cost per unit using activity based costing method

(b) Determine the selling price of each product based on activity based costing with the same profit mark-up on cost.

Ans. (a) ₹129.60; ₹268.40; ₹955.80; (b) ₹899.50; ₹1,410.57; ₹2,407.25.

13. SK Ltd. is a manufacturer of a range of goods. The cost structure of its different products is as follows: **[RTP May 2018]**

Particulars	Product S	Product K	Product M	
Direct Materials	50	40	40	₹/u
Direct Labour @ ₹10/hour	30	40	50	₹/u
Production Overheads	30	40	50	₹/u
Total Cost	110	120	140	₹/u
Quantity Produced	10,000	20,000	30,000	Units

SK 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 (₹)
Stores Received	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 S	Product K	Product M
No. of Setups	360	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 to calculate activity based production cost of all the three products.

Ans. ₹150.49; ₹124.25; ₹123.67.

14. SK Limited manufactures three products S, K and M which are similar in nature and are usually produced in production runs of 100 units. Product S and M require both machine hours and assembly hours, whereas product K requires only machine hours. The overheads incurred by the company during the first quarter are as under: **[MTP May 2019]**

Machine Department expenses	₹18,48,000
Assembly Department expenses	₹6,72,000
Setup costs	₹90,000
Stores receiving cost	₹1,20,000
Order processing and dispatch	₹1,80,000
Inspect and Quality control cost	₹36,000

The data related to the three products during the period are as under:

	S	K	M
Units produced and sold	15,000	12,000	18,000
Machine hours worked	30,000 hrs.	48,000 hrs.	54,000 hrs.
Assembly hours worked (direct labour hours)	15,000 hrs.	-	27,000 hrs.
Customers' orders executed (in numbers)	1,250	1,000	1,500
Number of requisitions raised on the stores	40	30	50

Required:

Prepare a statement showing details of overhead costs allocated to each product type using activity based costing.

Ans. ₹8,02,000; ₹7,83,600; ₹13,60,400.

15. Bank of SK operated for years under the assumption that profitability can be increase by increasing Rupee volume. But that has not been the case. Cost analysis has revealed the following:

[MTP May 2018]

Activity	Activity Cost (₹)	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:

(a) Calculate rates for each activity

(b) Using the rates computed in required (a), calculate the cost of each product.

Ans. (a) ₹0.50; ₹0.40; ₹1.60; ₹0.60; (b) ₹52.67; ₹42.80; ₹46.60.

16. 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 ₹15,00,000 and 25,000 hours respectively. The information about the company's products is as follows: **[May 2019]**

	Equipment	
	A	**B**
Budgeted Production Volume	3,200 units	3,850 units
Direct Material Cost	₹350 per unit	₹400 per unit
Direct Labour Cost		
A: 3 hours @ ₹120 per hour	₹360	
B: 4 hours @ ₹120 per hour		₹480

Overheads of ₹15,00,000 can be identified with the following three major activities:

Order Processing ₹3,00,000

Machine Processing ₹10,00,000

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 follows:

	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:

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

(ii) Determine cost driver rates and prepare a statement showing the manufacturing cost per unit of each product using activity based costing, assuming the budgeted manufacturing volume is attained.

(iii) MNO 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.

Ans. (i) ₹890; ₹1,120; (ii) ₹928.75; ₹1,087.79; (iii) -₹38.75; + ₹32.21.

17. The following budgeted information relates to N Ltd. for the year 2021: **[RTP May 2021]**

	Products		
	X	Y	Z
Production and Sales (Units)	1,00,000	80,000	60,000
	(₹)	(₹)	(₹)
Selling price per unit	90	180	140
Direct cost per unit	50	90	95
	Hours	Hours	Hours
Machine department (machine hours per unit)	3	4	5
Assembly department (direct labour hours per unit)	6	4	3

The estimated overhead expenses for the year 2021 will be as below:

Machine Department ₹73,60,000

Assembly Department ₹55,00,000

Overhead expenses are apportioned to the products on the following basis:

Machine Department On the basis of machine hours

Assembly Department On the basis of labour hours

After a detailed study of the activities the following cost pools and their respective cost drivers are found:

Cost Pool	Amount (₹)	Cost Driver	Quantity
Machining services	64,40,000	Machine hours	9,20,000 hours
Assembly services	44,00,000	Direct labour hours	11,00,000 hours
Set-up costs	9,00,000	Machine set-ups	9,000 set-ups
Order processing	7,20,000	Customer orders	7,200 orders
Purchasing	4,00,000	Purchase orders	800 orders

As per an estimate the activities will be used by the three products:

	Products		
	X	Y	Z
Machine set-ups	4,500	3,000	1,500
Customer orders	2,200	2,400	2,600
Purchase orders	300	350	150

You are required to prepare a product-wise profit statement using:

(a) Absorption costing method;

(b) Activity-based method.

Ans. (a) (₹14,00,000); ₹30,40,000; (₹6,00,000); (b) (₹13,20,000); ₹29,65,000; (₹6,05,000).

18. RST Limited specializes in the distribution of pharmaceutical products. It buys from the pharmaceutical companies and resells to each of the three different markets. **[SM]**

(a) General Supermarket Chains

(b) Drugstore Chains

(c) Chemist Shops

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

	General Super Market 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 analyzing 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, 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 Unit of costs 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 Super Market 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:

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

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

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

Ans. (a) 2.91%; 4.76%; 9.09%; (b) ₹40; ₹3; ₹50; ₹1; ₹16; (c) ₹6,53,840; ₹9,43,965; ₹8,86,600.

19. A drug store is presently selling three types of drugs namely 'Drug A', 'Drug B' and 'Drug C'. due to some constraints, it has decided to go for only one product line of drugs. It has provided the following data for the year 2020-21 for each product line: **[SM, Dec 2021]**

	Drug Types		
	A	B	C
Revenue (in ₹)	74,50,000	1,11,75,000	1,86,25,000
Cost of goods sold (in ₹)	41,44,500	68,16,750	1,20,63,750
Number of purchase orders placed (in nos)	560	810	630
Number of deliveries received	950	1,000	850
Hours of shelf-stocking time	900	1,250	2,350
Units sold (in nos)	1,75,200	1,50,300	1,44,500

Following additional information is also provided:

Activity	Description of Activity	Total Cost (₹)	Cost-allocation base
Drug License fee	Drug License fee	5,00,000	To be distributed in ratio 2:3:5 between A, B and C
Ordering	Placing of orders for purchases	8,30,000	2,000 purchase orders

Activity	Description of Activity	Total Cost (₹)	Cost-allocation base
Delivery	Physical delivery and receipt of goods	18,20,000	2,800 deliveries
Shelf stocking	Stocking of goods	32,40,000	4,500 hours of shelf-stocking time
Customer Support	Assistance provided to customers	28,20,000	4,70,000 units sold

You are required to:

(i) Calculate the operating income and operating income as a percentage (%) of revenue of each product line if:

(*a*) All the support costs (other than cost of goods sold) are allocated in the ratio of cost of goods sold

(*b*) All the support costs (Other than cost of goods sold) are allocated using activity-based costing system.

(ii) Give your opinion about choosing the product line on the basis of operating income as a percentage (%) of revenue of each product line under both the situation as above.

Ans. (i) (a) 22.12%; 14.60%; 9.32%; (b) 8.81%; 12.71%; 15.78%.

SOLUTION OF PRACTICE QUESTIONS

8.

(i) Statement showing cost per unit – Traditional Method

Particulars	P	Q	R
Direct material	90	80	120
Direct labour [(4, 12, 8 hours) × ₹20]	80	240	160
Production overheads [(10, 18, 14 hours) × ₹6]	60	108	84
Cost per unit	230	428	364

(ii) Total machine hours = (3,000 × 10) + (5,000 × 18) + (20,000 × 14) = 4,00,000

Total production overheads = 4,00,000 × ₹6 = ₹24,00,000

	Particulars	P	Q	R	Total
A.	Production (units)	3,000	5,000	20,000	
B.	Batch size (units)	150	500	1,000	
C.	Number of batches (A ÷ B)	20	10	20	50
D.	Number of purchase order per batch	3	10	8	
E.	Total purchase order (C × D)	60	100	160	320
F.	Number of inspections per batch	5	4	3	
G.	Total inspections (C × F)	100	40	60	200

Statement of cost driver rate

Activity	Overhead (₹)	Cost driver quantity	Cost driver rate (₹)
Setup	24,00,000 × 20% = 4,80,000	50 batches	9,600 per batch
Inspection	24,00,000 × 40% = 9,60,000	200 inspections	4,800 per inspection
Purchases	24,00,000 × 10% = 2,40,000	320 purchases	750 per purchase
Machine operations	24,00,000 × 30% = 7,20,000	4,00,000 machine hours	1.80 per machine hour

Statement showing cost per unit – Activity Based Costing Method

Particulars	P	Q	R
Production units	3,000	5,000	20,000
	(₹)	(₹)	(₹)
Direct material (90, 80, 120)	2,70,000	4,00,000	24,00,000
Direct labour (80, 240, 160)	2,40,000	12,00,000	32,00,000
Machine related costs [(30,000, 90,000, 2,80,000) × ₹1.80]	54,000	1,62,000	5,04,000
Setup costs [(20, 10, 20) × ₹9,600]	1,92,000	96,000	1,92,000
Inspection cost [(100, 40, 60) × ₹4,800]	4,80,000	1,92,000	2,88,000
Purchase related costs [(60, 100, 160) × ₹750]	45,000	75,000	1,20,000
Total Costs	12,81,000	21,25,000	67,04,000
Cost per unit (Total cost ÷ Units)	427	425	335.20

9.

(i) Statement of Cost Driver Rate

Activity	Amount (A)	Cost driver (B)	Cost Driver Rate (A÷B)
Direct Labour Hours	3,00,000	30,000 Labour Hours	₹10 per labour hour
Production runs	1,80,000	600 Production runs	₹300 per production run
Quality Inspections	2,40,000	8000 Inspections	₹30 per inspection

Statement of Cost

Particulars	P	Q	R	Total
Direct labour hour	10 × 10,000 = 1,00,000	10 × 8,000 = 80,000	10 × 6,000 = 60,000	2,40,000
Production run	300 × 200 = 60,000	300 × 180 = 54,000	300 × 160 = 48,000	1,62,000

Particulars	P	Q	R	Total
Quality inspection	30 × 3,000 = 90,000	30 × 2,500 = 75,000	30 × 1,500 = 45,000	2,10,000
Total Cost	**2,50,000**	**2,09,000**	**1,53,000**	**6,12,000**

(ii) Statement of Cost of Unused Capacity

Activity	Total Cost	Cost Charged to Products	Unused Cost
Direct Labour Hours	3,00,000	2,40,000	60,000
Production runs	1,80,000	1,62,000	18,000
Quality Inspections	2,40,000	2,10,000	30,000

(iii) Statement of Cost

Particulars	Amount (₹)
Direct material	18,000
Direct expenses (design cost) $\left(\frac{30,000}{12,000}\times 1,500\right)$	3,750
Prime Cost	21,750
Add: Overheads	
Direct labour hours (1,500 × 10)	15,000
Production run (15 × 300)	4,500
Quality inspection (250 × 30)	7,500
COS	48,750
Add: Profit (48,750 × 20%)	9,750
Sales	58,500

10.

Working Note:

(1) Total labour hours and recovery rate

Particulars	Product X	Product Y	Product Z	Total
Production units	1,200	1,440	1,968	
Labour hours per unit	18÷4 = 4.50	20÷4 = 5	30÷4 = 7.50	
Total labour hours	5,400	7,200	14,760	27,360
Total Overheads	-	-	-	2,46,240
OHs recovery rate	-	-	-	₹9

(2) Cost per activity and driver

Activity (1)	Total cost ₹ (2)	Cost allocation base (3)	Cost driver rate (4)=[(2)÷(3)]
Material Procurement	50,000	25 × 3 = 75 orders	₹666.67 per order
Set-up	40,000	$\frac{1200}{48}+\frac{1440}{48}+\frac{1968}{48}$ = 96 run	₹416.67 per run
Quality Control	28,240	$\frac{1200}{48}+\frac{1440}{48}+\frac{1968}{48}$ = 96 run	₹294.17 per run
Maintenance	1,28,000	6,400 hours	₹20 per hour

(i) Statement of Cost per unit

Particulars	X	Y	Z
Direct material	90	84	176
Direct labour	18	20	30
Overheads	9×4.50 = 40.50	9×5 = 45	9×7.50 = 67.50
	148.50	149	273.50

(ii) Statement of Cost per unit

Particulars	X	Y	Z
Direct material	90	84	176
Direct labour	18	20	30
Material procurement	$\frac{25\times666.67}{1,200}$ = 13.89	$\frac{25\times666.67}{1,440}$ = 11.57	$\frac{25\times666.67}{1,968}$ = 8.47
Set-up cost	$\frac{1,200\times416.67}{48\times1,200}$ = 8.68	$\frac{1,440\times416.67}{48\times1,440}$ = 8.68	$\frac{1,968\times416.67}{48\times1,968}$ = 8.68
Quality control cost	$\frac{1,200\times294.17}{48\times1,200}$ = 6.13	$\frac{1,440\times294.17}{48\times1,440}$ = 6.13	$\frac{1,968\times294.17}{48\times1,968}$ = 6.13
Maintenance	$\frac{20\times6400\times\left(\frac{1}{4}\right)}{1,200}$ = 26.67	$\frac{20\times6400\times\left(\frac{1}{4}\right)}{1,440}$ = 22.22	$\frac{20\times6400\times\left(\frac{2}{4}\right)}{1,968}$ = 32.52
Total Cost per unit	163.37	152.60	261.80

11.

(a) Overhead application base: Direct Labour Hours

	Equipment S (₹)	Equipment K (₹)
Direct material cost	300	450
Direct labour cost	450	600
Overheads (62.125×3) (62.125×4)	186.38	248.50
	936.38	1,298.50

$$\text{Pre-determined overhead rate} = \frac{\text{Budgeted Overheads}}{\text{Budgeted direct labour hours}} = \frac{12,42,500}{20,000} = ₹62.125$$

(b) Estimation of cost-driver rate

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

Calculation of Overhead Costs

Activity	Equipment S (₹)	Equipment K (₹)
Order Processing (350×350) (250×350)	1,22,500	87,500
Machine processing (23,000×17.50) (27000×17.50)	4,02,500	4,72,500
Inspection (4000×10.50) (11,000×10.50)	42,000	1,15,500
Total overhead cost	5,67,000	6,75,500
Total units	2,500	3,125
Overhead per unit	226.80	216.16

Calculation of cost per unit

	Equipment S (₹)	Equipment K (₹)
Direct material cost	300	450
Direct labour cost	450	600
Overheads	226.80	216.16
	976.80	1,266.16

(c) Statement of cost

	Equipment S (₹)	Equipment K (₹)
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 S is under-costed and high volume product K is over costed using direct labour hours for overhead production.

12.

Working Note:

(1) Total labour hours and overhead cost:

Particulars	Product S	Product K	Product P	Total
Production units	45,000	52,500	30,000	1,27,500
Hour per unit	3	5	7	
Total hours	1,35,000	2,62,500	2,10,000	6,07,500
Rate per hour	-	-	-	₹80
Total Overheads	-	-	-	₹4,86,00,000

(2) Cost per activity and driver

Activity	Machine Set-up	Customer order processing	Customer complaint management	Total
Total overheads (₹)	1,45,80,000	1,45,80,000	1,94,40,000	4,86,00,000
No. of drivers	600	2,400	8,000	
Cost per driver (₹)	24,300	6,075	2,430	

(*a*) Computation of Overhead cost per unit:

Particulars	Product S	Product K	Product P
No. of machine set-up	40	160	400
Cost per driver (₹)	24,300	24,300	24,300
Total machine set-up cost (₹) (A)	**9,72,000**	**38,88,000**	**97,20,000**
No. of purchase orders	400	800	1,200
Cost per driver (₹)	6,075	6,075	6,075
Total order processing cost (₹) (B)	**24,30,000**	**48,60,000**	**72,90,000**
No. of customers	1,000	2,200	4,800
Cost per driver (₹)	2,430	2,430	2,430

Particulars	Product S	Product K	Product P
Total customer complaint management cost (₹) (C)	**24,30,000**	**53,46,000**	**1,16,64,000**
Total Overhead Cost (A + B + C)	58,32,000	1,40,94,000	2,86,74,000
Production units	45,000	52,500	30,000
Cost per unit (₹)	**129.60**	**268.40**	**955.80**

(*b*) Determination of selling price per unit

Particulars	Product S (using machine A)	Product K (using machine B)	Product P (using machine C)
Material cost per unit (₹)	350.00	460.00	410.00
Wages per unit @ ₹80 per hour	240.00	400.00	560.00
Overhead cost per unit (₹)	129.60	268.46	955.80
Total cost per unit (₹)	719.60	1,128.46	1,925.80
Profit (25% profit mark-up) (₹)	179.90	282.11	481.45
Selling price (₹)	**899.50**	**1,410.57**	**2,407.25**

13. The total production overheads are ₹26,00,000:

Product S: 10,000 × ₹30 = ₹3,00,000
Product K: 20,000 × ₹30 = ₹8,00,000
Product M: 30,000 × ₹30 = ₹15,00,000
On the basis of ABC analysis this amount will be apportioned as follows:

Particulars	Basis	Product S	Product K	Product M
Stores Receiving	Purchase Requisition 6:9:10	71,040	1,06,560	1,18,400
Inspection	Production Runs 5:7:8	2,23,500	3,12,900	3,57,600
Dispatch	Orders Executed 6:9:10	50,400	75,600	84,000
Machine Set-ups	Setups 12:13:15	3,60,000	3,90,000	4,50,000
Total Activity Cost		7,04,940	8,85,060	10,10,000
Quantity Produced		10,000	20,000	30,000
Units Cost (Overheads)		70.49	44.25	33.67
Add: Conversion cost (Material + Labour)		80	80	80
Total		150.49	124.25	123.67

14.

Calculation of Activity Rate

Cost pool	Costs (₹) (A)	Cost Driver (B)	Cost Driver Rate (₹) (A ÷ B)
Machine department expenses	18,48,000	Machine hours – 1,32,000 hours	14.00
Assembly department expenses	6,72,000	Assembly hours – 42,000 hours	16.00
Setup cost	90,000	No. of production runs – 450	200.00
Stores receiving cost	1,20,000	No. of requisitions raised on the stores – 120	1,000.00
Order processing and dispatch	1,80,000	No. of customers' orders executed – 3,750	48.00
Inspection and quality control cost	36,000	No. of production runs – 450	80.00
Total (₹)	29,46,000		

Number of production runs is 450 (150 + 120 + 180)

Statement showing Overheads Allocation

Particulars	S	K	M
Machine department expenses	4,20,000 (30,000 × 14)	6,72,000 (48,000 × 14)	7,56,000 (54,000 × 14)
Assembly department expenses	2,40,000 (15,000 × 16)	-	4,32,000 (27,000 × 16)
Setup cost	30,000 (150 × 200)	24,000 (120 × 200)	36,000 (180 × 200)
Stores receiving cost	40,000 (40 × 1,000)	30,000 (30 × 1,000)	50,000 (50 × 1,000)
Order processing and dispatch	60,000 (1,250 × 48)	48,000 (1,000 × 48)	72,000 (1,500 × 48)
Inspection and quality control cost	12,000 (150 × 80)	9,600 (120 × 80)	14,400 (180 × 80)
Overheads (₹)	8,02,000	7,83,600	13,60,400

15.

(a) Statement showing Activity Rate

Activity	Activity Cost (₹)	Activity Driver	Activity Capacity	Activity Rate
Providing ATM Service	1,00,000	No. of Transactions	2,00,000	0.50
Computer Processing	10,00,000	No. of 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

(b) Statement showing Cost of Product

Activity	Checking Accounts (₹)	Personal Loan (₹)	Gold Visa (₹)
Providing ATM Service	1,80,000 × 0.50 = 90,000	-	20,000 × 0.50 = 10,000
Computer Processing	20,00,000 × 0.40 = 8,00,000	2,00,000 × 0.40 = 80,000	1,50,000 × 1.60 = 2,40,000
Issuing Statements	3,00,00 × 1.60 = 4,80,000	50,000 × 1.60 = 80,000	1,50,000 × 1.60 = 2,40,000
Customer Inquiries	3,50,000 × 0.60 = 2,10,000	90,000 × 0.60 = 54,000	1,60,000 × 0.60 = 96,000
Total Cost	15,80,000	2,14,000	4,66,000
Number of units	30,000	5,000	10,000
Cost per unit	52.67	42.80	46.60

16.

(i) Overhead application base: Direct Labour Hours

	Equipment A (₹)	Equipment B (₹)
Direct material cost	350	400
Direct labour cost	360	480
Overheads (60×3)(60×4)	180	240
	890	1,120

$$\text{Pre-determined overhead rate} = \frac{\text{Budgeted Overheads}}{\text{Budgeted direct labour hours}} = \frac{15,00,000}{25,000} = ₹60$$

(ii) Estimation of cost-driver rate

Activity	Overhead Cost (₹)	Cost-driver level	Cost driver rate (₹)
Order processing	3,00,000	600 order processed	500
Machine processing	10,00,000	50,000 machine hrs.	20
Inspection	2,00,000	15,000 inspection hrs.	10

Calculation of Overhead Costs

Activity	Equipment A (₹)	Equipment B (₹)
Order Processing (400×500) (200×500)	2,00,000	1,00,000
Machine processing (22,500×20) (27,500×20)	4,50,000	5,50,000
Inspection (5000×10) (10,000×10)	50,000	1,50,000
Total overhead cost	7,00,000	8,00,000
Total units	3,200	3,850
Overhead per unit	218.75	207.79

Calculation of cost per unit

	Equipment A (₹)	Equipment B (₹)
Direct material cost	300	400
Direct labour cost	360	480
Overheads	218.75	207.79
	928.75	1,087.79

(iii) Statement of cost

	Equipment A (₹)	Equipment B (₹)
Unit manufacturing cost-using direct labour hours as an application base	890	1,120
Unit manufacturing cost-using activity based costing	928.75	1,087.79
Cost distortion	(-) 38.75	+ 32.21

17.

(a) Statement of calculation of machine and labour hours

	X	Y	Z	Total
Production (units) (A)	1,00,000	80,000	60,000	-
Machine hours per unit (B)	3	4	5	-
Machine hours (A×B)	3,00,000	3,20,000	3,00,000	9,20,000
Labour hours per unit (C)	6	4	3	-
Labour hours (A×C)	6,00,000	3,20,000	1,80,000	11,00,000

Machine hour rate = $\frac{73,60,000}{9,20,000}$ = ₹8 per machine hour

Labour hour rate = $\frac{55,00,000}{11,00,000}$ = ₹5 per labour hour

Statement of profit

	X	Y	Z	Total
Production (units) (A)	1,00,000	80,000	60,000	2,40,000
Selling price per unit (B)	90	180	140	-
Sales (C = A×B)	90,00,000	1,44,00,000	84,00,000	3,18,00,000
Direct cost per unit (D)	50	90	95	-
Total Direct Cost (A×D)	50,00,000	72,00,000	57,00,000	1,79,00,000
Overheads:				
Machine department cost	3,00,000 × 8 = 24,00,000	3,20,000 × 8 = 25,60,000	3,00,000 × 8 = 24,00,000	73,60,000
Labour department cost	6,00,000 × 5 = 30,00,000	3,20,000 × 5 = 16,00,000	1,80,000 × 5 = 9,00,000	55,00,000
Total Cost (E)	1,04,00,000	1,13,60,000	90,00,000	3,07,60,000
Profit (C – E)	(14,00,000)	30,40,000	(6,00,000)	10,40,000

(b) Calculation of cost Driver Rate

Cost pool	Amount (₹)	Cost Driver Quantity	Cost Driver Rate (₹)
Machining Services	64,40,000	9,20,000 Machine hours	₹7 per machine hour
Assembly Services	44,00,000	11,00,000 direct labour hours	₹4 per labour hour
Set-up costs	9,00,000	9,000 Machine set-ups	₹100 per machine set-up
Order processing	7,20,000	7,200 Customer orders	₹100 per order
Purchasing	4,00,000	800 Purchase order	₹500 per purchase order

Statement of profit

	X	Y	Z	Total
Production (units) (A)	1,00,000	80,000	60,000	2,40,000
Selling price per unit (B)	90	180	140	-
Sales (C = A×B)	90,00,000	1,44,00,000	84,00,000	3,18,00,000
Direct cost per unit (D)	50	90	95	-
Total Direct Cost (A×D)	50,00,000	72,00,000	57,00,000	1,79,00,000
Overheads:				
Machining services	3,00,000 × 7 = 21,00,000	3,20,000 × 7 = 22,40,000	3,00,000 × 7 = 21,00,000	64,40,000
Assembly services	6,00,000 × 4 = 24,00,000	3,20,000 × 4 = 12,80,000	1,80,000 × 4 = 7,20,000	44,00,000
Machine set-up costs	4,500 × 100 = 4,50,000	3,000 × 100 = 3,00,000	1,500 × 100 = 1,50,000	9,00,000
Order processing cost	2,200 × 100 = 2,20,000	2,400 × 100 = 2,40,000	2,600 × 100 = 2,60,000	7,20,000
Purchasing cost	300 × 500 = 1,50,000	350 × 500 = 1,75,000	150 × 500 = 75,000	4,00,000
Total Cost (E)	1,03,20,000	1,14,35,000	90,05,000	3,07,60,000
Profit (C – E)	(13,20,000)	29,65,000	(6,05,000)	10,40,000

18.

(a) Statement of operating income

Particulars	Market S	Market K	Market M	Total
Revenue per delivery	84,975	28,875	5,445	-
No. of delivery	330	825	2,750	-
Revenue (A)	2,80,41,750	2,38,21,875	1,49,73,750	6,68,37,375
COGS	82,500×330 =2,72,25,000	27,500×825 =2,26,87,500	4,950×2,750 =1,36,12,500	6,35,25,000
Gross Margin (B)	8,16,750	11,34,375	13,61,250	33,12,375
(-) Operating cost	-	-	-	8,27,970
Net Income	-	-	-	24,84,405
Gross Margin % (B ÷ A)	2.91%	4.76%	9.09%	4.96%

(b) Statement of Cost

Particulars	Cost (₹) (A)	Cost Driver (B)	Cost per cost driver (A÷B)
Customer purchase order	2,20,000	5,500 orders	₹40 per order
Line item ordering	1,75,560	58,520 line items	₹3 per line item
Store delivery	1,95,250	3,905 delivery	₹50 per delivery
Cartons dispatched	2,09,000	2,09,000 cartons	₹1 per carton
Shelf-stocking	28,160	1,760 hours	₹16 per hour

(c) Statement of operating income

Particulars	Market S	Market K	Market M
Gross Margin (A) [From (a) part]	8,16,750	11,34,375	13,61,250
Customer purchase order cost	40×385 = 15,400	990×40 = 39,600	4,125×40 = 1,65,000
Line item ordering cost	3×14×385 = 16,170	3×12×990 = 35,640	3×10×4,125 = 1,23,750
Store delivery cost	50×330 = 16,500	50×825 = 41,250	50×2,750 = 1,37,500
Cartons dispatch cost	1×300×330 = 99,000	1×80×825 = 66,000	1×16×2,750 = 44,000
Shelf-stocking cost	16×3×330 = 15,840	16×0.6×825 = 7,920	16×0.1×2,750 = 4,400
Operating cost (B)	1,62,910	1,90,410	4,74,650
Net income (A – B)	6,53,840	9,43,965	8,86,600

Activity based costing shows that Market M uses the large amount of SK Ltd.'s operating cost resources than the other two channels.

19.

(i) (a) Statement of operating income

Particulars	Drug A	Drug B	Drug C	Total
Revenue (A)	74,50,000	1,11,75,000	1,86,25,000	3,72,50,000
COGS	41,44,500	68,16,750	1,20,63,750	2,30,25,000
Gross Margin	33,05,500	43,58,250	65,61,250	1,42,25,000
(-) Operating cost (in COGS Ratio)	16,57,800	27,26,700	48,25,500	92,10,000
Operating Income (B)	16,47,700	16,31,550	17,35,750	50,15,000
Operating income % (B ÷ A)	22.12%	14.60%	9.32%	13.46%

(i) (b) Statement of Cost

Particulars	Cost (₹) (A)	Cost Driver (B)	Cost per cost driver (A÷B)
Ordering	8,30,000	2,000 purchase order	₹415 per purchase order
Delivery	18,20,000	2,800 deliveries	₹650 per delivery
Shelf stocking	32,40,000	4,500 hours of shelf stocking time	₹720 per hour of shelf stocking time
Customer support	28,20,000	4,70,000 units sold	₹6 per unit sold

Statement of operating income

Particulars	Drug A	Drug B	Drug C
Revenue (A)	74,50,000	1,11,75,000	1,86,25,000
COGS	41,44,500	68,16,750	1,20,63,750
Gross Margin (B)	33,05,500	43,58,250	65,61,250
Drug License Fee (in 2:3:5)	1,00,000	1,50,000	2,50,000
Ordering cost	415 × 560 = 2,32,400	415 × 810 = 3,36,150	415 × 630 =2,61,450
Delivery cost	650 × 950 = 6,17,500	650 ×1000 = 6,50,000	650 × 850 = 5,52,500
Shelf Stocking cost	720 × 900 = 6,48,000	720 ×1250 = 9,00,000	720 ×2350 = 16,92,000
Customer support	6 × 175200 = 10,51,200	6 × 150300 = 9,01,800	6 × 144500 = 8,67,000
Operating cost (C)	26,49,100	29,37,950	36,22,950
Operating income (B – C = D)	6,56,400	14,20,300	29,38,300
Operating income % (D÷A)	8.81%	12.71%	15.78%

(ii) When the operating costs are distributed on the basis of cost of goods sold, Drug A has the highest level of operating income percentage because lesser operating cost share is distributed to it.

Activity based costing shows that Drug C uses the large amount of operating cost resources than the other two drugs and simultaneously generates the highest level of revenue and thus operating income percentage is maximum in case of Drug C.

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