Paper 10- Cost & Management Accountancy

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

Section A

1. Answer Question No.1 which is compulsory carrying 25 Marks

(a) Answer the following: **[5 x 2 = 10]**

(i) Product Z has a P/V ratio of 28%. Fixed operating costs directly attributable to Product Z during the 2nd Quarter of the financial year will be ₹2,80,000. Calculate the Sales Revenue required to achieve a quarterly profit of ₹ 70,000.

(ii) Following details relating to product X during the month of April are available:
Standard cost per unit of X: Materials: 50kg at ₹40/kg.
Actual production: 100 units. Material Price Variance = ₹9,800 (Adverse)
Actual Materials cost: ₹42/kg. Material Usage variance = ₹4,000 (Favourable)
Calculate the actual quantity of materials used during the month of April.

(iii) The budgeted annual sale of a firm is ₹80 lakhs and 25% of the same is cash sales. If the average amount of debtors of the firm is ₹5 lakhs, what will be the average collection period of credit sales?

(iv) BEEU LTD. operates throughput accounting system. The details of Product-X per unit are as under:

Selling price	**₹50**
Material cost	**₹20**
Conversion cost	**₹15**
Time on Bottleneck resources	**10 minutes**

What would be the return per hour for Product-X?

(v) The following data are given for an industry using batch costing.
Annual consumption of components – 2400 units
Setting up cost per batch – ₹ 100
Manufacturing cost/unit – ₹ 200
Carrying cost/unit – 6% per annum
Calculate the Economic Batch Quantity.

Answer:

(i) Required Sales = Desired Contribution/P/V ratio
= Fixed Cost + Desired Profit/P/V Ratio
= 2,80,000 + 70,000/28%
= ₹12,50,000

(ii) Material Price Variance = AQ × SP – AQ × AP = AQ (SP – AP)
Or 9,800 (A) = AQ × (₹40 – ₹42)
Or – 9,800 = -2 × AQ or AQ = 4,900 kg.

(iii) Credit sale = ₹80 – ₹20 = ₹60 lakhs

Hence, Avg. collection period = Debtors/Credit sales per month

= 5/(60/12) = 5/5 = 1 month.

(iv) Return per hour for Product-X

(Selling price - Material cost) / Time on bottleneck resource

= [(₹ 50 - ₹20)/10] x 60 = ₹180 per hour

(v) 200 units

Econ Batch Quantity = $\sqrt{\frac{2AS}{C}}$

Where,

A = Annual Demand

S = Setting up cost per batch

C = Carrying cost per unit

$= \sqrt{\frac{2 \times 2{,}400 \times 100}{6\% \text{ of } 200}}$

$= \sqrt{40{,}000}$

= 200 units

(b) Match the following **[5 x 1 = 5]**

	Column 'A'		Column 'B'
1.	**P/V ratio**	**A**	**Decision Package**
2.	**Direct Labour efficiency variance**	**B**	**Equivalent Production**
3.	**Zero based budgeting**	**C**	**Total contribution /Total Sales Value *100**
4.	**Contract Costing**	**D**	**Work Certified**
5.	**Process Costing**	**E**	**(Standard hour for actual production minus Actual hours) x Standard Rate**

Answer:

	Column 'A'		Column 'B'
1.	P/V ratio	**C**	Total contribution /Total Sales Value *100
2.	Direct Labour efficiency variance	**E**	(Standard hour for actual production minus Actual hours) x Standard Rate
3.	Zero based budgeting	**A**	Decision Package
4.	Contract Costing	**D**	Work Certified
5.	Process Costing	**B**	Equivalent Production

(c) Discuss the applicability of Cost Audit. **[5]**

Answer:

Applicability for Cost Audit

(a) Every company specified in item (A) of rule 3 shall get its cost records audited in accordance with these rules if the overall annual turnover of the company from all its products and services during the immediately preceding financial year is rupees fifty

crore or more and the aggregate turnover of the individual product or products or service or services for which cost records are required to be maintained under rule 3 is rupees twenty five crore or more.

(b) Every company specified in item (B) of rule 3 shall get its cost records audited in accordance with these rules if the overall annual turnover of the company from all its products and services during the immediately preceding financial year is rupees one hundred crore or more and the aggregate turnover of the individual product or products or service or services for which cost records are required to be maintained under rule 3 is rupees thirty five crore or more.

(c) The requirement for cost audit under these rules shall not apply to a company which is covered in rule 3; and

- whose revenue from exports, in foreign exchange, exceeds seventy five per cent of its total revenue; or
- which is operating from a special economic zone;
- which is engaged in generation of electricity for captive consumption through Captive Generating Plant. For this purpose, the term "Captive Generating Plant" shall have the same meaning as assigned in rule 3 of the Electricity Rules, 2005"

(d) A company sells two types of products, one is Super and the other is Delux. Super contains 5 units of carton. The Super is sold for ₹ 7 per jar and the Delux is sold for ₹ 4 per carton. chemical A and 2 units of chemical B per jar. Delux contains 3 units of each of chemical A and B per

A customer requires at least 150 units of chemical A and at least 120 units of chemical B for his business. How many of each type of the products should the customer purchase to minimize the cost while meeting his requirements?

Formulate LPP model for solving the above problem (do not solve it). [5]

Answer:

LPP formulation:

	Products		Require Units
	Super	Delux	
Chemical A	5	3	150
Chemical B	2	3	120
Cost per unit ₹	7	4	

Let x be the number of litres of Super

y be the number of kilograms of Delux

Z be the cost to customer

Objective function:

$Z \min = 7x + 4y$

Subject to (requirement constraints):

$5x + 3y \geq 150$

$2x + 3y \geq 120$

$x, y \geq 0$ (non-negativity constraint)

Section B

(Cost & Management Accounting – Methods & Techniques and Cost Records and Cost Audit)

Answer any three questions from the following
Each question carries 17 marks

2. (a) Naitik Ltd. provides the following cost data of a product passing through two manufacturing processes: Process A and Process B.

(Amount in ₹)

	Process A	Process B
Input: 8800 units	**9,59,200**	**—**
Material	**46,500**	**93,680**
Labour Cost	**1,45,000**	**95,000**
Electric Power	**48,000**	**32,000**
Normal loss	**5%**	**4%**
Value of scrap per unit	**10**	**12**
Output (units)	**8,300**	**8,000**

Other manufacturing expenses are ₹ 1,68,000 to be charged on the basis of labour cost. You are required to prepare the Process Accounts, Abnormal Loss Account and Abnormal Gain Account. [4+4+4]

Answer:

Process A Account

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
Input	8800	959200	Normal Loss A/C (5% of 8800)	440	4400
Material		46500	Abnormal Loss A/C (WN 2)	60	9300
Labour cost		145000	Process B A/C (@ ₹155 pu)	8300	1286500
Electric Power		48000			
Other manufacturing Expenses (WN 1)		101500			
	8800	1300200		8800	1300200

Process B Account

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
Input	8300	1286500	Normal Loss A/C (4% of 8300)	332	3984
Material		93680			
Labour cost		95000	Finished Stock A/C (@ ₹197pu)	8000	1576000
Electric Power		32000			
Other manufacturing Expenses (WN 1)		66500			
Abnormal Gain A/C (WN 3)	32	6304			
	8332	1579984		8332	1579984

Abnormal Loss Account

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
Process A A/c	60	9,300	Bank A/c	60	600
			P/L A/c		8700
	60	9,300		60	9300

Abnormal Gain Account

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
Normal Loss A/c	32	384	Process B A/c	32	6,304
P/L A/c		5,920			
	32	6,304		32	6,304

WN 1: Other Manufacturing Expenses charged as % of Labour Cost
= 16800 ×100/(145000 + 95000) = 70%

WN 2: Cost per unit = (1300200 - 4400)/ (8800 - 440) = ₹155
Value of Abnormal Loss = 155 × 60 = ₹9300

WN 3: Cost per unit = (1573680 - 3984)/ (8300 - 332) = ₹197
Value of Abnormal Gain = 197 × 32 = ₹ 6304

(b) List out the limitation of Inter-firm Comparison. [5]

Answer:

Limitations of Inter-firm Comparison: The practical difficulties that are likely to arise in the implementation of a scheme of inter-firm comparison are:

- The top management may not be convinced of the utility of inter-firm comparison.
- Reluctance to disclose data which a concern considers to be confidential.
- A sense of complacence on the part of the management who may be satisfied with the present level of profits.
- Absence of a proper system of Cost Accounting so that the costing figures supplied may not be relied upon for comparison purposes.
- Non-availability of a suitable base for comparison

3. (a) VIBRANT LTD. a manufacturing Company, produces one main Product A and two by-products M and N.

For the month of May, 2016, following details are available:

Total Cost upto separation point ₹2,20,000.

Product/By-Product	A	M	N
Cost after separation		**₹ 35,000**	**₹ 24,000**
No. of units produced	**4,000**	**1,800**	**3,000**
Selling price per unit	**₹100**	**₹40**	**?30**
Estimated net profit as percentage to sales value		**20%**	**30%**
Estimated selling expenses as percentage to sales value	**20%**	**15%**	**15%**

There is no beginning or closing inventories.

Required:

Prepare statement showing:

(i) Allocation of joint cost; and

(ii) Product wise and overall profitability of the company for May, 2016. [5+5=10]

Answer:

VIBRANT LTD.

Apportionment of Joint costs at the point of separation:

Total cost upto point of separation					₹2,20,000
By product			M	N	
Less: Cost of by-products by working backward					
Sales realization	M ₹	N ₹	72000	90000	
Less: Net Profit [20% and 30% of sales]	14,400	27,000			
Less: Selling expenses (15% of sales)	10,800	13,500			
Less: Cost after separation	35,000	24,000	60,200	64,500	
Joint expenses			11,800	25,500	37,300
Joint cost of Product-A					1,82,700

Profit & Loss Statement for May 2015

Particular	A	M	N	Total
No. of Units produced:	4,000	1,800	3,000	
	₹	₹	₹	
Sales (A)	4,00,000	72,000	90,000	5,62,000
Cost of Sales:				
Pre-separation cost	1,82,700	11,800	25,500	2,20,000
Post-separation cost	-	35,000	24,000	59,000
Cost of production	1,82,700	46,800	49,500	2,79,000
Selling expenses	80,000	10,800	13,500	1,04,300
Cost of Sales(B)	2,62,700	57,600	63,000	3,83,300
Profit (A- B)	1,37,300	14,400	27,000	1,78,700
Profit as a % Sales	34.32%	20%	30%	31.80%

(b) A contractor has undertaken a construction work at a price of ₹ 5,00,000 and begun the execution of work on 1st January, 2016. The following are the particulars of the contract up to 31st December, 2016.

Particulars	Amount ₹	Particulars	Amount ₹
Machinery	**30,000**	**overheads**	**8,252**
Materials	**1,70,698**	**Materials returned**	**1,098**
Wages	**1,48,750**	**Work certified**	**3,90,000**
direct expenses	**6,334**	**Cash received**	**3,60,000**
Uncertified work	**9,000**	**Materials on 31.12.2015**	**3,766**
Wages outstanding	**5,380**		
Value of plant on 31.12.16	**22,000**		

It was decided that the profit made on the contract in the year should be arrived at by deducting the cost of work certified from the total value of the architects certificate, that

1/3 of the profit so arrived at should be regarded as a provision against contingencies and that such provision should be increased by taking to the credit of Profit and Loss Account only such portion of the 2/3rd profit, as the cash received to the work certified. [7]

Answer:

Dr. Contract Account Cr.

Particulars	Amount ₹	Particulars		Amount ₹
To, Machinery A/c To,	30,000	By, Plant & Machinery A/c		22,000
Materials A/c	1,70,698	By, Materials returned A/c		1,098
To, Wages incl. outstanding	1,54,130	By, Materials on hand A/c		3,766
A/c	6,334	By, W.I.P A/c		
To, direct Expenses A/c	8,252	Work certified	3,90,000	
To, overheads A/c	34,738	Work uncertified	9,000	3,99,000
To, P & L A/c	21,712			
	4,25,864			4,25,864

4. (a) A factory is currently working to 40% capacity and produces 10,000 units. At 50% the selling price falls by 3%. At 90% capacity the selling price falls by 5% accompanied by similar fall in prices of raw material. Estimate the profit of the company at 50% and 90% capacity production.

The cost at present per unit is:

Material ₹ 10

Labour ₹ 3

Overheads ₹ 5(60% fixed)

The selling price per unit is ₹ 20/- per unit. [10]

Answer:

Statement Showing Computation of Profit at 50% and 90% Capacity as well as at Current Capacity:

	Particulars	40%		50%		90%	
			₹		₹		₹
		Unit	Total	Unit	Total	Unit	Total
I.	Selling price	20.00	2,00,000	19.40	2,42,500	19.00	4,27,500
II.	Variable cost						
	Material	10.00	1,00,000	10.00	1,25,000	9.50	2,13,750
	Labour	3.00	30,000	3.00	37,500	3.00	67,500
	Variable OH	2.00	20,000	2.00	25,000	2.00	45,000
		15.00	1,50,000	15.00	1,87,500	14.50	3,26,250
III.	Contribution	5.00	50,000	4.40	55,000	4.50	1,01,250
IV.	Fixed cost	3.00	30,000		30,000		30,000
V.	Profit		20,000		25,000		71,250
VI.	B.E. sales (F x S/ C)		1,20,000		1,32,273		1,26,667

(b) Modern Co produces 3 products, A, B and C, details of which are shown below:

	A	B	C
Selling price per unit (₹)	**120**	**110**	**130**
Direct material cost per unit (₹)	**60**	**70**	**85**
Variable overhead (₹)	**30**	**20**	**15**
Maximum demand (units)	**30,000**	**25,000**	**40,000**
Time required on the bottleneck resource (hours per unit)	**5**	**4**	**3**

There are 3,20,000 bottleneck hours available each month.

Required:

Calculate the optimum product mix based on the throughput concept. **[7]**

Answer:

Particulars	A	**B**	**C**
Selling price per unit (`)	120	110	130
Direct material cost per unit (`)	60	70	85
Throughput per unit (`)	60	40	45
Time required on the bottleneck resource (hours per unit)	5	4	3
Return per factory hour (`)	12	10	15
Ranking	2	3	1
Total Available hours		= 3,20,000	

(-) Hours used for C (40,000 x 3) = 1,20,000
(-) Hours used for A (30,000 x 5) = 1,50,000 = 2,70,000
Balance hours available for B = 50,000
No. of units that can be made in balance hours = 50,000 / 4 = 12,500 units.
Statement showing optimum mix:

	A	B	C
No. of units	30,000	12,500	40,000

5. (a) The standard labour complement and the actual labour complement engaged in a week for a job are as under:

	Skilled workers	**Semi-skilled workers**	**Unskilled workers**
a. **Standard no. of workers in the gang**	**32**	**12**	**6**
b. **Standard wage rate per hour (₹)**	**3**	**2**	**1**
c. **Actual no. of workers employed in the gang during the week**	**28**	**18**	**4**
d. **Actual wage rate per hour (₹)**	**4**	**3**	**2**

During the 40 hour working week the gang produced 1,800 standard labour hours of work. Calculate

1. **Labour Efficiency Variance**
2. **Mix Variance**
3. **Rate of Wages Variance**
4. **Labour Cost Variance** **[8]**

Answer:

Analysis of Given Data

	Standard Data			**Actual Data**		
	Hours	**Rate (₹)**	**Value (₹)**	**Hours**	**Rate (₹)**	**Value (₹)**
Skilled	1,280	3	3,840	1,120	4	4,480
Semi skilled	480	2	960	720	3	2,160
unskilled	240	1	240	160	2	320
	2,000		5,040	2,000		6,960

Computation of Required Values

	SRSH (1) (₹)	SRRSH (2) (₹)	SRAH (3) (₹)	ARAH (4) (₹)
Men	3 x 1,152 = 3,456	3,840	3 x 1,120 = 3,360	4,480
Women	2 x 432 = 864	960	2 x 720 = 1,440	2,160
Boys	1 x 216 = 216	240	1 x 160 = 160	320
	4,536	5040	4,960	6,960

Computation of SH

SH = (SH for that worker / SH for all the worker) x AQ for that worker
For Skilled worker = (1,280 /2,000) × 1,800 = 1,152

For Semiskilled worker = (480 /2,000) × 1,800 = 432
For unskilled worker = (240 /2,000) × 1,800 = 216

Where
(1) SRSH = Standard Cost of Standard Labour = ₹ 4,536
(2) SRRSH = Revised Standard Cost of Labour = ₹ 5,040
(3) SRAH = Standard Cost of Actual Labour = ₹ 4,960
(4) ARAH = Actual Cost of Labour = ₹ 6,960

Computation of Labour Variances:
a. Labour Sub-efficiency Variance = (1) – (2) = ₹ 504 (A) [₹(4,536 – 5,040)]
b. Labour Mix or gang Variance = (2) – (3) = ₹80 (F) [₹(5,040 – 4,960)]
c. Labour efficiency Variance = (1) – (3) = ₹424 (A) [₹(4,536 – 4,960)]
d. Labour Rate Variance = (3) – (4) = ₹2,000 (A) [₹(4,960 – 6,960)]
e. Labour Cost Variance = (1) – (4) = ₹2,424 (A) [₹(4,536 – 6,960)]

(b) CT Ltd. Provides you the following information:

Production capacity	Costs and sales At 80%	(₹ Lakhs) At 60%
Direct Material	**2.00**	**1.50**
Direct Labour	**2.00**	**1.50**
Direct Expenses	**1.60**	**1.20**
Production overheads	**4.00**	**3.85**
Administrative overheads	**4.00**	**3.80**
Selling & Distribution overheads	**4.00**	**3.75**
Sales	**20.00**	**15.00**

Required: Draw up a Flexible Budget at 90% capacity. **[9]**

Answer:

Working Notes:

STATEMENT SHOWING THE CALCULATION OF FIXED AND VARIABLE EXPENSES

A Particulars	B Variable Costs at 20%	C =B × 80/20 Variable Costs at 80%	D = Total Cost at 80%	E = D-C Fixed Cost
Direct Material	0.50	2.00	2.00	Nil
Direct Labour	0.50	2.00	2.00	Nil
Direct Expenses	0.40	1.60	1.60	Nil
Prod. Overheads	0.15	0.60	4.00	3.40

Admin. Overheads	0.20	0.80	4.00	3.20
Selling &Distribution Overheads	0.25	1.00	4.00	3.00
Total	2.00	8.00	17.60	9 60

Flexible Budget (in lakhs of Rupees)

Particulars		Capacity Level		
		60%	80%	90%
A.	Sales	15.00	20.00	22.50
B.	Variable cost of sales:			
	Direct Material	1.50	2.00	2.25
	Direct Labour	1.50	2.00	2.25
	Direct Expenses	1.20	1.60	1.80
	Prod. Overheads	0.45	0.60	0.675
	Admin. Overheads	0.60	0.80	0.9000
	Selling& Distribution Overheads	0.75	1.00	1.125
		6.00	8.00	9.00
C.	Contribution (A – B)	9.00	12.00	13.50
D.	Fixed costs:			
	Prod. Overheads	3.40	3.40	3.40
	Admin Overheads	3.20	3.20	3.20
	Selling & Distribution Overheads	3.00	3.00	3.00
		9.60	9.60	9.60
E.	Profit (C – D)	(0.60)	2.40	3.90

6. (a) (i) Who can be appointed as a Cost Auditor? [3]

(ii) Under what circumstances will the appointment of Cost Auditor for Conducting Cost Audit be made in firm's name?

Who will authenticate such report and how? [4+2=6]

Answer:

(i) Only a Cost Accountant, as defined under section 2(28) of the companies Act, 2013, can be appointed as a cost auditor.

Clause (b) of sub-section (1) of section 2 of the Cost and Works Accounts Act.1959 defines "Cost Account". It means a Cost Account who holds a valid certificate of practice under sub-section (1) of section 6 of the Cost and Works Accountants Act, 1959 and is in whole-time practice. Cost Accountant includes a Firm of Cost Accountants and a LLP of cost accountants.

(ii) Appointment of cost Auditor under a firm's name will be subject to the following conditions: -

(a) All the partners of the firm are full time Cost Accounting Practitioners within the Meaning of Sec 6 and Sec 7 of the Cost and Works Accountants Act,1959

(b) The firm must have constituted with the previous Approval of central Government or of the Central Council of ICWAI as per amended regulation 113 of the Cost and Works Accountants Act, 1959.

The cost audit report shall be signed by any one Partner of the firm responsible for the conduct in his own hand for and on behalf of the firm. In any case the report should not be signed by merely offering the firm's name.

(b) The Companies Act, 2013 has introduced provision regarding rotation of auditors. Is the provision of rotation of auditors applicable to cost auditors also? [8]

Answer:

The provisions for maintenance of cost accounting records and cost audit are governed by Section 148 of the Companies Act, 2013. The provisions of Section 148 clearly states that no person appointed under Section 139 as an auditor of the company shall be appointed for conducting audit of cost records of the company. Section 148 also provides that qualifications, disqualifications, rights, duties and obligations applicable to auditors (financial) shall apply to a cost auditor appointed under this section. The eligibility, qualifications and disqualifications are provided in Section 141 of the Act and powers and duties are provided in Section 143. Section 143(14) specifically states that the provisions of Section 143 shall mutatis mutandis apply to a cost auditor appointed under Section 148. There are no other provisions governing the appointment of a cost auditor. Section 139(3) of the Act, applicable to appointment of auditors (financial), and Rule 6 of Companies (Audit and Auditors) Rules, 2014 deals with the provision of rotation of auditors and these provisions are applicable only to appointment of auditors (financial). The Act does not provide for rotation in case of appointment of cost auditors and the same is not applicable to a cost auditor. It may, however, be noted that though there is no statutory provision for rotation of cost auditors, individual companies may do so as a part of their policy, as is the practice with Public Sector Undertakings.

Section C

(Economics for managerial decision making)
Answer any two from the following
Each question carries 12 marks

7. (a) What are the objectives of Fiscal Policy in India? [5]

Answer:

Objective of Fiscal Policy in India:

Fiscal policy or budgetary policy in India is designed to achieve the following objectives:

i. To achieve rapid economic development,

ii. To reduce concentration of income and wealth so as to create socialistic pattern of society.

iii. To achieve plan targets of growth and employment

iv. To reduce regional imbalances by providing incentive for backward area location of industries, and

v. To modify industrial structure according to plan frame work by encouraging/discouraging investments in certain industries.

(b) Write a brief note on the "intervention of Government in Indian economy'. [2]

Answer:

The intervention of Government in India economy can be analyzed under the following broad heads:

i. Government as a regulator of business. Various acts have been passed to achieve the different objectives of the economy, like say Income Tax Act, SEBI, Essential Commodities Act, etc.,
ii. Government as a promoter of business by setting up appropriate Financial institutions, sound banking system NABARD, IDBI, etc.,

iii. Government as an Economic Planner thru' a process of Planned Development, Review System= 0m and Evaluation Plans.
iv. Government as an Entrepreneur by setting Public Sector Undertakings, Public Utility Services, Nationalised Banks,
v. Departmental Undertakings like Railway, ICF, BHEL, NLC etc., etc.,

(c) What are the different methods of demand forecasting? [5]

Answer:

Demand forecasting method can be broadly categorized into two types:

(i) Opinion Survey Methods or Qualitative Techniques. The methods adopted are based on subjective assessment
(ii) Statistical methods or Quantitative Techniques.

The Opinion Survey Methods can further be classified into 3 types, viz.,

- 100% Enumerator Survey, the most direct method of forecasting demands in the short run.
- Delphi Method, a group process and aims at achieving consensus of members, who are experts in the field of marketing research and demand forecasting.
- Sales force opinion Survey or collective opinion of the salesmen regarding expected sales in their territories.

The Statistical Methods can further be classified as

- Simple Average Method
- Moving Average Method
- Weighted Moving Average
- Time Series and
- Linear Trend.

8. (a) Given below are the figures of milk demand for last seven years:

Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Milk Demand (in lakh liters)	**830**	**920**	**1020**	**1130**	**1060**	**1240**	**1410**

You are required to determine the trend values by using least square method and estimate the demand of milk for the year 2017. [8]

Answer:

Calculation of trend values by Least Squares Method

Year (T)	**Sales (Y)**	**Time Deviation X = (T-2012)/I**	**XY**	**X^2**	**Trend Values Yc = a + b X (In Litres)**
2009	830	-3	-2490	9	827.85
2010	920	-2	-1840	4	914.28
2011	1020	-1	-1020	1	1000.71
2012	1130	0	0	0	1087.14
2013	1060	1	1060	1	1173.57

2014	1240	2	2480	4	1260
2015	1410	3	4230	9	1346.43
N = 7	∑Y = 7610	∑X = 0	∑XY = 2420	$\sum X^2$=28	

Trend Values Yc = a + b X

Where,

Normal Eqn 1: ∑Y = Na + b* ∑X

7610 = 7*a + 0

a = 7610/7 = 1087.14

Normal Eqn 2: $\sum XY = a^* \sum X + b^* \sum X^2$

2420 = 0 + 28b

b = 2420/28 = 86.43

Trend Values Yc = 1087.14 + 86.43 *X

FOR 2009 TO 2015 (shown in table)

For 2017

X = 2017-2012 = 5

Estimated Demand = 1087.14 + 5 *86.43 = 1519.29 (Litres)

(b) Briefly explain the 'Penetration Price Policy'. [4]

Answer:

Penetration Price Policy: Instead of setting a high price, the firm may set a low price for a new product by adding a low mark-up to the full cost. This is done to penetrate the market as quickly as possible. The assumptions behind the low penetration pricing policy are:

- The new product is being introduced in a market which is already served by well-known brands. A low price is necessary to attract gradually consumers who are already accustomed to other brands.
- The low price would help to maximize the sales of the product even in the short period.
- The low price is set in the market to prevent the entry of new products.

9. (a) What are the differences between ISO-quant curve and indifference curve? [4]

Answer:

Differences between ISO-quant curve and indifference curve.

- Indifference curve refers to two commodities. ISO-quant curve relates to combination of two factors of production.
- Indifference curve indicates level of satisfaction; ISO-quant curve indicates quantity of output.
- No numerical measurement of satisfaction is possible; so it cannot be labeled. ISO-quant curve can easily be labeled as physical units of output are measurable.
- The extent of difference of satisfaction is not quantifiable in the indifference map. But in ISO-quant map we can measure exact difference between quantities represented by one curve and another.

(b) The total cost function of Krish Ltd. is $C = x^3/3 - 5x^2 + 27x + 10$, where C is the total cost (₹) and x is the output in units. A tax @ ₹ 3 per unit of output is imposed and producer adds it to his cost. The demand function is given by P = 2055 - 5X, where P (₹) is the price per unit of output. Find the profit maximizing output and the price at that level of output. [4]

Answer:

Given $C = X^3/3 - 5X^2 + 27X + 10 + 3X$ [Tax @ ₹3 per unit of output is added]

$P = 2055 - 5X$

Revenue (R)= $XP = -2055X - 5X^2$

Profit = $R - C = 2055X - 5X^2 - (X^3/3 - 5X^2 + 27X + 10 + 3X)$

$= 2055X - 5X^2 - X^3/3 + 5X^2 - 27X - 10 - 3X$

$= -X^3/3^* + 2025X - 10$

$d(\text{Profit})/dX = -3X^2/3 + 2025 = 0$ [at maximization first derivative = 0]

$X^2 = 2025$

$X = 45$

d Profit)/dX = -2x [first order derivative = 0 and second order derivative is negative; conditions satisfied for maximization]

Maximum profit occurs at X = 45 (units)

Price (₹) = 2055 - 5*45 = 1830

(c) Z Ltd. Sells output in a perfectly competitive market. The average variable cost function is (₹) AVC = 300 - 40Q + 2Q2 where, Q is the quantity in units.

Z Ltd. has an obligation to pay ₹ 500 irrespective of the output produced. What is the price below which Z Ltd. has to shut down its operation in the short run? [4]

Answer:

The firm will shut down in the short run if Price falls below minimum average variable cost.

$AVC = 300 - 40Q + 2Q^2$

AVC is minimum where $d(AVC)/dQ = 0$ and $d^2(AVC)/dQ^2 > 0$

Or, $-40 + 4Q = 0$ [and it is seen that $d^2(AVC)/dQ^2 = 4 > 0$]

Or, Q = 10 Hence, minimum AVC = 300 - 40*10 + 2*100

= 100(₹)

Thus if Price falls below ₹ 100 the firm has to shut down in short run.