PAPER – 5: STRATEGIC COST MANAGEMENT AND PERFORMANCE EVALUATION

*Question No.**1** is compulsory.*

Candidates are also required to answer any

***four** questions from the remaining **five** questions.*

Working notes should form part of the respective answers.

Question 1

Audio Tech is a company that designs, develops and sells audio equipments. Audio Tech is best known for its home audio systems and speakers, noise cancelling headphones, professional audio systems and automobile audio systems.

Audio Tech sells audio equipments to consumers through its large network of retail outlets in its home country and via the company's website.

Audio Tech purchases the materials and components that it needs to manufacture audio equipments from a number of different suppliers. All of the purchases are delivered to a company's godown at its factory and are held there until they are needed for production and assembling.

Finished products are transported from the factory to Audio Tech's retail outlets by company's own trucks. The trucks follow the same schedule each week irrespective of the load they are carrying. Audio equipments that are required for sale via the company's website are transported to Audio Tech's distribution centre.

The company believes that it can attract more customers by offering quality products at reasonable prices. Each unit is tested for quality with a real time analyzer ipad app and a calibrated microphone to measure how consistently each sound system reproduced various frequencies. A bass-test sweep tone allows checking how well the subwoofer managed low-end frequencies.

Finally, they drive each in cars briefly to see how sound quality changes while on the move.

The company aims to build customer loyalty also through high level of customer services and value chain analysis. The customers can return the product if quality specifications are not met. There is a separate department to handle such complaints.

Audio Tech had implemented Balanced Scorecard as a performance measurement and management system. Company has been doing great on financial parameters and customer satisfaction parameters. Market capitalization of the company has been increased considerably over the years.

Of late, the company has witnessed high employee turnover ratio. Though the company has a formal exit interview process for the resigning employees, the input received from these interviews is rarely considered in improving HR practices. One of the common feedbacks from employees was that working hours are too long and they have to frequently work on weekends also and there is so much pressure to improve customer service without adequate support of system and processes. Also the truck drivers have been on strike thrice in the last one year demanding better pay, retirement benefits and good working conditions.

Audio Tech is keen to address the above issues and recently held a meeting to discuss the performance of the company. The Management Accountant suggested to the Managing Director to use an alternative performance measurement mechanism which considers all the stakeholders instead of just shareholders and customers. The Managing Director is skeptical of the Management Accountant's suggestions and is unclear as to whether they are suitable for the company or not. Therefore, the company seeks your assistance.

Required

(i) IDENTIFY and EXPLAIN the various primary activities of Audio Tech in its value chain. Also SUGGEST, if there is any scope for cost reduction in these activities. ***(10 marks)***

(ii) RECOMMEND an alternative performance measurement mechanism which considers all stakeholders instead of just shareholders and customers. Also INDICATE the performance measures as applicable to the situations of Audio Tech in the alternative mechanism suggested by you. ***(10 marks)***

Answer

(i) <u>The Various Primary Activities of Audio Tech in its Value Chain Analysis</u>

Michael Porter describes the value chain as "internal processes or activities a company performs to design, produce, market, deliver and support its product." Rather than looking at costs as per accounting cost pools, the value chain model focuses on the work flow of an organization in the form of discrete set of activities that are linked to each other. The value chain model is a generic model that examines activities as Primary Activities and Secondary Activities. Passing through each activity, the product or service gains some value. The idea is to *(a) eliminate non-value adding activities and (b) identify product differentiating or cost leadership opportunities among the value adding activities.*

Individual activities reflect the company's strategy, implementation of its strategy and underlying economics of the activities themselves.

Profit margin for the company = Value created less the cost of creating that value

Primary activities are those activities that enable inputs (raw material) to be transformed into output (finished goods) or in the provision of service. Primary activities as per Porter's model are:

Inbound Logistics

Activities related to receiving, storing and distributing the inputs (raw materials) to the production process.

Audio Tech has its materials and components needed to manufacture audio equipment delivered to its godown at the factory premises. These materials are stored until needed for production and assembling at the factory. These are the inbound logistics related activities.

Operations

Activities involved in transforming raw materials into final products. These would include machining, packaging, testing and equipment maintenance.

Audio Tech's work flow activities related to manufacturing of the audio equipment and components need to be considered here. In addition, the testing of equipment using ipad application, bass sweep test as also sound quality check after assembly into the car, are operations related activities.

Outbound Logistics

Activities involved in collecting, storing and distributing the products from the assembly line to the end user customers. This includes finished goods warehousing, delivery vehicle operation, order processing and scheduling.

Some of the activities that would be classified here are:

(a) *Storage of Audio Tech's finished goods within factory premises and at its distribution centre.*

(b) *Scheduling and dispatch of goods using trucks to retail outlets and distribution centres.*

(c) *Activities related to order taking from retail outlets as well as direct orders on the company's website.*

Marketing and Sales

Activities such as advertising, promotion, distribution channel selection, sales force management, pricing policy and such other activities that make the customer aware of the product would be listed here.

All of Audio Tech's activities that relate to the above list of activities whereby it aims to spread customer awareness would be classified here. It aims to build customer loyalty by offering quality products.

Service

Activities related to after sales service such as installation, repair and part replacement would be classified here.

Audio Tech has a separate department to handle customer complaints. Customers can return the product if quality specifications are not met. Also, any activity relating to after sale service would be classified here.

Below are certain measures that Audio Tech can implement to Reduce Costs

(a) Just in Time raw material procurement system: Procure input materials and components only when needed for production and handling. This would *reduce inventory holding costs*. Less inventory on hand could also result in *savings in storage and material insurance costs*. Before implementation, the company needs to

consider the risk of loss incurred on account of stock-outs. It needs to develop close relationships with its suppliers to ensure streamlined delivery of inputs. At the same time inputs should meet the required quality standards.

(b) Company's trucks deliver the finished goods to retail outlets as per a fixed schedule each week, irrespective of the load they carry. This indicates that there may be possibilities of dis-economies of cost. If there is a pile up of inventory due to lesser number of truck delivery runs, it could lead to high inventory holding cost. Conversely, if delivery runs are scheduled even if the trucks are not loaded to full capacity, dis-economies of delivery cost would creep in. Therefore, the *production and truck delivery schedule should be streamlined efficiently and economically*.

(c) Audio Tech lays importance in the quality of the product to ensure customer satisfaction. Lower the defects higher the customer satisfaction. It has extensive testing and inspection processes in place. This preventive step should be assessed to find out if it is effective in reducing the cost of poor quality – internal failure cost as well as external failure costs. Internal failure costs (repair, scrap, rework) are associated with defects found after the production but before delivery to the customer. This can be avoided, if quality inspection is done throughout the production work-flow rather than just at the end of production. External failure costs (repairs and servicing, sale returns, warranty claims, complaints) are incurred when the customer finds the product defective and returns it. External failure costs can severely impact customer loyalty and should be minimized.

Therefore, Audio Tech should *invest in preventive and appraisal costs to ensure good quality in order to balance out the cost of poor quality*. Preventive costs would include quality planning and assurance, error proofing quality improvements, education and training. Appraisal costs could be inspection, quality audits, supplier rating etc. Total Quality Management (TQM) and Six Sigma could be effective tools to ensure efficient good quality production that would minimize cost of poor quality.

(ii) <u>Alternate Performance Measurement Mechanism considering all Stakeholders</u>

Audio Tech uses Balanced Scorecard to measure performance. Balanced Scorecard focuses on the financial, customer, business, and innovation perspectives. It is given that the company is doing well on financial and customer satisfaction parameters. Market capitalization has also increased over the years, the company is on a growth trajectory. However, the company is facing issues in the form of high employee turnover and dissatisfaction among truck drivers who deliver the goods.

An alternate performance measurement mechanism can be **Performance Prism**. This is a second-generation performance management framework conceptualized by *Andy Neely* and *Chris Adams*. The reasons why it would be an effective replacement for models like Balanced Scorecard are:

(a) Balanced scorecard focuses on *just two of the stakeholders* – Investors and Customers. Performance measurement of other stakeholders like employees, suppliers, government etc. have not been considered. The other stakeholders play an important role in the growth of the company's business. Hence, performance measures are needed to monitor both their contribution to the company as well as their overall satisfaction with the company.

(b) Most of the performance measurement models *do not focus on the changes that need to be made to strategies and processes*. Balanced Scorecard assumes that once the strategies are implemented, measuring a relevant set of metrics of performance will ensure that the rest of the business also functions properly. However, this is not true. In the case of Audio Tech, both customers and shareholders are happy with the company's performance. Yet even in a growing business, the drivers of growth, namely other stakeholders like employees and suppliers are not satisfied. Neither is their contribution nor their satisfaction is captured under the Balanced Scorecard performance measurement.

(c) A company has a *"Quid Pro Quo" relationship* with all its stakeholders. Stakeholders contribute to the company's business while they also derive benefits from it. For example, employees perform their functions well, this is their contribution to Audio Tech's growth. In return, employees would want good working condition and pay to remain motivated and loyal to the company.

Therefore, Performance Prism can be an alternate performance measurement mechanism that considers metrics related to a *broader set of stakeholders* of an organization, not limited to just customers and shareholders alone.

Five Interrelated Facets of the Performance Prism

Stakeholder Satisfaction

"Identify the organizations set of stakeholders and their needs"

Unlike a balanced scorecard, the performance prism focuses on all the stakeholders of a company. Audio Tech has satisfied investors and customers, but dissatisfied employees and truck operators. The company must likewise identify all its stakeholders and determine the relative importance of each of the stakeholders. It can use **Mendelow's Matrix** to identify key shareholders in terms of *power* and *interest* of stakeholders. A stakeholder group with higher power and high interest (say a trade union) must be *kept satisfied*.

The main stakeholders of a company are:

- Investors - They want return on investment.
- Customers - They want good quality products at reasonable prices.
- Suppliers - They want better price for procurements or service.
- Government - They want revenues and development.
- Society at large - They want employment opportunities.

After identification of the stakeholders, the company must identify the requirement of each of the stakeholder group. What must the company do to ensure stakeholder satisfaction?

Audio Tech has to ensure that it improves employee satisfaction in order to reduce its employee turnover. It should also address the issues faced by truck drivers and involve them in a dialogue. If they are not satisfied, the company might suffer financially in the longer run.

Performance Measure: Employee turnover ratio, average employment duration of employees, number of strikes by truck drivers etc.

Stakeholder Contribution

"What the organization expect the stakeholders to contribute and deliver?"

In the second facet, the company has to identify the contribution required from each stakeholder group and must define ways to measure contribution of stakeholders. In turn the company will have something to offer the stakeholders. This is the "Quid Pro Quo" relationship. For example, Audio Tech provides quality products to its customers. The customers in turn contribute towards the profits of the company, they pay a price for the value Audio Tech offers.

Audio Tech should provide for better working conditions to its employees. Motivated employees will perform better and remain loyal to the company. They would drive the growth of the company. Similarly, dialogue with truck drivers would be needed to provide better pay, retirement benefits and good working conditions. Truck drivers in turn need to ensure timely and safe delivery of goods to retail outlets.

Performance Measure: Efficiency of employees, productivity, on time delivery by truck drivers.

Strategies

"What strategies should an organization adopt that derives stakeholder contribution while reciprocating by ensuring their satisfaction?"

The organization should identify strategies that ensure that:

- The wants and needs of the stakeholders are satisfied.
- Stakeholders contribute to the organizations objectives.

Performance measures must be put in place to confirm that the strategies are working. Effective implementation depends on appropriate communication of strategies, implementation by managers and continuous evaluation of appropriateness of strategies.

Audio Tech has to roll out strategies to retain employees by means of better pay, working conditions and growth opportunities within the company. The strategy will be effective when the employee turnover is reduced following these initiatives. Similarly, the issues faced by truck drivers need to be addressed by taking appropriate strategic decisions. The absence of strikes will indicate that these decisions have been effective.

Performance Measures: Employee turnover after implementation of new strategy, efficiency of deliveries after issues with truck drivers have been resolved.

Processes

"What are the necessary processes to satisfy the above strategies?"

Processes ensure successful implementation of strategies. Each process could have sub-process. Process owners have to be identified to assign responsibility of functioning of the process.

Processes require continuous evaluation. Instead of evaluating all at once, the company has to identify important processes that are critical to the business. Porter's Value Chain Analysis can be used to identify and evaluate various processes in the organization.

Audio Tech should have well defined processes to hire appropriately skilled personnel for the job, transparent pay structure etc. This process may be owned by the Human Resource Manager. The working condition of truck drivers can be improved by providing sufficient training and better working conditions.

Performance Measures: Number of personnel hired at various skill levels, average payout for each of these skilled groups, hours of employee training, maintenance log of trucks etc.

Capabilities

"What resources should an organization need to effectively operate these processes?"

The company must have the right capabilities in order to support the process. Capabilities could include resources, technology, and infrastructure for a particular process to work.

Audio Tech may decide to increase pay/salaries, however it should have sufficient financial resources to make these payments.

Performance Measures: Amount spent of new recruitments and training etc.

Conclusion

"Manage these interlinked facets to cater to all stakeholders"

While meeting targets as defined by performance measures should be emphasized, the performance measurement system should be dynamic and flexible to allow the stakeholders to voice their opinions and expectations as well. Taking their requirements into consideration, along with managing capabilities and processes, Audio Tech can implement effective strategies that will cater to the needs of all stakeholders.

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Conceptually correct *brief explanation* is sufficient for each step.

Question 2

Amber Ltd. is a leading company in the Footwear Industry. The company has four factories in different locations with state of the art equipments. Due to competition in the market, company is continually reviewing its product range and enhancing its existing products by developing new models to satisfy the demands of its customers.

The company currently has a production facility which has a capacity of 3,500 standard hours per week.

Product 'Comfort' was introduced to the market six months ago and is now about to enter the maturity stage of its life cycle.

However, research by the marketing department indicates that demand of the product 'Comfort' in the market is price sensitive. The likely market responses are as follows:

Selling price per unit (₹)	*1,750*	*1,600*	*1,525*	*1,450*	*1,300*
Sales demand per week (units)	*550*	*725*	*1,000*	*1,150*	*1,200*

The variable cost per unit of manufacturing 'Comfort' is ₹750.

Standard hours used to manufacture one unit is 2 hours.

Product 'Sports' was introduced to the market two months ago using a penetration pricing policy and is now about to enter its growth stage. Each unit has a variable cost of ₹545 and takes 2.50 standard hours to produce. Market research has indicated that there is a linear relationship between its selling price and the number of units demanded, of the form P = a - bx. At a selling price of ₹1,000 per unit demand is expected to be 1,000 units per week. For every ₹100 increase in selling price the weekly demand will reduce by 200 units and for every ₹100 decrease in selling price the weekly demand will increase by 200 units.

Product 'Ethnic' is currently being developed and which is about to be launched in the market. This is a highly innovative designer product which the company believes that it will have a revolutionary impact on the market and consumer behaviour. The company has decided to use a market skimming approach to pricing this product during its introduction stage.

Required

(a) (i) *ADVISE which of the above five selling prices should be charged for product 'Comfort', in order to maximize its contribution during its maturity stage.* ***(3 marks)***

(ii) *CALCULATE the number of units to be produced of product 'Sports' in order to utilize all of the spare capacity from your answer to (i) above and the selling price per unit of product 'Sports' during its growth stage.* ***(2 + 3 = 5 marks)***

(b) *COMPARE penetration and skimming pricing strategies during the introduction stage, using product 'Ethnic' to illustrate your answer.* ***(4 marks)***

(c) *EXPLAIN with reasons, for each of the stages of 'Ethnic's product life cycle, the changes that would be expected in the*

(i) average unit production cost

(ii) unit selling price ***(4 + 4 = 8 marks)***

Answer

(a) (i) Selling Price for "Comfort" that would *maximize* its contribution at Maturity Stage

Contribution per unit of "Comfort" = Selling Price per unit – Variable Cost per unit

Total Contribution = Contribution per unit × Units sold

All figures in Rupees

Sales (units) *per week*	550	725	1,000	1,150	1,200
Selling Price *per unit*	1,750	1,600	1,525	1,450	1,300
Less: Variable Cost *per unit*	750	750	750	750	750
Contribution *per unit*	1,000	850	775	700	550
Total Contribution	5,50,000	6,16,250	7,75,000	8,05,000	6,60,000

Total contribution is maximum when sales are 1,150 units. Therefore, the selling price per unit of "Comfort" should be **₹ 1,450 per unit**.

(ii) Production Number of "Sports" and Selling Price per unit

Amber Ltd. has a production capacity of 3,500 hours per week. As explained in (i) above, it would manufacture 1,150 units of "Comfort" per week. Each unit of "Comfort" requires 2 hours of production. Therefore, total production hours for Comfort would be 1,150 units × 2 hours = 2,300 hours per week.

Production capacity remaining to manufacture "Sports" = 3,500 hours – 2,300 hours = **1,200 hours per week**. Each unit of "Sports" requires 2.5 hours of production.

Therefore, the number of "Sports" units that can be produced = 1,200 hours / 2.5 hours **= 480 units per week.**

Linear relationship between Selling Price and Number of Units Demanded has been given to be P= a – bx.

P = Selling Price per unit

a = Selling Price when demand will be zero

b (slope) = Change in Price / Change in Quantity

x = Quantity Demanded

Given, at a Selling Price of ₹1,000 per unit, Quantity Demanded will be 1,000 units *per week*. For every ₹100, per unit increase / decrease in Selling Price, the Quantity Demanded will decrease / increase by 200 units per week respectively. A ₹500 per unit increase in Selling Price will result in fall of 1,000 units of Sales per week. The Selling Price at which Sales will be Zero i.e. a = ₹1,500 per unit.

b (slope) = Change in Price / Change in Quantity = ₹100 / 200 = 0.50

Penetration pricing is most commonly associated with a marketing objective of increasing market share or sales volume, rather than short term profit maximization. Thus, substituting the values in the equation to find the Selling Price of "Sports" when the Quantity Sold is 480 units:

P = a – bx

= 1,500 – 0.50 × (480)

= 1,500 – 240

= ₹1,260

Sports should be sold at ₹1,260 per unit during the growth stage.

Alternative

Hours after production of Product 'Comfort' (3,500-1,150×2) =1,200 hours to be utilized to produce product 'Sports'.

1,200 hours/ 2.5 = 480 units

10% increase in selling price will lead to 20% decrease in demand of units of product "Sports". Here we can produce only 480 units which amounts to 52% decrease in units so the selling price should be increased by 26% as per given price demand function. So, the selling price per unit will be 1,260 for 480 units of product "Sports".

(b) "Ethnic" is given to be a highly innovative product that is about to be launched into the market. The product with unique features that will differentiate it from other products leading to a revolutionary impact on market and customer behavior. There seem to be no competitors providing similar products.

Skimming Price Strategy is adopted to charge high prices in the introduction stage in order to recover costs. Skimming Price will be suitable for "Ethnic" because:

- Market for the product is not yet established. Initially *high promotional expense* may have to be incurred *to create customer awareness* and *build a market* for the product.
- Due to its *innovative feature*, the customers would not mind paying a premium for the unique product offering. Demand would be inelastic.
- The market demand is unknown. Initial capital outlay to produce this product may be high, resulting in *high cost of production*.
- Production and promotional costs in the initial years is likely to be high. Therefore, a higher selling price would help Amber Ltd. *to recover the costs*. Since demand is likely to be inelastic, charging a premium may not be a problem.

- The price can be gradually reduced once the market for the product is established. Competitors may reverse engineer and offer similar products, due to which *price may have to be lowered in the long run to retain customers*.

Penetration Pricing is adopted to charge a low price in the initial stage for penetrating the market as quickly as possible. For a new product, this low-price strategy will popularize the product. Once the market is established, the price may be increased. Penetration pricing will be suitable when:

- Demand for the product is *elastic*, more demand when prices are low.
- Large scale production of the product yields *economies of scale*.
- *Threat of competition* requires prices to be set low. It serves as an entry barrier to prospective competitors as well.

Product "Ethnic" is an innovative product that the manufacturer believes will change the whole market once it is launched. A strategy of penetration pricing could be effective in *discouraging potential new entrants* to the market. However, the product is believed to be unique and as such *demand* is likely to be fairly *inelastic*. In this instance a policy of penetration pricing could *significantly reduce revenue* without a corresponding increase in sales. Thus, this strategy is not suitable for "Ethnic".

(c) Impact on Unit Selling Price and Average Cost of Production *per unit* at each stage of "Ethnic" Product Lifecycle

Introduction Stage

As explained in (b) above, at the Introduction Stage of Lifecycle, due to high cost of production and initial promotion expenditure, the *unit cost of production will be high*. Using Skimming Price Policy, *the unit selling price will also be high*.

Growth Stage

This is the second phase of the Life-Cycle, product awareness among customers would result in increased demand. Therefore, scale of production likely to increase. The new market segment would attract competitors, who are like to *reverse engineer* and offer similar products in the market. Promotional activities and marketing activities need to continue to maintain and gain market share.

Accordingly, the *unit selling price would reduce* from the introduction stage on account of the following reasons:

- Competitors offering similar product would take away the uniqueness feature of "Ethnic".
- Again, to gain market share, the unit selling price may have to be lowered to make it attractive to a larger segment of customers.

The *unit cost of production is also likely to reduce* due to the following reasons:

- Increased production would result in increased material procurement from suppliers. *Bulk purchasing discounts* can be negotiated with them to lower cost of production.
- *Learning curve and experience* would enable the labor force to become more efficient. This leads to higher production with the same level of resources leading to cost savings.
- *Larger production batches* due to increase in scale of operations will reduce the unit variable overhead cost.
- *Economies of scale* would result due to fixed overhead cost being spread over larger number of units.

Maturity Stage

The third phase of Product Life-Cycle that is characterized by an established market for "Ethnic". After rapid growth in sale volume in the previous stages, growth of sales for the product will *saturate*. Competition would be high due to large number of rivals in the market, this may lead to decreasing market share.

It is likely that the price of the product will be lowered further at the maturity stage in a bid to *preserve sales volumes***.** The company may attempt to preserve sales volumes by employing an *extension strategy rather than reducing the selling price*. For example, they may introduce product add-ons to the market that are compatible with "Ethnic".

Unit production cost will remain constant

- Direct material cost will remain constant. If procurement is lower than the growth phase, it might even lead to slightly higher prices since supplier may not extend bulk discounts.
- The benefits of efficient production due to the effect of learning and experience may also have waned. Therefore, unit labour cost is also likely to remain constant.
- Since scale of production is no longer increasing, the unit variable overhead costs are also likely to remain constant.

Decline Stage

This last stage in the product cycle is characterized by saturated market, declining sales, change in customer's tastes etc. Profitability may slowly start decreasing with fall in sales.

At the decline stage, Product "Ethnic" is likely to have been *surpassed by more advanced products* in the market and consequently will *become obsolete***.** The company will not want to *incur inventory holding costs* for an obsolete product and is likely to *sell "Ethnic" at marginal cost or perhaps lower.*

Sales volumes at the decline stage are likely to be low as the product is *surpassed by new exciting products* that have been introduced to the market. Furthermore, the workforce may be less interested in manufacturing a declining product and may be looking to learn new skills. For both of these reasons, *unit production costs are likely to increase* at the decline stage.

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Conceptually correct *brief explanations* are sufficient.

Question 3

Excel Ltd. is the leading manufacturer and exporter of high quality leather products - Product A and Product B.

Selling price per unit of Product A and Product B is ₹ 620 and ₹ 420 respectively.

Both the products pass through three processes - Tanning, Dyeing and Finishing during manufacturing process. Allocation of costs per unit of leather products manufactured among the processes are given below:

Particulars	*Tanning*	*Dyeing*	*Finishing*	*Total*
Direct Materials per unit	*140*	*180*	*140*	*460*
Direct Labour per unit	*90*	*120*	*90*	*300*
Cost allocation to Product A	*70%*	*50%*	*70%*	
Cost allocation to Product B	*30%*	*50%*	*30%*	

General overheads per unit of leather products manufactured are ₹ 230 which is allocated equally between Product A and Product B. Above cost allocation is the basis for the decisions regarding pricing of the products.

In this Industry, all the major production processes have environmental impact at all stages of the process, including generation of waste, emission of harmful gases, noise pollution, water contamination etc.

The management of the company is worried about the above environmental impact and has taken initiative to preserve the environment like - research and development activities aimed at reducing pollution level, planting trees, treatment of harmful gases and airborne emissions, wastewater treatment etc.

The management of the company desires to adopt Environmental Management Accounting as a part of strategic decision making process. Pricing of products should also factor in environmental cost generated by each product.

General overheads per unit of leather products manufactured are ₹ 230 which includes :

Treatment cost of harmful gases…₹ 80

Wastewater treatment cost…….. ₹ 100

Cost of planting of trees……₹ 20

Process wise information related to generation of wastewater and harmful gases is given as below:

	Tanning	***Dyeing***	***Finishing***	***Total***
Wastewater generated (litres per week)	*900*	*600*	*0*	*1,500*
Emission of harmful gases (cc per week)	*400*	*300*	*100*	*800*
Cost allocation to Product A	*70%*	*50%*	*70%*	
Cost allocation to Product B	*30%*	*50%*	*30%*	

The remaining overheads cost and cost of planting trees can be allocated equally between Product A and Product B.

Required

(a) CALCULATE the product wise profitability based on the original cost allocation. ***(2 marks)***

(b) RECALCULATE the product wise profitability based on activity based costing (Environment driven costs). ***(5 marks)***

(c) ANALYZE the difference in product profitability as per both the methods. ***(2 marks)***

(d) RECOMMEND and EXPLAIN the four management accounting techniques for the identification and allocation of environmental costs. ***(8 marks)***

(e) STATE why the management of environmental costs is becoming increasingly important in organizations. Give reasons. ***(3 marks)***

Answer 3

(a) Product Wise Profitability as per Original Allocation Methodology

(Figures in ₹ per unit of leather produced)

Particulars	**Product A**	**Product B**	**Total**
Selling Price	620	420	1,040
Direct Material (Refer Table 1)	286	174	460
Direct Labour (Refer Table 1)	186	114	300
Overheads (allocated equally)	115	115	230
Total Expenses	587	403	990
Profit	33	17	50
Profitability (%)	**5.32%**	**4.05%**	×

Workings

Table 1 Cost Allocation to the Products

(Figures in ₹ per unit of leather produced)

Particulars	Tanning			Dyeing			Finishing			Total		
	A	B	Total	A	B	Total	A	B	Total	A	B	Grand Total
Direct Material	98	42	140	90	90	180	98	42	140	286	174	460
Direct Labour	63	27	90	60	60	120	63	27	90	186	114	300

(b) Product wise profitability based on activity based costing using *environment driven costs* requires the following steps:

- Breakdown of overhead cost of ₹ 230 per unit into treatment cost of harmful gases, wastewater treatment cost, cost of planting trees and other overhead costs. Refer Table 2 for the breakup.
- Treatment cost of harmful gases, wastewater treatment cost need to be individually allocated to various processes based on relevant cost drivers. Refer Table 3 for cost allocation to process.
- The overheads mentioned in point 2 thus allocated to the various processes, will be further allocated to products based on the specific ratios given in the problem. Refer Table 4 for cost allocation to products.

Product Wise Profitability Statement based on ABC using *environment driven costs*

(Figures in ₹per unit of leather produced)

Particulars	Product A	Product B	Total
Selling Price	620	420	1,040
Direct Material (Refer Table 1)	286	174	460
Direct Labour (Refer Table 1)	186	114	300
Allocation of Overheads			
Treatment Cost of Harmful Gases (Refer Table 4)	50	30	80
Wastewater Treatment Cost (Refer Table 4)	62	38	100
Cost of Planting Trees (shared equally)	10	10	20
Other Overhead Cost (shared equally)	15	15	30

Total Expenses	609	381	990
Profit	11	39	50
Profitability %	**1.77%**	**9.29%**	×

Workings

Table 2: Breakdown of General Overheads *per unit*

Overhead	Amount (₹)	Allocation basis between products
Treatment Cost of Harmful Gases	80	Emission of Harmful Gases (cc per week)
Wastewater Treatment Cost	100	Wastewater Generated (litres per week)
Cost of Planting Trees	20	Equally *between* Products A and B
Other Overheads (balancing figure)	**30**	Equally *between* Products A and B
Total General Overheads *per unit*	230	

Table 3: Allocation of Treatment Cost *to various process*

Process Wise Information

Overhead	Amount (₹)	Allocation Basis Between Products	Tanning	Dyeing	Finishing	Total
Treatment Cost of Harmful Gases	80	Emission of Harmful Gases (cc per week)	400cc	300cc	100cc	800cc
Wastewater Treatment Cost	100	Wastewater Generated (ltr. per week)	900lt.	600lt.	---	1,500lt.

Cost Allocation to Process

Overhead	Amount (₹)	Allocation Basis Between Products	Tanning (₹)	Dyeing (₹)	Finishing (₹)	Total (₹)
Treatment Cost of Harmful Gases	80	Emission of Harmful Gases (cc per week)	40	30	10	80

Wastewater Treatment Cost	100	Wastewater Generated (litres per week)	60	40	0	100

Table 4: Allocation of Treatment Cost to Product A and B

(₹)

Overhead	Tanning	Dyeing	Finishing	Total
Treatment Cost of Harmful Gases	₹40	₹30	₹10	₹80
Cost Allocation % to Product A	70%	50%	70%	×
Cost Allocation % to Product B	30%	50%	30%	×
Cost Allocation to Product A	₹28	₹15	₹7	₹50
Cost Allocation to Product B	₹12	₹15	₹3	₹30
Wastewater Treatment Cost	₹60	₹40	---	₹100
Cost Allocation % to Product A	70%	50%	70%	×
Cost Allocation % to Product B	30%	50%	30%	×
Cost Allocation to Product A	₹42	₹20	---	₹62
Cost Allocation to Product B	₹18	₹20	---	₹38

(c) Analysis of the difference in product profitability as per both the methods

In the first method, general overhead costs are allocated to the products A and B, irrespective of the environment costs that each product incurs. General overhead costs are to each product equally. The resultant product profitability shows that Product A yields 5.32% and Product B yields 4.05% profitability. Therefore, the Excel Ltd. would conclude that Product A is more profitable.

In the next method, general overhead costs are bifurcated to identify "hidden" environment costs that are incurred on account of manufacturing these products. Environment costs are first traced to the process that generates harmful gases and wastewater, for which treatment is done. It can be seen that Tanning process, followed by Dyeing and Finishing process generates the maximum amount of waste. Therefore, by proportioning the cost based on the waste generated, more cost is allocated to Tanning the process. Similarly, Dyeing and Finishing are allocated lesser cost since they do not generate as much waste. It is further given that 70% of the cost of Tanning relates to Product A. This is much higher than the 50% that was allocated to the Product as per the first method.

Accordingly, the revised workings show that Product A yields 1.77% and Product B yields 9.29% profitability. The reason being, Product A generates more environment driven costs as compared to Product B.

Excel Ltd. would therefore increase the selling price of Product A if it wants to maintain profitability as per the original method. However, the more sustainable approach would be find out ways of reducing wastewater and harmful gases the manufacturing process produces. This would in turn result in reduction of environment driven costs such as wastewater treatment and treatment of harmful gases. This would sustain profits in the long run.

(d) Four Techniques for the *identification* and *allocation* of Environmental Costs

Input-Output Analysis: This technique *monitors the material input with the output that is produced*. For example, if 100kg of material have been bought and input in the process resulting in 80kg output material, the 20kg must been accounted in some way. Some part of this may say 10% (2kgs) may have been sold as scrap while the remaining 90% (18kgs) of it may be waste. Possibly scrap can be reused therefore may have neutral environment impact. The company can then concentrate on minimizing waste generation.

Flow Cost Accounting: This technique uses not only material flows but also the organizational structure. Classic material flows are recorded as well as material losses incurred at various stages of production. Flow cost accounting makes material flows transparent. It tracks:

(i) quantities (physical data);

(ii) costs (monetary data) and

(iii) values = (quantities × costs).

Material flows are divided into three categories: material, system, and delivery/disposal.

(i) The *material values and costs* apply to the materials which are involved in the various processes.

(ii) The *system values and costs* are the in-house handling costs, which are incurred inside the company for the purpose of maintaining and supporting material throughput. Example personnel costs or depreciation.

(iii) The *delivery and disposal values and costs* refer to the costs of flows leaving the company for example transport costs or cost of disposing waste.

The focus of flow cost accounting is on reducing the quantities of materials, which leads to increased ecological efficiency.

Life Cycle Costing: This technique considers the costs and revenues of a product over its *whole life rather than one accounting period*. Therefore, the full environmental cost of producing a product will be taken into account. In order *to reduce lifecycle costs, an organization may adopt a TQM approach*. Good environmental management is increasingly recognized as an essential component of TQM. Such organizations pursue objectives that may include zero complaints, zero spills, zero pollution, zero waste and zero accidents. Information systems need to be able to support such environmental objectives via provision of feedback of the organizational efforts in achieving such objectives.

Activity Based Costing (ABC): ABC allocates internal costs to cost centres and cost drivers on the basis of the activities that give rise to the costs. *Environment-related costs* can be attributed to joint cost centers and environment-driven costs are hidden on general overheads. *Environment-driven costs* are removed from general overheads and traced to products or services. The cost drivers are determined on environment impact that activities have and costs are charged accordingly. This should give a good attribution of environmental costs to individual products that should result in better control of costs.

(e) Reasons why environmental costs is becoming important in organizations

(i) "Carbon footprint" measures the total greenhouse gas emissions caused directly and indirectly by a person, organization, event or product. People are now becoming aware about the carbon footprint and recycling. Several companies have initiated CSR committees as they feel that portraying themselves as environmentally responsible makes them popular among their consumers.

(ii) Environmental costs are becoming huge for some companies particularly those operating in highly industrialized sectors such as oil production. Such significant costs need to be managed.

(iii) Regulation is increasing worldwide at a rapid pace, with penalties for *non-compliance* also increasing accordingly.

Conceptually correct *brief explanations* are sufficient.

Question 4

(a) GRV is a chemical processing company that produces sprays used by farmers to protect their crops. One of these sprays 'Agrofresh' is made by using either chemical A or chemical B. To produce one litre of Agrofresh spray they have the option to use either 12 litres of chemical A or 12 litres of chemical B. During the financial year, the purchase department of GRV has planned to use chemical B as it appeared that it would be the cheaper of the two and their plans were based on a cost of chemical B of ₹15 per litre.

Due to subsequent market movement during the year the actual prices changed and if the concerned department had purchased efficiently, the cost would have been

Chemical A	*₹15.40 per litre*
Chemical B	*₹16.00 per litre*

Production of Agrofresh spray was 1,000 litres and the usage of chemical B was 12,800 litres at a cost of ₹2,09,920.

You are the CEO of GRV and the Management Accountant has sent to you the following suggestions through e-mail:

"I feel that in our particular circumstances the traditional approach to variance analysis is of little use as for some of our products we can utilize one of several equally suitable chemicals and we always plan to use such chemical which will lead to cheapest production costs. However due to sharp market movements, we are frequently trapped by the sharp price changes which lead to the choice of expensive alternative at the end."

To check the reality in the content of the mail, your CEO asked you, the Cost Accountant of the company:

(i) to CALCULATE the material variances for Agrofresh by using

- *Traditional Variance Analysis*
- *Planning and Operational Variances* ***(6 marks)***

(ii) to ANALYSE how planning and operational variances approached the variances. ***(2 marks)***

(iii) to ANALYSE how the advanced variances are useful to your organisation. ***(2 marks)***

(b) DK International is developing a new product. During its expected life, 16,000 units of the product will be sold for ₹ 102 per unit.

Production will be in batches of 1,000 units throughout the life of the product.

The direct labour cost is expected to reduce due to the effects of learning for the first eight batches produced. Thereafter, the direct labour cost will remain constant at the same cost per batch as in the 8^{th} batch.

The direct labour cost of the first batch of 1,000 units is expected to be ₹ 55,000 and a 90% learning effect is expected to occur. The direct material and other non-labour related variable costs will be ₹ 50 per unit throughout the life of the product.

There are no fixed costs that are specific to the product.

The learning index for a 90% learning Curve = - 0.152; $8^{-0.152}$ = 0.729; $7^{-0.152}$ = 0.744

Required

(i) CALCULATE the expected direct labour cost of the 8^{th} batch. ***(3 marks)***

(ii) CALCULATE the expected contribution to be earned from the product over its lifetime. ***(3 marks)***

(iii) CALCULATE the rate of learning required to achieve a lifetime product contribution of ₹ 5,00,000, assuming that a constant rate of learning applies throughout the product's life. ***(4 marks)***

Answer

(a) (i) Traditional Variances

Usage Variance	=	(12,000 lt. – 12,800 lt.) × ₹ 15.00
	=	**₹ 12,000 (A)**
Price Variance	=	(₹ 15.00 – ₹ 16.40) × 12,800 lt.
	=	**₹ 17,920 (A)**
Total Variance	=	₹ 12,000 (A) + ₹ 17,920 (A)
	=	₹ 29,920 (A)

Operational Variances

Usage Variance	=	(12,000 lt. – 12,800 lt.) × *₹ 16.00*
	=	**₹ 12,800 (A)**
Price Variance	=	(₹ 16.00 – ₹ 16.40) × 12,800 lt.
	=	**₹ 5,120 (A)**
Total Variance	=	₹ 12,800 (A) + ₹5,120 (A)
	=	₹ 17,920 (A)

Planning Variances

Controllable Variance	=	(₹ 15.40 – ₹ 16.00) × *12,000 lt.*
	=	**₹ 7,200 (A)**
Uncontrollable Variance	=	(₹ 15.00 – ₹15.40) × *12,000 lt.*
	=	**₹ 4,800 (A)**
Total Variance	=	₹ 7,200 (A) + ₹ 4, 800 (A)
	=	₹ 12,000 (A)
Reconciliation	=	₹ 17,920 (A) + ₹ 12,000 (A)
	=	₹ 29,920 (A)

Direct Material Usage Operational Variance using *Standard Price*, and the Direct Material Price Planning Variance based on *Actual Quantity* can also be calculated. This approach reconciles the Direct Material Price Variance and Direct Material Usage Variance calculated in part.

(ii) Traditional variance analysis is applied based on the assumption that whole of the variance is due to operational deficiencies and the planning associated with setting the original standard is perfectly correct. But this assumption is not practical. When the conditions are volatile and dynamic, traditional variances need to be analysed into planning and operational variances. Planning variances try to explain the extent to which the original standard needs to be adjusted to reflect changes in operating conditions between the current situation and that imagined when the standard was originally derived. Planning variances are generally *not controllable and may need to revise to cater the changes due to* environmental/ technological changes at a later stage. In certain situation planning variances can be considered *controllable* as well. Whereas operational variances explain the extent to which adjusted standards have been achieved. Operational variances are calculated after the planning variances have been established and are thus a realistic way of assessing performance. So, it Indicates a reality check of traditional variance analysis.

In GRV, as per traditional approach total variances are ₹ 29,920 (adverse), out of which ₹ 17,920 (adverse) accounts for total operational variance and ₹ 12,000 (adverse) is for total planning variance. It is necessary to analyse planning variances further. The planning variance of ₹ 12,000 (adverse) can be divided into an *uncontrollable* adverse variance of ₹ 4,800 and a *controllable* adverse variance of ₹ 7,200. Similarly, total operational variance can be sub classified as adverse price variance of ₹ 5,120 and adverse usage variance of ₹ 12,800. This analysis gives a clearer indication of the inefficiency of the purchasing function by the concerned department. Performance of the staff of the purchasing department should be evaluated/rewarded/ based on variances which are *controllable*. If an adverse *uncontrollable* variance of ₹ 4,800 is reported in the performance reports this is likely to lead to dysfunctional motivation effects to the purchase department.

(iii) In today's cutthroat competition managers must react quickly and accurately to the changes in technology, price fluctuation, consumer tastes, laws and regulations, economic conditions, political conditions, and international conditions etc. which are changing rapidly and dramatically. Accordingly, management accountant should be able to provide necessary inputs by a proper analysis of the things that pertains to his/her area like effect of changes in price. The unique features of advanced variance analysis are that, it considers *different market conditions* and *changes in the dynamic environment*.

Moreover, advanced variances classify variances into *controllable* and *uncontrollable* variances and helps the management to find out reasons for adverse variances so that corrective action can be taken. Similarly, if any adverse variances have arrived, because of changes in the market condition like inflation, it has to be differentiated from the other variances.

GRV is a type of organization where management of performance can be done only through advanced variance analysis. Advanced variance analysis of GRV shows that it has adverse planning variance as well as adverse operational variance. Further, the emergence of *controllable* and *uncontrollable* variances makes it a perfect case of advance variance analysis in GRV. In GRV, sharp price changes which lead to the choice of expensive alternative and efficiency of purchase department need to be analyzed, reported, and dealt separately by the joint effort of the management accountant and the top management. Hence, advanced variance analysis in GRV is an absolute necessity.

☞

Conceptually correct *brief explanations* are sufficient.

(b) (i) Total Direct Labour Cost for first 8 batches based on learning curve of 90% (when the direct labour cost for the first batch is ₹55,000)

The usual learning curve model is

$$y = ax^b$$

Where

y = Average Direct Labour Cost *per batch* for x batches

a = Direct Labour Cost for *first batch*

x = Cumulative No. of batches produced

b = Learning Coefficient /Index

$y = ₹\ 55,000 \times (8)^{-0.152}$

$= ₹\ 55,000 \times 0.729$

$= ₹\ 40,095$

Total Direct Labour Cost for first 8 batches

= 8 batches × ₹ 40,095

= **₹ 3,20,760**

Total Direct Labour Cost for first 7 batches based on learning curve of 90% (when the direct labour cost for the first batch is ₹ 55,000)

$y = ₹\ 55,000 \times (7)^{-0.152}$

$= ₹\ 55,000 \times 0.744$

= **₹ 40,920**

Total Direct Labour Cost for first 7 batches

= 7 batches × ₹ 40,920

= ₹ 2,86,440

Direct Labour Cost for 8th batch

= ₹ 3,20,760 – ₹ 2,86,440

= **₹ 34,320**

(ii) Statement Showing "Life Time Expected Contribution"

Particulars	Amount (₹)
Sales (₹102 × 16,000 units)	16,32,000
Less: Direct Material and Other Non Labour Related Variable Costs (₹50 × 16,000 units)	8,00,000
Less: Direct Labour *	5,95,320
Expected Contribution	**2,36,680**

(*) Total Labour Cost over the Product's Life

= ₹3,20,760 + (8 batches × ₹34,320)

= **₹5,95,320**

(iii) In order to achieve a Profit of ₹5,00,00,000 the Total Direct Labour Cost over the Product's Lifetime would have to equal ₹3,32,000.

Statement Showing "Life Time Direct Labour Cost"

Particulars	Amount (₹)
Sales (₹102 × 16,000 units)	16,32,000
Less: Direct Material and Other Non Labour Related Variable Costs (₹50 × 16,000 units)	8,00,000
Less: Desired Life Time Contribution	5,00,000
Direct Labour	**3,32,000**

Average Direct Labour Cost *per batch* for 16 batches is ₹20,750 (₹3,32,000 / 16 batches).

Total Direct Labour Cost for 16 batches based on learning curve of r% (when the direct labour cost for the first batch is ₹ 55,000)

$y = ₹\ 55,000 \times (16)^b$

$₹\ 20,750 = ₹\ 55,000 \times (16)^b$

$0.3773 = (16)^b$

$$\log 0.3773 = b \times \log 2^4$$

$$\log 0.3773 = b \times 4 \log 2$$

$$\log 0.3773 = \left(\frac{\log r}{\log 2}\right) \times 4 \log 2$$

$$\log 0.3773 = \log r^4$$

$$0.3773 = r^4$$

$$r = \sqrt[4]{0.3773}$$

$$\mathbf{r = 78.37\%}$$

Alternative

In order to achieve a contribution of ₹5,00,000, the total labour cost over the product's lifetime would have to be ₹8,32,000 – ₹5,00,000 = ₹3,32,000. This equals an average batch cost of ₹3,32,000/16 = ₹20,750/-. This represents ₹20,750/ ₹55,000 = 37.73% of the cost of the first batch.

16 batched represent 4 doublings of output.

Therefore, the rate of learning required = $\sqrt[4]{0.3773}$ = 78.37%

Question 5

(a) (i) Name any two competition-based pricing methods. ***(2 Marks)***

(ii) RECOMMEND the Pricing Strategy to be adopted with reference to the following situations. You are not required to explain the reasons for your answer.

a. Star Coffee Shop follows the practice of keeping the price of its coffee or service artificially high in order to encourage favourable perceptions among buyers, based solely on the price.

b. Sky TV gave away their satellite dishes for free in order to set up a market for them.

c. Princeton Hotels Ltd. follows a competitive pricing method under which it tries to keep its price at an average level charged by the Industry.

d. Eddisson Enterprises has piled up stocks in large quantities and the market price has fallen.

e. Acqua LLP follows a new product pricing strategy through which company makes profitable sales by selling out few units.

f. X Ltd. produces Product X a revolutionary product and as a reward for innovation and for taking first initiative which pricing strategy should X Ltd. adopt?

g. *An established company has recently entered the stationery market segment and launched quality paper for printing at home and office.*

h. *D is a perishable item, with more than 80% of its shelf life is over.*

(1 x 8 = 8 Marks)

(b) *RK Ltd., which is producing a product, prepared a budget for the next year as follows :*

Fixed Cost p.a……..₹ 12,60,000

Variable Cost p.u……... ₹ 25

Production……..1,80,000 units

Selling price - Cost plus 25% mark up on total budgeted cost

When these budgeted figures and the pricing approach were informed to the Marketing Manager, he came out with a remark that the demand for the product is more price sensitive and he expected the demand under various prices as given below:

Selling Price p.u. (₹)	*36*	*38*	*40*	*42*	*44*
Annual Demand (units)	*1,74,000*	*1,62,000*	*1,50,000*	*1,38,000*	*1,25,000*

The Marketing Manager further informed that a wholesale dealer is ready to buy the entire production of the company at a price of ₹ 32 p.u. In that situation he expected a savings of ₹ 2 p.u. in the selling expenses which are a part in the above stated variable cost.

Required

EVALUATE the situation and advice the most profitable course of action. ***(10 Marks)***

Answer

(a) **(i)** Competition Based Pricing Methods- Going Rate Pricing, Sealed Bid Pricing

(ii) a. Premium Pricing

b. Penetration Pricing

c. Going Rate Pricing

d. Pricing Below Marginal Cost

e. Skimming Pricing

f. Premium Pricing

g. Market Price

h. Any Cash Realizable Value

(b) The company has a plan to produce 1,80,000 units and it proposed to adopt Cost *plus* Pricing approach with a markup of 25% on full budgeted cost. To achieve this pricing policy, the company has to sell its product at the price calculated below:

Qty.	1,80,000 units
Variable Cost (1,80,000 units × ₹25)	45,00,000
Add: Fixed Cost	12,60,000
Total Budgeted Cost	57,60,000
Add: Profit (25% of ₹57,60,000)	14,40,000
Revenue (need to earn)	72,00,000
Selling Price *per unit* $\left(\frac{₹72,00,000}{1,80,000 \text{ units}}\right)$	40 p.u.

However, at selling price ₹40 per unit, the company can sell 1,50,000 units only, which is 30,000 units less than the budgeted production units.

After analyzing the price-demand pattern in the market (which is price sensitive), to sell all the budgeted units market price needs to be further lowered, which might be lower than the total cost of production.

Statement Showing "Profit at Different Demand & Price Levels"

	I	II	III	IV	V	Dealer
Qty. (units)	1,74,000	1,62,000	1,50,000	1,38,000	1,25,000	1,80,000
	96.67%	90.00%	83.33%	76.67%	**69.44%**	100%
Selling Price p.u. (₹)	36	38	40	42	44	32
	₹	₹	₹	₹	₹	₹
Sales	62,64,000	61,56,000	60,00,000	57,96,000	55,00,000	57,60,000
Less: Variable Cost	43,50,000	40,50,000	37,50,000	34,50,000	31,25,000	41,40,000
Total Contribution	19,14,000	21,06,000	22,50,000	23,46,000	23,75,000	16,20,000
Less: Fixed Cost	12,60,000	12,60,000	12,60,000	12,60,000	12,60,000	12,60,000
Profit (₹)	6,54,000	8,46,000	9,90,000	10,86,000	11,15,000	3,60,000
Profit (% on total cost)	11.66%	15.93%	19.76%	23.06%	**25.43%**	6.67%

Advice

(i) Taking the above calculation and analysis into account, the company should produce and sell 1,25,000 units (i.e. near to 70% of budgeted production) at ₹44. At this price RK will not only be able to achieve its desired mark up of 25% on the total cost but can earn maximum contribution as compared to other even higher selling price.

(ii) Sell to wholesale dealer is not a financially viable option. RK will get only 6.67% margin on cost which is substantially lower than the desired level of mark up. However, this option will utilize the entire production. Instead RK may explore other opportunities to utilize additional capacity i.e.30%, for example, international expansion through e – commerce website or outsource the unutilized capacity to others to earn additional revenue.

Question 6

(a) Raju is Chief Financial Officer of Millets. com, an internet company that enables customer to order for delivery of different millets by accessing its website. Raju is concerned with the efficiency and effectiveness of the financial function. He collects the following information for three finance activities in 2018.

Rate per unit of Cost Driver

Activity	*Activity level*	*Cost Driver*	*Static Budget Amount (₹)*	*Actual Amount (₹)*
Receivables	*Output unit*	*Remittance*	*6.39*	*7.50*
Payables	*Batch*	*Invoices*	*29.00*	*28.00*
Travel expenses	*Batch*	*Travel claims*	*76.00*	*74.00*

The output measure is the number of deliveries which is the same as the number of remittances. The following additional information are also given:

	Budgeted	*Actual*
Number of deliveries	*10,00,000*	*9,48,000*
Delivery Batch size	*5*	*4.468*
Travel expenses Batch size	*500*	*501.587*

Required

CALCULATE the flexible budget variances for 2018 to :

(i) Receivable Activities ***(2 Marks)***

(ii) Payable Activities ***(4 Marks)***

(iii) Travel expense Activities ***(4 Marks)***

(Ignore fractions in all calculations)

(b) The information given below pertains to ABC Enterprises, a specialized car garage door installation company. ABC Enterprises use to get multiple service calls from the customers with variety of requirements. They may have to Install, Replace, Adjust or Lubricate some part or other to make the door functional. They work with 5 parts as given in the table, namely Door, Motor, Track, Trimmer and T -Lock.

	Parts	Type of Service				Total
		Install	Replace	Adjust	Lube	
1	Door	2	5	1	0	**8**
2	Motor	3	2	16	9	**30**
3	Track	5	0	6	6	**17**
4	Trimmer	14	6	0	0	**20**
5	T-Lock	5	0	1	0	**6**
6	Miscellaneous	0	2	1	1	**4**
	Total	**29**	**15**	**25**	**16**	**85**

Required

(i) Using the above data, carry out a Pareto Analysis (80/20 rule) of Total Parts.

(3 Marks)

(ii) Using the same data carry out the second level Pareto Analysis on the type of services with respect to Motors only. ***(2 Marks)***

(iii) Give your RECOMMENDATIONS on the basis of your calculations in (i) and (ii) above. ***(5 Marks)***

(Do calculations to two decimals only)

OR

STATE the business situations in which you recommend to apply Pareto Analysis.

(5 Marks)

Answer

(a) Activity-based costing, flexible-budget variances for finance function activities.

(i) Receivables

Receivables is an output unit level activity. Its flexible-budget variance can be calculated as follows:

Flexible Budget Variance

= Flexible Budget Costs – Actual Costs

= ₹ 6.39 × 9,48,000 – ₹ 7.50 × 9,48,000

= ₹ 60,57,720 – ₹ 71,10,000

= **₹ 10,52,280 (A)**

(ii) Payables

Payables is a batch level activity.

	Static-Budget Amounts	Actual Amounts
a. Number of deliveries	10,00,000	9,48,000
b. Batch size (units per batch)	5	4.468
c. Number of batches (a / b)	2,00,000	2,12,175
d. Cost per batch	₹29	₹28
e. Total payables activity cost (c×d)	₹58,00,000	₹59,40,900

Step 1: The number of batches in which payables should have been processed

= 9,48,000 actual units / 5 budgeted units per batch

= **189,600 batches**

Step 2: The flexible-budget amount for payables

= 1,89,600 batches × ₹ 29 budgeted cost per batch

= **₹ 54,98,400**

The flexible-budget variance can be computed as follows:

Flexible-Budget Variance

= Flexible-Budget Costs – Actual Costs

= 1,89,600 × ₹ 29 – 2,12,175 × ₹ 28

= ₹ 54,98,400 – ₹ 59,40,900

= ₹ 4,42,500 (A)

(iii) Travel Expenses

Travel expenses is a batch level activity.

	Static-Budget Amounts	Actual Amounts
a. Number of deliveries	10,00,000	9,48,000
b. Batch size (units per batch)	500	501.587
c. Number of batches (a / b)	2,000	1,890
d. Cost per batch	₹76	₹74
e. Total travel expenses activity cost (c×d)	₹1,52,000	₹1,39,860

Step 1: The number of batches in which the travel expense should have been processed

= 948,000 actual units/ 500 budgeted units per batch

= 1,896 batches

Step 2: The flexible-budget amount for travel expenses

= 1,896 batches × ₹ 76 budgeted cost per batch

= ₹ 1,44,096

The flexible budget variance can be calculated as follows:

Flexible Budget Variance

= Flexible-Budget Costs – Actual Costs

= 1,896 × ₹ 76 – 1,890 × ₹ 74

= ₹ 1,44,096 – ₹ 1,39,860

= ₹ 4,236 (F)

(b) (i) Statement Showing "Pareto Analysis of Total Parts"

Parts	No. of Items	% of Total Items	Cumulative Total
Motor	30	35.29	35.29%
Trimmer	20	23.53	58.82%
Track	17	20.00	78.82%
Door	8	9.41	88.23%
T-Lock	6	7.06	95.29%
Miscellaneous	4	4.71	100.00%

(ii) Statement Showing "Pareto Analysis of Type of Services (Motor)"

Type of Services	No. of Items	% of Total Items	Cumulative Total
Adjust	16	53.33	53.33%
Lube	9	30.00	83.33%
Install	3	10.00	93.33%
Replace	2	6.67	100.00%
	30		

(iii) Pareto Analysis is a rule that recommends focus on most important aspects of the decision making in order to simplify the process of decision making. The very purpose of this analysis is to direct attention and efforts of management to the product area where best returns can be achieved by taking appropriate actions.

Pareto Analysis is based on the 80/20 rule which implies that 20% of the products account for 80% of the revenue. But this is not the fixed percentage rule. In general business sense, it means that a few of the products, goods or customers may make up most of the value for the firm.

The present case stands in a difference to 80/20 rule. Because the company installs doors, they sometimes have multiple service calls to install each door piece by piece. They may have to install, replace, adjust, or lubricate some part to get the door working properly. They work with five main parts: door, motor, track, trimmer and t-lock. The service calls with reference to motors are heavy and accounted for as much as 35.29% of the number of calls attended. Motor together with trimmer accounted for 58.82%. So, these two parts are to be considered as key parts and ABC enterprises must be ever ready to cater to all provisional requirements for attending these classes without any inordinate delay. Any delay in service these calls is likely to damage its service rendering reputation within a very short span of time. Further, the second level Pareto Analysis on motors has revealed a particular reference to the service problems related to motors. Adjustments and Lubrication issues cover up 83.33% of the total service problems exclusively connected to Motors. So, ABC Enterprise must direct its best efforts and develop specific expertise to solve these problems in the best interest of the customers.

Or

Pareto Analysis is generally applicable in the following business situations.

Pricing of a Product

- In the case of a *firm dealing with multi products*, it would not be possible for it to analyse cost-profit- price -volume relationships for all of them. In practice, in case of such firm approximately *20% of products may account for about 80% of total sales revenue*. Pareto Analysis is used for analysing the firm's estimated sales revenues from various products and it might indicate that approximately 80% of its total sales revenue is earned from about 20% of its products.

Customer Profitability Analysis

- Instead of analysing products, *customers can be analysed* for their relative profitability to the organisation. Again, it is often found that approximately *20% of customers generate 80% of the profit*. There will always be some customers who are less profitable than others, just as some products are less profitable than others. Such an analysis is useful tool for evaluation of the portfolio of

customer profile and decision making such as whether to continue serving a same customer group, what is the extent of promotion expenses to be incurred.

ABC Analysis- Stock Control

- Another application of Pareto analysis is in *stock control* where it may be found that only a few of the goods in stock make up most of the value. In practice, approximately *20% of the total quantity of stock may account for about 80% of its value*. The outcome of such analysis is that by concentrating on small proportion of stock items that jointly accounts for 80% of the total value, a firm may well be able to control most of monetary investment in stocks.

Application in Activity Based Costing

- In Activity Based Costing it is often said that *20% of an organisation cost drivers are responsible for 80% of the total cost*. By analysing, monitoring and *controlling those cost drivers that cause most cost*, a better control and understanding of overheads will be obtained.

Quality Control

- Pareto analysis seeks to discover from an *analysis of defect report or customer complaints* which "vital few" causes are responsible for most of the reported problems. Often, *80% of reported problems can usually be traced to 20% of the various underlying causes*. By concentrating one's efforts on rectifying the vital 20%, one can have the greatest immediate impact on product quality.

Conceptually correct *brief explanations* are sufficient.