

CLASS XI | CBSE | 2025-26

INTRODUCTORY

MICROECONOMICS

CHAPTER 3

Consumer's Equilibrium

Utility Analysis

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Chapter Overview

What You Will Learn:

1. Meaning of Utility — Total Utility (TU) and Marginal Utility (MU)
2. Law of Diminishing Marginal Utility (DMU) — statement, table, diagram
3. Relationship between TU and MU
4. Consumer's Equilibrium — Single Commodity (Law of Equi-Marginal Utility)
5. Consumer's Equilibrium — Two Commodities
6. Numericals on TU and MU

Exam Importance: This chapter carries 4-6 marks every year. Law of DMU diagram and Consumer Equilibrium formula are MOST important. Numericals on TU-MU are asked for 3-4 marks.

1. MEANING OF UTILITY

DEFINITION: Utility

Utility is the want-satisfying power of a commodity. It is the satisfaction that a consumer gets from consuming a good or service. Utility is subjective — it varies from person to person, place to place, and time to time.

EXAMPLE: Examples of Utility

1. A cold water bottle has HIGH utility on a hot summer day, but LOW utility on a cold winter night. 2. Food has high utility for a hungry person, low utility for a full person. 3. An umbrella has high utility in the rainy season.

Important Points about Utility:

- (a) Utility does NOT mean usefulness — e.g., wine has utility for a drinker even if it is not useful.
- (b) Utility is SUBJECTIVE — depends on the person, time, and place.
- (c) Utility is measured in imaginary units called "UTILS".
- (d) Cardinal Utility approach: Utility can be measured in numbers (Marshall's approach).
- (e) Ordinal Utility approach: Utility can only be ranked, not measured (Hicks's approach — Chapter 4).

Basis	Cardinal Utility (Marshall)	Ordinal Utility (Hicks)
Meaning	Utility can be measured in numbers	Utility can only be ranked
Measurement	In utils (1, 2, 10 utils)	In order (1st, 2nd, 3rd preference)
Tool used	Total Utility, Marginal Utility	Indifference Curves
Chapter	Chapter 3	Chapter 4
Assumption	Utility is measurable	Utility is not measurable but can be compared

2. TOTAL UTILITY (TU) AND MARGINAL UTILITY (MU)

Total Utility (TU)

DEFINITION: Total Utility (TU)

Total Utility is the total satisfaction that a consumer gets from consuming all units of a commodity. TU is the SUM of all marginal utilities.

$$TU = MU_1 + MU_2 + MU_3 + \dots + MU_n = \text{Sum of all Marginal Utilities}$$

$$\text{OR: } TU_n = TU_{(n-1)} + MU_n$$

Marginal Utility (MU)

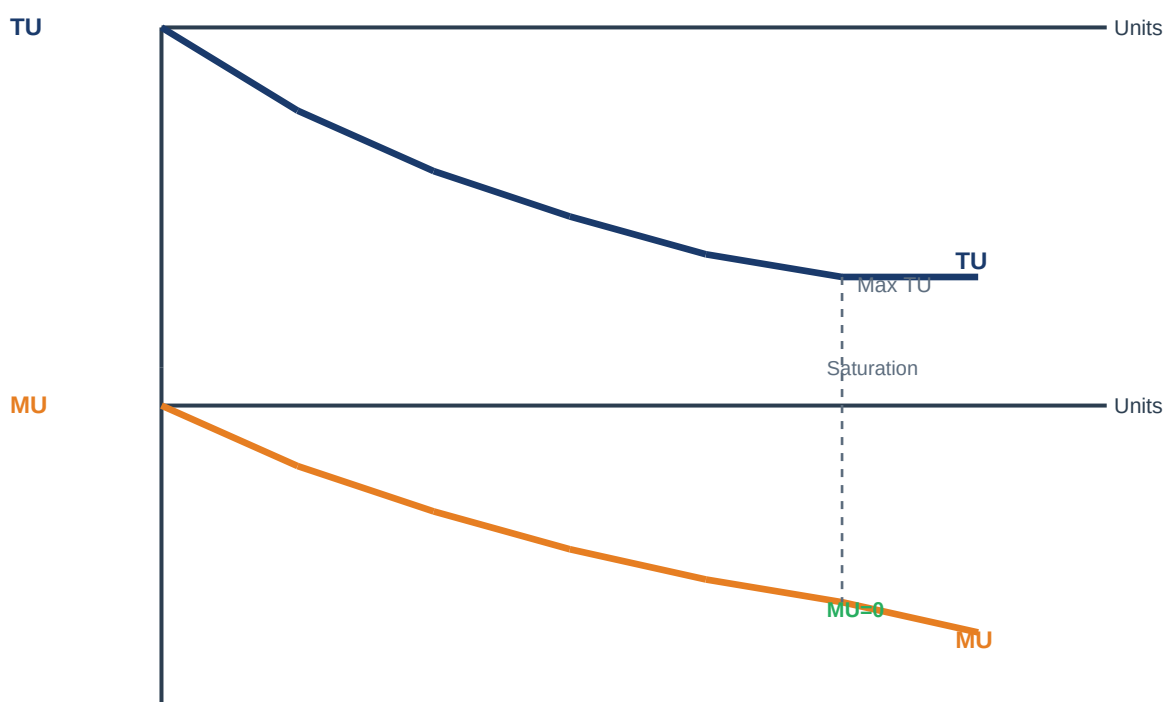
DEFINITION: Marginal Utility (MU)

Marginal Utility is the additional satisfaction gained from consuming one more unit of a commodity. It is the CHANGE in Total Utility when one more unit is consumed.

$$MU = \text{Change in TU} / \text{Change in Quantity} = TU_n - TU_{(n-1)}$$

TU and MU Schedule (Numerical Example):

Units Consumed	Total Utility (TU)	Marginal Utility (MU)	Observations
0	0	—	No consumption, no satisfaction
1	10	10 (10-0)	First unit gives maximum satisfaction
2	18	8 (18-10)	MU falling but positive → TU still rising
3	24	6 (24-18)	MU falling → TU rising slowly
4	28	4 (28-24)	MU falling → TU still rising
5	30	2 (30-28)	MU very small → TU rising slowly
6	30	0 (30-30)	MU = 0 → TU is MAXIMUM (Point of Saturation)
7	28	-2 (28-30)	MU is NEGATIVE → TU FALLS

TU and MU Diagram:**Key Observations from TU-MU Diagram:**

1. When MU is POSITIVE and FALLING → TU is INCREASING at a decreasing rate.
2. When MU = ZERO → TU is at its MAXIMUM (Point of Saturation). Consumer should STOP here.
3. When MU is NEGATIVE → TU is FALLING. Consumer has consumed TOO MUCH.
4. MU curve is always BELOW the TU curve (for the same output level).

3. LAW OF DIMINISHING MARGINAL UTILITY (LAW OF DMU)

DEFINITION: Law of Diminishing Marginal Utility (Alfred Marshall)

"As a consumer consumes more and more units of a commodity, the marginal utility derived from each successive unit goes on diminishing (falling)." In other words, the more you consume of a good, the less satisfaction you get from each additional unit.

EXAMPLE: Easy Daily Life Example

You are very thirsty. You drink glasses of water one by one: 1st glass → Very satisfying (MU = 20 utils) 2nd glass → Less satisfying (MU = 15 utils) 3rd glass → Even less (MU = 8 utils) 4th glass → Slightly satisfying (MU = 3 utils) 5th glass → No satisfaction (MU = 0 utils) 6th glass → Discomfort! (MU = -5 utils) This is the Law of Diminishing Marginal Utility in action!

Assumptions of the Law of DMU:

- (a) Units consumed are standard/homogeneous (same size, quality).
- (b) Consumption is continuous (no gap between units).
- (c) Consumer is rational (acts to maximise satisfaction).
- (d) Income, taste, and preferences of consumer remain constant.
- (e) Price of the commodity remains unchanged.

Exceptions to Law of DMU (when MU does NOT fall):

- (a) Hobbies: For a collector (stamps, coins), MU may increase initially.
- (b) Alcohol: For habitual drinkers, early units may give increasing MU.
- (c) Listening to music: You may enjoy more with each listen.
- (d) Misers and money: More money may give more MU to a miser.

MEMORY TRICK

TRICK to remember Law of DMU: 'MORE you EAT, LESS you BEAT' — more consumption = less marginal satisfaction. Think of eating mangoes: 1st mango is heaven, 10th mango is torture! The law applies to all normal goods under normal circumstances.

4. CONSUMER'S EQUILIBRIUM — SINGLE COMMODITY

DEFINITION: Consumer's Equilibrium

A consumer is said to be in equilibrium when he/she is spending his/her income in such a way that the last rupee spent on each good gives equal marginal utility. At equilibrium, the consumer maximises total satisfaction.

Condition for Equilibrium — ONE Commodity:

$$\text{MU of commodity (MU}_x\text{)} = \text{Price of commodity (P}_x\text{)} \times \text{MU of Money (MU}_m\text{)}$$

In simpler form: $\text{MU}_x / \text{P}_x = \text{MU}_m \rightarrow \text{MU}_x = \text{P}_x \times \text{MU}_m$

Logic Behind the Condition (Very Important for Exam):

Case 1: If $\text{MU}_x > \text{P}_x \times \text{MU}_m \rightarrow$ Consumer should buy MORE of X (more utility than cost $\rightarrow$ buy more).

Case 2: If $\text{MU}_x < \text{P}_x \times \text{MU}_m \rightarrow$ Consumer should buy LESS of X (less utility than cost $\rightarrow$ buy less).

Case 3: If $\text{MU}_x = \text{P}_x \times \text{MU}_m \rightarrow$ Consumer is in EQUILIBRIUM (utility = cost $\rightarrow$ just right!).

5. CONSUMER'S EQUILIBRIUM — TWO COMMODITIES

Law of Equi-Marginal Utility (Law of Maximum Satisfaction):

DEFINITION: Law of Equi-Marginal Utility

A consumer spending his/her fixed income on two commodities X and Y will be in equilibrium when the Marginal Utility per rupee spent is equal for both goods AND income is fully spent.

$$\text{MU}_x / \text{P}_x = \text{MU}_y / \text{P}_y = \text{MU}_m \text{ (and income is fully spent)}$$

Where: MU_x = Marginal Utility of X, P_x = Price of X, MU_y = Marginal Utility of Y, P_y = Price of Y, MU_m = MU of Money

Numerical Example — Two Commodity Equilibrium:

Given: Income = Rs. 24, Price of X (P_x) = Rs. 4, Price of Y (P_y) = Rs. 6

Units	MU _x (utils)	MU _x /P _x	MU _y (utils)	MU _y /P _y
1	40	10	54	9
2	32	8	48	8
3	28	7	42	7

4	24	6	36	6
5	16	4	30	5

Solution (Step-by-Step):

Step 1: Find where $MU_x/P_x = MU_y/P_y$. From table: At $X=2$ and $Y=2$, $MU_x/P_x = 8$ and $MU_y/P_y = 8$. At $X=3$ and $Y=3$, $MU_x/P_x = 7$ and $MU_y/P_y = 7$.

Step 2: Check budget: If $X=2$, $Y=2 \rightarrow$ Spending = $2 \times 4 + 2 \times 6 = 8 + 12 = \text{Rs. } 20$ (not equal to Rs. 24)

Step 3: If $X=3$, $Y=2 \rightarrow$ Spending = $3 \times 4 + 2 \times 6 = 12 + 12 = \text{Rs. } 24$ ✓ (income fully spent!)

Step 4: But MU_x/P_x (at $X=3$) = 7 and MU_y/P_y (at $Y=2$) = 8 $\rightarrow$ NOT equal.

Step 5: Try $X=2$, $Y=2$ + check if we can buy one more of cheaper $\rightarrow$ Actually equilibrium at $X=3$, $Y=2$ considering budget constraint carefully.

FINAL ANSWER: Consumer buys 3 units of X and 2 units of Y. Total spending = Rs. 24.

COMMON MISTAKE

Common Mistake: Students forget to check that income is FULLY SPENT. Both conditions must hold simultaneously: $MU_x/P_x = MU_y/P_y$ AND budget is fully used. Missing either condition = incomplete answer.

EXAM-ORIENTED QUESTIONS

1-Mark Questions

Q1. Define Utility.

Ans. Utility is the want-satisfying power of a commodity. It is the satisfaction a consumer derives from consuming a good.

Q2. Define Marginal Utility.

Ans. Marginal Utility is the additional satisfaction from consuming one more unit of a commodity. $MU = \text{Change in TU} / \text{Change in quantity}$.

Q3. At what point does Total Utility reach its maximum?

Ans. TU is maximum when Marginal Utility (MU) is equal to ZERO.

Q4. When does TU fall?

Ans. TU falls when MU becomes NEGATIVE (consumer has over-consumed).

Q5. State the Law of Diminishing Marginal Utility in one line.

Ans. As consumption increases, Marginal Utility from each additional unit goes on diminishing.

Q6. What is the condition for consumer's equilibrium for a single commodity?

Ans. $MU_x = P_x \times MU_m$, i.e., MU of commodity = Price $\times$ MU of money.

Q7. What is the condition for consumer's equilibrium for two commodities?

Ans. $MU_x/P_x = MU_y/P_y = MU_m$, and income should be fully spent.

Q8. What are "utils"?

Ans. Utils are imaginary units used to measure utility in cardinal utility analysis.

4-Mark Numerical Question

Q1. From the following MU schedule, find TU and identify the point of consumer equilibrium if Price = Rs. 3.

Units	MU (utils)	TU (utils)	MU/Price
1	30	30	10
2	24	54	8
3	18	72	6
4	12	84	4
5	6	90	2
6	0	90	0

Solution:

TU: 30, 54 (30+24), 72 (54+18), 84 (72+12), 90 (84+6), 90 (90+0) ✓

Equilibrium when $MU_x = P_x \times MU_m$. Assuming $MU_m = 1$: equilibrium when $MU = \text{Price} = \text{Rs. } 3$.

At 4 units: $MU = 12 \neq 3$. At 5 units: $MU = 6 \neq 3$.

Note: If $MU_m = 2$, equilibrium at 5 units ($MU = 6 = 3 \times 2$). Exact equilibrium depends on MU_m assumed.

TU is maximum (90 utils) at 5th and 6th units. $MU = 0$ at 6th unit = saturation point.

CHAPTER SUMMARY

KEY POINTS:

1. Utility = Want-satisfying power of a good. Measured in Utils (Cardinal approach).
2. $TU = \text{Sum of all MUs}$. $MU = \text{Change in TU} / \text{Change in units}$.
3. TU rises when $MU > 0$, is maximum when $MU = 0$, falls when $MU < 0$.
4. Law of DMU: More consumption $\rightarrow$ Less MU from each successive unit.
5. Single commodity equilibrium: $MU_x = P_x \times MU_m$.
6. Two commodity equilibrium: $MU_x/P_x = MU_y/P_y = MU_m$ + full income spent.
7. Law used for two commodities = Law of Equi-Marginal Utility (Gossen's Second Law).

LAST-MINUTE REVISION:

Cardinal = Measurable | Ordinal = Rankable

$MU = 0 \rightarrow TU$ is MAX (Saturation) | $MU < 0 \rightarrow TU$ FALLS

DMU Law: More units $\rightarrow$ Less MU | Exceptions: Hobbies, Alcohol

Single good equilibrium: $MU_x = P_x \times MU_m$

Two goods equilibrium: $MU_x/P_x = MU_y/P_y$ AND income fully spent