BBS 1st Year Micro-Economics

Probable question 2082

UNIT 1: Introduction

Short Questions:

1. Define microeconomics and differentiate it from macroeconomics.
2. State the scope and limitations of microeconomics.
3. What is opportunity cost? Give examples.

Long Questions:

1. Explain the central problems of an economy (what, how, and for whom to produce).
2. Discuss the importance and limitations of microeconomics.

UNIT 2: Market Equilibrium and Efficiency

Short Questions:

1. What is market equilibrium?
2. Define consumer surplus and producer surplus.
3. State the law of supply and law of demand.

Long Questions:

1. Explain how market equilibrium is determined with the help of a diagram.
2. What is economic efficiency? Discuss types of efficiency.

UNIT 3: Elasticity of Demand and Supply

Short Questions:

1. Define price elasticity of demand.
2. Differentiate between income elasticity and cross elasticity.
3. What are the factors affecting elasticity of demand?

Long Questions:

1. Explain the methods of measuring price elasticity of demand.
2. Explain the concept of elasticity of supply and its determinants.

UNIT 4: Analysis of Consumer Behavior

Short Questions:

1. What is the law of diminishing marginal utility?
2. Define indifference curve and its properties.
3. Differentiate between cardinal and ordinal utility approach.

Long Questions:

1. Explain consumer equilibrium using the indifference curve and budget line approach.
2. State and explain the law of equi-marginal utility.

UNIT 5: Theory of Production

Short Questions:

1. What is the law of variable proportion?
2. Define returns to scale.
3. Distinguish between short run and long run production function.

Long Questions:

1. Explain the law of variable proportion with the help of a diagram.
2. Explain Cobb-Douglas production function and its properties.

UNIT 6: Cost and Revenue Curves

Short Questions:

1. Define fixed cost and variable cost.
2. What is marginal cost?
3. Define average revenue and marginal revenue.

Long Questions:

1. Derive the relationship between short run cost curves with diagram.

2. Explain the relationship between AR and MR curves.

UNIT 7: Product Pricing Theories and Practices

Short Questions:

1. Define perfect competition.
2. What is monopoly? Give two features.
3. Distinguish between monopolistic and oligopoly market.

Long Questions:

1. Explain price and output determination under perfect competition.
2. Explain short run and long run equilibrium under monopoly.

UNIT 8: Theory of Factor Pricing

Short Questions:

1. What is marginal productivity theory?
2. Differentiate between wage and rent.
3. What is quasi rent?

Long Questions:

1. Explain Ricardian theory of rent.
2. Discuss the marginal productivity theory of factor pricing.

2081 Model Question Solutions

1. Business economics is normative in character. Why?

English:
Business economics is normative because it deals with "what ought to be" rather than "what is." It provides suggestions, guidelines, and policies for achieving business objectives, not just an analysis of facts.

Nepali:
व्यावसायिक अर्थशास्त्र आदर्शात्मक (normative) हुन्छ किनभने यसले "के हुनुपर्छ" भन्ने कुरा बताउँछ, "के भएको छ" भन्ने मात्र होइन। यसले व्यवसायिक लक्ष्य प्राप्त गर्नका लागि सल्लाह, नीतिहरू र सुझावहरू दिन्छ।

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2. How is the price elasticity of supply computed by the arc method?

The arc elasticity of supply is computed as:

$$E_s = \frac{\Delta Q_s}{\Delta P} \times \frac{P_1 + P_2}{Q_1 + Q_2}$$

Where Q_1, Q_2 are initial and new quantity supplied, and P_1, P_2 are initial and new prices.

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3. Write any two examples of explicit costs.

English:

1. Wages and salaries paid to employees.
2. Rent paid for land or building.

Nepali:

1. कर्मचारीलाई तलब र ज्याला।
2. जग्गा वा भवनको भाडा।

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4. How is economies of scope measured?

Economies of scope is measured by:

$$S = \frac{C(Q_1) + C(Q_2) - C(Q_1 + Q_2)}{C(Q_1 + Q_2)}$$

If $S > 0$, there is economies of scope (cost saving by producing jointly).

5. Write any four assumptions of indifference curve.

English:

1. Consumer is rational.
2. Preferences are complete and transitive.
3. More is preferred to less.
4. Indifference curves are convex to the origin.

Nepali:

1. उपभोक्ता तार्किक हुन्छ।
2. प्राथमिकताहरू पूर्ण र स्थानान्तरणीय हुन्छन्।
3. बढी कमभन्दा राम्रो मानिन्छ।
4. उदासीनता वक्र मूल बिन्दुप्रति अवतल हुन्छ।

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6. Numerical: Compute VMPLVMP_LVMPL at P=Rs.10P = Rs. 10P=Rs.10 and L=5L = 5L=5.

Given:

Given:

$$Q = 14L + 7L^2 - L^3$$

Step 1: Find marginal product of labor (MP_L)

$$MP_L = \frac{dQ}{dL} = 14 + 14L - 3L^2$$

Step 2: Put $L = 5$

$$MP_L = 14 + 14(5) - 3(5)^2 = 14 + 70 - 75 = 9$$

Step 3: Value of marginal product (VMP_L)

$$VMP_L = P \times MP_L = 10 \times 9 = Rs.90$$

1. Price Elasticity of Demand (E_p)

- Other things remaining the same, price elasticity of demand is the ratio of the percentage change in the demand for a commodity with the percentage change in price of the same commodity.

Mathematically, it can be expressed as:

$$\text{Price elasticity of demand} = \frac{\%\text{ change in quantity demand}}{\%\text{ change in price}}$$

Symbolically, it can be expressed as:

$$E_p = \frac{\Delta q}{\Delta p} \times \frac{p}{q}$$

where,

E_p = Price elasticity of demand

q = Original quantity demanded

Δq = change in quantity demanded

p = Original price

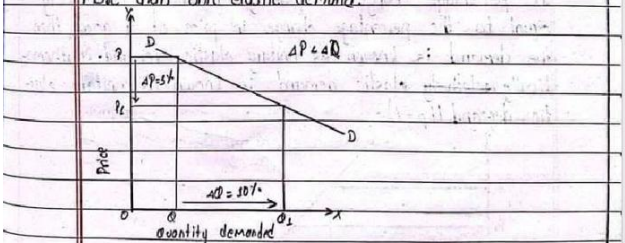
Δp = Change in price

Types of Price Elasticity of Demand

1. Relatively Elastic Demand ($E_p > 1$)
2. Relatively Inelastic Demand ($E_p < 1$)
3. Unitary Elastic Demand ($E_p = 1$)
4. Perfectly Elastic Demand ($E_p = \infty$)
5. Perfectly Inelastic Demand ($E_p = 0$)

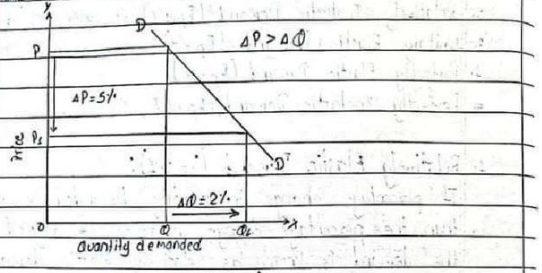
1. Relatively Elastic Demand ($E_p > 1$):

If percentage change in quantity demanded is greater than the percentage change in price of a good, then the demand is known as relatively elastic demand. Mathematically, relatively elastic demand is known as more than unit elastic demand.



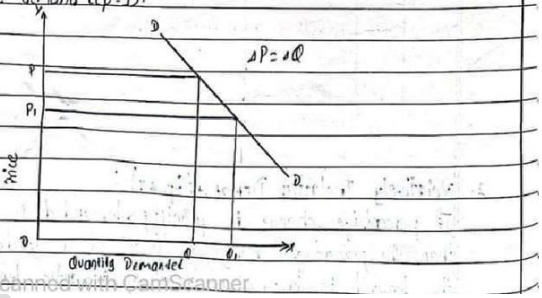
2. Relatively Inelastic Demand ($E_p < 1$):

If percentage change in quantity demanded is less than the percentage change in price of a goods, then the demand is known as relatively inelastic demand. Mathematically, relatively inelastic demand is known as less than unit elastic demand ($E_p < 1$).



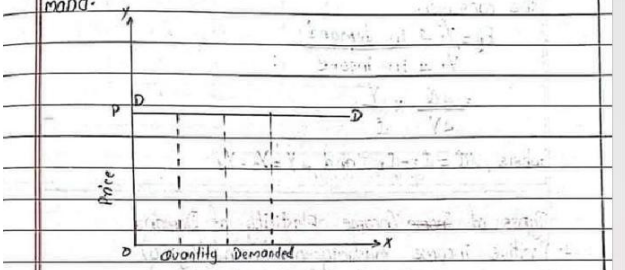
3. Unitary Elastic Demand ($E_p = 1$):

If percentage change in quantity demanded is exactly equal to the percentage change in price of a good, then the demand is known as unitary elastic demand. Mathematically, relatively elastic demand is known as unitary elastic demand ($E_p = 1$).



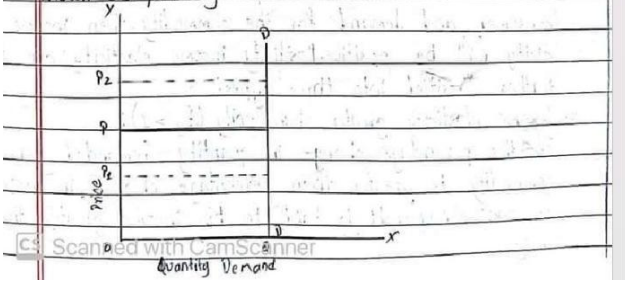
4. Perfectly Elastic Demand ($E_p = \infty$):

If a very small change in price of a goods leads an infinitive change in quantity demanded for that goods, then the demand is known as perfectly elastic demand.



5. Perfectly Inelastic Demand ($E_p = 0$):

If the quantity demanded is totally irresponsive to the change in the price of a goods, then the demand is known as perfectly inelastic demand.



Income Elasticity of Demand

Other things remaining the same, income elasticity of demand is the ratio of the percentage change in the demand for a commodity with the percentage change in income of the consumer.

$$E_y = \frac{\%\ \Delta \text{ in demand}}{\%\ \Delta \text{ in income}}$$

$$= \frac{\Delta Q}{\Delta Y} \times \frac{Y}{Q}$$

where, $\Delta Q = Q_2 - Q_1$ and $\Delta Y = Y_2 - Y_1$

Types of ~~Income~~ Income Elasticity of Demand

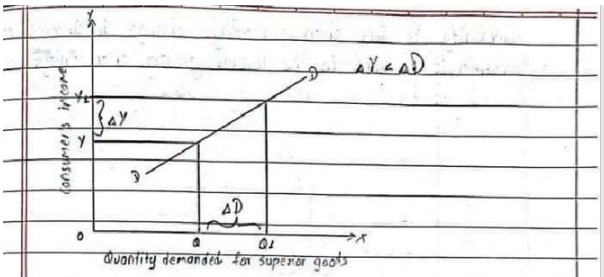
1. Positive income elasticity of demand ($E_y > 0$)
2. Zero income elasticity of demand ($E_y = 0$)
3. Negative income elasticity of demand ($E_y < 0$).

1. Positive Income Elasticity of Demand ($E_y > 0$):

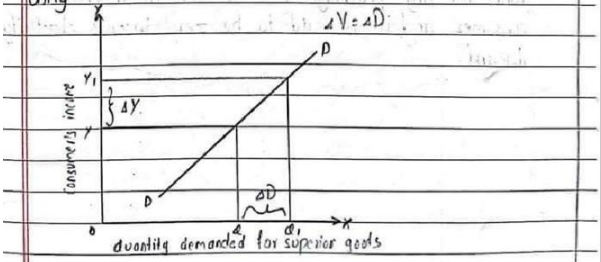
If there is direct relationship between income of the consumer and demand for the commodity, then income elasticity will be positive. Positivity income elasticity can be further classified into three types:

a. Income elasticity greater than unity ($E_y > 1$):

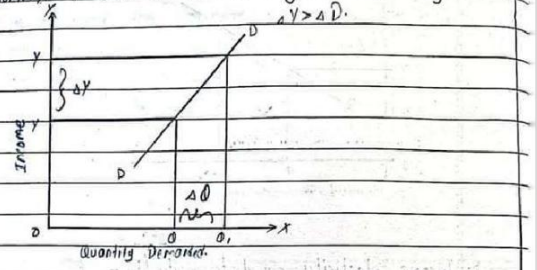
If the percentage change in quantity demanded for a commodity is greater than percentage change in income of the consumer, it is said to be income greater than unity.



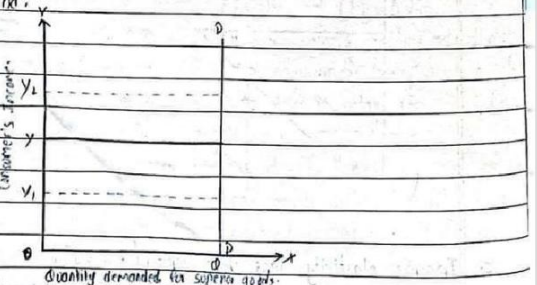
b. Income elasticity equal to unity ($E_y = 1$):
If the percentage change in quantity demanded for a commodity is equal to percentage change in income of the consumer, it is said to be income elasticity equal to unity.



c. Income elasticity less than unity ($E_y < 1$):
If the percentage change in quantity demanded for a commodity is less than percentage change in income of the consumer, it is said to be Income greater than unity.



2. Zero Income Elasticity of Demand ($E_y = 0$):
If the quantity demanded for a commodity remains constant with any percentage rise or fall in income of the consumer and, it is said to be zero income elasticity of demand.



Price and Output Determination Under Perfect Competition

1. Price and output determination under perfect competition in the short-run (Short-run equilibrium)

Short run is the period in which market supply cannot adjusted according to the change in market demand. It is because of lack of sufficient time to change all inputs. The short-run equilibrium of a firm under perfect competition requires:

i) Market demand should be equal to market supply.
ii) MR = MC
iii) MC must intersect MR from below.

# If AR > AC = Excess profit
AR = AC = Normal profit
AR < AC = loss

The determination of equilibrium price and output in the short-run under perfect competition can be explained by the help of following diagram:-

The above fig(I) shows equilibrium of the Industry. The demand curve DD and supply curve SS are intersecting each other at point E. The point E is the equilibrium point. Hence, equilibrium price is OP and equilibrium output is OQ. All firms under the industry have to accept price determined by the industry.

- Excess profit:

In fig(II), the firm is equilibrium at point E_1 because at this point MC is intersecting MR from below. Hence, OQ is the equilibrium output determined by the firm. At the market price OP and output OQ, the firm is making excess or abnormal or super normal profit equal to the shaded area AEP_1C.

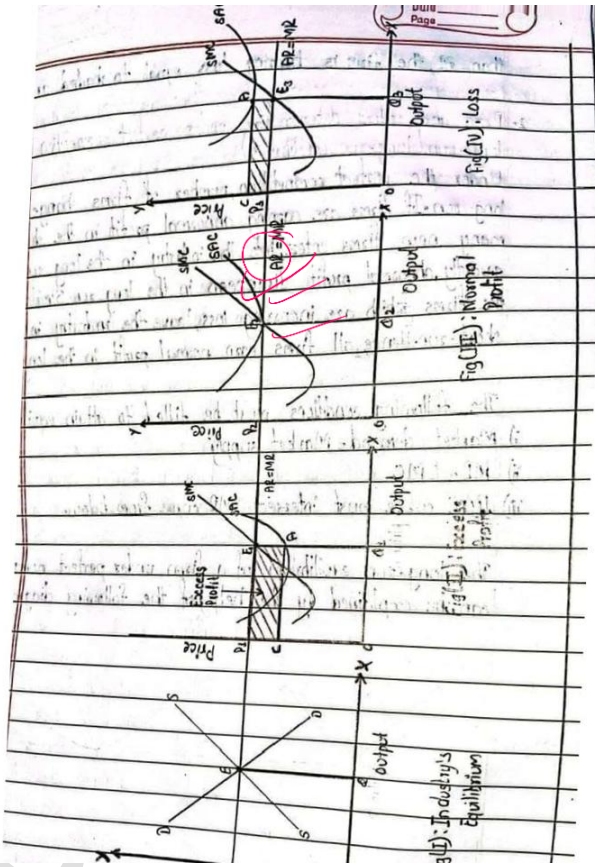
$\therefore AR > AC \Rightarrow$ Excess profit.

- Normal Profit:

In fig(III), E_2 is the equilibrium point. At point E_2, AR and AC are equal. Therefore, the firm is making normal profit.

- loss:

In figure (IV), E_3 is equilibrium point. Since AC is greater



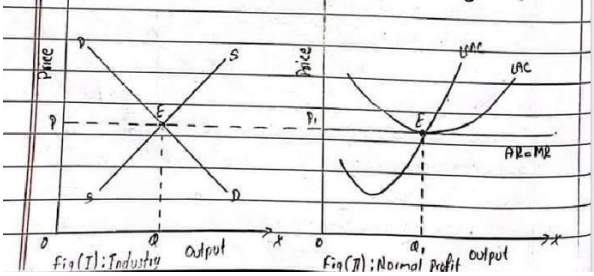
2. Price and output determination under perfect competition in the long-run (long-run equilibrium)

Under the perfect competition, number of firms change in the long run. If firms are earning abnormal profit in the short-run, many new firms enter into the industry in the long run. Consequently, abnormal profit disappears in the long run. Similarly, all the firms which are incurring loss, leave the industry in the short-run. Hence, all firms earn normal profit in the long-run.

The following conditions must be filled to attain equilibrium:

i) Market demand = Market supply
ii) MR = LMC
iii) LMC curve must intersect MR curve from below.

The long-run equilibrium of a firm under perfect competition can be explained by the help of the following diagram:-



The above fig(I) shows equilibrium of the industry or determination of equilibrium market price. The demand curve DD and supply curve SS are intersecting each other at point E. Hence, equilibrium market price and output are OP and OQ respectively. All the firms under the industry have to accept price determined by the industry.

The above fig(II) shows equilibrium of the firm. The point E is the equilibrium point because at this point LMC and MR are equal and LMC intersecting MR from below. Hence at price OP, the firm is earning normal profit.

Monopoly

Monopoly is the market structure where there is single seller of a product having no close substitutes. A fundamental cause of monopoly is barriers to entry. Monopoly is also called a 'Cartel'.

Characteristics of Monopoly

1. Single seller
2. No close substitutes
3. Barriers to entry
4. Firm and industry
5. Independent price policy
6. Price discrimination
7. Profit maximization

Price and Output Determination under Monopoly

1. Price and output determination under monopoly in the short-run (Short-run equilibrium)

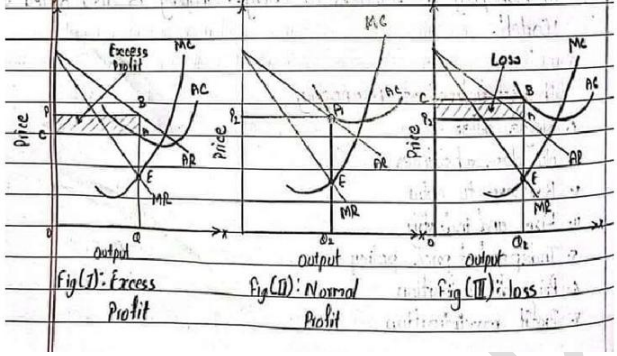
Short-run refers to the period in which time is so short that a monopolist cannot change fixed factors like machinery, plant, etc. Monopolist can increase output in response to increase in demand by changing variable factors.

The short-run equilibrium of monopolist requires:

i) MC = MR

ii) MC curve must intersect MR curve from below.

At equilibrium, the monopoly firm may earn earn excess profit or normal profit or even bear loss in the short-run. The short run equilibrium under monopoly is described in the figure:



Fig(I): Excess Profit Fig(II): Normal Profit Fig(III): loss

- Excess profit:

In figure(I) at equilibrium, the monopolist is producing OQ units of output at per unit cost OC and selling it at OP. In this case, the monopolist is earning excess profit in the short-run as equilibrium price OP is greater than average cost OC i.e $P > AC$. The firm's excess profit is shown by the shaded area ABPC.

- Normal Profit:

In fig(II), at equilibrium, monopolist is producing OQ_2 units of output at per unit cost OC and selling it at price OP_2. In this case, a monopolist earns just normal profit in the short-run, as equilibrium price OP_2 is equal to average cost AQ_2. It is shown by the tangency of AC curve and AR curve at point A. Therefore, in the short-run the firm is earning just normal profit.

- loss:

In fig(III), at equilibrium, the monopolist is producing OQ_2 unit of output at per unit cost OC and selling it at price OP_2. In this case, the monopolist is incurring loss in the short-run, as equilibrium price OP_2 is less than average cost OC. Thus, monopolist is incurring loss equivalent to the shaded area $CBAP_2$.

2. Price and output determination under monopoly in the long-run (Long-run Equilibrium)

Long-run is a period of time in which a monopoly firm can rearrange its production techniques and size of production plant. The long-run equilibrium requires the following conditions:

Numerical:

N.1. Suppose, Initial price per packet of a noodle is Rs. 10 and quantity demanded 100 units. If price falls to Rs. 8 and quantity demanded increase to 150 units. Find the price elasticity of demand.

Soln

Initial price (P) = Rs. 10

Initial quantity (Q) = 100

New price (P_1) = Rs. 80

New quantity (Q_1) = 150

Change in price (ΔP) = $P_1 - P = 8 - 10 = -2$

change in quantity (ΔQ) = $Q_1 - Q = 150 - 100 = 50$

$$E_p = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q} = -\left(\frac{50}{-2}\right) \times \frac{10}{100} = 2.5$$

Coefficient of price elasticity of demand (E_p) = 2.5

price

.N.6 with the help of the information given below, Find out the across elasticity of demand.

Price of Tea (Ps)	Demand For Tea	Demand For Coffee
20	2000	1800
25	1500	2000

Soln Given, Initial price of tea (P_Y) = Ps.20

New price of tea (P_1) = Ps.25

Change in price of tea (ΔP_Y) = Ps. 25-20 = Ps.5

Initial demand for coffee (Q_X) = 1800

New demand for coffee (Q_{X_1}) = 2000

Change in demand for coffee (ΔQ_X) = 2000 - 1800 = 200

cross elasticity of demand (ε_c) = $\frac{\Delta Q_X}{\Delta P_Y} \times \frac{P_Y}{Q_Y}$

$= \frac{200}{5} \times \frac{20}{1800}$

$= 0.44$

Since the value of ε_c is positive, tea and coffee are substitute goods.

Q.N.9 A publishing company plans to publish a book. from the sales data of other publishers of similar book it works out the demand function for the book as Q_d = 500 − 5p. Find:

(i) point - elasticity of demand at price Rs. 20,

(ii) Arc elasticity for a all in price from Rs. 25 to Rs.

Soln

(i) Given, demand Function (Q_d) = 500 − 5p

At price (p) = Rs. 20

$Q_d = 500 - 5 \times 20 = 500 - 100 = 400$ units

Point elasticity of demand $(\varepsilon_p) = -\frac{dQ}{dP} \times \frac{P}{Q} =$

or, $\varepsilon_p = -b \cdot P/Q$.

In the given demand Function, Slope (b) -5

$\because \varepsilon_p = -b \cdot \frac{P}{Q} = -(-5) \cdot \frac{20}{400} = 1/4 < 1$

(ii) Arc elasticity of demand for a all price from Rs. 25 to Rs. 20.

According to Arc Method $E_p = -\frac{Q_2-Q_1}{P_1-P_2} \cdot \frac{(P_1+P_2)}{(Q_1+Q_2)}$

At P_1 = Rs.25 $Q_{d_1} = 500 - 5\times25 = 375$ units

At P_2 = Rs.20 $Q_{d_2} = 500 - 5\times20 = 400$ units.

$\therefore E_p = \frac{(400-375)(25+20)}{(20-25)(375+400)} = -\frac{25}{-5} \cdot \frac{45}{775} = \frac{45}{155}$

$= 0.29 < 0$

Hence, the book is less elastic product.

Q.N. 10. Compute price elasticity of supply by percenta and Arc method form the following supply schedule.

price (Rs)	20	30
Quantity Supplied (units)	40	80

Soln

Given,

Initial price (P_1) = Rs.20

New price (P_2) = Rs.30

Initial quality supplied (Q_1) = 40 units

New quantity supplied (Q_2) = 80 units

Percentage Method:

Change in price (ΔP) = $P_2 - P_1$ = 30 - 20 = Rs.10

Change in quality supplied (ΔQ) = $Q_2 - Q_1$

= 80 - 40 = 40 units

$E_s = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q} = \frac{40}{10} \times \frac{20}{40} = 2$

Since $E_p = 2 > 1$, supply is relatively elastic. It means 1% change in price causes 2% change in quantity supplied.

Arc Method:

$E_s = \frac{Q_2-Q_1}{P_2-P_1} \times \frac{P_1+P_2}{Q_1+Q_2}$

$= \frac{80-40}{30-20} \times \frac{20+30}{40+80} = \frac{40}{10} \times \frac{50}{120} = \frac{5}{3} = 1.67$

Since $E_p = 1.67 > 1$, Supply is relatively elastively elastic. It means 1% change in price results, 1.67% change in quality supplied.

Q.N.1. If $Q_d = 100 - 20p$ and $Q_s = 10 + 40p$. find the equilibrium level of price and output.

Solution:

given $Q_d = 100 - 20p$

$Q_s = 10 + 40p$

The Market under perfect competition attains equilibrium when $Q_d = Q_s$

Then, $Q_d = Q_s$

or, $100 - 20p = 10 + 40p$

or, $40p + 20p = 100 - 10$

or, $60p = 90$

or, $p = 90/60$

Then, $p = Rs. 1.5$

And $Q_d = 100 - 20p$

$= 100 - 20 \times 1.5$

$= 100 - 30$

$= 70$ units Q_s

Therfore the equilibrium pr
and output is qs. 1.5 and
units respectively.

Q.N.4 Suppose the demand function (Q_d) = 50 - p and Supply function (Q_s) = 5 + 2p

(i) fill the table given below

(ii) find equilibrium price and quantity

(iii) show Q_d, Q_s and prices in the graphs.

Price (Rs)	Quantity deman.	Quantity supply (Q_s)
5		
10		
15		
20		
25		

Solution (i) →

Price (Rs.)	Quantity dem.	Quantity Sup.
5	50 - 5 = 45	5 + 2 × 5 = 15
10	50 - 10 = 40	5 + 2 × 10 = 25
15	50 - 15 = 35	5 + 2 × 15 = 35
20	50 - 20 = 30	5 + 2 × 20 = 45
25	50 - 25 = 25	5 + 2 × 25 = 55

(ii) → We know that, $Q_d = Q_s$

$50 - p = 5 + 2p$

or, $2p + p = 50 - 5$

or, $3p = 45$

or, $p = \frac{45}{3}$

$p = Rs. 15$

again, $Q_d = 50 - p = 50 - 15$

$= 50 - 15 = 35$ kg

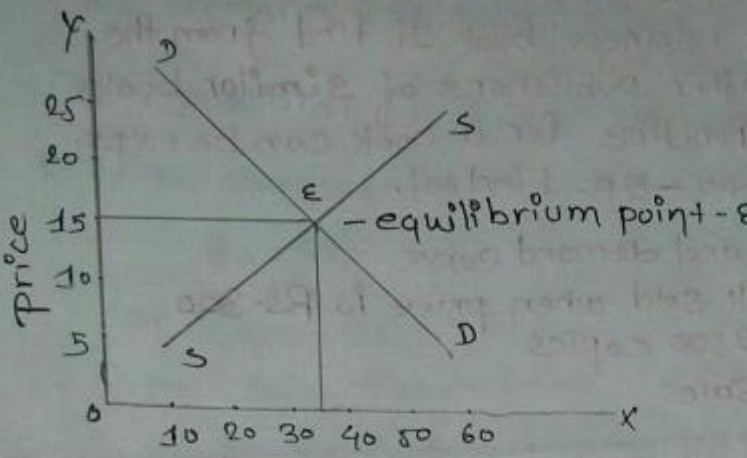
$Q_s = 5 + 2p = 5 + 2 \times 15$

$= 5 + 30 = 35$ k

Therefor equilibrium price = Rs. 15

Equilibrium quantity = 35 kg.

(iii) →



– equilibrium point – E

Q.N.5 – Suppose demand function for a product is given as D = 50 – p. find:

a. Quantity demanded at price Rs. 10

b. price at which demand equals zero.

c. Quantity demanded at zero price.

Solution:

Given that,

Demand function (D) = 50 – p

a. At price (P) = Rs. 10

quantity demanded (D) = 50 – 10 = 40 units

b. for price at which demand equals zero.

D = 0

Or, 50 – p = 0

∴ p = 50

When price is zero

quantity demand (D) =

50 – 0 = 50 units.

Q.N. 11. Suppose that the demand and supply function for goods are

$Q_d = 50 - 8P$ and $Q_s = -17.5 + 10P$

a. what are the equilibrium price and quantity?

b. what is the demand and supply situation if price is Rs. 2.75? what do you expect to happen? why?

c. At equilibrium price, determine price elasticity of demand and interpret your result.

Solution:

Demand Function (Q_d) = $50 - 8P$

Supply Function (Q_s) = $-17.5 + 10P$

For market equilibrium

$Q_d = Q_s$

or, $50 - 8P = -17.5 + 10P$

or, $18P = 67.5$

$\therefore P = 3.75$

Now putting the value of P in demand and supply Function, we get.

$Q_d = 50 - 8 \times 3.75 = 20$ units

$Q_s = -17.5 + 10 \times 3.75 = 20$ units

Thus, equilibrium price, is Rs. 3.75 and equilibrium quantity is 20 units.

b. At P = Rs. 2.75

$Q_d = 50 - 8 \times 2.75 = 28$ units

$Q_s = -17.5 + 10 \times 2.75 = 10$ units

At price Rs. 2.75, $Q_d > Q_s$

c. At equilibrium price (P) = Rs. 3.75, $Q_d = 20$ units

Given demand function is $Q_d = 50 - 8P$

Differentiating w.r. to P we get

$$\frac{dQ_d}{dP} = \frac{d(50-8P)}{dP} \quad \text{or,} \quad \frac{dQ_d}{dP} = -8$$

Elasticity of Demand $(\varepsilon_p) = \frac{dQ_d}{dP} \times \frac{P}{Q_d}$

$$= -(-8) \times \frac{3.75}{20} = 1.5$$

Interpretation: Since the value of $\varepsilon_p = 1.5 > 1$, The demand for the product is relatively elastic.

Hence, product is luxurious goods.

Descriptive Answer Questions

(23) 2075 Q.No. 15

Output	TFC	TVC (TC-TFC)	TC = TFC + TVC	AFC = TFC/Q	AVC = TVC/Q	AC = TC/Q	MC = ΔTC/ΔQ
0	100	0	100	–	–	–	–
1	100	10	110	100	10	110	10
2	100	18	118	50	9	59	8
3	100	24	124	33.33	8	41.33	6
4	100	32	132	25	8	33	8
5	100	50	150	20	10	30	18
6	100	80	180	16.6	13.3	30	30
7	100	124	224	14.2	17.7	32	44
8	100	180	280	12.5	22.5	35	44
9	100	260	360	11.1	28.9	40	80

Explanations:-

(i) We have calculated TVC by subtracting TFC from TC.
(ii) We have calculated AFC from ~~subtracting~~ dividing TFC by Qty.
(iii) AVC is calculated by the ratio of TVC and Qty.
(iv) AC is calculated by dividing TC by Qty
(v) MC is the ratio of change in total cost and change in level of output.

24 2072 (i) Q No. 14.

Output	TFC	TVC	TC	AFC = TFC/Q	AVC = TVC/Q	AC = TC/Q	MC = ΔTC/ΔQ
0	50	0	50	-	-	-	-
1	50	30	80	50	30	80	30
2	50	55	105	25	27.5	52.5	25
3	50	77	127	16.67	25.6	42.33	22
4	50	102	152	12.5	~~26.4~~ 25.6	38	25
5	50	132	182	10	~~28.17~~ 26.4	36.4	30
6	50	169	219	8.33	~~30.86~~ 28.17	36.5	37
7	50	216	266	7.14	30.86	38	47
8	50	278	328	6.25	24	41	62

(a) TFC :- Total fixed cost is the cost which remains fixed whatever be the change in level of output
TVC :- Total Variable cost is the cost which changes with the change in level of output.

(b) Relation between AC and MC can be listed as below:-
(i) Both AC and MC are of U-shaped.
(ii) Both AC and MC are derived from TC.
(iii) When AC falls, MC falls faster than AC, ie AC>MC
(iv) MC cuts AC at its minimum point. ie AC=MC
(v) When AC rises, MC rises faster than AC, ie MC>AC

$$TC = 1000 + 10Q - 0.9Q^2 + 0.004Q^2$$

When output is zero, Total cost and total fixed cost becomes equal.

Let $Q = 0$, $TC = 1000 + 10 \times 0 - 0.9 \times 0^2 + 0.0004(0)^3$

$= 1000$ (TFC)

So, when $Q = 5$, $TFC = 1000$

When, $Q = 5$,

$$AFC = \frac{TFC}{Q} = \frac{1000}{5} = 200$$

We know that,

$TC = TFC + TVC$

$TVC = TC - TFC$

$= 1000 + 10Q - 0.9Q^2 + 0004Q^3 - 1000$

$= 10 \times 5 - 0.9(5)^2 + 0.004(5)^3$

$= 50 - 22.5 + 0.5 = 28$ #

Now, $TC = TFC + TVC$

$= 1000 + 28 = 1028$

Now,

$$AVC = \frac{TVC}{Q} = \frac{28}{5} = 5.6$$

$$MC = \frac{d(TC)}{dQ} = \frac{d}{dQ}(1000 + 10Q - 0.9Q^2 + 0.004Q^3)$$

$$= 0 + 10 - 0.9 \times 2Q + 0.004 \times 3Q^2$$

$$= 0 + 10 - 0.9 \times 2 \times 5 + 0.004 \times 3 \times (5)^2$$

$= Rs.\ 1.03$ #