Paper – 10: Cost & Management Accountancy

Time Allowed: 3 Hours **Full Marks: 100**

This paper contains 4 questions. All questions are compulsory, subject to instruction provided against each question. All workings must form part of your answer. Assumptions, if any, must be clearly indicated.

1. **Answer all questions** **[2x10=20]**

(a) A company maintains a margin of safety of 25% on its current sales and earns a profit of ₹30 lakhs per annum. If the company has a P/V ratio of 40%, what would be its current sales?

Answer:

Margin of Safety = Profit / PV ratio.
= 30 ÷ 40% = 75 Lakhs
∴Total Sales =75 /.25
= ₹300 Lakhs

(b) List the non-cost considerations in a shut-down or continue decision.

Answer:

The non-cost considerations are as follows:

- Loss of market share to competition
- Loss of goodwill and market image.
- Strain in labour management relations.
- Availability of skilled labour on re-opening.

(c) In case of joint products, the main objective of accounting of the cost is to apportion the joint costs incurred up to the split off point. For cost apportionment one company has chosen Physical Quantity Method. Three joint products 'A', 'B' and 'C' are produced in the same process. Up to the point of split off the total production of A, B and C is 60,000 kg, out of which 'A' produces 30,000 kg and joint costs are ₹3,60,000. What would be the Joint costs allocated to product A?

Answer:

Product A produces 50% of total production (60,000 kg ÷ 30,000 kg.).
So according to physical quantity method, 50% of joint costs (₹1,80,000) to be allowed to product- A.

(d) Coal India Ltd. (CI) owns the rights to extract minerals from Jharkhand state. CI has costs in three areas:

- **Payment to a mining subcontractor who charges ₹4,000 per ton of coal mined and returned to the beach (after being processed on the mainland to extract three minerals – ilmenite, rutile, and zircon).**
- **Payment of a government mining and environmental tax of ₹3,000 per ton of coal mined.**
- **Payment to a barge operator. This operator charges ₹1,50,000 per month to transport each batch of coal up to 100 tons per batch per day to the mainland and ten return to**

Jharkhand State (i.e., 0-100 tons per day ₹,50,000 per month; 101 – 200 tons per day = ₹3,00,000 per month, and so on.) Each barge operates 25 days per month. The ₹50,000 monthly charge must be paid even if fewer than 100 tons are transported on any day and even if Coal India Ltd. requires fewer than 25 days of barge transportation in that month.)

What is the unit cost per ton of coal mined (I) if 180 tons are mined each day, or (II) if 220 tons are mined each day?

Answer:

	Tons Mined per day (1)	Tons Mined per Month (2) = (1) x 25	Fixed Unit Cost per Ton (3) = FC ÷ (2)	Variable Unit Cost per Ton (4)	Total Unit Cost per Ton (5) = (3) + (4)
(I)	180	4,500	₹ 3,00,000 ÷ 4,500 =₹ 66.67	₹ 7,000	₹ 7,066.67
(II)	220	5,500	₹ 4,50,000 ÷ 5,500 =₹ 81.82	₹ 7,000	₹ 7,081.82

(e) Write two limitations of ZBB.

Answer:

The limitations of ZBB

- Lack of co-ordination: Various operational problems are likely to be faced in implementing the technique of ZBB. It requires the wholehearted support from Top Management.
- Old is gold attitude: Generally, managers are reluctant to start afresh. They tend to plan for future just by reference to past actions and budgets.

(f) A Company manufacturing Cotton Textiles wrote off in the same year the expenditure in replacement of Copper Rollers used for Printing Fabrics and Stainless Steel Frames used for Drying Yarn. Whether the Cost Auditor can qualify the report for these?

Answer:

The Cost Auditor is justified in qualifying his report because according to Cost Accounting Records (Textiles) Rules, cost of items like Copper Rollers used for printing fabrics and the stainless steel frames used for dying yarn put into use in the relevant year shall be treated as deferred revenue expenditure and spread over the effective life of such items. Thus writing off such items in the same year.

(g) How will you treat Cenvat availed as credit on purchased raw materials in the Cost Accounting Records?

Answer.

Cenvat credit to be deducted from the cost of raw materials, and only the net value should be taken in the priced stores ledger, which forms the basis for pricing materials issues to cost centres.

(h) Name the way of determining price under Oligopoly.

Answer:

Price can be determined in three ways under oligopoly:

(I) Independent pricing (II) Pricing under collusion (III) Price Leadership

(i) Show that elasticity of demand = $\frac{AR}{AR-MR}$, where AR and MR are average and marginal revenue respectively at any output.

Answer:

Total Revenue, (Say R) = px, $AR=\frac{R}{X}=\frac{px}{x}=p$

$$MR=\frac{d}{dx}(R)=\frac{d}{dx}(R)=p+x\frac{dp}{dx}$$

$$\text{Now, } \frac{AR}{AR-MR}=\frac{p}{p-p-x\frac{dp}{dx}}=\frac{p}{-x\frac{dp}{dx}}=\frac{p\frac{dp}{dx}}{-x}=-\frac{\frac{dx}{dp}}{\frac{x}{p}}=-\frac{dp}{dx}\times\frac{p}{x}=\left|E_p\right|\text{(proved)}$$

(j) Name the types of Price Elasticity of Demand.

Answer:

The price elasticity of demand is of five types:

(I) Perfectly elastic demand (II) Perfectly inelastic demand (III) Relatively elastic demand (IV) Relatively inelastic demand (V) Unitary elastic demand.

2. Answer any two questions from a, b and c. [2x20=40]

(a)

(i) X uses traditional standard costing system. The inspection and setup costs are actually ₹ 1,760 against a budget of ₹ 2,000.

ABC system is being implemented and accordingly, the number of batches is identified as the cost driver for inspection and setup costs. The budgeted production is 10,000 units in batches of 1,000 units, whereas actually, 8,800 units were produced in 11 batches.

I. Find the volume and total fixed overhead variance under the traditional standard costing system.

II. Find total fixed overhead cost variance under the ABC system. [4+6=10]

Answer:

I. Calculation of volume and total fixed overhead under Traditional Standard Costing System.

Budgeted overhead cost per unit	₹ 2,000/10,000 units	₹ 0.20
Actual overhead cost per unit	₹ 1,760/8,800 units	₹ 0.20
Total fixed over head variance	Absorbed budgeted overhead – Actual overhead = (₹ 0.20 x 8,800 units) – ₹ 1,760	Nil
Fixed overhead expenditure variance	Budgeted overhead – Actual overhead = 2,000 – 1,760	₹ 240 (F)
Standard absorption rate	₹ 2,000 / 10,000 units	₹ 0.20 per

		unit
Verification:	Standard absorption rate x (Budgeted units – Actual units) = ₹ 0.20 (10,000 units – 8,800 units)	₹ 240 (A)
Total fixed overhead variance	Expenditure variance + Volume variance = 240 (F) + 240 (A)	Nil

II. Calculation of fixed overhead cost variance under ABC System

Particulars	Budget	Actual	ABC standard
Total cost (₹)	2,000	1,760	1,800
Production (units)	10,000	8,800	8,800
No. of batches	10	11	9
Batch size (units/batch)	1,000	800	1,000
Cost per batch	200	160	200

Under ABC 8,800 units should have been produced in standard batch size of 1,000 units/ batch.

No. of batches = 8,800/1,000 = 9 approx.

Standard cost under ABC =

(Budgeted cost per batch x ABC standard number of batches)

= ₹ 200 x 9 = 1,800

Under ABC, variability is with respect to batches and not units

Absorbed overheads = 9 batches x Standard rate per batch

= 9 x ₹ 200 = ₹ 1,800

Actual overheads = ₹ 1,760

Total overheads cost variance = ₹ 40 (F)

(ii) What are the methods of fixing "Transfer Price" for transfer of a product from one profit centre to another? Mention one demerit of each method. [1+4]

Answer:

Methods of fixing Transfer Price for transfer of a product from one profit centre to another:

Methods	Demerit
Cost Based Pricing – Standard Cost	It becomes essential to revise the standard cost, otherwise the method becomes outdated
Market Based Pricing	Market price is a rather vague term as such prices may be ex-factory price, wholesale price, retail price etc.
Negotiated Pricing	The main limitation of this method is that lot of time is spent by both the negotiating parties in fixation of the negotiated prices.
Pricing based on Opportunity Cost	The most ideal situation will be when the minimum price expected by the selling division is less than the maximum price accepted by the buying division.

(iii) A company is manufacturing building bricks and fire bricks. Both the products require two processes:

Brick- forming heat –treating

Time requirements for the two bricks are:

	Building Bricks	Fire Bricks
Forming per 100 Bricks	**3 hrs**	**2 hrs**
Heat- treatment per 100 Bricks	**2 hrs**	**5 hrs**

Total costs of the two departments in one month were:
Forming ₹21,200 heart-treatment ₹48,800
Production during the month was:

Building bricks 1,30,000 Nos. Fire Bricks 70,000 Nos.

Prepare a statement of manufacturing costs for the two varieties of bricks. [5]

Answer:

In the manufacturing of the two types of bricks, time seems to play an important part. It will be therefore appropriate to apportion the costs of the two departments-Forming and Heat-treatment, between the Building Bricks and Fire Bricks in the ratio of total time taken.

Department	Building Bricks	Fire Bricks
Forming	3 × 1,30,000 = 39	2 × 70,000 = 14
Heat- treatment	2 × 1,30,000 = 26	5 × 70,000 = 35

The cost statement can be prepared as follows:

	Total	Ratio	Building	Fire Bricks
Output			1,30,000	70,000
Forming costs	21,200	39 : 14	₹15,600	₹5,600
Heat –treatment costs	48,800	26 : 35	20,800	28,000
Total cost of production			36,400	33,600
Cost per 100 bricks			28	48

(b)

(i) A Company produces three products A, B and C. The following information is available for a period:

Product	A	B	C	Throughout Accounting Ratio
Contribution (₹ per unit) (Sales – Direct Materials)	**30**	**25**	**15**	
Machine hours required per unit of production:				
Machine 1	**10 hours**	**2 hours**	**4 hours**	**133.33%**
Machine 2	**15 hours**	**3 hours**	**6 hours**	**200.00%**
Machine 3	**5 hours**	**1 hour**	**2 hours**	**66.67%**

Estimated Sales Demand for A, B and C are 500 units each and machine capacity is limited to 6,000 hours for each machine. You are required to analyze the above information and apply Theory of Constraints process to remove the constraints. How many units of each product will be made? [5]

Answer:

TA Ratio is highest for 'Machine 2'. So, 'Machine 2' is the bottleneck. Total 'Machine 2' hours available = 6,000

Particulars	A	B	C
1.Throughput Contribution per unit (given) (₹)	30	25	15
2.'Machine 2' hours required per unit	15	3	6
3.Contribution per 'Machine 2' hour (1÷ 2) (₹)	2	8.33	2.5
4.Ranking	III	I	II
5.Maximum Sales Demand (units)	500	500	500
6.'Machine 2' hours required (2 × 5)	7,500	1,500	3,000
7.'Machine 2' hours allocated based on ranking	(bal. fig)	(I Rank)	(II Rank)
	1,500	1,500	3,000
8. Possible Output Quantity (7 ÷ 2) (units)	100	500	500

(ii) The Manager of a Repairs Maintenance Deptt. in response to a request, submitted the following budget estimates for his department that are to be used to construct a flexible budget to be used during the coming year.

Details of cost	**Planned at 6,000**	**Planned at 9,000**
	Direct repair Hours	**Direct repair Hours**
Employee salaries	**₹30,000**	**₹30,000**
Indirect repair materials	**₹40,200**	**₹60,300**
Miscellaneous cost etc.	**₹13,200**	**₹16,800**

i. **Prepare a flexible budget for the department upto activity level of 10,000 repair hours (use increments of 1,000).**

ii. **What would be the budget allowance at 8,500 direct repair hours?** **[5+2]**

Answer:

Details of Costs

Particulars	Direct repair	Hours (DRH)	Nature of Expenses
	6,000	9,000	
Employees Salaries	₹30,000	₹30,000	Fixed
Indirect Repairs Materials	40,200	60,300	Variable: ₹670 per Repair Hour
Miscellaneous costs	13,200	16,800	Semi-variable classified into (i) Variable $\frac{16,800 - 13,200}{9,000 - 6,000}$ = ₹1.20 per Repair Hour (ii) Fixed = 13,200 – (1.2 × 6,000) = ₹6,000

The above analysis shows that variable costs are:
₹6.70 + ₹1.20 = ₹7.90 per Repair Hour.
Fixed costs are: ₹30,000 + ₹6,000 = ₹36,000.

i. **FLEXIBLE BUDGET**

Details of costs	Nature of Expenses	DRH 6,000	DRH 7,000	DRH 8,000	DRH 9,000	DRH 10,000
Employees Salaries	Fixed	₹30,000	₹30,000	₹30,000	₹30,000	₹33,000
Indirect Repairs:						
Material	Variable	40,200	46,900	53,600	60,300	67,000
Miscellaneous Costs etc.	Semi -variable	13,200	14,400	15,600	16,800	18,000
		83,400	91,300	92,200	1,07,100	1,15,000

ii. Budget allowance for 8,500 Direct repair Hours = (7.90 × 8,500) + 36,000 = ₹1,03,150.

(iii) A radio manufacturer, who commenced his business on 1st April, 2014 supplies you with the following information and asks you to prepare a statement showing the profit per radio sold. Wages and materials are to be charged at actual cost, works overhead at 75% of wages and office overhead at 30% of works cost. Number of radios manufactured and sold during the year was 540.

Other particulars:

Materials per set	**₹240**
Wages per set	**₹80**
Selling price per set	**₹600**

If the actual works expenses were ₹32,200 and office expenses were ₹61,760, prepare a Reconciliation Statement. **[8]**

Answer:

Cost Sheet (or) Statement of Cost and Profit

Particulars	**Unit ₹**	**Total ₹**
Material	240	1,29,600
Wages	80	43,200
Prime cost	320	1,72,800
(+) Works overhead (75% of wages)	60	32,400
Works cost	380	2,05,200
(+) Office overheads	114	61,560
Total cost	494	2,66,760
(+) Profit *	106	57,240
Sales	600	3,24,000

Dr. Trading and Profit & Loss Account Cr.

Particulars	Amount ₹	**Particulars**	Amount ₹
To, Materials A/c	1,29,600	By, Sales A/c	3,24,000
To, Wages A/c	43,200		
To, Works Overheads A/c	32,200		
To, Gross Profit	1,19,000		
	3,24,000		3,24,000
To, Office Expenses	61,760	By, Gross Profit b/d	1,19,000
To, Net Profit	57,240		

	1,19,040		1,19,040

Statement of Reconciliation

Particulars	Amount ₹	Amount ₹
Profit as per Financial Accounts		57,240
(-) Over recovery of works overheads		(210)
(+) Under recovery of office expenses		200
Profit as per Cost Accounts		57,240

(c)

(i) What are the prerequisites for Installation of a Uniform Costing System? [5]

Answer:

The organizational set up for implementing the principles and methods of Uniform Costing may take different forms. It may range from a small association of a number of concerns who agree to have uniform information regarding a few specific cost accounting respects, to be a large organization which has a fully developed scheme covering all the aspects of costing. The success of a uniform costing system will depend upon the following:

- There should be a spirit of mutual trust, co-operation and a policy of give and take amongst the participating members.
- There should be a free exchange of ideas and methods.
- The bigger units should be prepared to share with the smaller ones, improvements, achievements of efficiency, benefits of research and know-how.
- There should not be any hiding or withholding of information.
- There should be no rivalry or sense of jealousy amongst the members.

(ii) Gupta Enterprise is operating at 60% capacity level producing and selling 60,000 units @ ₹50 per unit. Other relevant particulars are as follows:

	Cost per unit
Material	**₹20**
Conversion Cost (variable)	**₹10**
Dealer's margin (10% of sales)	**₹5**
Fixed cost for the period is	**₹6,00,000**

As there is a stiff competition it is not possible to sell all the products at the existing cost price structure. The following alternative proposals are considered:

(i) Decrease selling price by 20%

(ii) Increase dealer's margin from 10% to 20%

Select the better alternative. Also calculate the sales volume required to maintain the same amount of profit under the alternative which is considered better assuming that volume of sales will not be a limiting factor under such alternative. Also assume that fixed cost will remain constant. [7+2]

Answer:

Computation under existing condition

Contribution per unit = unit selling price – unit variable cost = ₹50 – (₹20 + ₹10 + ₹5) = ₹15

Contribution from sale of 60,000 units = 60,000 ×₹15 = ₹9,00,000

Profit = Contribution – Fixed Cost = ₹9,00,000 –₹6,00,000 = ₹3,00,000

Computation under the first alternative
(i.e. when selling price is decreased by 20%)

Revised Selling price per unit ₹40

(₹50 – 20% of ₹50)

Variable Cost per Unit:		
Material	₹20	
Conversion Cost	₹10	
Dealer Margin (10% of Sales)	₹4	₹34
Revised Contribution per unit:		₹6

P/V Ratio = Contribution / Sales × 100
= ₹6 /₹40 × 100 = 15%
BEP Sales (in ₹) = Fixed Cost / P.V Ratio
= ₹6,00,000 / 15% = ₹40,00,000

Computation under the second alternative
(i.e. when dealer's margin is increased to 20%)

Selling price per unit		₹50
Material	₹20	
Conversion Cost	₹10	
Dealer Margin (20% of Sales)	₹10	
		₹40
Revised Contribution per unit:		₹10

P/V Ratio = (Contribution / Sales) × 100
= (₹10 /₹50) × 100 = 20%

BEP Sales (in ₹) = Fixed Cost / P.V Ratio = ₹6,00,000 / 20% = ₹30,00,000

From the above results, it appears that P/V Ratio under the second alternative is higher than that under the first alternative. Also break even point under the second alternative sets at a lower level than the level under the first alternative. Therefore, second alternative i.e. increasing dealer's margin to 20% is better both in terms of profitability (as reflected from P/V Ratio) and risk (as reflected from BEP). If the second alternative is selected, the required volume of sales to maintain the same profit. (i.e. ₹3,00,000)
= (Fixed Cost + Profit) /P.V Ratio
= (6,00,000 + 3,00,000) /20%
=45,00,000

(iii) List out the advantages and disadvantages of adopting standard costs for inventory valuation. [3+3]

Answer:

The advantages of adopting standard costs for inventory valuation are as follows:

- Stores ledger may be maintained in quantities only and the standard price noted at the top in the ledger sheets. These economies the use of forms as well as reduces clerical costs as no columns for rates need be maintained.
- Pricing of materials requisitions is simplified as only one standard price for each item of material is required to be used.
- Price variance is promptly revealed at the time of purchase of material.

The disadvantages are:

- The stores ledger does not reveal the current prices.

- If the material stock is shown in the Balance Sheet at standard costs, the variances have the effect of distorting the profit or loss. Standard cost of the closing inventory is required to be adjusted to actual cost based on price variance to comply with the statutory requirement of the Indian Companies Act.
- A revision of the standard necessitates revision of the cost of the inventory.

3. Answer any two questions from a, b and c. [2x8=16]

(a)

(i) Will the Companies subject to Cost Audit be also required to file Compliance Report under Companies (Cost Accounting Records) Rule 2011? How to prepare the Compliance Report? [2+3]

Answer:

Every company covered under Companies (Cost Accounting Records) Rules 2011 is required to file a Compliance Report irrespective of whether all or any of its products are covered under cost audit. Thus the Compliance Report shall include product groups covered under cost audit as well as product groups not covered under cost audit.

Preparation of the Compliance Report:-

The Compliance Report is to be prepared for the 'company as a whole' under different product groups.

- If all the products/activities of a company, excluding the exempted categories, are covered under cost audit, then the company will not be required to separately file the compliance report.
- If one or more product(s)/activity(s) of a company is covered under Cost Audit and there are other products covered under Companies (Cost Accounting Records) Rules 2011 but not covered under Cost Audit as per company-wise or industry specific Cost Audit Orders dated 2nd May, 2011 and 3rd May, 2011 (amended by 30th June, 2011), the Company will be required to file a Compliance Report (Company as a whole) covering products under cost audit and products not under cost audit.
- If one or more product(s)/activity(s) of a company is covered under Cost Audit and there are other products not covered under Companies (Cost Accounting Records) Rules 2011, then the company will not be required to file a Compliance Report since the product(s)/activity(s) other than product(s)/ activity(s) under Cost Audit are in the exempted category.

(ii) Whether a Cost Auditor can be appointed as Internal Auditor of the company. Whether there is any restriction on the cost auditor to accept assignments from a company where he is the cost auditor. [1+2]

Answer:

A cost auditor cannot render any services to the company whether acting individually, or through the same firm or through other group firms where he or any partner has any common interest, relating to:

- design and implementation of cost accounting system; or
- the maintenance of cost accounting records, or
- act as internal auditor,

However, a cost auditor can certify the compliance report or provide any other services as may be assigned by the company, excluding the services mentioned above.

(b)

(i) Classify the Cost Audit Reporting Format. [6]

Answer:

The Cost Audit Reporting Format is classified as follows:

Form I	Part I of Form I deals with the General Information about the Company. This is the "Form for filling Cost Audit Report and other documents with the Central Government"
	Part II of Form I contains the Cost Audit Report in PDF format as an attachment and verification portion. It also contains the digital signature of the cost auditor.
Form II	It is the Cost Audit Certificate furnished by the Cost Auditor. The Cost Audit Report duly completed along with the Cost Auditor's observations and suggestions is to be signed by the Cost Auditor. Membership number should mandatorily be mentioned.
	Form II also contains "Annexure to the Cost Audit Report" classified in 11 Paras. [stated below]
Form III	This contains indicative areas for "Performance Appraisal Report" to be submitted by the Cost Auditor to the Board of Directors of a Company.

Form II – Paras at a glance:

Para No.	Refers to
1	General Information
2	Cost Accounting Policy
3	Product group details : - Product Group Name - Product Group Code - Whether covered under Cost Audit - Net Sales of Product Group - CETA Chapter heading - Other Incomes
4	Quantitative information
5	Abridged Cost Statement
6	Operating Profit Analysis
7	Profit Reconciliation
8	Value Addition & Distribution of Earnings
9	Financial Position & Ratio Analysis
10	Related Party Transactions
11	Reconciliation of Indirect Taxes

(ii) A company is exporting 80% of its sales and 20% is domestic sale. Can this company be exempted from the mandatory cost audit? [2]

Answer:

The exemption from mandatory cost audit is available only to those 100% EOUs who are registered under the policy document as per the Foreign Trade Policy and which are functioning within the permissible approved limit as per the said Policy. The DTA (Domestic Tariff Area) sales should not exceed the permissible limits as per the policy in force.

If the percentage of domestic sales is within the DTA limit, the company will be exempted from mandatory cost audit. It may be noted that if DTA sales for any year exceeds the permissible limits, then the exemption from cost audit available to the unit shall be withdrawn and the unit will be subjected to cost audit in accordance with the provisions of applicable rules/orders starting with the year in which exemption stood withdrawn and for every subsequent year thereafter.

(c)

(i) Inclusion of Petroleum Blocks there is no commercial production of oil or gas. Explain. [4]

Answer:

Inclusion of Petroleum Blocks where there is no commercial production of oil or gas

As per MCA General Circular No. 67/2011 dated 30th November 2011, Companies engaged in the production, processing, manufacturing or mining activities are not covered under Companies (Cost Accounting Records) Rules 2011 till such time they commences their commercial operations. It rises to the issue whether the Petroleum Blocks where there is no commercial production of oil or gas are excluded or not

The Cost Accounting Records (Petroleum Industry) Rules 2011 is applicable for companies engaged in Petroleum activity. Survey, Exploration, Exploratory/ Developmental Drilling activities are an integral operation of the Petroleum Industry which may or may not lead to establishment of a producing property resulting in commercial production of oil or gas from the well/block. Hence, companies engaged in Survey, Exploration etc and blocks where such activities are being carried out are covered under Cost Accounting Records (Petroleum Industry) Rules 2011.

(ii) Variance Accounting is also part of a system of Cost Records. Explain. [4]

Answer.

The company may maintain Cost Records on any basis other than actual, i.e., Standard Costing System. In such case, the Cost Records should reveal the following:

- Particulars of norms and standards established – both physical and financial
- Details of variances recognized and accounted by the Costing System.
- Time of recognition of variances and the method of accounting – either single plan or partial plan.
- Method of disposition of variances at the end of the period.

4. Answer any three questions from a, b, c and d. [3x8=24]

(a) What are the factors influencing Elasticity of Demand? [8]

Answer:

- **Nature of goods:**

  Elasticity of demand depends on the nature of goods. The elasticity of demand for a commodity depends upon the necessity of it for a human life. Goods may be necessary for human life, comfort or luxurious. Necessary goods are extremely essential so the demand for these goods-is inelastic.

But the consumption of comfort and luxury goods enhances man's efficiency and social prestige. So their consumption is less important and can be very well postponed. Thus the elasticity of demand for such commodities is elastic.

- **Availability of substitutes:**
  The demand for a commodity having perfect substitute is relatively more elastic. If a flood gives the same pleasure and satisfaction in place of the consumption of another commodity, it is called a substitute commodity. A substitute may be close and remote.
  Close substitute has got more elastic demand and remote substitute has less elastic demand. Tea and coffee are substitute commodities. Both can be used in absence of another. Thus the demand for tea and coffee is elastic.
- **Alternative use:**
  The demand for those goods having more than one use is said to be elastic. In other words goods having alternative uses are elastic. All the uses are not of same importance. As the commodities are put to certain less urgent needs or uses as a result of fall in price their demand raises. People use those commodities for certain urgent use in response to a rise in price.
  For example electricity can be used for a number of purposes like heating, lighting, cooking, cooling etc. If the electricity hill increases people utilise electricity for certain important urgent purpose and if the bill falls people use electricity for a number of other unimportant uses. Thus the demand for electricity is elastic.
- **Possibility of postponing consumption:**
  The demand for those goods whose consumption can be postponed for sometime is said to be elastic. On the other hand if the commodities cannot be postponed and need to be fulfilled the demand for them is in elastic.
  Medicine for a patient, books for a student and milk for a child cannot be postponed. They are to be satisfied first. That is why the demand for those commodities is in elastic.
- **Proportion of income spent:**
  Elasticity of demand also depends on the proportion of income spent on different goods. The demand for those goods on which a negligible amount of the total income of the consumer is spent is said to be inelastic.
  Salt, edible oil, match box, soap etc account for a very negligible amount of the consumer income. That is why their demand is inelastic.
- **Price-level:**
  The demand for high priced commodities is elastic. On the other hand the low priced goods is said to have inelastic demand. High priced commodities are luxurious goods and low priced goods are necessaries. Luxurious goods are mainly consumed by the people of high income brackets. For example if the price of a colour TV falls from Rs 15000 to Rs 5000 the price comes to the reach of the people who were unable to buy at the old price.
  Now they rush to buy colour TV. Thus with a rise or fall in price the amount demanded of colour TV remarkably falls or rise. But if the price of salt raises from ₹2.00 to ₹5.00 it account for no such remarkable fall in the quantity demanded of salt.
- **Force of habit:**
  A repeated and constant use of a commodity by a person forms habit. A habit can't be avoided. Thus in such a case the consumption of the commodity can't be abstained in spite of the rise in price.

The consumer has to satisfy his habit regardless of change in price. Thus the demand for habitual commodities is fairly inelastic.

- **Durability of Commodities:**
  The demand for durable commodities is elastic whereas the demand for less durable commodity is inelastic. Durable commodity is used over a long period of time. The utility of a durable good is destroyed continuously. Once a durable good is bought the buyer feels no want of it for a long period of time. Thus the change (rise or fall) in price can't influence the demand.
  Thus the demand becomes elastic. On the other hand less durable or perishable goods are consumed repeatedly. Any change in price affects the demand. Thus the demand for perishable goods is less elastic.

(b)

(i) The market for tri-cycles for small kids is competitive and each tri-cycle is priced at ₹230. The cost function of a firm is given by TC = 130q – 10q² + q³.

I. What is q_0 and p_0

II. Is the industry in equilibrium? [3+1]

Answer:

I. We have $P_0 = 230$. With $TC = 130q - 10q^2 + q^3$

$\Rightarrow MC = 130 - 20q + 3q^2$

At equilibrium

$P_0 = MC$

$\Rightarrow 230 = 130 - 20q + 3q^2$

$\Rightarrow 3q^2 - 20q - 100 = 0$

$\Rightarrow (3q + 10)(q - 10) = 0$

$= q_0 = 10$ Now $\pi_0 = P_0 q_0 - [130q_0 - 10q_0^2 + q_0^3$

$= 230 \times 10 - [130 \times 10 - 10 \times (10)^2 + (10)^3]$

$= 2300 - [1300] = 1000.$

We see q = 10, satisfies 2nd order condition

II. As the economic profits are negative i.e., as there are losses the industry is not in equilibrium. Some firms will leave the industry.

(ii) The cost function of a competitive firm is c = 200+ 10q + 2q ². Determine price level if the firm only earns normal profit. [4]

Answer:

If a firm is earning just normal profits, we have P_0 = min AC.

Now $AC = \frac{c}{q} = \frac{200}{q} + 10 + 2q$

For minimum AC, $\frac{d(AC)}{dq} = 0$

$\Rightarrow \frac{200}{q^2} + 2 = 0$

$\Rightarrow$ q = 10.

$\Rightarrow$ Min AC at q = 10 is $\frac{200}{10}$ + 10 + 2(10) = 50.

$\Rightarrow$ P_0 = 50.

(c)

(i) Fit straight line by the least square method to the following figures of production of Sugar Factory. Estimate the production for the year 2015.

Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Production(in Lakh tons)	**76**	**87**	**95**	**81**	**91**	**96**	**90**

[4+2]

Answer:

Analysis of Trend by Least square Method

Year	**x**	**Y (production)**	**xy**	**x^2**
2008	-3	76	-228	9
2009	-2	87	-174	4
2010	-1	95	-95	1
2011	0	81	0	0
2012	1	91	91	1
2013	2	96	192	4
2014	3	90	270	9
Total	0	$\sum y = 616$	$\sum xy = 56$	

The two normal equations are as under:

Equation 1	**Equation** 2
$\sum y = na + b\sum x$	$\sum xy = a\sum x + b\sum x^2$
So, 616=7a+ b (0)	56=88 (0)+b (28)
So, 7a= 616	56=28b
a=616÷ 7=88	b=56÷28=2

The first degree polynomial trend equation (straight line trend) is Y=a+ bx
So, Y=88+2x (where original year is 2011, x=1 year unit)
Estimated production for the year 2015: Here, x=4 (i.e. from 2011 to 2015)
So, Y=88+2(4); 88+8=96.
Hence, production for the year 2015= 96 lakh tons.

(ii) What are the conditions for price discrimination? **[2]**

Answer:

The price discrimination is possible if the following conditions are satisfied.

- **More than one Market:** There must be two or more than two separate markets otherwise the price discrimination is not possible. Different markets must be essential for charging different prices from different persons.
- **Different elasticity:** The elasticity of demand in each market must be different. It means that if one market is less elastic than the other it should be elastic. If the elasticity of demand is equal in all markets there will be no scope for price discrimination.

(d)

(i) Distinguish between macro and micro economics. [6]

Answer.

Broadly speaking, microeconomic analysis is individualistic, whereas macroeconomic analysis is aggregative. Microeconomics deals with the part (individual) units while macroeconomics deals with the whole (all units taken together) of the economy,

- Difference in nature: Microeconomics is the study of the behaviour of the individual units. Macroeconomics is the study of the behaviour of the economy as a whole.
- Difference in methodology: Microeconomics is individualistic. Whereas macroeconomics is aggregative in its approach.
- Difference in economic variables: Microeconomics is concerned with the behaviour of micro variables or micro quantities. Macroeconomics is concerned with the behaviour of macro variables and macro quantities. In short, microeconomics deals with the individual incomes and output, whereas macroeconomics deals with the national income and national output.
- Difference in field of interest: Microeconomics primarily deals with the problems of pricing and income distribution. Macroeconomics pertains to the problems of the size of national income, economic growth and general price level.
- Difference in outlook and scope: The concept of 'industry' in microeconomics is an aggregate concept but it refers to all firms producing homogenous goods taken together. Macroeconomics uses aggregates which relate to the entire economy or to a large sector of the economy. Aggregate demand covers all market demands.
- Demarcation in areas of study: Theories of value and economic welfare are major areas in microeconomics. Theories of Income and employment are core topics in macroeconomics.

(ii) State Average Fixed Cost. [2]

Answer:

Average fixed cost is obtained by dividing the total fixed cost of the firm by its output.

$$\text{Average Fixed Cost (AFC)} = \frac{\text{Total Fixed Cost (TFC)}}{\text{Output (Q)}}$$

The fixed costs of a firm are, by definition, constant when output is changed. Therefore, the burden of fixed cost per unit of output will continue to fall as output is increased. Thus, with increasing output the average fixed cost will continue to fall.