

CLASS XI | CBSE | 2025-26

INTRODUCTORY

MICROECONOMICS

CHAPTER 4

Consumer's Equilibrium
Indifference Curve Analysis

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Chapter Overview

What You Will Learn:

1. Indifference Curve (IC) — meaning, properties, and diagram
2. Marginal Rate of Substitution (MRS) — meaning and calculation
3. Indifference Map — what it is and what it shows
4. Budget Line — meaning, slope, and shifts
5. Consumer's Equilibrium using IC and Budget Line
6. Effect of income change and price change on Budget Line

Exam Importance: IC diagram, MRS calculation, and Budget Line concept are asked for 4-6 marks. This chapter is very diagram-heavy — you MUST practice drawing ICs and Budget Lines.

1. INDIFFERENCE CURVE (IC) — MEANING

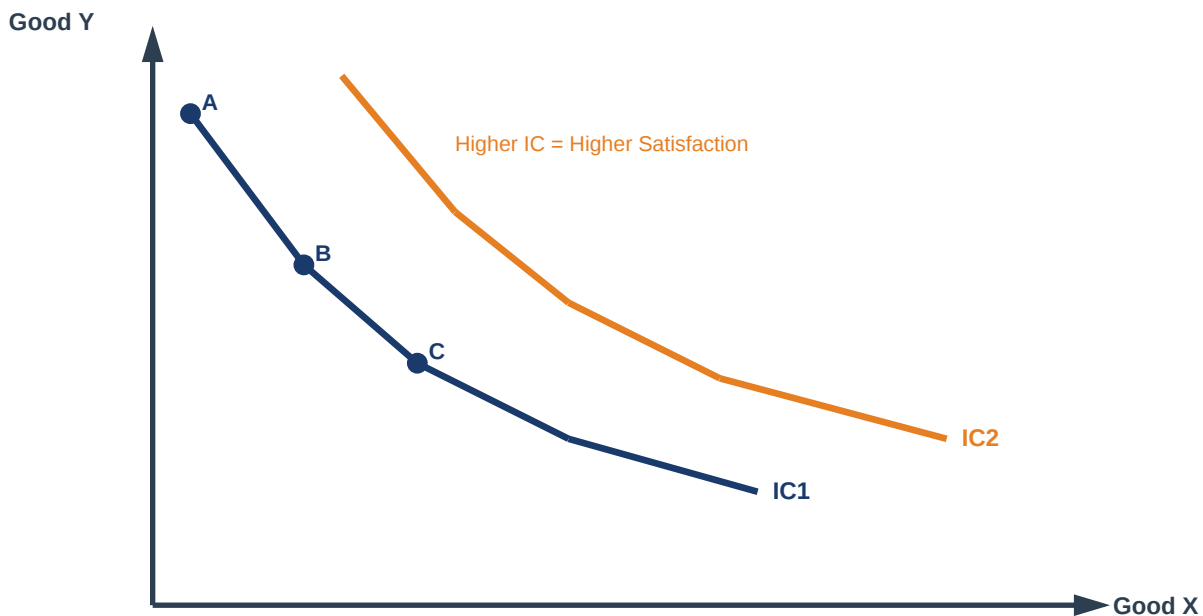
DEFINITION: Indifference Curve (IC)

An Indifference Curve is a curve showing all the combinations of two goods that give the consumer the SAME level of satisfaction (utility). The consumer is indifferent (has no preference) between any two points on the same IC.

EXAMPLE: Example of Indifference Curve

Suppose you get equal satisfaction from these combinations of Apple and Orange:
Combination A: 1 Apple + 4 Oranges
Combination B: 2 Apples + 2 Oranges
Combination C: 3 Apples + 1 Orange
If all three give you the same satisfaction, they all lie on the SAME IC.

Indifference Curve Diagram:



2. PROPERTIES OF INDIFFERENCE CURVE

Property	Statement	Reason / Explanation
IC slopes downward (negative slope)	IC goes from top-left to bottom-right	To have more of X, consumer must give up some Y (trade-off). Both goods are desirable.
IC is convex to origin	IC curves inward (bows toward origin)	MRS decreases as we move down the IC. Consumer gives up less Y for each extra unit of X.
ICs cannot intersect each other	Two ICs never cross	If they cross, one point would give two different utility levels — contradiction.

Higher IC = Higher satisfaction	$IC_2 > IC_1$ (further from origin)	Higher IC has more of both goods, hence more satisfaction.
ICs do not touch axes (generally)	Curve does not reach X or Y axis	Consumer must consume positive quantities of both goods.

MEMORY TRICK

IC Properties Trick: 'DCIHN' D = Downward sloping | C = Convex to origin | I = ICs cannot Intersect | H = Higher IC = Higher utility | N = Never touch axes MOST IMPORTANT: Convexity is because MRS DECREASES (not increases!)

3. MARGINAL RATE OF SUBSTITUTION (MRS)

DEFINITION: Marginal Rate of Substitution (MRS)

MRS is the rate at which the consumer is willing to give up Good Y to get one additional unit of Good X, while keeping total satisfaction constant (staying on the same IC).

$$\text{MRS}_{xy} = \text{Units of Y given up} / \text{Units of X gained} = -\text{Change in Y} / \text{Change in X}$$

Negative sign is sometimes added to make MRS positive (since Y decreases when X increases).

Movement on IC	Units of X (gained)	Units of Y (given up)	MRS
A → B	1	4	4
B → C	1	3	3
C → D	1	2	2
D → E	1	1	1

Why Does MRS Decrease?

As the consumer gets MORE of Good X, X becomes less desirable (diminishing MU). At the same time, the consumer has LESS of Y, so Y becomes more desirable (higher MU). Therefore, the consumer is willing to give up LESS Y for each additional unit of X. This is why MRS decreases.

Decreasing MRS → IC is CONVEX to origin. (This is the most important connection!)

4. BUDGET LINE

DEFINITION: Budget Line (Price Line / Budget Constraint)

A Budget Line shows all the combinations of two goods that a consumer can buy by spending his/her entire income at given prices. Any combination ON the budget line is affordable. Any combination ABOVE it is unaffordable.

Budget Line Equation: $M = P_x \cdot Q_x + P_y \cdot Q_y$

Where M = Money Income, P_x = Price of X, Q_x = Quantity of X, P_y = Price of Y, Q_y = Quantity of Y

EXAMPLE: Budget Line Example

Income (M) = Rs. 100, Price of Good X (P_x) = Rs. 10, Price of Good Y (P_y) = Rs. 20
 X-intercept: $M/P_x = 100/10 = 10$ units of X (if all income spent on X) Y-intercept: $M/P_y = 100/20 = 5$ units of Y (if all income spent on Y) Slope of Budget Line = $-P_x/P_y = -10/20 = -1/2$
 Budget Line connects point (10, 0) on X-axis to (0, 5) on Y-axis.

Shifts in Budget Line:

Situation	Effect on Budget Line	Direction
Income increases (P_x , P_y unchanged)	Parallel shift OUTWARD (right)	More affordable combinations
Income decreases (P_x , P_y unchanged)	Parallel shift INWARD (left)	Fewer affordable combinations
Price of X falls (M, P_y unchanged)	Rotates OUTWARD on X-axis only	X-intercept increases; Y-intercept unchanged
Price of X rises (M, P_y unchanged)	Rotates INWARD on X-axis only	X-intercept decreases; Y-intercept unchanged
Price of Y falls	Rotates OUTWARD on Y-axis only	Y-intercept increases; X-intercept unchanged

5. CONSUMER'S EQUILIBRIUM

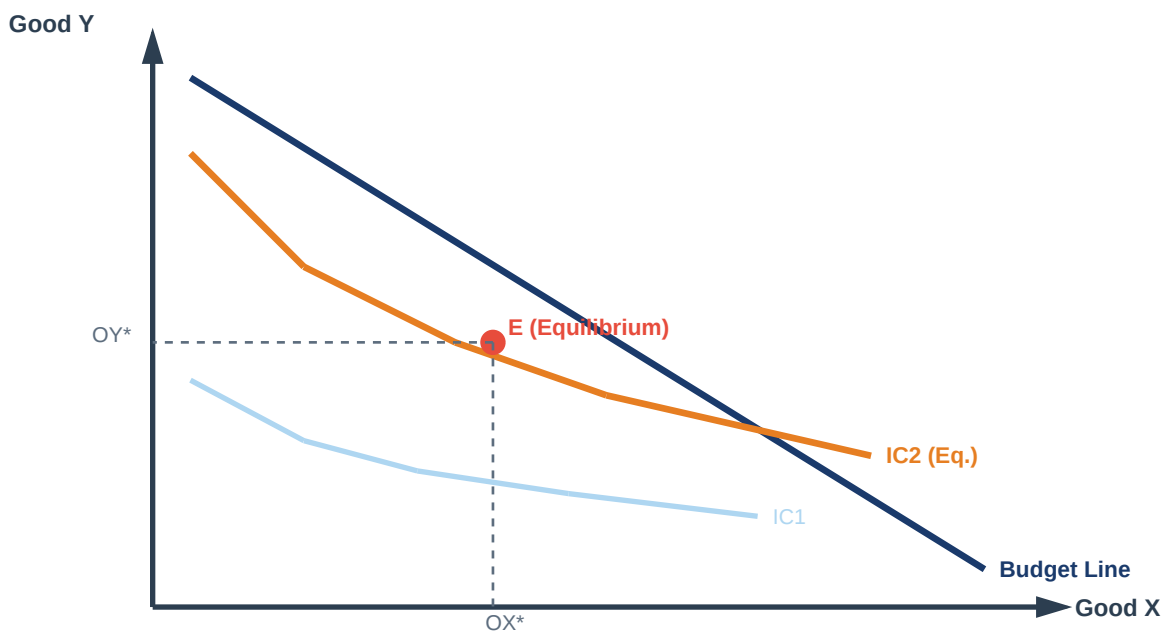
DEFINITION: Consumer's Equilibrium (IC Analysis)

*A consumer reaches equilibrium when the Budget Line is **TANGENT** to an Indifference Curve. At this point, the consumer maximises satisfaction given income and prices.*

Two Conditions for Equilibrium:

Condition	Mathematical Form	Meaning
Condition 1: IC tangent to Budget Line	$MRS_{xy} = P_x/P_y$	Rate of substitution (MRS) = Price ratio. Consumer adjusts to where willingness to trade = market rate.
Condition 2: IC convex to origin	MRS decreasing at equilibrium point	Ensures this is a MAXIMUM (not minimum) — IC must curve toward origin.

Consumer Equilibrium Diagram:



How to Explain Equilibrium Diagram in Exam:

At point E, IC2 is tangent to the Budget Line. This means $MRS = P_x/P_y$ (slope of IC = slope of Budget Line).

IC2 is convex to origin, confirming this is a maximum satisfaction point.

The consumer buys OX^* of Good X and OY^* of Good Y.

IC1 (below E) is intersected by Budget Line — so consumer could do better. IC3 (above) is unaffordable.

Therefore E is the OPTIMAL point where consumer maximises satisfaction.

EXAM-ORIENTED QUESTIONS

1-Mark Questions

Q1. What is an Indifference Curve?

Ans. An IC is a curve showing all combinations of two goods that give the consumer equal satisfaction.

Q2. Why is IC convex to origin?

Ans. Because Marginal Rate of Substitution (MRS) decreases as we move down the IC.

Q3. Can two ICs intersect? Give reason.

Ans. No. If two ICs intersected, one point would show two different utility levels — a logical contradiction.

Q4. What is MRS?

Ans. MRS (Marginal Rate of Substitution) = Rate at which a consumer gives up Good Y to gain one more unit of Good X while remaining on the same IC.

Q5. What does a Budget Line show?

Ans. Budget Line shows all combinations of two goods that a consumer can buy by spending his entire income at given prices.

Q6. What is the slope of Budget Line?

Ans. Slope of Budget Line = $-P_x/P_y$ (negative ratio of prices of the two goods).

Q7. What is the condition for consumer's equilibrium using IC analysis?

Ans. $MRS_{xy} = P_x/P_y$ AND IC must be convex to origin at that point.

Q8. What happens to Budget Line if consumer's income increases?

Ans. Budget Line shifts OUTWARD (parallel shift to the right) — consumer can afford more combinations.

6-Mark Question

Q1. Explain consumer's equilibrium using indifference curve analysis with the help of a diagram. (6 marks)

Step 1 — Introduction: Consumer's equilibrium is reached when the consumer maximises satisfaction given his income and prices. In IC analysis, this occurs where the Budget Line is tangent to an IC.

Step 2 — IC: An Indifference Curve shows all combinations giving equal satisfaction. Higher IC = higher satisfaction.

Step 3 — Budget Line: Shows what the consumer can afford. Slope = $-P_x/P_y$.

Step 4 — Equilibrium Conditions: (a) IC must be tangent to Budget Line $\rightarrow MRS = P_x/P_y$.
(b) IC must be convex to origin at equilibrium point.

Step 5 — Diagram: Draw axes, draw Budget Line from Y-intercept (M/P_y) to X-intercept (M/P_x). Draw three ICs. Mark equilibrium point E where Budget Line is tangent to IC2. Mark optimal quantities OX^* and OY^* .

Step 6 — Logic: Points below E (on IC1) give less satisfaction even though affordable. Points above (IC3) are unaffordable. Only E on IC2 gives MAXIMUM ATTAINABLE satisfaction.

Conclusion: The consumer buys OX^* units of Good X and OY^* units of Good Y to maximise satisfaction.

CHAPTER SUMMARY

KEY POINTS:

1. IC = Curve of equal satisfaction. All points on IC give same utility.
2. IC Properties: Downward sloping, Convex, Cannot intersect, Higher IC = higher utility.
3. $MRS = Y \text{ given up} / X \text{ gained}$. MRS decreases along IC → causes convexity.
4. Budget Line = affordable combinations. Slope = $-P_x/P_y$.
5. Equilibrium: Budget Line tangent to IC. Condition: $MRS = P_x/P_y$.
6. Income change → Parallel shift of Budget Line. Price change → Rotation of Budget Line.
7. Indifference Map = Family of ICs. Each IC = different level of utility.

LAST-MINUTE REVISION:

IC = Same utility | Higher IC = More utility | ICs NEVER intersect

$MRS = Y/X$ given up. MRS decreases = Convex IC

Budget Line slope = $-P_x/P_y$ | Income up → Parallel shift right | P_x falls → Rotate right on X-axis

Equilibrium: Budget Line TANGENT to IC + IC CONVEX at that point

Condition: $MRS = P_x/P_y$