THEORY OF CONSUMER BEHAVIOR

Question 1: What do you mean by the budget set of a consumer?

Question 2: What is a budget line?

Question 3: Explain why the budget line is downward sloping.

Question 4: A consumer wants to consume two goods. The prices of the two goods are Rs 4 and Rs 5 respectively. The consumer's income is Rs 20.

(i) Write down the equation of the budget line.
(ii) How much of good 1 can the consumer consume if he/she spends his/her entire income on that good?
(iii) How much of good 2 can be consumed if he/she spends his/her entire income on that good?
(iv) What is the slope of the budget line?

Question 5: How does the budget line change if the consumer's income increases to Rs 40 but the prices remain unchanged?

Question 6: How does the budget line change if the price of good 2 decreases by a rupee but the price of good 1 and the consumer's income remain unchanged?

Question 7: What happens to the budget set if the prices as well as the income double?

Question 8: Suppose a consumer can afford to buy 6 units of good 1 and 8 units of good 2 if he/she spends her entire income. The prices of two goods are Rs 6 and Rs 8. How much is the consumer's income?

Question 9: Suppose a consumer wants to consume two goods that are available only in integer units. The two goods are equally priced at Rs 10 and the consumer's income is Rs 40.

(i) Write down all the bundles that are available to the consumer.
(ii) Among the bundles that are available to a consumer, identify those that cost will him/her exactly Rs 40.

Question 10: What do you mean by monotonic preferences?

Question 11: If the consumer has monotonic preferences, then can he/she be indifferent towards bundles (10, 8) and (8, 6)?

Question 12: Suppose a consumer's preferences are monotonic. What can you say about his/her preference ranking over the bundles (10, 10), (10, 9) and (9, 9)?

Question 13: Suppose your friend is indifferent to the bundles (5, 6) and (6, 6). Are the preferences of your friend monotonic?

Question 14: Suppose there are two consumers in the market for a good and their demand functions are as follows:

$d_1(p) = 20 - p$ for any price less than or equal to 20 and $d_1(p) = 0$ at any price greater than 20.

$d_2(p) = 30 - 2p$ for any price less than or equal to 15 and $d_1(p) = 0$ at any price greater than 15.

Find out the market demand function.

Question 15: Suppose there are 20 consumers for a good and they have identical demand functions:

$D(p) = 10 - 3p$ for any price less than or equal to 10/3 and $d1(p) = 0$ at any price greater than 10/3.

What is the market demand function?

Question 16: Consider a market where there are just two consumers and suppose their demands for the good are given as follows:

Calculate the market demand for the goods.

P	D_1	D_2
1	9	24
2	8	20
3	7	18
4	6	16
5	5	14
6	4	12

Question 17: What do you mean by a normal good?

Question 18: What do you mean by an 'inferior good'? Give some examples.

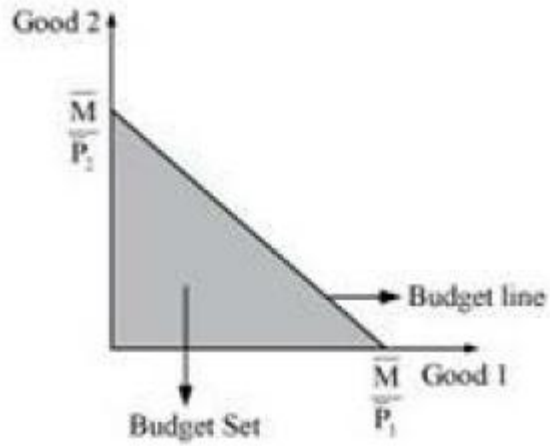
Question 19: What do you mean by substitutes? Give examples of two goods which are complements of each other.

Question 20: What do you mean by complements? Give examples of two goods which are complements of each other.

Question 21: Explain price elasticity of demand.

ANSWERS

Answer 1: It refers to the set of consumption bundles that are available to or affordable by the consumer; while being aware of his/her income-level and the existing market prices.



Answer 2: A budget line represents the different combinations of two goods that are affordable and are available to a consumer; while being aware of his/her income-level and market prices of both the goods.

Let x_1 be the amount of good 1.

x_2 be the amount of good 2.

P_1 be the price of good 1.

P_2 be the price of good 2.

P_1x_1 = Total money spent on good 1

P_1x_2 = Total money spent on good 2

Then, the budget line will be:

$P_1x_1 + P_2x_2 = M$

All the consumption bundles on the budget line cost the consumer exactly the equivalent of hi/her income.

Answer 3: The budget line is a negatively downward sloping line. The slope of a budget line measures the amount of good 2 that must be sacrificed in order to get an additional unit of good 1, as the consumerâ€™s income (M) is fixed. The budget line is downward sloping because, in order to increase the consumption of one good, the consumption of the other good must be reduced, with constant M.

The slope of the budget line is $\frac{-p_1}{p_2} = \frac{\Delta x_2}{\Delta x_1}$ which implies the rate of exchange or the rate at which good 2 can be substituted for good 1.

Answer 4: (i) P_1 = Rs 4
P_2 = Rs 5
M = Rs 20 Equation of the budget line = $P_1x_1 + P_2x_2 = M$
$4x_1 + 5x_2=20$
(ii) If Rs 20 is entirely spent on good 1, then the amount of good 2 demanded will be zero i.e., x2 = 0 as the consumer has no income left to spend on good 2.
$4x_1 + 5\ (0) = 20$
$4x_1 = 20$
Amount of good 1 consumed = 5 units
(iii) If Rs 20 is entirely spent on good 2, then x1 = 0, as the consumer has no income left to spend on good 1.
$4(0) + 5(x2) = 20$
$5(x_2) = 20$
$X_2 = 20/5$
$X_2 = 4$ units
Amount of good 2 consumed = 4 units
$-P_1/P_2$
(iv) Slope of the budget line =

$$= \frac{-\text{Price of good 1}}{\text{Price of good 2}} = -\frac{4}{5} = -0.8$$

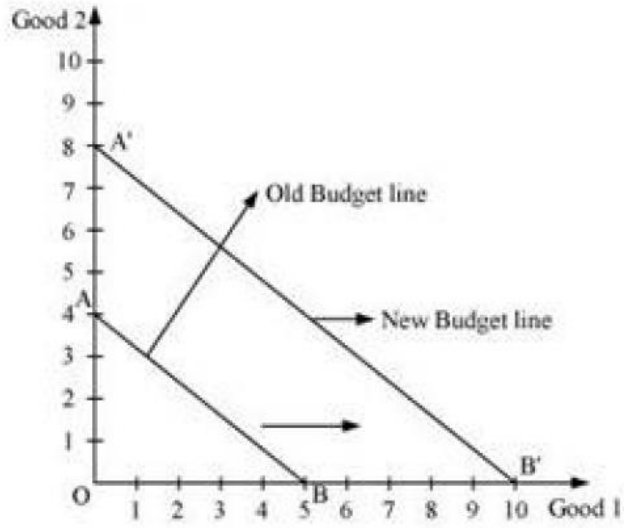
Answer 5: M_2 = Rs 40
P_1 = Rs 4
P_2 = Rs 5
Initial equation of the budget line:
$4x_1 + 5x_2 = 20$
New equation of the budget line:
$4x_1 + 5x_2 = 40$
As M has increased, the consumer can now purchase more of both the goods and the budget line will shift parallelly outwards to A'B' from AB.

Horizontal intercept will be $= \frac{M}{P_2} = \frac{40}{4} = 10$

Vertical intercept will be $= \frac{M}{P_2} = \frac{40}{5} = 8$

The slope of the new budget line will be the same as that of the old budget line.

$$-\frac{P_1}{P_2}=\frac{4}{5}$$



Answer 6: P_1 = Rs 4

P_2 = Rs 5

$P_2^1 = Rs\ 4$

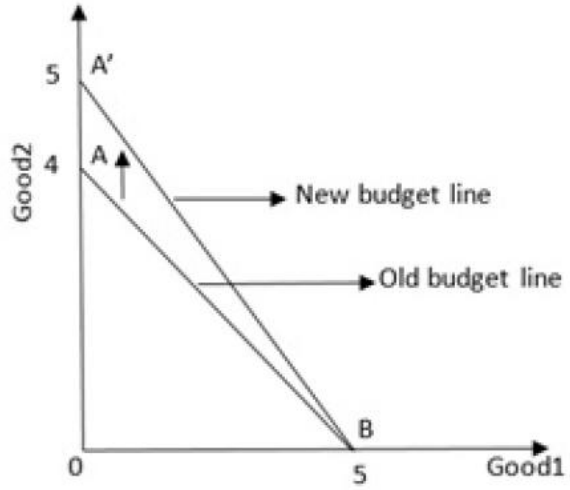
M = Rs 20

Since the income and the price of good 1 are unchanged, the decrease in the price of good 2 will increase the vertical intercept of the budget line. The new budget line will also pivot outwards around the same horizontal intercept.

Horizontal intercept $= \frac{M}{P_1} = \frac{40}{4}$

Vertical intercept $= -\frac{P_1}{P_2} = -\frac{4}{4} = 1$

Slope



The slope of the new budget line will be more and the new budget line will be steeper than the original one.

Answer 7: If the prices and the income are doubled, then the budget line will remain unchanged.

M_1=Rs 20 M_2=Rs 40

P_1= Rs 4 =Rs 8

P_2= Rs 5 =Rs 10

Horizontal intercept $= \frac{M_2}{P_1} = \frac{40}{8} = 5$

$= \frac{M_2}{P_2} = \frac{40}{10} = 4$

Vertical intercept $= \frac{-P_1}{P_2} = \frac{-8}{10} = 0.8$

Slope Hence, the vertical intercept, the horizontal intercept and the slope of the budget line will remain the same. The new budget line will be the same as the old budget line but associated with higher income and higher prices of both the goods.

Answer 8: P_1 = Rs 6

P_2 = Rs 8

$x_1 = 6$

$x_2 = 8$

Budget line = $M = P_1x_1 + P_2x_2$

$M = 6 \times 6 + 8 \times 8$

$M = 36 + 64$

$M = 100$

Thus, the consumer's income is Rs 100

Answer 9: (i) P_1 = Rs 10

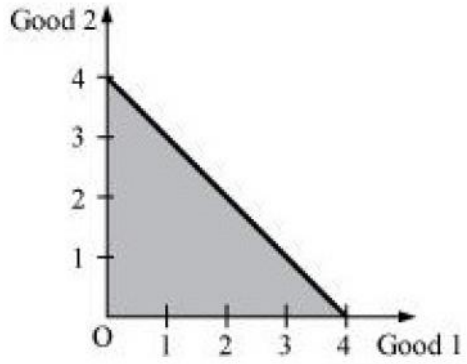
P_2 = Rs 10

M = Rs 40

Budget set $\Rightarrow P_1x_1 + P_2x_2 \leq M$

$10x_1 + 10x_2 \leq 40$

The bundles that are available to the consumer should cost less than or equal to Rs 40.



Horizontal intercept

Vertical intercept

Slope

The bundles in the shaded region (ΔAOB) are all available to the consumer, including the bundles lying on the line AB.

(0, 0)	(0, 1)	(0, 2)	(0, 3)	(0, 4)
(1, 0)	(1, 1)	(1, 2)	(1, 3)	(1, 4)
(2, 0)	(2, 1)	(2, 2)	(2, 3)	(2, 4)
(3, 0)	(3, 1)	(3, 2)	(3, 3)	(3, 4)
(4, 0)	(4, 1)	(4, 2)	(4, 3)	(4, 4)

(ii) The coordinates that lie on the line AB cost exactly the same as the income of the consumer. The bundles are as follows:
(0, 4), (1, 3), (2, 2), (3, 1), (4, 0)

Answer 10: It means that the consumer prefers a particular bundle over the other bundle if the former consists of at least more of one good and no less of the other good. Example: If bundle A(3, 5) and bundle B(3, 2) are available to the consumer, then he/she will prefer bundle A over bundle B as bundle A consists of more units of good 2 than bundle B.

Answer 11: No, he/she cannot be indifferent towards these two bundles as bundle I consists of more of both goods as compared to bundle II. He/she will prefer bundle I over bundle II as it contains 10 units of good 1 and 8 units of good 2 as compared to 8 units and 6 units of good 1 and good 2 respectively in bundle II.

Answer 12:

	Bundles	U_1
I)	(10, 10)	3
II)	(10, 9)	2
III)	(9, 9)	1

As the consumer's preferences are monotonic, more is better and he/she will prefer bundle I over the rest of the bundles. This means that bundle I will be assigned a higher utility number i.e., three (rank = three) out of the available three bundles.

Answer 13: It is given that my friend is indifferent towards the bundles (5, 6) and (6, 6). This implies that his/her preferences are not monotonic. If he/she is indifferent towards both the bundles, then it means that he/she derives the same level of satisfaction and assigns them the same rank. However, the second bundle consists of more of both the goods. Thus, according to the monotonicity assumption, he/she must prefer the second bundle over the first.

Answer 14:

$d_1(p)=20-P \quad \begin{cases} p \leq 20 \\ p > 20 \end{cases}$

$d_2(p)=30-2p \quad \begin{cases} p \leq 15 \\ p > 15 \end{cases}$

For price less than Rs 15 ($p \leq 15$)

Market demand for a good = d1 (p) + d2 (p)

$= 20 - p + 30 - 2p$

$= 50 - 3p$

For price more than Rs 15 but less than Rs 20 ($15 < p < 20$) $= 20 - p$

Market demand = $d_1(p) + d_2(p) = 0$)

$= 20 - p$

For price more than Rs 20 ($p > 20$)

Market demand = $d_1(p) + d_2(p)$

$= 0 + 0$ (for $p > 10$, $d_1(p) = 0$, d2 (p) = 0)

$= 0$

Thus, market demand

$= 50 - 3p$ if $p \leq 15$

$=20 - p$ if $15 < p \leq 20$

$= 0$ if $p > 20$

Answer 15:

$d(p) = 10 - 3p$ if $p \leq 10/3$

$d_1(p) = 0$ if $p > 10/3$

Market demand = Summation of demand of all the consumers in the market

For price$\leq 10/3$

Market demand = $20 \sum d(p)$ (Since consumers have identical demand curve)

$= 20 \times (10 - 3p)$

$= 200 - 60p$

For price $> 10/3$

Market demand = $20 \times d1(p)$

= 20 × 0
= 0

Market demand function=200-60p $\begin{cases} \text{If } p \leq 15 \\ \text{If } p > \frac{10}{3} \end{cases}$

=0

Answer 16:

p	d_1	d_2	Market demand = D = d_1 + d_2
1	9	24	9 + 24 = 33
2	8	20	8 + 20 = 28
3	7	18	7 + 18 = 25
4	6	16	6 + 16 = 22
5	5	14	5 + 14 = 19
6	4	12	4 + 12 = 16

Answer 17: Those goods that share a positive relationship with income but a negative relationship with price are called normal goods. In other words, if the income of a consumer increases, then the demand for a normal good also increases. However, the demand will fall with the rise in the price of that good.
That is,
If the price of a good (P_x) increases, then the demand for good (D_x) decreases If a consumer's income (M) increases, then the demand for good D_x increases.

Answer 18: Inferior good: Those goods that share an inverse relationship with their prices and with the income of a consumer are called inferior goods. That is,
If the price of a good (P_x) increases, then the demand for good (D_x) decreases.
If a consumer's income (M) increases, then the demand for good (D_x) decreases.
Examples: Coarse cereals, bidis etc.

Answer 19: Those goods that can be consumed in place of other goods are called substitute goods. Example: Tea and coffee are goods that can be substitutes for each other. If the price of tea increases, then the demand for tea will decrease and people will substitute coffee for tea, which will increase the demand for coffee.
The demand for a good moves in the same direction as the price of its substitutes.
Price of tea (P_T) increases →Demand for tea (D_T) decreases →Demand for coffee (D_C) increases

Answer 20: Those goods that are consumed together are called complementary goods. Example: Tea and sugar. If the price of sugar increases, then it will lead to a decrease in the demand for tea. If the price of tea increases, then it will reduce the demand for sugar.
The demand for a good moves in the opposite direction of the price of its complementary goods. That is,

If the price of tea (P_T) increases, then the demand for sugar (D_S) decreases.
If the price of sugar (P_S) increases, then the demand for tea (D_T) decreases.

Answer 21: Price elasticity of demand is the measure of the degree of responsiveness of the demand for a good to the changes in its price. It is defined as the percentage change in the demand for a good divided by the percentage change in its price.

$$e_d = \frac{\text{Percentage change in the demand for a good}}{\text{Percentage change in the price of the good}}$$

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

Where,
$\Delta Q = Q_2 - Q_1$, change in demand
$\Delta P = P_2 - P_1$, change in demand
P = Initial price
Q = Initial quantity