ECONOMICS NUMERICALS

CHP 2 → THEORY OF DEMAND & SUPPLY

- Unit 1 Demand → Elasticity of Demand
- Unit 2 Consumer Behaviour → Utility
- Unit 3 Supply → Elasticity of Supply

I) Elasticity of Demand

The responsiveness of quantity demanded to a change in one of the determinant of demand is called as elasticity of demand.

General formula

$$\text{Elasticity of Dem} = \frac{\%\,\Delta \text{ in } Q_D}{\%\,\Delta \text{ in one of Determinant}}$$

(a) **Price** $E_p = \frac{\%\Delta Q}{\%\Delta P}$

(b) **Income** $E_i = \frac{\%\Delta Q_D}{\%\Delta I}$

(c) **Cross Elasticity** $E_c = \frac{\%\Delta Q_x}{\%\Delta P_y}$

(d) **Advt** $E_q = \frac{\%\Delta Q_D}{\%\Delta A}$.

a) **Price Elasticity**

i) Percentage Method

$$\frac{\%\Delta Q_d}{\%\Delta \text{Price}}$$

OR

$$\frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

ii) Point Method

- Using Derivative: $-\frac{dQ}{dP} \times \frac{P}{Q}$
- Geometric Method: $\frac{\text{Lower Segment}}{\text{Upper Segment}}$

iii) Arc Method

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

iv) Total Outlay Method

Change in Price	Demand		
	Unitary Elastic	Elastic	Inelastic
Price Increase	TR Same	TR Decrease	TR Increase
Price Decrease	TR Same	TR Increase	TR Decrease

Inverse Relation

Direct Relation

b) **Income Elasticity**

- Percentage Method
- Arc Method
- (*) Proportionate Method

i) $\left[\frac{\%\Delta Q}{\%\Delta \text{Income}}\right]$ — Arc Method: $\frac{Q_1 - Q_2}{Q_1 + Q_2} \times \frac{I_1 + I_2}{I_1 - I_2}$

OR

ii) $\left[\frac{\Delta Q}{\Delta I} \times \frac{I}{Q}\right]$

If after increase in income

Case I
Proportion of income spent on a good REMAINS SAME
→ Unitary Income Elasticity
→ $E_i = 1$

Case II
Prop of Income spent also increases
→ Income Elastic Demand
→ $E_i > 1$

Case III
Prop of Income spent on good decreases
→ Income Inelastic Demand
→ $E_i < 1$

* **Interpretation of value of Income Elasticity**

Value	Type of Good
• Positive	Normal Good
• Negative	Inferior Good
• $E_i > 1$	Luxury Good
• $E_i < 1$	Generally, Necessities

c) **Cross Price Elasticity** = $\frac{\%\Delta Q_x}{\%\Delta P_y}$ OR $\frac{\Delta Q_x}{\Delta P_y} \times \frac{P_y}{Q_x}$

The responsiveness of Qty Demanded of Good X to a change in price of Good Y, is called as cross price elasticity.

where, Good X & Good Y are

i) Substitute Goods → E_c → Always Positive

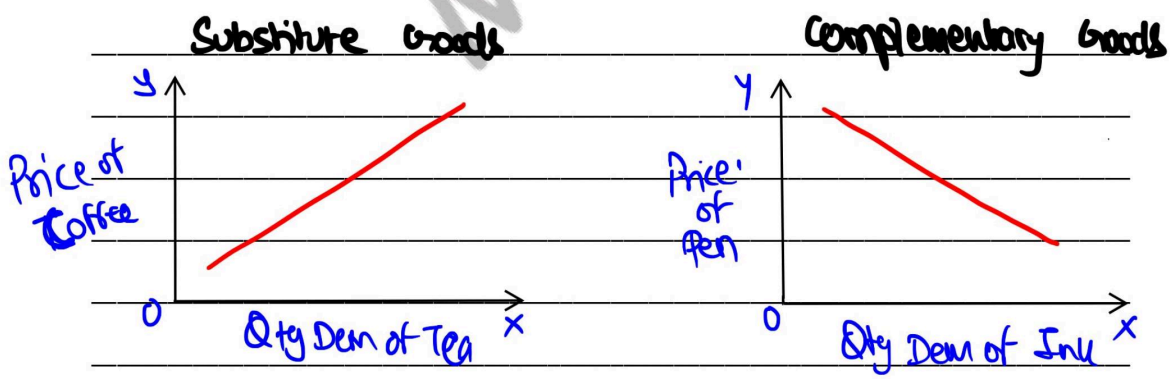
OR

ii) Complementary Goods → E_c → Always Negative

OR

iii) Unrelated Goods → E_c → Zero.

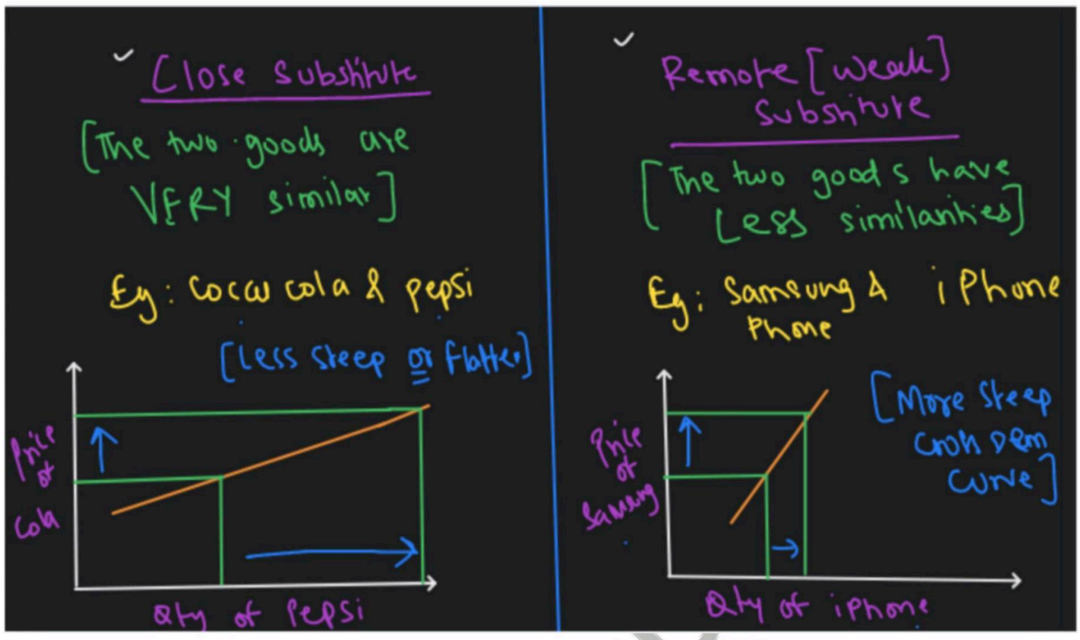
* **CROSS DEMAND CURVE**



Upward Sloping — Downward Sloping

* $E_c = \infty$ → in case of PERFECT SUBSTITUTES

* Arc Method ⇒ $E_c = \frac{Q_1 - Q_2}{Q_1 + Q_2} \times \frac{P_1 + P_2}{P_1 - P_2}$



d) **Advertisement Elasticity**

$$Ea = \frac{\%\Delta Q_D}{\%\Delta \text{Advt Exp}} \text{ or } = \frac{\Delta Q}{\Delta A} \times \frac{A}{Q}$$

* **Arc Method**

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

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Economics Chp 2

Elasticity of Demand- Questions

MV Sir

Illustration 1 **[Pg no.- 2.20]** Price Elasticity of Demand

The price of a commodity decreases from Rs 6 to Rs 4 and quantity demanded of the good increases from 10 units to 15 units. Find the coefficient of price elasticity.

Illustration 2 **[Pg no.- 2.20]** Price Elasticity of Demand

A 5% fall in the price of a good leads to a 15% rise in its demand. Determine the elasticity and comment on its value.

Illustration 3 [Pg no.- 2.21] Price Elasticity of Demand

The price of a good decreases from ` 100 to ` 60 per unit. If the price elasticity of demand for it is 1.5 and the original quantity demanded is 30 units, calculate the new quantity demanded.

Illustration 4 [Pg no.- 2.21] Price Elasticity of Demand

The quantity demanded by a consumer at price Rs 9 per unit is 800 units. Its price falls by 25% and quantity demanded rises by 160 units. Calculate its price elasticity of demand.

Illustration 5 **[Pg no.- 2.21]** **Price Elasticity of Demand**

A consumer buys 80 units of a good at a price of Rs 4 per unit. Suppose price elasticity of demand is - 4. At what price will he buy 60 units?

Price Elasticity- Point Method

In the case of a straight line demand curve meeting the two axes, the price-elasticity of demand at the mid-point of the line would be : **[Q5- Pg no.- 2.84]**

(a) 0

(b) 1

(c) 1.5

(d) 2

Price Elasticity- Point Method

Point elasticity is useful for which of the following situations? **[Q 28- Pg no.- 2.88]**

(a) The bookstore is considering doubling the price of notebooks.

(b) A restaurant is considering lowering the price of its most expensive dishes by 50 percent.

(c) An auto producer is interested in determining the response of consumers to the price of cars being lowered by Rs 100.

(d) None of the above.

Price Elasticity- Arc Method

Suppose the price of movies seen at a theatre rises from Rs 120 per person to Rs 200 per person. The theatre manager observes that the rise in price causes attendance at a given movie to fall from 300 persons to 200 persons. What is the price elasticity of demand for movies? (Use Arc Elasticity Method)

[Q22- Pg no.- 2.87]

(a) .5

(b) .8

(c) 1.0

(d) 1.2

Price Elasticity- Arc Method

Suppose a consumer's income increases from Rs 30,000 to Rs ` 36,000. As a result, the consumer increases her purchases of compact discs (CDs) from 25 CDs to 30 CDs. What is the consumer's income elasticity of demand for CDs? (Use Arc Elasticity Method) **[Q 33- Pg no.- 2.89]**

(a) 0.5

(b) 1.0

(c) 1.5

(d) 2.0

Price Elasticity- Total Outlay Method

Suppose the demand for meals at a medium-priced restaurant is elastic. If the management of the restaurant is considering raising prices, it can expect a relatively: **[Q 27- Pg no.- 2.88]**

(a) Large fall in quantity demanded.

(b) Large fall in demand.

(c) Small fall in quantity demanded.

(d) Small fall in demand.

Price Elasticity- Total Outlay Method

An increase in price will result in an increase in total revenue if : **[Q 30- Pg no.- 2.88]**

(a) The percentage change in quantity demanded is less than the percentage change in price.

(b) The percentage change in quantity demanded is greater than the percentage change in price.

(c) Demand is elastic.

(d) The consumer is operating along a linear demand curve at a point at which the price is very high and the quantity demanded is very low.

Price Elasticity- Total Outlay Method

A firm learns that the own price elasticity of a product it manufactures is 3.5. What would be the correct action for this firm to take if it wishes to raise its total revenue? **[Q 92- Pg no.- 2.99]**

(a) Lower the price because demand for the good is elastic.

(b) Raise the price because demand for the product is inelastic.

(c) Raise the price because demand is elastic.

(d) We need information in order to answer this question.

ILLUSTRATION 6 [Pg no.- 2.32] Income Elasticity of Demand

Income Elasticity of Demand

A car dealer sells new as well as used cars. Sales during the previous year were as follows;

Car type	Price	Quantity (Nos)
New	6 .5 lakhs	400
Used	60,000	4000

During the previous year, other things remaining the same, the real incomes of the customers rose on average by 10%. During the last year sales of new cars increased to 500, but sales of used cars declined to 3,850.

What is the income elasticity of demand for the new as well as used cars? What inference do you draw from these measures of income elasticity?

SOLUTION [Pg no.- 2.32] Income Elasticity of Demand

Income Elasticity of demand for new cars

Percentage change in income = 10%, given

Percentage change in quantity of new cars demanded = (Δ Q/Q) X 100 = (100/400) X100 = 25%

Income elasticity of demand = 25%/ 10% = + 2.5

New car is therefore income elastic. Since income elasticity is positive, new car is a normal good.

Income Elasticity of demand for used cars

Percentage change in income = 10%, given

% change in quantity of used cars demanded = (Δ Q/Q)X 100 =(-1 50/4000) x100 = - 3.75%Income elasticity of demand = – 3.75/ 10= –.375

Since income elasticity is negative, used car is an inferior good.

Income Elasticity of Demand

Suppose potatoes have (-).0.4 as income elasticity. We can say from the data given that:

[Q60- Pg no.- 2.93]

(a) Potatoes are superior goods.

(b) Potatoes are necessities.

(c) Potatoes are inferior goods.

(d) There is a need to increase the income of consumers so that they can purchase potatoes.

Income Elasticity of Demand

The average income of residents of two cities A and B and the corresponding change in demand for two goods is given in the following table. Which of the following statements is true? **[Q 114- Pg no.- 2.105]**

City	%Increase In Income	% change in demand for Good X	% change in demand for Good Y
A	12	6.5	- 2.3
B	9	5.6	1.6

(a) Both goods are normal goods in both cities A and B

(b) Good X is a normal good in both cities ; good Y is an inferior good in city A

(c) Good X is a normal good in both cities ; good Y is an inferior good in city B

(d) Need more information to make an accurate comment

ILLUSTRATION 7 [Pg no.- 2.35] **Cross Price Elasticity of Demand**

A shopkeeper sells only two brands of note books Imperial and Royal. It is observed that when the price of Imperial rises by 10% the demand for Royal increases by 15%.What is the cross price elasticity for Royal against the price of Imperial?

ILLUSTRATION 8 [Pg no.- 2.36] **Cross Price Elasticity of Demand**

The cross price elasticity between two goods X and Y is known to be - 0.8. If the price of good Y rises by 20%, how will the demand for X change?

ILLUSTRATION 9 [Pg no.- 2.36] **Cross Price Elasticity of Demand**

The price of 1kg of tea is Rs 30. At this price 5kg of tea is demanded. If the price of coffee rises from Rs 25 to Rs 35 per kg, the quantity demanded of tea rises from 5kg to 8kg. Find out the cross price elasticity of tea.

ILLUSTRATION 10 [Pg no.- 2.36] **Cross Price Elasticity of Demand**

The price of 1 kg of sugar is Rs 50. At this price 10 kg is demanded. If the price of tea falls from Rs 30 to Rs 25 per kg, the consumption of sugar rises from 10 kg to 12 kg. Find out the cross price elasticity and comment on its value.

Cross Price Elasticity of Demand

If the quantity demanded of mutton increases by 5% when the price of chicken increases by 20%, the cross-price elasticity of demand between mutton and chicken is **[Q 18- Pg no.- 2.86]**

(a) -0.25

(b) 0.25

(c) -4

(d) 4

Cross Price Elasticity of Demand

When the numerical value of cross elasticity between two goods is very high, it means **[Q 24- Pg no.- 2.87]**

(a) The goods are perfect complements and therefore have to be used together

(b) The goods are perfect substitutes and can be used with ease in place of one another

(c) There is a high degree of substitutability between the two goods

(d) The goods are neutral and therefore cannot be considered as substitutes

Cross Price Elasticity of Demand

XYZ are three commodities where X and Y are complements whereas X and Z are substitutes. A shopkeeper sells commodity X at ₹ 40 per piece. At this price he is able to sell 100 pieces of X per month. After some time he decreases the price of X to ₹ 20. Following the price decrease, he is able to sell 150 pieces of X per month, the demand for Y increases from 25 units to 50 units and the demand for commodity Z decreases from 150 to 75 units. [Pg no.- xiv]

Answer the following using para given in previous page

Cross Price Elasticity of Demand

The price elasticity of demand when the price of X decreases from ₹ 40 per piece to ₹ 20 per piece will be equal to:

(a) 1.5 (b) 1.0

(c) 1.66 (d) 0.6

The cross elasticity of monthly demand for Y when the price of X decrease from ₹ 40 to ₹ 20 is equal to:

(a) +1 (b) –1

(c) –1.5 (d) +1.5

The cross-elasticity of Z when the price of X decreases from 40 to 20 is equal to:

(a) –0.6 (b) +0.6

(c) –1 (d) +1

Advertisement Elasticity of Demand

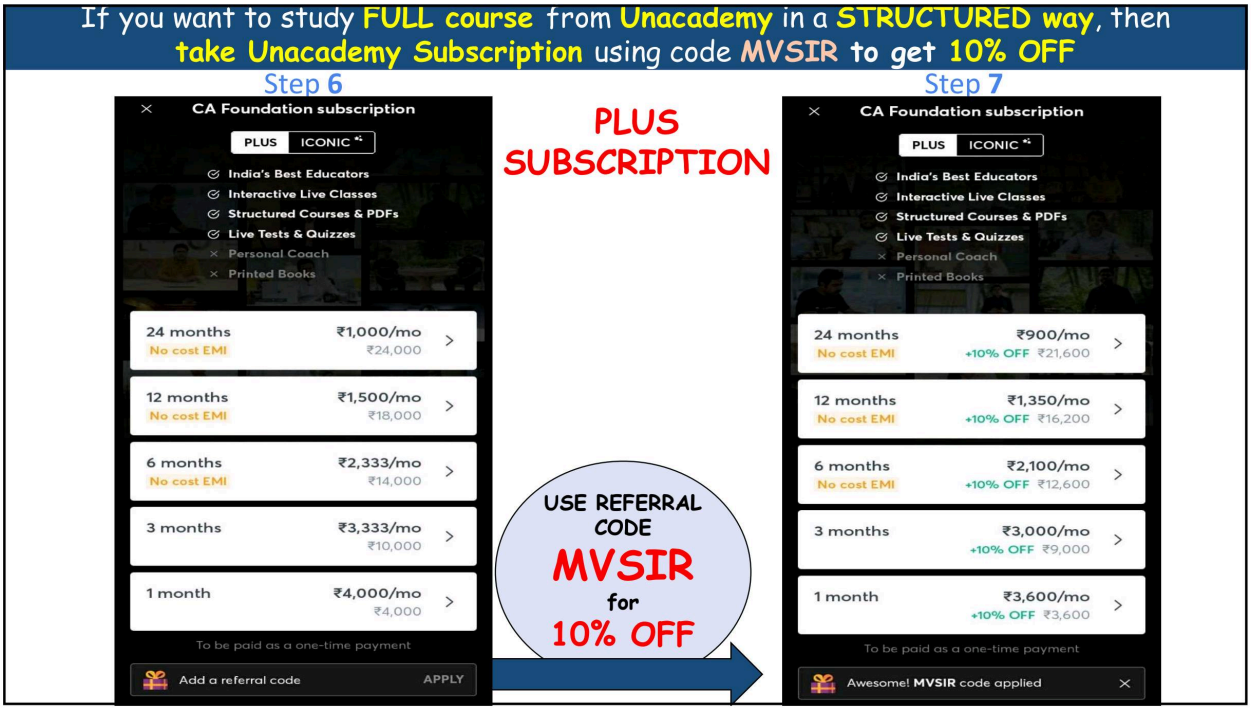
When the advertisement expenditure on Mimo Mobile Phone was Rs 2,00,000, the company could sell only 20,000 units. The company thought of increasing the sales and thus increased the advertisement expenditure to Rs 3,50,000, leading to an increase in sale by 25,000 units. What is the advertisement elasticity ? [New Question]

a) 1.67

b) 0.33

c) -0.33

d) -1.67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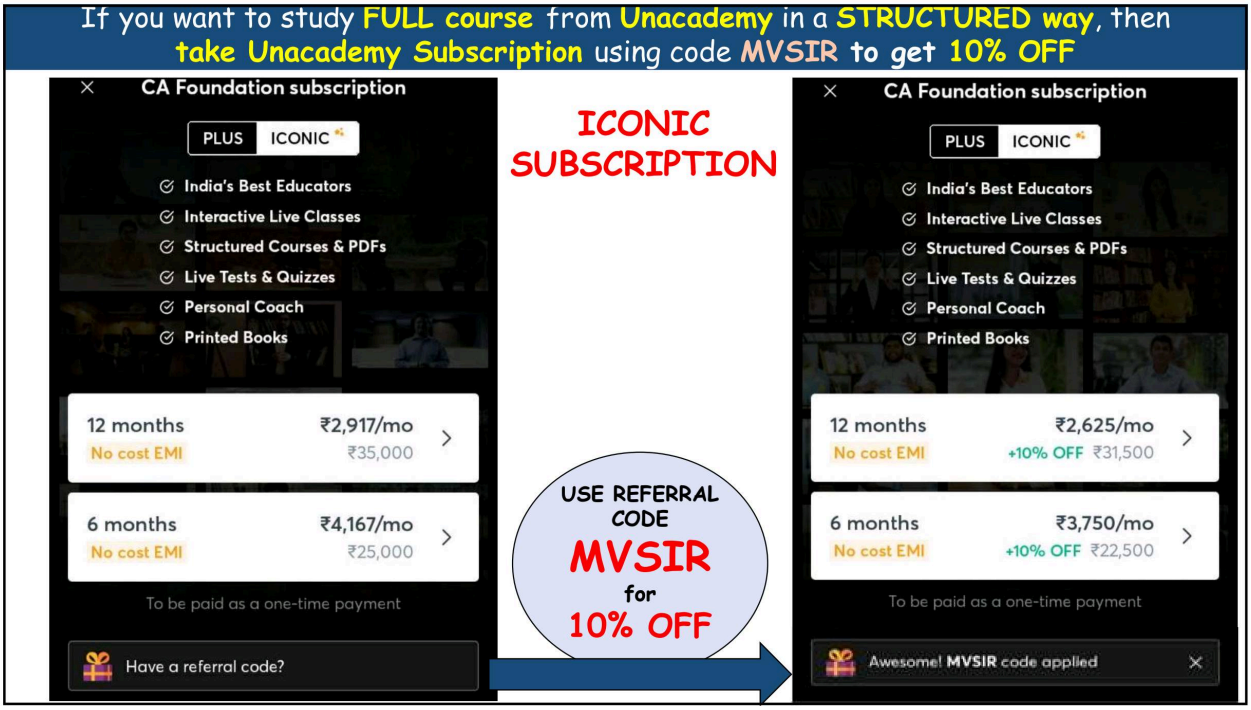
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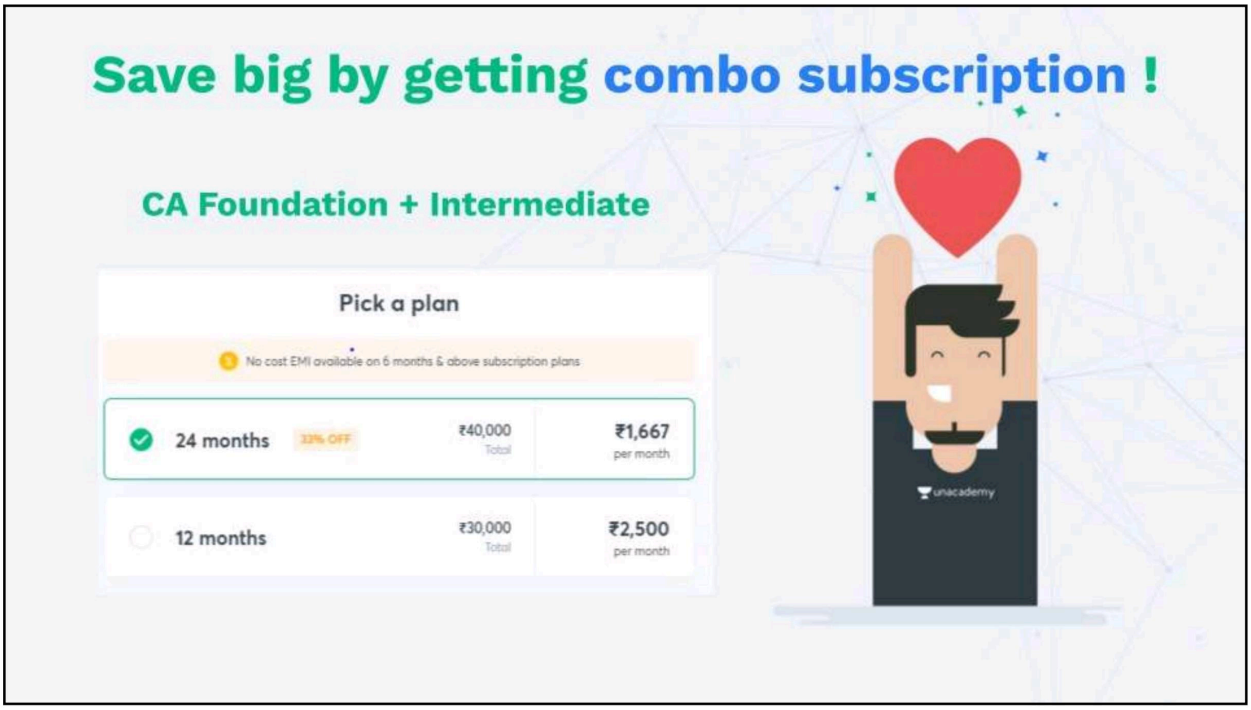
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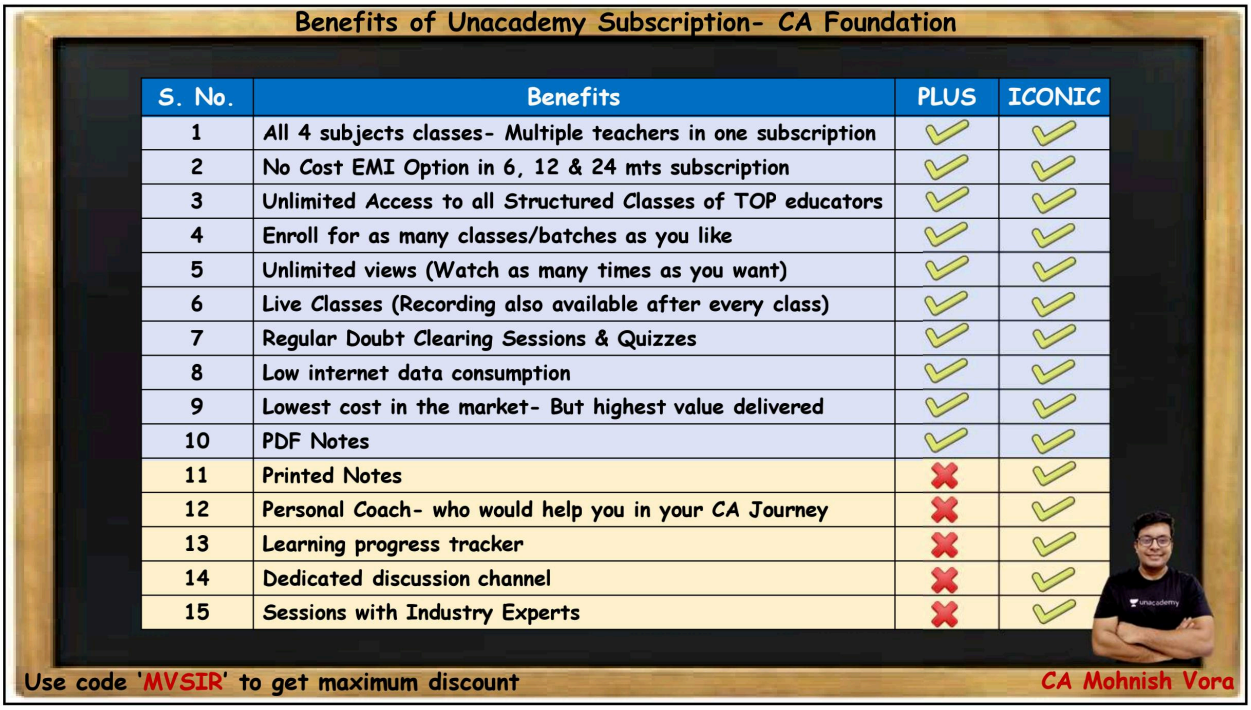
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