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## शक्तिउत्थानआश्रमलखीसरायबिहार

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**Elasticity of Demand(H.W)**

## Unit 2: Consumer's Equilibrium and Demand

**Q1. When price of a good rises from ₹ 5 per unit to ₹ 6 per unit, its demand falls from 20 units to 10 units. Compare expenditures on the good to determine whether demand is elastic or inelastic.**

**Ans.** Given,

$P = 5$ $\qquad\qquad Q = 20$

$P_1 = 6$ $\qquad\qquad Q_1 = 10$

Initial expenditure $= P \times Q = 5 \times 20$

$= ₹\ 100$

Later expenditure $= P_1\ Q_1 = 6 \times 10$

$= ₹\ 60$

As price rises from ₹ 5 to ₹ 6 per unit, expenditure falls from ₹ 100 to ₹ 60. Price and expenditure are moving in opposite direction meaning that price elasticity of demand is elastic.

**Q2. At a given market price of a good a consumer buys 120 units. When price falls by 50 per cent he buys 150 units. Calculate price elasticity of demand.**

**Ans.** Given,

% fall in price = 50

$Q$ = 120 units

$Q_1$ = 150 units

$\Delta Q$ = 30 units

$$e_D = \frac{\text{\% change in qty demanded}}{\text{\% change in price}}$$

Percentage change in quantity demanded

$$= \frac{\text{change in quantity}}{\text{original quantity}} \times 100 = \frac{30}{120} \times 100 = 25\%$$

$$\therefore e_D = \frac{25\%}{50\%} = \frac{1}{2} = 0.5$$

**Q3. What is the relation between good *X* and good *Y* in each case, if with fall in the price of *X* demand for good *Y* (*i*) rises and (*ii*) falls? Give reasons.**

**Ans.** (*i*) If with fall in price of *X* (say, sugar) demand for good *Y* (say, tea) rises. Then goods *X* and *Y* are complements.

(*ii*) If with fall in price of $X$ (say, tea) demand for good $Y$ (say, coffee) falls, then $X$ and $Y$ are substitutes.

**Q4. (*a*) Given $P_X$ = ₹ 2, and $P_Y$ = ₹ 1, income = ₹ 12. Find how a consumer spends her income in order to maximise total utility.**

**(*b*) Calculate total utility received by the consumer. Show that equilibrium conditions for the consumer are satisfied.**

| $Q$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| $MU_X$ | 16 | 14 | **12** | 10 | 8 | 6 | 4 | 2 |
| $MU_Y$ | 11 | 10 | $\boxed{9}$ | 8 | 7 | $\boxed{6}$ | 5 | 4 |

**Ans.** (*a*) Consumer will spend first and second rupee to buy first and second units of $Y$. This will give total of 21 utils. If the first two rupees were spent on first unit of $X$ (Since $P_X$ = ₹ 2) then 16 utils would be received.

The third and the fourth rupee should be spent on buying third and fourth units of $Y$. This will give total of 17 utils.

The fifth and sixth rupee should be spent to buy first unit of $X$ and the seventh and eighth rupee to buy the second units of $X$. From these the consumer gets 16 and 14 utils respectively.

The ninth and tenth rupee should be spent to buy fifth and sixth units of $Y$. These will give a total of 13 utils of utility.

The last two rupees should be spent to buy third unit of $X$, from which 12 utils would be received.

(*b*) $TU$ received by the consumer = 21 + 17 + 16 + 14 + 13 + 12 = 93 utils.

The two conditions of consumer's equilibrium are:

$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} \text{ ... Subject to } P_X.X + P_Y.Y = M$$

We have $\frac{12}{2} = \frac{6}{1}$ ... Subject to (2). (3) + (1). (6) = 12

Both conditions are satisfied.