(1) The demand schedule for milk is given in Table-3:

Table-3: Demand Schedule for Milk	
Price of Milk(per litre)	**Quantity Demanded(litres)**
15	100
20	90

Calculate the price elasticity of demand and determine the type of price elasticity.

Solution:

P= 15

Q = 100

P1 = 20

Q1 = 90

Therefore, change in the price of milk is:

$\Delta P = P1 - P$

$\Delta P = 20 - 15$

$\Delta P = 5$

Similarly, change in quantity demanded of milk is:

$\Delta Q = Q1 - Q$

$\Delta Q = 90 - 100$

$\Delta Q = -10$

The change in demand shows a negative sign, which can be ignored. This is because of the reason that the relationship between price and demand is inverse that can yield a negative value of price or demand.

Price elasticity of demand for milk is:

$e_p = \Delta Q/\Delta P * P/Q$

$e_p = 10/5 * 15/100$

$e_p = 0.3$

The price elasticity of demand for milk is 0.3, which is less than one. Therefore, in such a case, the demand for milk is relatively inelastic.

(2). The cross elasticity of substitute goods is explained in Table 5.

Table 5 : Cross Elasticity of Substitutes

Commodity	*Before Change*		*After Change*	
	Price in Rs. Per K.G	*Quantity (K.G)*	*Price in Rs. Per (K.G.)*	*Quantity (K.G.)*
X (Tea)	20	400	20	500
Y (Coffee)	30	500	40	300

$$E_{xy} = \frac{\Delta Q_x}{\Delta P_y} \times \frac{P_y}{Q_x} = \frac{500-400}{40-30} \times \frac{30}{400}$$

$$= \frac{100}{10} \times \frac{30}{400} = (+)\frac{3}{4} \text{ or } (+)\,0.75.$$

It is clear from the above that the coefficient of cross elasticity of substitute goods such as tea (X) and coffee (Y) is positive (+0.75) when with the rise in price of coffee, the price of tea being constant, the demand for tea also increases.
The cross elasticity of complementary goods is explained in Table 6.

Table 6 : Cross Elasticity of Complementary

Goods	Before the Price Change		After the Price Change	
	Price in Rs. Per K.G.	Quantity (K.G.)	Price in Rs. Per K.G.	Quantity (K.G.)
X (Tea)	150	40	150	30
Y (Sugar)	15	100	20	80

$$E_{xy} = \frac{\Delta Q_x}{\Delta P_Y} \times \frac{P_y}{Q_x} = \frac{30-40}{20-15} \times \frac{15}{40}$$

$$= \frac{-10}{5} \times \frac{15}{40} = \frac{-15}{20} = \frac{-3}{4} = (-)\,0.75.$$

Q.3) For a particular product, price was reduced from Rs 50 per unit to Rs 48 in order to attract more customers. It was observed that demand for the product subsequently increased from 100 to 110 units. Calculate the price elasticity of demand

ANS: Ep= (ΔQ/ΔP) * P/Q
ΔQ(new-initial)= 110-100= 10 units
ΔP (new - initial) = 48-50 = Rs -2
Ep= 10/-2 * 50/100 = -2.5
The product has a relatively elastic demand

Q.4) Find the income elasticity of demand for a consumer if his income rises from Rs 100 to Rs 200 and the quantity of a good purchased by him rises from 25 units to 30 units.

ANS: Ey= (ΔQ/ΔY) * Y/Q
ΔQ= 30 – 25= 5 units
ΔY= 200-100= Rs 100
Ey= 5/100 * 100/25 = 0.2

Q.5) The quantity demanded of a commodity increases from 8000 units to 10,000 units due to increase in advertisement expenditure from Rs 6000 to Rs 12000. Find the promotional elasticity of demand

ANS: Ea=(ΔQ/ΔA) * A/Q
ΔQ= 2000
ΔA= 6000
Ea= 2000/6000 * 6000/ 8000 = 0.25.
As this value is positive it is beneficial for the firm to undergo the promotional expenditure.

Q.6) Consider the demand for a good. At price Rs 4, the demand for the good is 25 units. Suppose price of the good increases to Rs 5, and as a result, the demand for the good falls to 20 units. Calculate the price elasticity?

Original Quantity (Q) = 25 units	Original Price (P) = ₹ 4
Fall in Quantity (ΔQ) = – 5 units	Rise in Price (DP) = ₹ 1
New Quantity (Q_1) = 20 units	New Price (P_1) = ₹ 5
Elasticity of Demand (ED) = ?	

Price Elasticity of demand (ED)

$$= \frac{\Delta Q}{\Delta P} \times \frac{P}{Q} = \frac{-5}{1} \times \frac{4}{25} = (-)0.8$$

ED = (–)0.8 (Demand is less elastic as ED < 1)

Negative sign indicates the inverse relationship between price and quantity demanded.