

CONSUMER EQUILIBRIUM IMPORTANT QUESTIONS

Q.1 State giving reasons whether the following statements are true or false: (4 marks)

(a) Marginal utility can never be negative.

(b) When the marginal utility falls, total utility also decreases.

Ans. (a); False: When marginal utility (MU) falls, total utility (TU) may increase (at decreasing rate) so long as MU is positive, TU increases. When TU decreases, consumer stops consumption thereby preventing MU from becoming negative.

(b) False: Marginal utility of a good falls and becomes negative when total utility falls as consumption of additional units of a commodity. is positive.

Q.2 A consumer consumes only two goods X and Y and is in equilibrium. Show that when the price of the good X rises, the consumer buys less of good X. Explain using the law of Equi-Marginal Utility. (3 marks)

Ans. According to the law of Equi-Marginal Utility, the consumer is in equilibrium when $MU_x/P_x = MU_y/P_y$.

Now, given that P_x rises, then $MU_x/P_x < MU_y/P_y$. Since per rupee MU_x is lower than per rupee MU_y , it means that satisfaction derived from consumption of good X is less than the satisfaction derived from consumption of good Y. Therefore, the consumer will buy less of X. It shows that when P_x rises, demand for X falls.

Q.3 A consumer consumes only two goods X and Y and is in equilibrium. Price of X falls. Explain the reaction of consumer through the marginal utility analysis. (3 marks)

Ans. According to the marginal utility analysis, the consumer is in equilibrium when $MU_x/P_x = MU_y/P_y$. Now, given that P_x falls, then $MU_x/P_x > MU_y/P_y$. Since per rupee MU_x is greater than per rupee MU_y , it means that satisfaction derived from consumption of good X is greater than the satisfaction derived from consumption of good Y. This will induce the consumer to buy more of X by reducing expenditure on Y.

— Buying more of X reduces MU_x . P_x remaining unchanged, MU_x/P_x is also reduced. — Buying less of Y raises MU_y . P_y remaining unchanged, it raises MU_y/P_y .
The change continues till MU_x/P_x becomes equal to MU_y/P_y and the consumer is in equilibrium.

Q.4 A consumer consumes only two goods X and Y whose prices are `4 and `5 per unit respectively. If the consumer chooses a combination of the two goods with marginal utility of X equal to 5 and that of Y equal to 4, is the consumer in equilibrium? Give reasons. What will a rational consumer do in this situation? Use utility analysis. (4 marks)

Ans. The consumer is in equilibrium when $MU_x/P_x = MU_y/P_y$ (Law of Equi-Marginal Utility). Since $P_x = 4$, $P_y = 5$, $MU_x = 5$ and $MU_y = 4$, therefore, $MU_x/P_x = 5/4 = 1.25$ and $MU_y/P_y = 4/5 = 0.8$. Since $MU_x/P_x \neq MU_y/P_y$, therefore, the consumer is not in equilibrium. Here, $MU_x/P_x > MU_y/P_y$. It means that the satisfaction a consumer derives from spending a rupee on Good X is greater than the satisfaction derived from spending a rupee on Good Y. The consumer will reallocate his income – substitute Good X for Good Y. As the consumption of Good X increases its marginal

utility will fall. As the consumption of Good Y decreases, its marginal utility will increase. This is due to the law of diminishing marginal utility. This process will continue till MU_x/P_x becomes equal to MU_y/P_y and the consumer is in equilibrium.

Q.5 If a rational consumer is consuming only two Goods X and Y, state her likely behaviour to attain consumer's equilibrium if she faces a situation where $MU_x/P_x < MU_y/P_y$. (3 marks)

Ans. When $MU_x/P_x < MU_y/P_y$, the consumer is obtaining greater marginal utility per rupee in case of good Y as compared to good X. Therefore, he would prefer to buy more units of good Y and lesser units of good X. This will lead to a decline in MU_y and rise in MU_x . The consumer will continue to buy more of Y till he attains equilibrium at a point where $MU_x/P_x = MU_y/P_y$.

Q.6 A consumer consumes only two goods A and B and is in equilibrium. If the price of good B rises, explain the likely reaction of the consumer under utility analysis.

Ans. In case of two goods A and B, a consumer will at equilibrium when:

- $MU \text{ of good A} / \text{Price of good A} = MU \text{ of good B} / \text{Price of good B}$
- MU falls as consumption increases

If the price of Good B rises the per rupee Marginal Utility derived from the consumption of Good A will be more than the consumption of Good B. This will create a situation where: $MU \text{ of good A} / \text{Price of good A} > MU \text{ of good B} / \text{Price of good B}$ (4 marks)

This will induce the consumer to reallocate his expenditure from Good B (less satisfying) to Good A (more satisfying). Therefore, consumer will buy more of Good A and less of Good B. As a result, MU derived from consumption of Good A decreases gradually while the MU derived from consumption of Good B increases. Eventually, this process will continue till $MU \text{ of good A} / \text{Price of good A} = MU \text{ of good B} / \text{Price of good B}$

Q.7 A consumer, Mr. Aman is in state of equilibrium consuming two goods X and Y, with given prices P_x and P_y . Explain what will happen if: (a) MU_x/P_x is greater than MU_y/P_y . (b) P_y falls (6 MARKS)

Ans. (a) If $MU_x/P_x > MU_y/P_y$, then it means that satisfaction of Mr. Aman, derived from spending a rupee on Good X is greater than the satisfaction derived from spending a rupee on Good Y. Mr. Aman, will reallocate his income by substituting Good X for Good Y. As the consumption of Good X increases its marginal utility will fall. As the consumption of Good Y decreases, its marginal utility will increase. This is due to the law of diminishing marginal utility. This process will continue till MU_x/P_x becomes equal to MU_y/P_y and the consumer is in equilibrium.

(b) If P_y falls, $MU_x/P_x < MU_y/P_y$, then it means that satisfaction derived from spending a rupee on Good X is lesser than the satisfaction derived from spending a rupee on Good Y.

Mr. Aman will reallocate his income by substituting Good Y for Good X. As the consumption of Good Y increases the marginal utility derived from it goes on diminishing and reverse proposition occurs for Good X, this process will continue till MU_x/P_x becomes equal to MU_y/P_y .

Q. 8 A consumer consumes only two goods X and Y. His money income is `24 and the prices of Goods X and Y are `4 and `2 respectively. Answer the following questions:

(i) What is the equation of budget line and its slope? (ii) How much of the good X can the consumer have by spending his entire income on that good? (iii) How much of the good Y can the consumer have by spending his entire income on that good? (iv) How does the budget line change if consumer's income increases to `48 but the prices remain unchanged? (v) How does the budget line change if price of good X falls by `1 but the price of good Y and income remain unchanged?

ANS: i) Equation of the budget line is $P_x Q_x + P_y Q_y = M$

Substituting $P_x = 4$, $P_y = 2$ and $M = 24$, we get the equation of budget line $4Q_x + 2Q_y = 24$

Slope of budget line = $(-) P_x/P_y = - 4/2 = - 2$

(ii) $Q_x = M/P_x = 24/4 = 6$, i.e. if the consumer spends his entire income on good X he can have 6 units of it.

(iii) $Q_y = M/P_y = 24/2 = 12$, i.e. if the consumer spends his entire income on good Y he can have maximum 12 units of it.

(iv) $P_x = 4$, $P_y = 2$, $M' = 48$

Equation of new budget line: $4Q_x + 2Q_y = 48$.

If there is an increase in the money income of the consumer, prices of the two goods X and Y remaining unchanged, the consumer can buy more of both the goods at prevailing market prices. Therefore, the new budget line shifts outward to the initial budget line. Since prices of the two goods remain unchanged the slope of the new budget line is the same as the slope of the initial budget line and hence, the new budget line will shift parallel to the initial budget line.

(v) $P'_x = 3$, $P_y = 2$, $M = 24$

Equation of new budget line: $3Q_x + 2Q_y = 24$.

Since price of good X falls, the consumer will be able to buy more of good X in same money income pushing the X-intercept of the budget line away from origin, keeping the Y-intercept constant. The budget line rotates outwards and becomes flatter.

Q. 9 Explain the meaning of budget line. What can cause a change in it ? Explain. (4

marks) **Ans.** A budget line is the locus of points that represent such combinations of two goods on which total expenditure equals total income. Causes of change in budget line are – (i) Change in income of the consumer. (ii) Change in prices of one or both the commodities.

Explanation

(i) Change in income shifts the budget line parallel because consumer can now buy more or less of either of the goods in the same proportion.

(ii) Change in price changes the maximum quantity consumer can buy of one or both the goods, changing one or both the ends of budget line.

Q.10 Why should marginal rate of substitution diminish for a stable consumer's equilibrium? (3 marks)

Ans. Marginal rate of substitution (MRS) is the rate at which consumer is willing to trade-off one good for the other. It depends on the quantity of the two goods s/he is consuming. A rational

consumer will sacrifice lesser units of Good Y so as to acquire additional units of Good X, due to the application of law of diminishing marginal utility. MRS should be diminishing as additional consumption of Commodity X, symbolises fall in marginal utility due to which the consumer will not further increase its consumption. If it does not fall, s/he will keep on increasing the consumption of Commodity-X and will not reach a stable equilibrium.

Q.11. A consumer consumes only two goods X and Y both priced at `3 per unit. If the consumer chooses a combination of these two goods with Marginal Rate of Substitution equal to 3, is the consumer in equilibrium? Give reasons. What will a rational consumer do in this situation? Explain. (4 marks)

Ans. The consumer is in equilibrium when Marginal Rate of Substitution is equal to the ratio of prices of the two goods X and Y, i.e., $MRS = P_x/P_y$.

Since $P_x = 3$ and $P_y = 3$, therefore, $P_x/P_y = 3/3 = 1$. $MRS = 3$

Since $MRS < P_x/P_y$, therefore, the consumer is not in equilibrium.

Here, $MRS > P_x/P_y$. It means that to obtain one extra unit of good X the consumer is willing to sacrifice more units of good Y than what he is required to sacrifice in the market. The consumer gains and buys more quantity of good X. As he goes on obtaining more and more units of good X, marginal utility of good X goes on declining due to the operation of the law of diminishing marginal utility. Therefore, the consumer is willing to sacrifice less and less of good Y each time he obtains one extra unit of good X. In other words, MRS continuously falls. The process continues till MRS becomes equal to P_x/P_y and the consumer is in equilibrium.

Q.12 : State giving reasons whether the following statements are true or false: (4 marks)

1. **(a) A budget set is the collection of all bundles of goods that a consumer wants to buy.**
2. **(b) An indifference curve is convex to the origin because of the operation of the law of diminishing marginal utility.**

Ans. (a) False: A budget set is the collection of all bundles of goods that a consumer can afford to buy with his given income and the prices of the goods in the market.

(b) True: The indifference curve is convex to the origin because when a consumer moves downwards along the indifference curve, Marginal Rate of Substitution (MRS) between the two goods continuously falls due to the operation of the law of diminishing marginal utility.

Q.13 State giving reasons whether the following statements are true or false: (4 marks)

(a) Marginal rate of substitution (MRS) is the term used to denote the rate at which the consumer is required to sacrifice units of one good to obtain one more unit of the other good.

(b) At the point of consumer's equilibrium marginal rate of substitution should be diminishing.

Ans. (a) False: Marginal rate of substitution (MRS) is the term used to denote the rate at which the consumer is willing to sacrifice units of one good to obtain one more unit of the other good.

(b) True: At the point of consumer's equilibrium, MRS falls because of the law of Diminishing Marginal Rate of Substitution. So, the indifference curve is convex to the origin

Q.14 State giving reasons whether the following statements are true or false: (6 marks)

- (a) Lower indifference curve represents higher level of satisfaction.**
- (b) Marginal rate of substitution is a measure of the slope of a budget line.**
- (c) A budget set is a collection of such bundles of goods that give same satisfaction.**

Ans. (a) False: Marginal rate of substitution (MRS) is a measure of the slope of indifference curve. **(b) False:** Lower indifference curve represents lower level of satisfaction because a point on a lower indifference curve represents a consumption bundle which contains less good(s). **(c) False:** Budget set is a collection such bundles of goods which cost less than or equal to the consumer's money income at the given prices.

Q.15 : What is a budget line ? Why the budget line is left to right downward sloping? (3 marks)

Ans. Budget line is a graphical presentation of all those combinations of two goods which costs the consumer exactly his income. It is downward sloping because to buy more of one good, the consumer must reduce the purchase of the other goods as income remains same.

Q.16 : Explain the following conditions: (4 marks)

- 1. (a) Movement along the same indifference curve.**
- 2. (b) Shift from a lower to a higher indifference curve.**

Ans. (a) Movement along the same indifference curve shows various bundles of two goods that provide equal satisfaction to the consumer. In order to increase the consumption of one commodity, the consumer has to sacrifice the consumption of the other and he moves up or down on the same indifference curve.

(b) A consumer will shift from a lower indifference curve to a higher indifference curve when he wants to have a new bundle of two goods, which has more quantity of at least one good and no less of the other good (monotonic preference). Alternatively, the new bundle may offer more quantity of both the goods, thereby providing the consumer greater level of satisfaction.

Q.17 "For a consumer to be in equilibrium position, marginal rate of substitution between the two goods must be equal to ratio of prices of the two goods." Do you agree with the given statement? Justify your answer. (6 marks)

Ans. The given partially statement is true. As the consumer will get stable equilibrium only when the following two conditions are satisfied:

(i) Slope of Indifference Curve is equal to the price ratio or $MRS_{xy} = P_x/P_y$ (ii) MRS_{xy} must be diminishing.

There may be following two situations that may arise:

- If $MRS_{xy} > P_x/P_y$ consumer is willing to pay more for commodity X than the price preventing in the market It will induce him to purchase more of X less of Good Y, which leads to decline of MRS. This will continue until $MRS_{xy} = P_x/P_y$.
- It must be supported by the second condition i.e. MRS must diminish.

Thus, the consumer will get stable equilibrium only when $MRS_{xy} = P_x/P_y$ and Indifference curve is convex to the origin.

Q.18 Suppose a consumer whose budget is ₹500, wants to consume only two goods, Good X and Good Y. The goods are respectively priced at ₹50 and ₹25.

Answer the following questions on the basis of the given information :

- (a) State the budget equation of the consumer.**
- (b) What is the slope of the budget line ?**
- (c) How many units can she purchase if she spends the entire ₹500 on Good X ?**
- (d) How many units can she purchase if she spends the entire ₹500 on Good Y, given that the price of good Y has doubled ?**

(a) $P_x Q_x + P_y Q_y = M$ $50.Q_x + 25.Q_y = 500$

(b) Slope = $-P_x/P_y = -50/25 = -2$

(c) $Q_x = M/P_x = 500/50 = 10$ units of Good X.

(d) $Q_y = M/P_y = 500/100 = 5$ units of Good Y. (since price of commodity Y has doubled)

Q.19 A rational consumer is consuming only two goods, Good X and Good Y. The prices of the goods are ₹20 and ₹10 respectively.

Her total money income is ₹200. Answer the following questions, using the given information :

- (i) State her Budget line equation.**
- (ii) State the slope of the Budget line of the consumer.**
- (iii) If she decides to spend her entire income on Good Y, how many units of Good Y can she buy? (3 marks)**

Ans. (i) $P_x.Q_x + P_y.Q_y = M$

$20.Q_x + 10.Q_y = 200$

(ii) Slope of Budget line = (ignoring minus sign) = 2

(iii) If the entire income is spent on Good Y Q_x is zero;

$P_x.Q_x + P_y.Q_y = M$

$20 \times 0 + 10 \times Q_y = 200$ $Q_y = 20$ units.

