UNIT 2: CONSUMER EQUILIBRIUM AND DEMAND

KEY CONCEPTS

1. UTILITY
   A) MARGINAL UTILITY
   B) LAW OF DIMINISHING MARGINAL UTILITY
2. CONDITIONS OF CONSUMER'S EQUILIBRIUM
3. INDIFFERENCE CURVE ANALYSIS
4. THE CONSUMER'S BUDGET
   A) BUDGET SET
   B) BUDGET LINE
5. PREFERENCES OF THE CONSUMER
   A) INDIFFERENCE CURVE
   B) INDIFFERENCE MAP
6. CONDITIONS OF CONSUMER'S EQUILIBRIUM
7. DEMAND
   A) INDIVIDUAL DEMAND
   B) MARKET DEMAND
   C) DEMAND SCHEDULE
   D) DEMAND CURVE
8. DETERMINANTS OF DEMAND
9. MOVEMENT ALONG THE DEMAND CURVE
   A) EXTENSION
   B) CONTRACTION
10. SHIFT IN THE DEMAND CURVE
    A) INCREASE IN DEMAND
    B) DECREASE IN DEMAND
11. MEASUREMENT OF PRICE ELASTICITY OF DEMAND
    A) TOTAL EXPENDITURE METHOD
    B) PROPORTIONATE METHOD
    C) GEOMETRIC METHOD
12. FACTORS AFFECTING PRICE – ELASTICITY OF DEMAND

Utility:- The satisfaction which a consumer gets from using/consuming a good or service.

Total Utility:- The total satisfaction a consumer gets from a given commodity /service.

(or)

Sum of marginal utility is known as total utility

Marginal Utility:- An addition made to total utility by consuming an extra unit of commodity. Sum of marginal utilities derived from various goods is known as total utility.
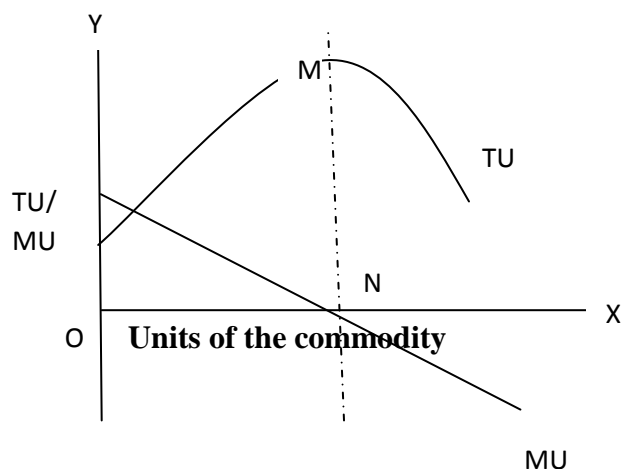
Graph -1: The relationship between TU and MU

Law of Diminishing Marginal Utility:-
It states that as the consumer consumes more and more units of a commodity , the marginal utility derived from each successive units goes on diminishing.

Demand for a commodity refers to the quantity of a commodity which a consumer is willing to buy at a given price in a given period of time.

Consumer Equilibrium:
Refers to a situation when he spends his given income on purchase of a commodity (or commodities) in such a way that yields him maximum satisfaction.

Condition of equilibrium:
MU in terms of money =   Price.
MU of product / MU of a Rupee.= Price

Consumer Equilibrium through Indifference Curve:-
Budget Set :- Set of bundles (combination of goods) available to consumer
Budget line:- It refers to all combinations of goods which a consumer can buy with his entire income and price of two goods.
Equation of Budget line: - $P_1 X_1 + P_2 X_2 = M$

Indifference Curve: -
The combination of two goods which gives consumer same level of satisfaction
Properties of IC :- 1. It slopes downwards from left to right
　　　　　　　　　2. It is always convex to the origin due to falling of Marginal Rate of
　　　　　　　　　　 Substitution (MRS)
　　　　　　　　　 3.Higher IC always gives higher satisfaction
　　　　　　　　　 4.Two IC never intersect each other.

Indifference Map:- Group of indifference curves that gives different levels of satisfaction to the consumer.

Marginal Rate of Substitution (MRS):- It is the rate at which a consumer is willing to give up one good to get another good.

Consumer Equilibrium:-

At a point where budget line is tangent to the indifference curve, $MRS = P_X / P_Y$, i.e., Marginal rate of substitution = ratio of prices of two goods.

Consumer Equilibrium
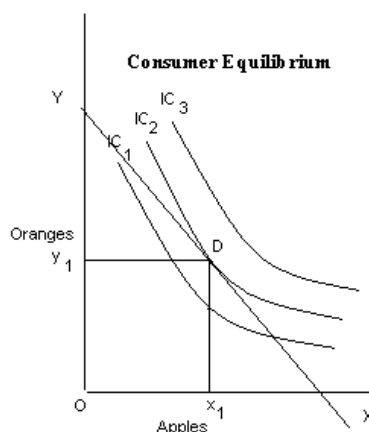
DEMAND

Demand:- Quantity of the commodity that a consumer is able and willing to purchase in a given period and at a given price.

Demand Schedule:- It is a tabular representation which shows the relationship between price of the commodity and quantity purchased.

Demand Curve:- It is a graphical representation of demand schedule.

Individual Demand:- Demand by an individual consumer.

Factors Affecting Individual Demand For a Commodity/Determinants of Demand:-
1. Price of the commodity itself
2. Income of the consumer
3. Price of related goods
4. Taste and Preference
5. Expectations of future price change

Demand Function:- $D_x = f(P_x, Y, P_r, T)$

Substitute Goods:- Increase in the price of one good causes increase in demand for other good. E.g., tea and Coffee

Complementary Goods:- Increase in the price of one good causes decrease in demand for other good. E.g:- Petrol and Car

Normal Good:- Goods which are having positive relation with income. It means when income rises, demand for normal goods also rises.

Inferior Goods:- Goods which are having negative relation with income. It means less demand at higher income and vice versa.

Law of Demand:- Other things remains constant, demand of a good falls with rise in price and vice versa .

Demand Schedule:-

PRICE (Rs.)	DEMAND (units)
1	100
2	80
3	60
4	40
5	20
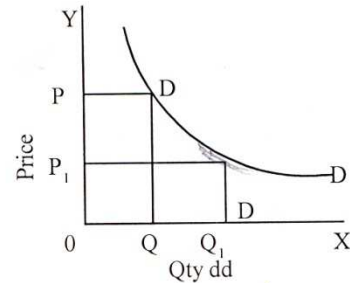
Changes in Demand:-

They are of two types:

1) Change in Quantity Demanded (Movement along the same demand curve)
2) Change in Demand (Shifts in demand)

1) **Change in Quantity Demanded: -**
   Demand changes due to change in price of the commodity alone, other factors remain constant; are of two types;

   A) Expansion of demand : More demand at a lower price
   B) Contraction of demand : Less demand at a higher price

Change in Quantity Demanded	Change in Demand
Due to price change	Due to other than price change
Movement will takes place	Shifting will takes place
Extension and contraction	Increase and decrease
Diagram	Diagram

2) Change in demand:-

Demand changes due to change in factors other than price of the commodity, are of two types:

A) **Increase in demand**:- more demand due to change in other factors, price remaining constant.
B) **Decrease in demand**:- less demand due to change in other factors, price remaining constant.

Causes of Increase in Demand:-

1. Increase in Income.
2. Increase/ favorable change in taste and preference.
3. Rise in price of substitute good.
4. Fall in price of complementary good.

Note: Increase in income causes increase in demand for normal good

Causes of Decrease in Demand:

1. Decrease in Income.
2. Unfavorable/Decrease in taste and preference
3. Decrease in price of substitute good.
4. Rise in price of complementary good.

Note: Decrease in income causes Decrease in demand for normal good

Price Elasticity of Demand (Ed):

Refers to the degree of responsiveness of quantity demanded to change in its price.

Ed. = Percentage change in quantity demanded/ Percentage change in price

Ed. = $P/q \times \Delta q/\Delta p$

P   = Original price

Q   = Original quantity

Δ = Change

Q. Explain the five degrees of elasticity of demand?

Ans.

1. **Perfectly inelastic demand:** - Even with change in price, there is no change in the quantity demanded, the demand is said to be perfectly inelastic Ed =0. The demand curve is parallel to OY axis.

2. **Perfectly elastic demand: -** Even with no change in price there is a great change in qty. Demanded, then the demand is said to be perfectly elastic. The demand curve is parallel to Ox axis
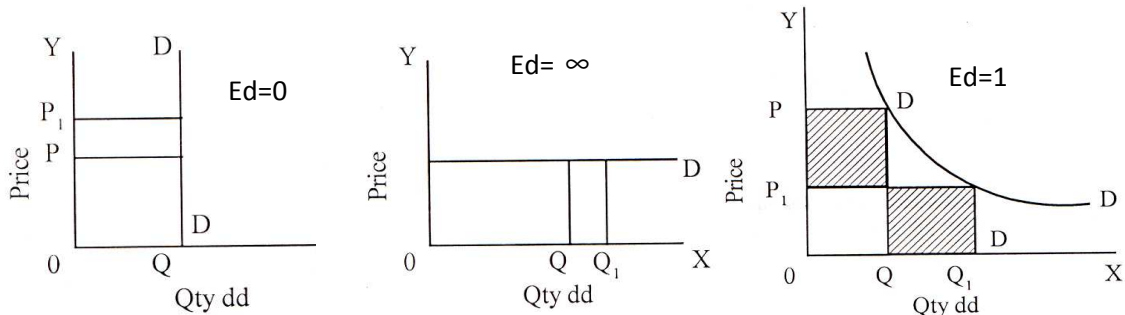

decrease in price, there is unit increase or decrease in quantity demanded. The demand curve resembles a rectangular hyperbola.

4. **Relatively less elastic:** With a unit increase in price, the quantity demanded is proportionately less, then demand is said to be less elastic

5. **Relatively more elastic:** With a unit increase in the price, there is proportionately more increase in the quantity demanded. The demand is said to be more elastic.
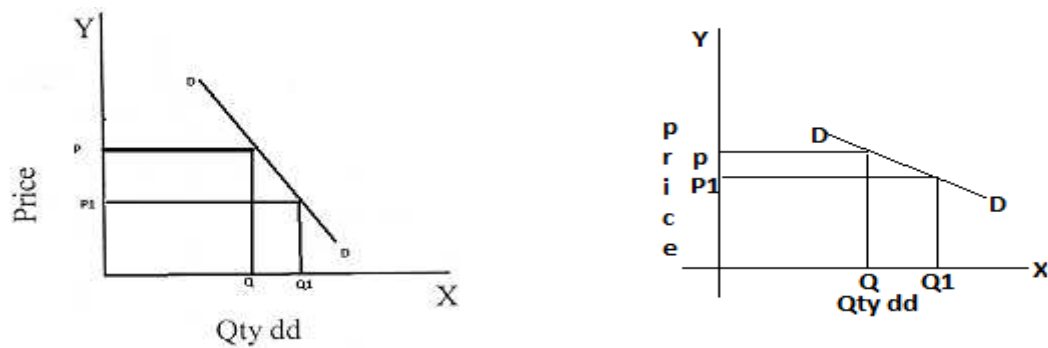
Methods of Measuring Price Elasticity of Demand:-
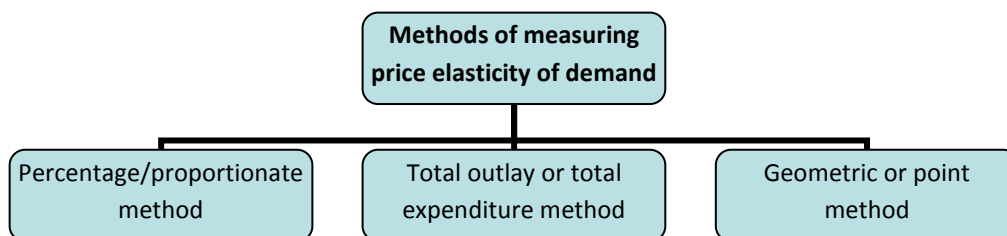
Proportionate / Percentage Method:

$$E_d = \frac{\% \text{ change in Quantity demanded}}{\% \text{ change in price}} = \frac{\Delta Q/Q0 \times 100}{\Delta P/P0 \times 100}$$

OR

$$= \Delta Q/\Delta P \times P/Q$$

Q. The Price of ice cream is Rs.20 per cup and demand is for 200 cup. If the price of ice cream falls to Rs.15 demand increases to 300 cups. Calculate elasticity of demand.

Sol.:

$P = 20; P_1 = 15 ; \Delta P = 5$

$Q = 200; Q_1 = 300; \Delta Q = 100$

$E_d = \frac{100}{5} \times \frac{20}{200} = 2$

## Total Outlay Method (Expenditure Method)

If with the fall in price, total outlay increases elasticity of demand is greater than one, if total outlay remain constant, elasticity is equal to one and if the total outlay decreases elasticity is less than one.

Situation	Price of Commodity (Rs)	Quantity (Kg)	Total Expenditure (Rs)	Effect on Total Expenditures	Elasticity of Demand
A	2 1	4 8	8 8	Same Total Expenditure	Unitary Elastic $E_d=1$
B	2 1	4 10	8 10	Total Expenditure increases	Greater than unitary $E_d > 1$
C	2 1	3 4	6 4	Total Expenditure decreases	Less than unitary $E_d < 1$

Geometric / Point Method: -

This measures the elasticity of demand at different points on the same demand Curve.

$$E_d = \frac{\text{lower segment of the demand curve}}{\text{Upper segment of the demand curve}}$$

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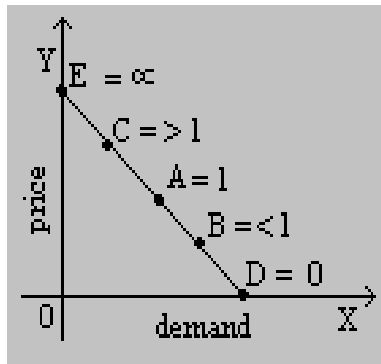
ONE MARK QUESTIONS AND ANSWERS

1. **What do you mean by utility?**

Ans :- Utility is the **want satisfying power** of a commodity.

2. **How is total utility derived from marginal utility?**

Ans :- Total utility is the **sum total of marginal utilities** of various units of a commodity.

   TUn= MU1+MU2+MU3------ +MUn

3. **State the law of equi-marginal utility.**

Ans :- It states that a consumer gets maximum satisfaction when the ratio of the marginal utilities of two goods and their prices is equal i.e., MUx / Px = MUy / Py

4. **What will you say about MU when TU is maximum?**

Ans :- MU is zero when TU is maximum

5. **Give the reason behind a convex indifference curve.**

Ans :- Diminishing marginal rate of substitution.

HOTS QUESTIONS

1. **Give the formula for calculating the slope of the budget line.**

Ans :- It is equal to the ratio of the prices of the two commodities , i.e., Px / Py

2. **Suppose a consumer's preferences are monotonic. What can you say about his preference ranking over the bundles (10,10),(10,9) and (9,9)?**

Ans :- Consumer will monotonically prefer bundle (10,10) to (10,9) and (9,9) and also prefer bundle (10,9) to (9,9)

3. **A rise in the income of the consumer leads to a fall in the demand for commodity 'x'. What type of good is commodity 'x'?**

Ans :- Inferior good

4. **What do you mean by substitute and complementary goods? Give two examples each.**

Ans :- Substitute goods are those goods which can be used in place of each other. Ex. Tea and Coffee. Complementary goods are those goods which are used together to satisfy a given want. Ex : Car and petrol.

5. **Mention one factor that causes a leftward shift of the demand curve.**

Ans :- Fall in income of a consumer.

6. **What causes a movement along the demand curve of a commodity?**
Ans :- When the price of a commodity changes and other factors remain constant, there will be movement along the demand curve.

7. **What is demand function?**
Ans: - A demand function shows the functional relationship between the quantity demanded and the factors on which demand depends on.

8. **Draw a demand curve with unitary elasticity.**

Ans :-
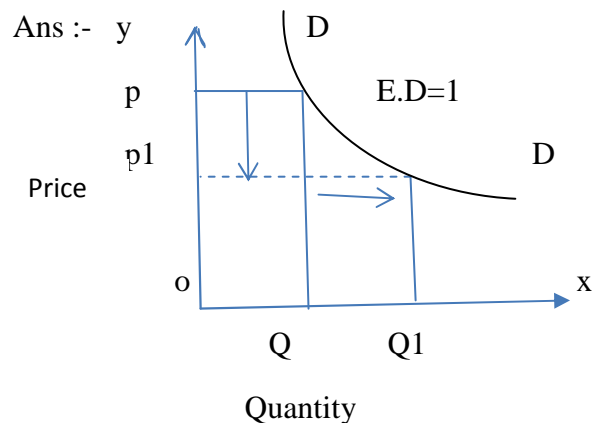
9. **Define price elasticity of demand.**
Ans :- It refers to the degree of responsiveness of quantity demanded to change in price.

3 AND 4 MARKS QUESTIONS & ANSWERS

1. Explain the law of Diminishing Marginal Utility with the help of a table and a diagram.
Ans :- The law of diminishing Marginal Utility states that as we consume more and more units of a commodity, the MU derived from the successive units of that commodity goes on decreasing. It is explained with the help of following schedule and diagram.

UNITS	TU	MU
1	8	8
2	14	6
3	18	4
4	20	2
5	20	0
6	18	-2

Diagram:
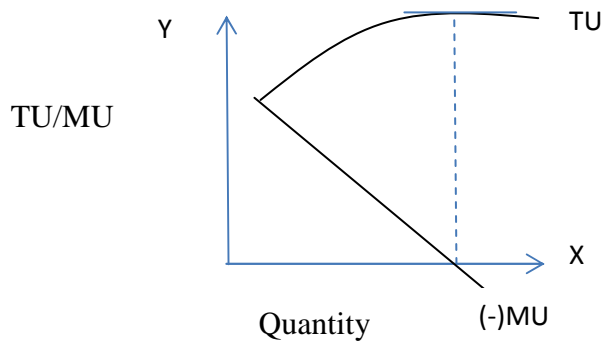
Relationship between MU and TU:

i) When MU is positive TU rises.

ii) When MU is zero TU is maximum.

iii) When MU is negative, TU falls.

2. **What is meant by consumer's equilibrium? State its conditions in case of two commodities approach.**

   a) **Meaning:** A consumer is to be equilibrium when he is spending his given income on various goods and services to get maximum satisfaction.

   b) **Conditions:**
      i) $MUx / Px = MUy / Py$ (MUs are equal to their prices)
      ii) $PxQx + PyQy = M$
      iii) M (Money spent is equal to income)

3. **What is the difference between cardinal and ordinal utility analysis.**

	Cardinal Utility	**Ordinal Utility**
1	Given by Prof. Alfred Marshall	Given by Prof. J.R. Hicks
2	Utility can be measured numerically	It cannot be measured numerically
3	Unit of measurement is 'utils'	Possible for a consumer to scale his preferences.

4. **Explain any four determinants of demand for a commodity.**

   Ans :- Following are the three determinants of demand for a commodity.

   i) **Price of the commodity:-** When the price of a commodity increases the demand for that commodity decreases and vice versa.

   ii) **Income of the consumer:-** When the income increases the demand for normal commodity also increases and vice-versa.

   iii) Price of related goods :-

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a) In complementary goods demand rises with fall in price of complementary goods.

iv) In substitute goods demand for a commodity falls with a fall in the price of other substitute goods

b) Taste & preference of the consumer: With favourable taste, demand increase and unfavourable taste demand decreases for a commodity.

5. **Draw a) perfectly elastic demand curve, b) perfectly inelastic demand curve and c) unitary elastic demand curve.**
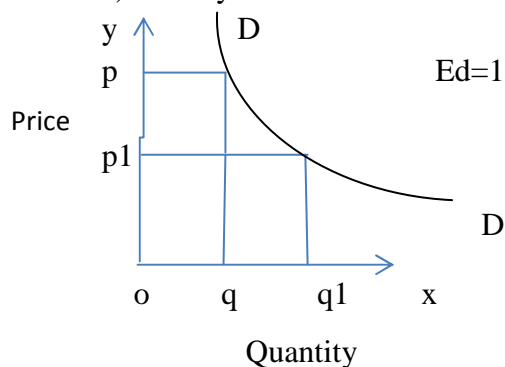
Ans :- a) perfectly elastic demand
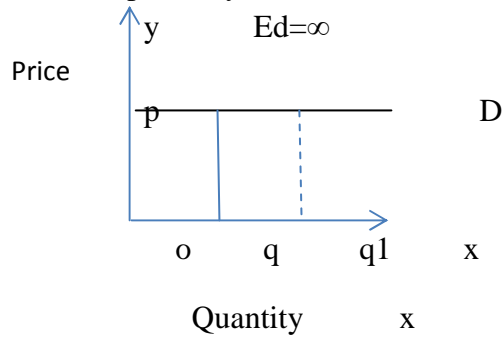
b). Perfectly inelastic demand
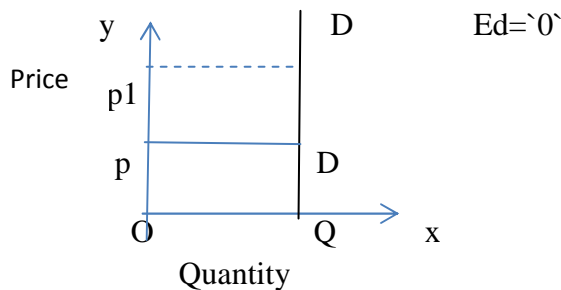
c) Unitary elastic demand

6. **Explain any four factors that affect elasticity of demand.**

Ans :- Following are the factors affecting price elasticity of demand.

1. **Availability of close substitutes**: If close substitutes of product are available, the commodity tends to be more elastic, If there are not available, they tend to be less elastic.

2. **Proportion of total expenditure spent on the product**:If the amount spent on a product constitutes a very small fraction of the total expenditure, then the demand tends to be less elastic of the amount spent is high the elasticity of demand tends to be high.

3. **Habits:** A commodity if it forms an essential part of the individual, the demand tends to be inelastic. It is consumed casually; the demand tends to be elastic

4. **Time Period:** Longer the time period, the more elastic is the demand for any product the shorter the time period, less elastic is the demand for any products

HOTS

1. **Is the demand for the following elastic, moderate elastic, highly elastic? Give reasons.**

   (i) **Demand for petrol**
   (ii) **Demand for text books**
   (iii)**Demand for cars**
   (iv)**Demand for milk**

Ans :- i) Demand for petrol is moderately elastic , because when the price of the petrol goes up , the consumer will reduce the use of it.

ii)Demand for text books is completely inelastic. In case of text books, even a substantial change in price leaves the demand unaffected.

iii) Demand for cars is elastic. It is a luxury good, when the price of the car rises, the demand for the car comes down.

iv) Demand for milk is elastic, because price of the milk increases then the consumer purchase less quantity milk.

2. What is the relationship between slope and elasticity of a demand curve?

Ans :- The formula of $Ed = \Delta Q / \Delta P * P / Q$

The formula for the slope of the demand curve is, slope $= \Delta P / \Delta Q$

The relationship between slope and elasticity of demand is $Ed= 1/slope * P/Q$

6 MARKS QUESTIONS

3. How is equilibrium achieved with the help of indifference curve analysis?

Ans :-

a) **Definition**: In the indifference curve approach, consumer's equilibrium is achieved at the point at which the budget line is tangent to a particular indifference curve. This is the point of maximum satisfaction.

b) Diagram:
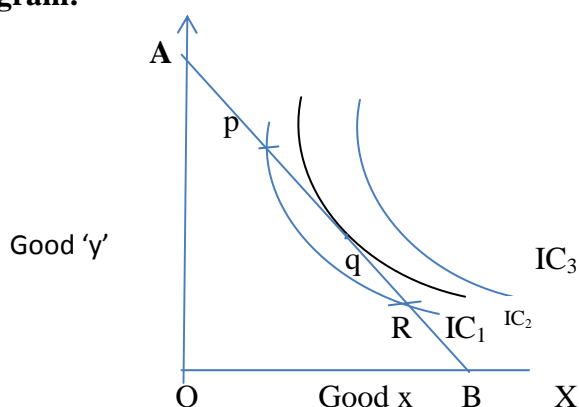
c) Explanation of the diagram:

i) 'AB' is the budget line.

ii) It is sure that consumer's equilibrium will lie on some point on 'AB'

iii) Indifference map (set of IC_1, IC_2, IC_3) shows consumers scale of preferences between different combinations of good 'x' and good 'y'

iv) Consumers' equilibrium will achieve where budget line (AB) is tangent to the IC_2.

d) Essential conditions for consumers equilibrium:

i) Budget line must be tangent to indifference curve i.e., MRS xy = Px / Py

ii) Indifference curve must be convex to the origin or MRS xy should decrease.

e) Consumers cannot achieve the following:

i) P and R points on budget line give satisfaction but they lie on lower indifference curve IC_1. Choosing point 'q' puts him on a higher IC which gives more satisfaction.

ii) He cannot move on IC_3, as it is beyond his money income.

4. **Explain the factors affecting the market demand of a commodity.**

Ans **:- i) Meaning**: Market demand is the aggregates of the quantities demanded by all the consumers in the market at different prices.

ii) Factors affecting market demand :

a) *Price of the commodity:* When the price goes up demand for its falls and vice-versa.

b) *Income of the consumers:* When the income of the consumers goes up the demand for a commodity also goes up.

c) *Price of related goods :*
   - *Complementary goods :*The demand for a commodity rises with a fall in the price of its complementary good (Car and petrol)
   - *Substitute goods:* Demand for a commodity falls with a fall in the price of other substitute good (Tea& Coffee).

d) *Tastes and preferences:* Any favourable change in consumers' tastes will lead to increase in market demand and any unfavourable change in consumers tastes will lead to decrease in market demand.

e) *Consumer's group:* More the consumers more will be market demand and vice-versa.

5. Explain the various degrees of price elasticity of demand with the help of diagrams.

Ans:- There are five degrees of price elasticity of demand. They are,

a) *Perfectly elastic demand (Ed=∞):-* a slight or no change in the price leads to infinite changes in the quantity demanded.

b) *Perfectly Inelastic demand (Ed=0) :-* Demand of a commodity does not change at all irrespective of any change in its price.

c) *Unitary elastic demand (Ed=1):-* When the percentage change in demand (%) of a commodity is equal to the percentage change in price.

d) *Greater than unitary elastic demand (Ed>1):-* When percentage change in demand of a commodity is more than the percentage change in its price.

e) *Less than unitary elastic demand (Ed<1) :-* When percentage change in demand of a commodity is less than the percentage change in its price.

Diagrams
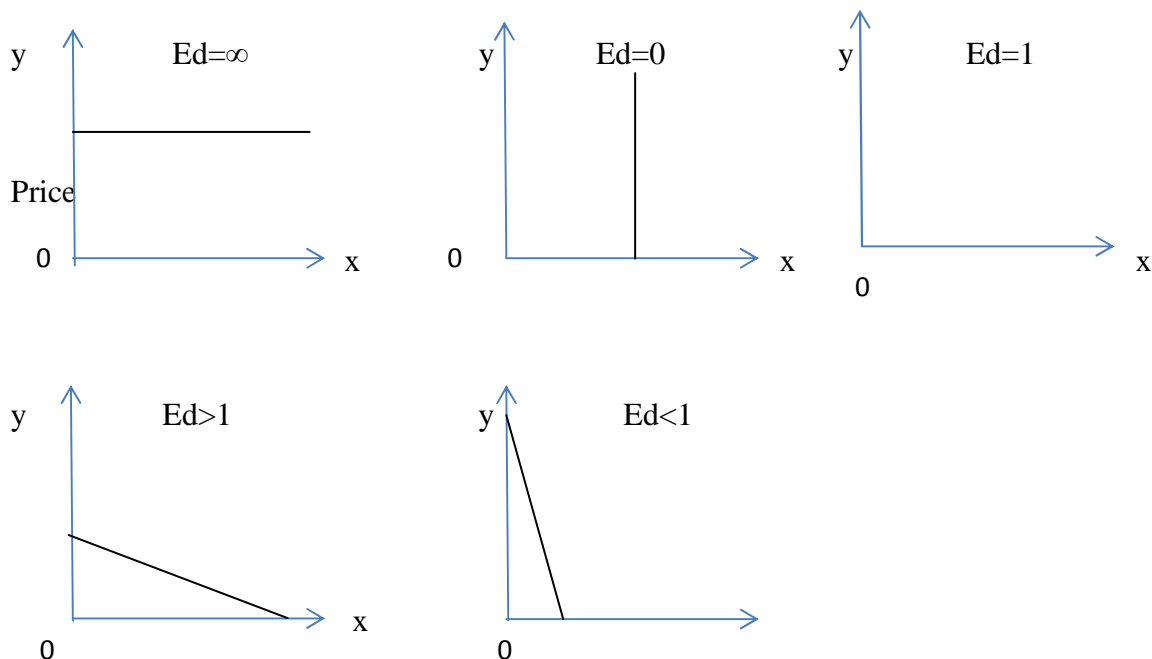
Numerical for practice

6. **Derive the total utility schedule from the marginal utility.**

Units consumed	Marginal utility
1	12
2	11
3	8
4	6
5	3
6	0

7. **A consumer buys 50 units of a good at Rs. 4/- per unit. When its price falls by 25 percent its demand rises to 100 units. Find out the price elasticity of demand.**

Ans:- Ed=4

8. **Price elasticity of demand for wheat is equal to unity and a household demands 40 Kg of wheat when the price is Rs.1 per kg. At what price will the household demand 36 kg of wheat?**

Ans:- The price of wheat rises to Rs.1.10 per kg.

9. **The quantity demanded of a commodity at a price of Rs.10 per unit is 40 units. Its price elasticity of demand is -2. Its price falls by Rs.2/- per unit. Calculate its quantity demanded at the new price.**

Ans :- 56 units.

FREQUENTLY ASKED QUESTIONS – CBSE BOARD EXAMINATIONS

1. Define Microeconomics.
2. Why an economic problem does arises?
3. What are the central problems of an economy?
4. Define opportunity cost.
5. Define marginal opportunity cost.
6. Distinguish between 'micro' and' macro' economics.
7. Why PPC is Concave from the origin.
8. Define Marginal Rate of Transformation (MRT)
9. Explain the problem, of 'what to produce' and 'how to produce.'
10. Explain the central problem of how to produce with the help of an example.
11. What is an indifference curve?
12. Define Utility.
13. What is budget set?
14. Define budget line.

15. Define MRS.

16. A consumer consumes only two goods. Explain the conditions of consumer's equilibrium with the help of IC analysis.

17. For a consumer to be in equilibrium, why must MRS be equal to the ratio of price of two goods?

18. What is an indifference map?

19. Explain the law of demand with the help of diagram and schedule.

20. Write three causes of increase / decrease in demand

21. Distinguish between the change in quantity demanded and change in demand.

22. Explain any three factors or determinants of demand.

23. Explain any three factors affecting elasticity of demand

24. Explain the price elasticity of demand through geometric method.

25. Explain the price elasticity of demand through expenditure method

26. Explain the properties of indifference curve.

27. Why can not two indifference curves meet each other?

28. Why is indifference curve convex to origin?

29. Why does higher indifference curve gives higher levels of satisfaction?

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