

A EXAM
LEVEL PAPERS

(Topical)

ECONOMICS

(P3 & P4)

2008
/
2019

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Revision: June / November 2019 Paper 3 & Paper 4

TOPIC 1.1

Law of Diminishing Marginal Utility, Indifference Curves and Budget Lines.

MCQ Section

1. The table shows the total utility that an individual derives from consuming different quantities of a good.

quantity of good (units)	total utility (units)
1	24
2	45
3	63
4	78
5	90
6	99

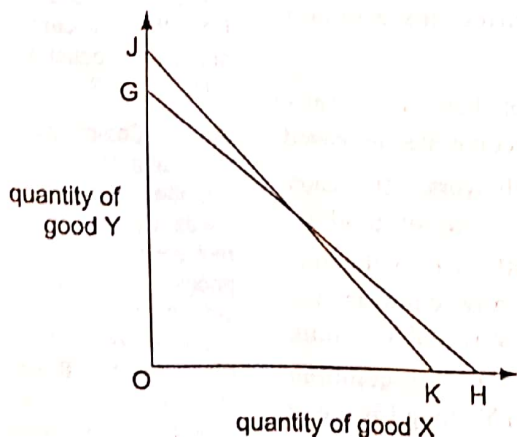
The individual's marginal utility of money is \$1 = 2 units of utility.

What is the maximum quantity of the good that the individual will buy when its price is \$6?

- A 2 units B 3 units
C 4 units D 5 units

[J08/P3/Q2]

2. In the diagram a consumer's initial budget line is JK.

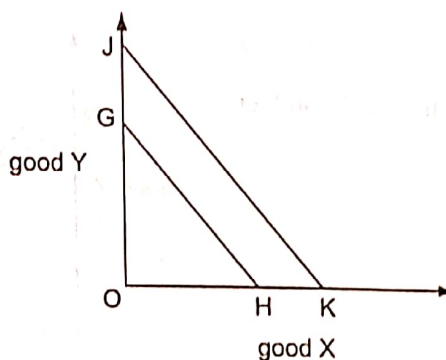


Assuming no change in the price of Y, what could explain a shift in the consumer's budget line to GH?

	price of good X	consumer's money income
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

[J08/P3/Q3]

3. In the diagram a consumer's budget line shifts from GH to JK.



Regardless of any other changes that might occur, what must be correct?

- A There has been an equal proportionate increase in the price of X and Y.
B There has been an equal proportionate decrease in the price of X and Y.
C There has been an increase in the consumer's money income.
D There has been an increase in the consumer's real income.

[N08/P3/Q3]

HELPS to MCQ

1. D A rational consumer will buy up to the level where,

$$MU_{\text{of money}} = MU_{\text{of the product}}$$

(\$6 = 12 units of utility, is the same as MU of the fifth unit.)

2. A Assuming no change in P_y , consumer's ability to purchase maximum quantity of good Y has fallen due to a decrease in his money income. But the rise in maximum quantity of good X is due to a greater fall in price of good X.

3. D Outward shift in the budget line implies that the consumer can purchase larger quantities of the two products Y and X hence, a rise in consumer's real income. Option A would shift the budget line inward and both B and C would finally result in an increase in real income.

4. The table shows the marginal utility derived by a consumer who devotes the whole of his weekly income of \$42 to two goods X and Y, whose unit prices are \$3 and \$6 respectively.

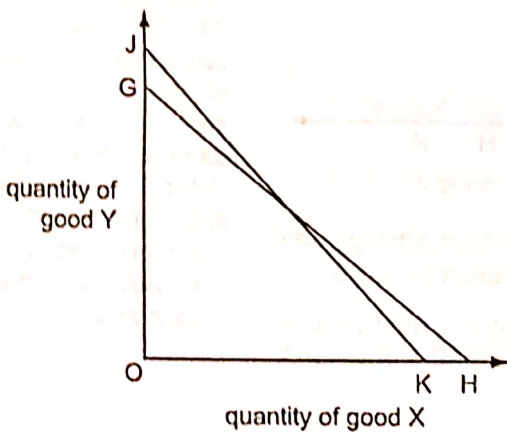
unit	marginal utility of X (units)	marginal utility of Y (units)
1	12	34
2	11	30
3	10	26
4	9	22
5	8	18
6	7	14
7	6	10
8	5	6

In order to maximise his utility, which quantities of X and Y should the consumer purchase?

	X	Y
A	2	6
B	4	5
C	6	4
D	8	3

[J09/P3/Q2]

5. In the diagram a consumer's budget line shifts from JK to GH.



Which statement must be correct?

- A There has been an increase in the consumer's money income.
- B There has been a decrease in the consumer's real income.
- C Good Y has become relatively more expensive.
- D The price of good X has increased.

[J09/P3/Q3]

6. The schedule shows the total utility derived by a consumer of a good X at different levels of consumption.

quantity of X consumed	1	2	3	4	5	6	7	8
total utility (units)	28	40	50	58	64	68	71	73

The consumer obtains two units of satisfaction from the last cent she spends on each good that she purchases.

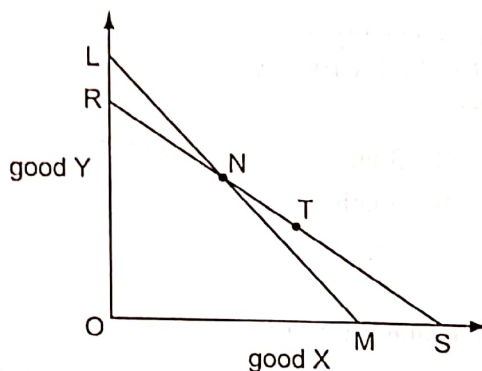
What is the maximum number of units of X that she will consume if the price of X is 6 cents?

- A 2
- B 5
- C 7
- D 8

[N09/P3/Q1]

7. In the diagram, an individual initially chooses combination N on budget line LM.

An increase in his money income accompanied by an increase in the price of good Y causes his budget line to shift to RS, and he now chooses combination T.



How does this affect his economic welfare?

- A He is definitely better off because his money income has increased.
- B He is definitely worse off because he has to pay more for good Y.
- C He is better off since combination T, which he now chooses, was not previously available to him.
- D He is worse off since combinations of X and Y along LN are no longer available to him.

[N09/P3/Q2]

HELPS to MCQ

4. B
$$\frac{MU_x}{MU_y} = \frac{P_x}{P_y}$$
$$\frac{9}{18} = \frac{3}{6}$$

5. C An inward shift on y-axis suggests that P_y has increased, making good Y relatively expensive and an outward shift on x-axis indicates that good X has become relatively cheaper. Alternative options cannot be concluded from the graph.

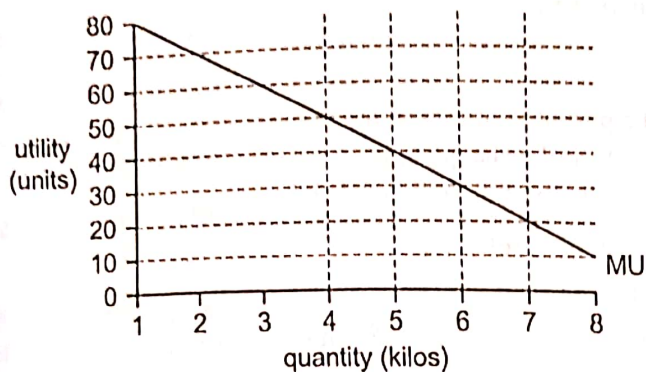
6. A

Qx	TUx	MUx / Px
1	28	28/6 = 4.7
2	40	12/6 = 2
3	50	10/6 = 1.7
4	58	8/6 = 1.3
5	64	6/6 = 1
6	68	4/6 = 0.7
7	71	3/6 = 0.5
8	73	2/6 = 0.33

In order to maximize satisfaction she must obtain two units of satisfaction from the last cent she spent on product X i.e. $MU_x / P_x = 2$

7. C Combination T is attainable only after changes in relative prices. Option A is incorrect because changes in prices of both the products have altered consumer's real income whereas option B and D are incorrect because at new prices, consumer prefers more X than Y.

8. The diagram shows the marginal utility (MU) that an individual derives from a good at different levels of consumption.



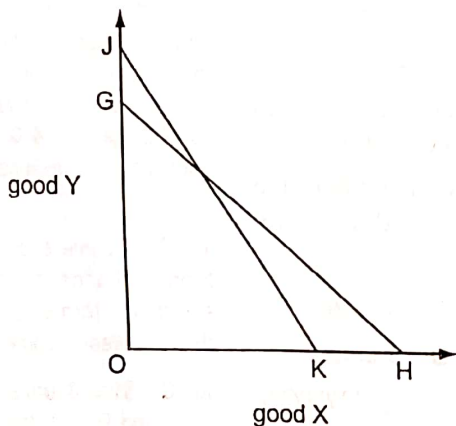
The utility he derives from the last \$ he spends on every good is 3 units.

Assuming the marginal utility of money is constant, which quantity will he purchase if the price of the good is \$10?

- A 4 kilos B 5 kilos
C 6 kilos D 7 kilos

[J10/P3/Q1]

9. In the diagram a consumer's budget line shifts from GH to JK.



Which statement **must** be correct?

- A The price of good X has increased relative to the price of good Y.
B The prices of both goods have fallen.
C There has been an increase in the consumer's real income.
D There has been an increase in the consumer's money income.

[J10/P3/Q2]

10. The schedule shows the total utility derived by a consumer of a good X at different levels of consumption.

quantity of X consumed	1	2	3	4	5	6	7
total utility (units)	30	50	65	75	80	83	84

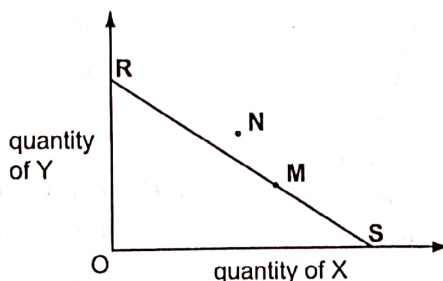
The consumer obtains three units of utility from the last \$ she spends on each good that she purchases.

What is the maximum number of units of X that she will consume if the price of X is \$5?

- A 3 B 4
C 5 D 6

[N10/P3/Q2]

11. The line RS in the diagram shows the different combinations of goods X and Y that a consumer can afford with his present income.



The consumer's original equilibrium is at M.

What could explain a change in his equilibrium position to N?

- A a change in his tastes
B a decrease in the price of X and a bigger percentage increase in the price of Y

HELPS to MCQ

8. C

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \dots = \frac{MU_n}{P_n}$$

$\frac{MU}{P} = 3$ from every other good, hence 6 units.

9. A A shift from GH to JK indicates a lower quantity of good X (due to increase in P_x) and relatively larger quantity of good Y (due to decrease in P_y), hence B is incorrect while C & D cannot be concluded.

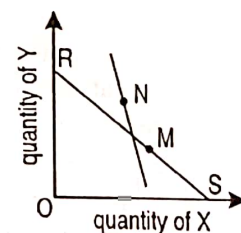
10. A $\frac{MU}{P} = 3$ from

every other good,

Quantity of X	TU	MU
1	30	30
2	50	20
3	65	15
4	75	10
5	80	5
6	83	3
7	84	1

$$\frac{MU}{P} = \frac{15}{3} = 3$$

11. C



Increase in P_x with no change in P_y would shift budget line pivotal inward on X axis and an increase in income would shift the budget line pivotal upward on Y-axis. Both A & D would not shift the budget line hence point N remains unattainable. Option B is incorrect because a decrease in P_x and increase in P_y would result in an increase in quantity of X consumed.

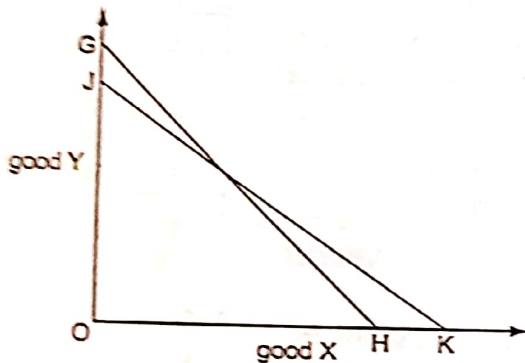
- C an increase in the price of X and an increase in his income
- D equal percentage increases in his income and in both prices

[N10/P3/Q3]

12. A consumer seeks to maximise his utility.
Up to what point should he continue to consume each good?
- A until the marginal utility per dollar from each good is the same
 - B until the marginal utility from each good is the same
 - C until the marginal utility from each good reaches a maximum
 - D until the marginal utility from each good is zero

[J11/P3/Q1]

13. In the diagram, a consumer's initial budget line is JK.



Assuming no change in the price of X, what could explain a shift in the consumer's budget line to GH?

	price of good Y	consumer's money income
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

[J11/P3/Q2]

14. Why does a normal demand curve for a product slope downwards from left to right?
- A Buyers' additional satisfaction declines as consumption rises.
 - B Consumers are faced with choices between competing products.

- C Sellers are willing to accept lower prices on larger orders.
- D The average cost of production falls as the scale of production increases.

[N11/P3/Q1]

15. For the purposes of measuring the income effect of a change in the price of a good, what is not held constant?
- A consumer preferences
 - B relative prices
 - C the consumer's money income
 - D the consumer's real income
16. The table shows the total utility that an individual obtains from consuming different quantities of a good.

quantity of good (units)	total utility (units)
1	20
2	36
3	50
4	62
5	72
6	80

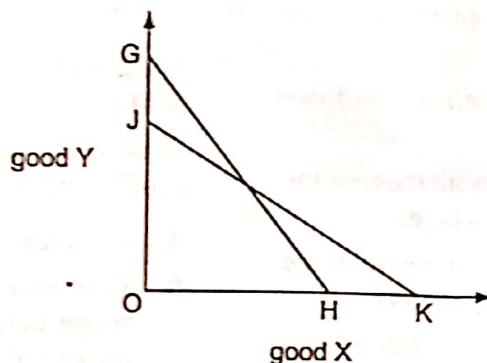
The individual's marginal utility of money is \$1 = 3 units of utility.

What is the maximum quantity of the good that the individual will buy when its price is \$4?

- A 2 units
- B 3 units
- C 4 units
- D 5 units

[J12/P3/Q2]

17. The curve GH in the diagram is a consumer's initial budget line.



HELP/PS to MCQ

12. A consumer can attain maximum satisfaction from his expenditure if he purchases the goods up to the point where utility from the last money unit (\$) spent on each good becomes equal i.e.

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \dots = \frac{MU_n}{P_n}$$

13. A decrease in money income with no change in price of good X would shift the budget line inward on X-axis. A simultaneous reduction in the price of good Y, which is more than the fall in money income, would cause a pivotal outward shift in the budget line on Y-axis.

14. A normal downward sloping demand curve shows that the consumer is willing to pay a lower price for every next unit because each additional unit represents lower satisfaction. Option B is incorrect because choices of products refer to PED, while C & D are not related to the demand curve.

15. D Income effect of a price change is measured in terms of a change in real income.

16. C \$1 = 3 units of utility and P = \$4, therefore consumer sacrifices 3 x 4 = 12 units of utility for each unit of the good. Maximum quantity that the consumer will buy is where MU_m = MU_g.

HELPS to MCQ

Which combination could cause the budget line to shift to JK?

	price of good X	consumers' money income
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

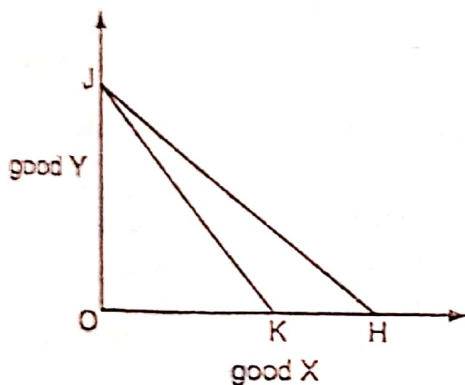
[J12/P3/Q3]

18. A consumer who aims to maximise his utility will arrange his consumption so that

- A the total utility obtained from each commodity is the same.
- B the total utility per \$ spent on each commodity is the same.
- C the same utility is obtained from the last unit of each commodity.
- D the same utility is obtained from the last unit of expenditure on each commodity.

[N12/P3/Q2]

19. In the diagram a consumer's budget line shifts from JK to JH.



What can definitely be concluded from the diagram?

- A There has been a decrease in the price of good Y.
- B There has been a decrease in the consumer's money income.
- C There has been an increase in the consumer's real income.
- D There has been no change in the price of good X.

[N12/P3/Q3]

20. The table shows the total utility that an individual derives from consuming different quantities of a good.

quantity of good (units)	total utility (units)
1	20
2	36
3	50
4	62
5	72
6	80

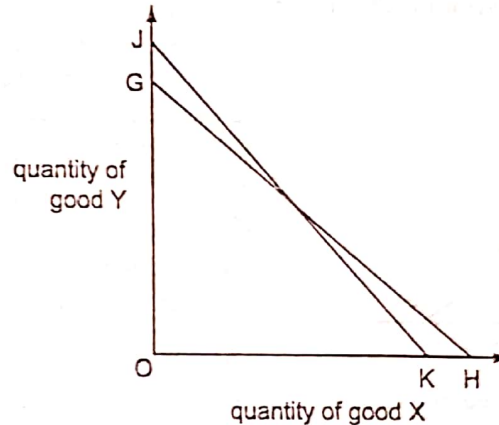
The individual's marginal utility of money is \$1 = 2 units of utility.

What is the maximum quantity of the good that the individual will buy when its price is \$6?

- A 2 units
- B 3 units
- C 4 units
- D 5 units

[J13/P3/Q2]

21. In the diagram a consumer's budget line shifts from GH to JK.



Which statement must be correct?

- A The price of good Y has fallen relative to the price of good X.
- B There has been a decrease in the price of good Y.
- C There has been an increase in the price of good X.
- D There has been an increase in the consumer's real income.

[J13/P3/Q3]

17. A An outward shift on x-axis suggests decrease in the P_x while an inward shift on y-axis can be attributed to a fall in money income.

18. D By definition.

19. C A larger quantity of good X suggests increase in real income measured in terms of purchasing power.

20. C Since \$1 = 2 units of utility and $P = \$6$, therefore consumer sacrifices $2 \times 6 = 12$ units of utility in order to obtain each unit of the good. The maximum quantity that the individual will buy is where, $MU_{money} = MU_{good}$.

units	TU	MU_{good}	MU_{money}
1	20	20	12
2	36	16	12
3	50	14	12
4	62	12	12
5	72	10	12
6	80	8	12

21. A After changes in absolute prices the budget line has become steeper i.e. good Y now is relatively less expensive than good X. Options B & C indicate causes of shift while D cannot be concluded.

22. The table shows the total utility that an individual derives from consuming different quantities of a good.

quantity of good (units)	total utility (units)
1	24
2	45
3	63
4	78
5	90
6	99

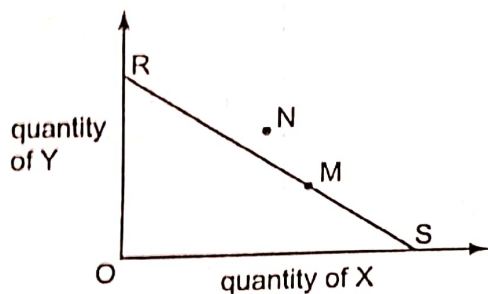
The individual's marginal utility of money is \$1 = 2 units of utility.

What is the maximum quantity of the good that the individual will buy when its price is \$6?

- A 2 units B 3 units
- C 4 units D 5 units

[N13/P3/Q2]

23. The line RS in the diagram shows the different combinations of goods X and Y that a consumer can afford with her present income.



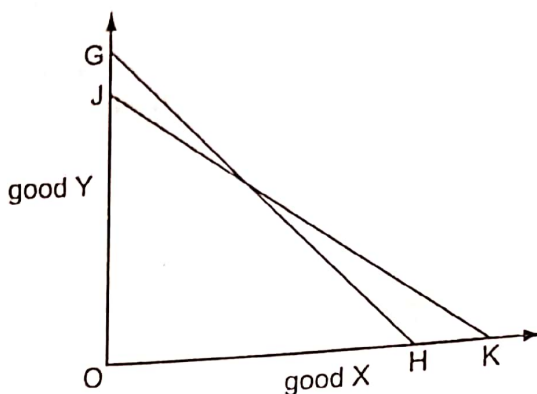
The consumer's original equilibrium is at M.

What could explain a subsequent change in her equilibrium position to N?

- A a change in her tastes
- B an increase in the price of X and a fall in the price of Y
- C an increase in the price of X and a smaller percentage increase in the price of Y
- D equal percentage increases in her income and in both prices

[N13/P3/Q3]

24. In the diagram, a consumer's initial budget line is JK.



Assuming no change in the price of X, what could explain a shift in the consumer's budget line to GH?

	price of good Y	consumer's money income
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

[J14/P3/Q2]

25. The table shows the output of chairs at a factory when different numbers of workers are employed.

number of workers	1	2	3	4	5
number of chairs produced	6	17	27	32	30

Diminishing marginal returns to labour will set in when

- A the second worker is employed.
- B the third worker is employed.
- C the fourth worker is employed.
- D the fifth worker is employed.

[J14/P3/Q3]

26. A household makes the following purchases of fruit.

fruit	quantity purchased (kg)	price per kg (\$)
bananas	5	1.00
apples	10	0.50

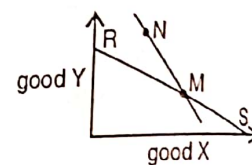
The household derives twice as much utility from the tenth kg of apples as from the fifth kg of bananas.

22. D In order to obtain each unit of the good, consumer sacrifices \$x = 12 units of utility. Consumer will continue to purchase up to the point where

$$MU_{\text{good}} = MU_{\text{money}}$$

unit	MU _{good}	MU _{money}
1	24	12
2	19	12
3	18	12
4	15	12
5	12	12
6	9	12

23. B



A change in equilibrium to point N suggests a pivotal outward shift on Y-axis and inward shift on X-axis, possibly due to a fall in P_Y and a simultaneous rise in P_X.

24. A A decrease in P_Y shifts the curve pivotal upward on y-axis, while a decrease in income with no change in P_X shifts the curve pivotal inward on x-axis.

25. B Diminishing returns sets in from the point where MP starts to fall.

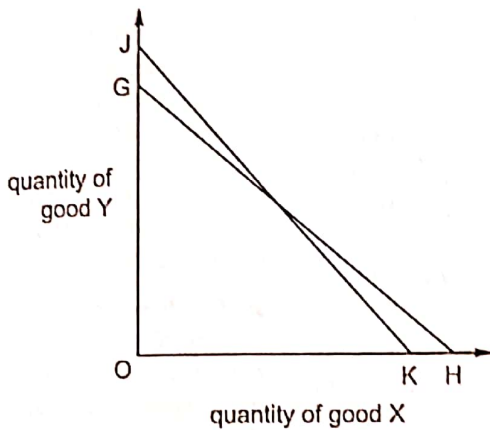
workers	No. of chairs (TP)	MP
1	6	6
2	17	11
3	27	10
4	32	5
5	30	-2

What should the household do to maximise utility from the purchase of these fruits?

	purchase of bananas	purchase of apples
A	decrease	increase
B	increase	decrease
C	increase	increase
D	no change	no change

[N14/P3/Q2]

27. In the diagram a consumer's budget line shifts from GH to JK.



Which statement must be correct?

- A There has been an increase in the consumer's real income.
- B There has been a decrease in the consumer's real income.
- C Good Y has become relatively more expensive.
- D Good X has become relatively more expensive.

[N14/P3/Q3]

28. A utility-maximising consumer spends the whole of his disposable income of \$40 on food and clothing.

The table shows the price of food, the quantity purchased by the consumer, and the marginal utility he derives from food consumption.

food	
price per unit	\$5
quantity demanded	5
marginal utility (units)	10

His marginal utility from clothing is 2 units.

What is the price of clothing per unit and the quantity purchased by the consumer?

	clothing	
	price (\$)	quantity (units)
A	0.5	30
B	1.0	15
C	3.0	5
D	5.0	3

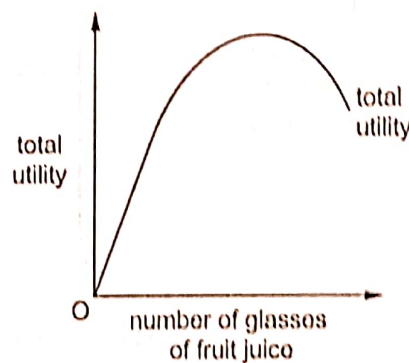
[J15/P3/Q2]

29. For the purposes of measuring the income effect of a change in the price of a good, what is **not** held constant?

- A consumer preferences
- B relative prices
- C the consumer's money income
- D the consumer's real income

[J15/P3/Q3]

30. The diagram shows an individual's total utility from consuming glasses of fruit juice.



How can this information help to derive the individual's demand curve for fruit juice?

- A by revealing the individual's marginal utility curve
- B by revealing the money value of marginal utility
- C by showing how total utility is maximised
- D by showing the relationship between utility and expenditure

[N15/P3/Q2]

HELPS to MCQ

26. A $MU_A = 2$ &
 $MU_B = 1$

$$\frac{2}{0.5} = \frac{1}{1}$$

Purchase of more apples will reduce MU_A and hence the value of its fraction while purchasing less bananas will increase MU_B and the value of its fraction. The consumer will switch his purchase until

$$\frac{MU_A}{P_A} = \frac{MU_B}{P_B}$$

27. D A pivotal outward shift on Y axis suggests a fall in P_Y while an inward shift on X-axis indicates a rise in P_X thus making X relatively more expensive.

28. B $\frac{MU_c}{P_c} = 2$

therefore, consumer is in equilibrium when

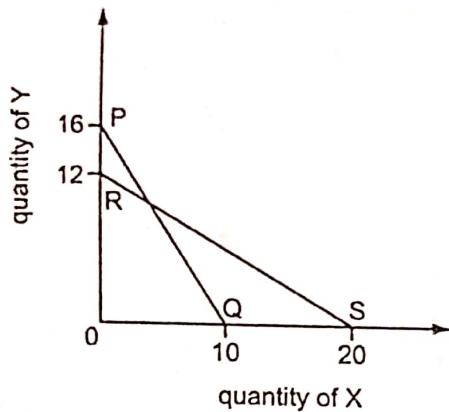
$$\frac{MU_c}{P_c} = 2, \text{ Since } MU_c = 2,$$

therefore, P_c must be \$1.

29. D A change in price causes a change in real income assuming everything else is constant.

30. A Rate of change of TU curve measures MU that can be used to derive an individual's demand curve.

31. In the diagram, PQ is a consumer's original budget line.

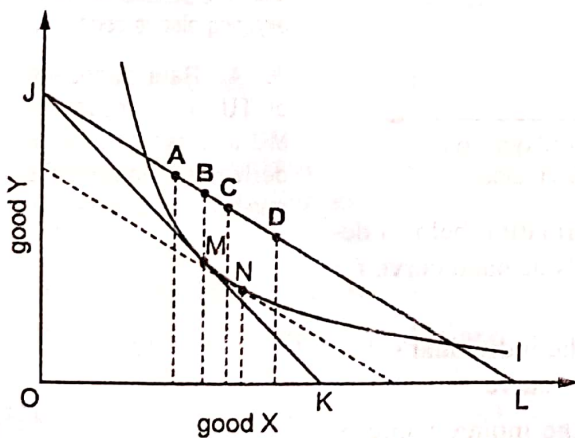


The consumer's income increases from \$80 to \$120 and, at the same time, the prices of X and Y change. If the consumer's budget line is now RS, what are the new prices of X and Y?

	price of X (\$)	price of Y (\$)
A	4	12
B	6	10
C	10	8
D	12	6

[N15/P3/Q3]

32. In the indifference curve diagram point M is the consumer's initial equilibrium and MN is the substitution effect of a fall in the price of good X. If good X is a Giffen good which point will be the consumer's new equilibrium point after the fall in the price of good X?



[J16/P3/Q4]

33. To maximise the satisfaction he derives from a given level of expenditure on two goods, X and Y, a consumer should allocate his expenditure between the two goods so that

- A marginal utility of X = price of X and marginal utility of Y = price of Y.
- B marginal utility of X plus marginal utility of Y is maximised.
- C marginal utility of X = marginal utility of Y.
- D $\frac{\text{marginal utility of X}}{\text{marginal utility of Y}} = \frac{\text{price of X}}{\text{price of Y}}$

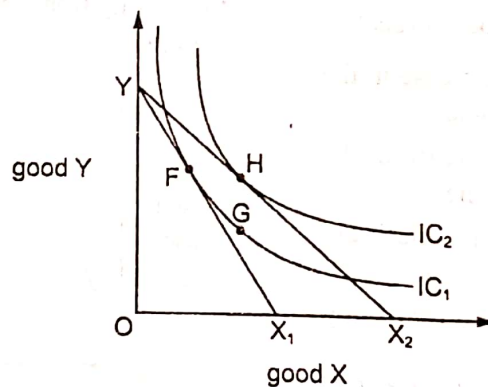
[J16/P3/Q5]

34. What will happen if, in response to a fall in its price, a consumer buys more of a good?

- A a fall in the total utility derived from consuming the good
- B a movement along the consumer's demand curve
- C a rise in the marginal utility derived from consuming the good
- D a shift in the consumer's demand curve

[N16/P3/Q4]

35. The diagram shows two indifference curves and two budget lines for goods X and Y.



The consumer's initial position is at point F. The consumer's preferred final position becomes point H.

What does the movement from F to G represent?

- A the income effect of a price fall for X
- B the price effect of a price change for X
- C the substitution effect of a price fall for X
- D the substitution effect of a price rise for X

[N16/P3/Q5]

HELPS to MCQ

31. B $P_x = \frac{120}{12} = \$10$
 $P_y = \frac{120}{20} = \$6$

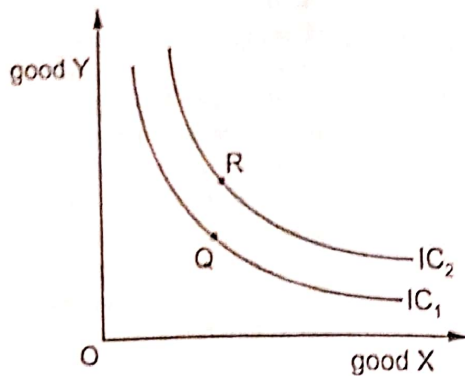
32. A In case of Giffen goods negative income effect outweighs positive substitution effect.

33. D A standard formula for consumer equilibrium.

34. B According to the theory a change in price of a good causes movement along its D curve. This rules out option D. A higher consumption causes MU to fall but TU to rise; therefore A & C are incorrect.

35. C Movement along the same IC due to a fall in P of one of the two goods implies substitution effect.

36. The diagram shows two indifference curves for a consumer.



What can be concluded if the consumer's equilibrium moves from Q to R?

- A The consumer is acting rationally.
- B The consumer's money income is unchanged.
- C The opportunity cost of good Y is constant.
- D The price of good X has risen.

[J17/P3/Q4]

37. When the price of a good falls the effect on the quantity demanded is the result of an income effect and a substitution effect.

Which statement about these effects is correct?

- A For inferior goods the income effect and the substitution effect work in the same direction.
- B For inferior, but not Giffen, goods the income effect outweighs the substitution effect.
- C For normal goods the income effect and substitution effect work in the same direction.
- D For normal goods the income effect outweighs the substitution effect.

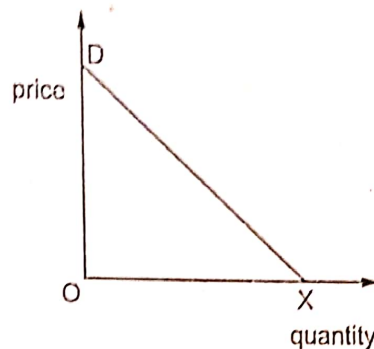
[J17/P3/Q5]

38. What would not affect the budget line of an individual consumer?

- A the individual's preference for various goods
- B the level of income tax
- C the money prices of goods
- D the wages earned by the individual

[J18/P3/Q5]

39. The diagram shows the demand curve for a product.

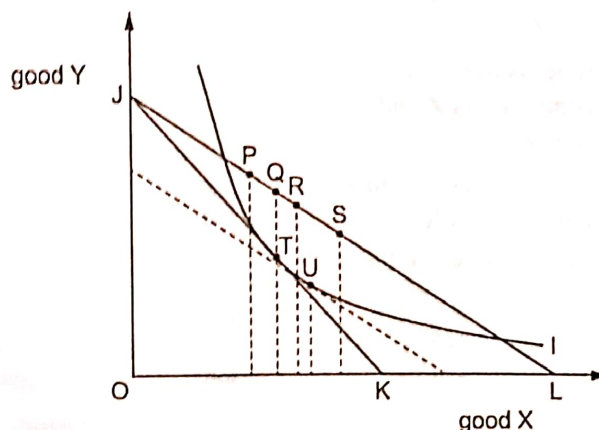


What is maximised at X?

- A marginal revenue
- B total revenue
- C marginal utility
- D total utility

[J18/P3/Q6]

40. The diagram shows budget lines and an indifference curve. The consumer's initial position is T. The price of good X then falls.



Which combination of statements about the movements in this diagram is correct?

HELPS to MCQ

36. A Further an IC drawn from the origin, the higher the level of satisfaction. Consumer, therefore, acts rationally when he shifts the equilibrium to the highest possible IC.

37. C For an inferior good substitution effect outweighs income effect thus all other options are incorrect.

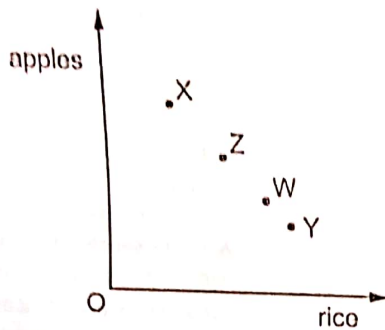
38. A A budget line shows real income because it is drawn with the assumptions that money income and prices of the goods remain unchanged. Therefore, changes in either of the two or both would shift the budget line. Thus options B, C & D are cancelled. However a change in consumer's preferences is indicated by a change in combination of two goods on the same budget line, therefore it does not affect the budget line.

HELPS to MCQ

- A T to Q represents perfect elasticity; T to P represents a Giffen good
- B T to R represents an income effect; R to S represents a substitution effect
- C T to U represents a substitution effect; T to Q represents a normal good
- D T to U represents a substitution effect; U to P represents an income effect

[N18/P3/Q4]

41. The diagram shows various combinations of apples and rice which are potentially available to a consumer.



If standard indifference curves were added to the diagram they would show that the consumer is indifferent between combination X and combination W.

What can be concluded?

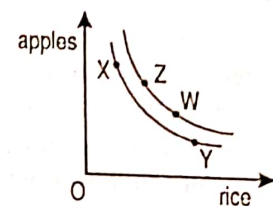
- A The consumer is indifferent between combination Y and combination Z.
- B The consumer is indifferent between combination Z and combination W.
- C The consumer prefers combination Y to combination X.
- D The consumer prefers combination Z to combination W.

[N18/P3/Q5]

39. D Consumer is willing to obtain quantity 'x' at zero price, therefore it would reduce both MR & MR to zero. Thus options A & B are cancelled. A consumer is willing to pay as much as the MU he derives from each unit and the graph suggests that he is willing to obtain the last unit of quantity 'x' at zero price that makes MU to fall to zero hence option C is incorrect. TU is the sum of MU that the consumer derives from all individual units he consumes up to quantity 'x' hence it is maximized.

40. D Movement along the same indifference curve from T to U suggests positive substitution effect for all goods. Thus options A & B are ruled out. Income effect of normal goods is also positive and it is indicated by a movement from U to S. Hence option C is cancelled. Giffen goods have a negative income effect that outweighs positive substitution effect. Thus a movement from T to U on the new budget line is due to income effect indicating a fall in Q that is more than a rise caused by substitution effect.

41. D



Consumer is indifferent between two combinations only on the same indifference curve. This rules out all other options.

TOPIC 1.1

Law of Diminishing Marginal Utility, Indifference Curves and Budget Lines.

ESSAY Section

LIST OF QUESTIONS

- Q1 (J10/P4/Q5)**
Economic theory emphasises the idea of an equilibrium position. Discuss whether the idea of an equilibrium is a useful and practical way of explaining the behaviour of a consumer. [25]
- Q2 (J11/P4/Q3)**
(a) Discuss whether demand schedules and budget line diagrams are similar in the way they represent the effect of
(i) a rise in the price of a good
(ii) a rise in a consumer's income. [12]
(b) Analyse what is meant by the equi-marginal principle of consumer demand and whether it can be linked to the derivation of a market demand curve. [13]
- Q3 (N11/P4/Q2)**
(a) Explain the link between a consumer's expenditure and the equi-marginal principle of utility. [12]
- Q4 (J12/P4/Q2)**
When buying goods not everyone buys the same standard product. There are some who want a cheap product even though it might be of poor quality, while there are those who are willing to pay more for a luxury or an individually-made product. Customers search for value but value is not just in the price.
(adapted from *New York Times in the Observer* 21.02.10)
(a) Explain the theoretical link between utility, price and the demand for a product. [12]
(b) Discuss whether the economic analysis of a rational consumer estimating demand based on value (utility) is valid not only for standard products but also for poor quality and luxury products. [13]
- Q5 (N12/P4/Q2)**
A study found that demand for tickets for exhibitions at a major art gallery had unitary price elasticity.
(a) Explain how the concept of diminishing marginal utility may be used to construct a demand curve for the product and whether that analysis still applies in the case of demand for tickets for the exhibitions. [12]
- Q6 (J13/P4/Q2)**
(a) Explain how a consumer allocates expenditure according to the principle of equi-marginal utility and analyse how a change in income might affect that allocation. [12]
- Q7 (N13/P4/Q2)**
(a) Use the theory of marginal utility to analyse how a consumer will normally buy more of a product at a lower price than at a higher price and explain how this theory can be used to derive a market demand curve. [12]
(b) Economic texts examine market equilibrium. Discuss whether it is the consumer or the producer who determines the equilibrium market price and whether consumers have the same power in all types of market structure. [13]
- Q8 (J14/P4/Q2)**
'The analysis of marginal utility as an explanation of consumer equilibrium can only be related to the purchase of one good, cannot be used if incomes increase, and is not applicable if advertising causes a change in tastes. It is, in practice, not a useful guide to consumer behaviour'.
Assess this opinion. [25]

Q9 (J15/P4/Q2)

- (a) Describe how consumer theory suggests a rise in income will cause a consumer's demand to change for a normal good and for an inferior good. [12]

Q10 (N15/P4/Q2)

Consumers decide what they wish to buy and as a result direct the market. Producers develop new products, which they then promote by advertising, in order to maximise profits. Without producers there would be no products to buy.

- (a) Explain how economic theory predicts what a rational consumer decides to buy. [12]

Q11 (J16/P4/Q3)

With the help of diagrams, use indifference analysis to:

- (a) explain what is meant in economic theory by consumer equilibrium and how it is related to a consumer's demand curve. [12]
- (b) discuss how this equilibrium might be affected by a government fiscal policy that raises taxes on goods. [13]

Q12 (N16/P4/Q3)

- (a) A number of consumers are deciding whether to buy a product. How far does economic theory explain the determination of the market demand curve for that product? [12]
- (b) Discuss whether that theory is still valid if the producer decides to advertise the product, and consider the effects of the advertising on the demand curve for the product. [13]

Q13 (J17/P4/Q2)

Choice is an essential part of economics. Sometimes consumers change their choices either when shops have special offers on previously very expensive luxury products, or when advertising persuades them to change their preferences.

Analyse how the economic theory of indifference curves can be used to construct a consumer's demand curve. Discuss whether this theory can explain the above changes in choice. [25]

Q14 (N17/P4/Q3)

- (a) Analyse how indifference curve theory explains why a consumer will normally buy more of a good at a lower price than at a higher price. [12]

- (b) Discuss why there might be exceptions to this normal response, distinguishing the income effect from the substitution effect. Consider the relevance of these exceptions to firms and the government. [13]

Q15 (J18/P4/Q2)

- (a) Explain, with the aid of a diagram, diminishing marginal utility and its link to indifference curves. [12]
- (b) Discuss, using indifference curve analysis, how the impact of an increase in indirect taxation on the quantity demanded of a good depends on whether it is a normal or inferior good. [13]

Question 1

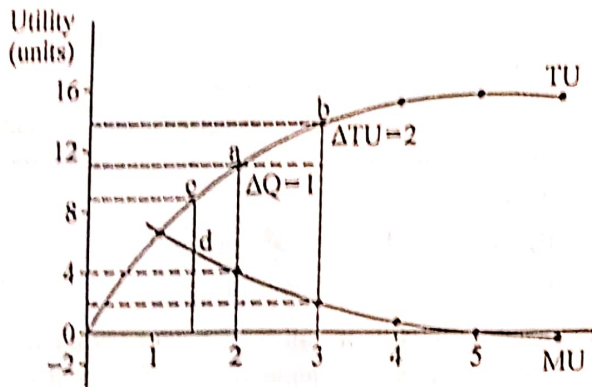
Economic theory emphasises the idea of an equilibrium position. Discuss whether the idea of an equilibrium is a useful and practical way of explaining the behaviour of a consumer. [25]

[110/P/1/Q5]

Essay

The theory of consumer behaviour explains consumer equilibrium with the help of utility analysis. Utility is the satisfaction that people derive from the consumption of goods and services. Total utility (TU) and Marginal utility (MU) are two important measures of utility. TU is the total satisfaction a consumer obtains from the consumption of all the units of a good consumed. While MU utility is the satisfaction gained from consuming one extra unit of a good within a given time period. It is measured by: $TU_n - TU_{n-1} = MU$.

According to the principle of diminishing marginal utility, as more units of a good are consumed successively, an extra unit will provide less additional satisfaction than previous unit. For example, the second cup of coffee in the morning gives us less additional satisfaction than the first cup. The third cup gives even less satisfaction. The relationship between TU and MU is shown below:



The MU curve slopes downward, simply illustrating the principle of diminishing marginal utility. The TU curve starts at the origin. When MU is positive and diminishing, TU increases at a decreasing rate. TU reaches a peak when marginal utility is zero. Marginal utility can be derived from the TU curve. It is the slope of the line joining two adjacent quantities on the curve. For example, the marginal utility of the third cup of coffee is the slope of the line joining points a and b. The slope of such a line is given by the formula:

$$MU = \frac{\Delta TU}{\Delta \text{units}}$$

We can extend our analysis of utility to explain how a rational consumer decides what combination of goods to buy from the given income. The underlying principle is called equi-marginal utility. The law states that the individual consumer is in equilibrium when it is not possible to switch a single penny's worth of expenditure from one product to another and obtain an increase in total utility. This occurs when:

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \frac{MU_n}{P_n}$$

Where A, B, ..., n are the various goods consumed.

The above equation states that the consumer equilibrium is where the marginal utility from the last penny spent on product 'a' equals the utility from the last penny spent on product b equals the utility from the last penny spent on product n, thus taking into account all of the products the individual consumes. When this situation is reached it is not possible for the individual to increase his total utility by reallocating expenditure. So the consumer equilibrium is important for it is where the consumer has allocated his or her income in such a way that maximum utility has been achieved. The analysis assumes the following:

Satisfaction can be measured in utils. A util is an imaginary unit of satisfaction from the consumption of a good. Consumer is rational, and therefore wants to maximize satisfaction also his taste and preferences are constant. Consumer has a fixed income, and he will be spending on two normal goods a and b. Product a costing £2.00 each and product b costing £4.00 each, and that the individual has an income per time period of £16.00. The table below will help to explain consumer equilibrium.

Product A (price £2.00 each)			Quantity demanded of product A and B	Product Y (price £4.00 each)		
TU _a	MU _a	$\frac{MU_a}{P_a}$		TU _b	MU _b	$\frac{MU_b}{P_b}$
80	80	40	1	68	68	17
132	52	26	2	100	32	8
152	20	10	3	128	28	7
168	16	8	4	152	24	6
176	8	4	5	172	20	5

Given this situation, it can be seen that the consumer is in equilibrium when he consumes four units of product a and two of product b. Here MU/P is the same, i.e. 8 for both products. Note that in

equilibrium the consumer obtains total utility of 268 utils and it is impossible for the consumer with an income of £16.00 to obtain a higher level of total utility. If the consumer were not in equilibrium it would be possible for him or her to reallocate income and obtain a greater level of satisfaction.

It is also possible to use marginal utility as a means of deriving a demand curve. If in the table above price of product b were to fall to £2.00, then assuming everything else remained constant, there would be a new column for MU/P and a new equilibrium would result. The consumer would reduce consumption of product a by 1 unit and increase the consumption of product b by 3 units. Hence, consuming 3 units of a and 5 units of b at the new equilibrium position. Thus a fall in price of product b would result in an increase in its QD and result in a downward sloping demand curve.

So, by the use of utility it has been possible to demonstrate the logic of 'rational' consumer choice and the derivation of demand curve, however it does present a few major difficulties particularly when it comes to the practical aspect of explaining consumer equilibrium.

In the first place the analysis seems to be oversimplifying the real world situation by assuming that the consumer knows precisely how much utility he will derive from each unit of all goods bought and then acts almost like a calculating machine to equalize their marginal utilities relative to price. In practice it is virtually impossible to calculate utility derived from different products, since it would involve a consumer having to imagine a whole series of different combinations of goods and deciding in each case whether a given combination gave more, equal or less satisfaction than other combinations.

Secondly consumers may not behave 'rationally', and hence may not give careful consideration to the satisfaction they believe they will gain from consuming goods. They may behave impetuously.

Moreover utility analysis is based on the satisfaction that consumers *believe* they will gain from a good. This belief may well be influenced when they are persuaded to buy through advertising and not through consumer's calculation of utility. Consumers may be disappointed or pleasantly surprised when they actually consume the good. In other words, consumers are not perfectly knowledgeable. Thus the 'optimum consumption' point may not in practice give consumers maximum satisfaction for their money.

Certain goods are only purchased every now and again, and then only one at a time. Examples would

include consumer durables such as cars, televisions and washing machines. The theory of consumer behaviour is based on the assumption that marginal increases in one good can be traded off against marginal decreases in another. This will not be the case with consumer durables.

So far we have assumed that when people buy goods and services they know exactly what price they will pay and how much utility they will gain. In many cases this is a reasonable assumption. For instance, when you buy a bar of chocolate you clearly know how much you are paying for it and have a very good idea how much utility you derive from its consumption. But what about a video recorder, or a car, or a washing machine, or any other consumer durable? In each of these cases you are buying something that will last a long time, and the further into the future you look, the less certain you will be about its utility. So how will uncertainty affect people's behaviour and equilibrium? The theory fails to explain this.

Finally it can be concluded that theory of consumer behaviour is a useful analysis of consumer equilibrium as it explains how a rational consumer can choose the best combination of goods from the given income. However, a number of assumptions that we make undermine its application to the real world.

Question 2

- (a) Discuss whether demand schedules and budget line diagrams are similar in the way they represent the effect of
- (i) a rise in the price of a good
 - (ii) a rise in a consumer's income. [12]
- (b) Analyse what is meant by the equi-marginal principle of consumer demand and whether it can be linked to the derivation of a market demand curve. [13]

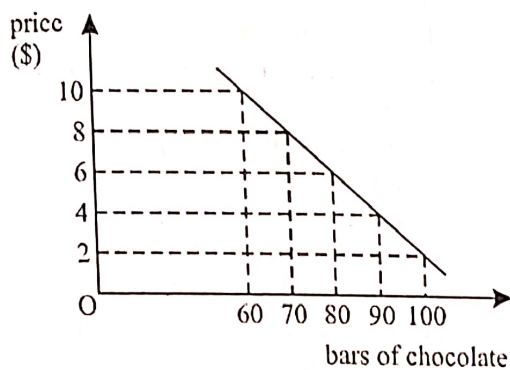
[J11/P4/Q3]

Essay

- (a) (i) A demand schedule is a numerical tabulation showing different quantities that are demanded at various prices per period of time, given the assumption that all other variables are held constant. Thus it shows the relationship between quantity demanded and the price of the same product. The table below shows the demand schedule for chocolate.

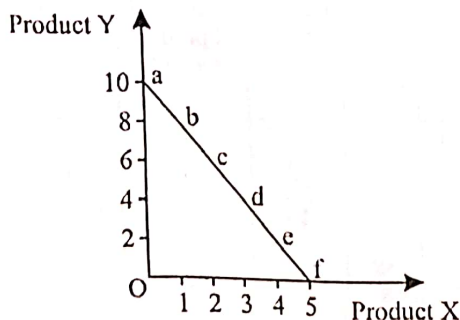
price (\$)	quantity demanded (bars of chocolate per week)
2	100
4	90
6	80
8	70
10	60

We can now plot the demand schedule on a graph to see how quantity demanded of chocolates relates to variation in price.



The negative slope of the demand curve indicates the inverse relationship between QD and P i.e. QD rises as price falls and vice versa.

A budget line, on the other hand, reveals all combinations of two products that are obtainable, given the individual's income and the prices of the two products. For example, an individual may have \$100 to spend on two products per week. Assuming the individual spends all of \$100 with the price of product X \$20 and that of product Y \$10. Thus the equation for the budget line is: $\$100 = \$20X + \$10Y$. This can be produced diagrammatically as in the figure below.



The individual can be at point 'a' purchasing 10 units of Y but unable to buy any of product X, or the point 'f' purchasing 5 units of X but none of product Y. Alternatively the consumer could be at any point between a and f on the budget line. Points above the budget line are

unobtainable and the slope of the budget line depends on the relative prices of the two products.

From the above descriptions of demand schedule and budget line we can make out that both portray two different aspects of consumption of a good, therefore several differences can be identified in their effect of a rise in price of a good.

Firstly, the demand schedule reflects consumers' willingness and ability to buy only one product at different prices, therefore, the demand curve for a particular product is drawn against various prices measured on y-axis and the quantity demanded on x-axis. In contrast to this, a budget line is drawn to show the various quantities of the two products which the consumer can obtain from the given money income and prices of the products. Therefore, a budget line, unlike demand curve, does not indicate the quantities that the consumer would buy rather it simply reflects the ability of the consumer to buy both the products; thus we measure the quantities of two products on each of the two axis.

Secondly the effect of a rise in price of a good, ceteris paribus, is shown by an upward movement along the demand curve while the effect of rise in price of one of the two products with the money income remaining constant, causes a pivotal inward shift in the budget line that signifies that the consumer can obtain a smaller quantity of the good at the new price. This is illustrated in the graphs below:

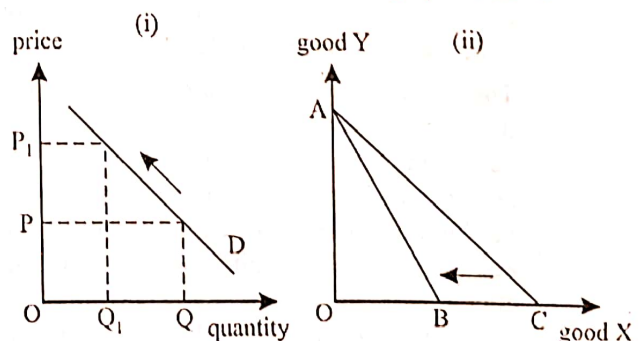
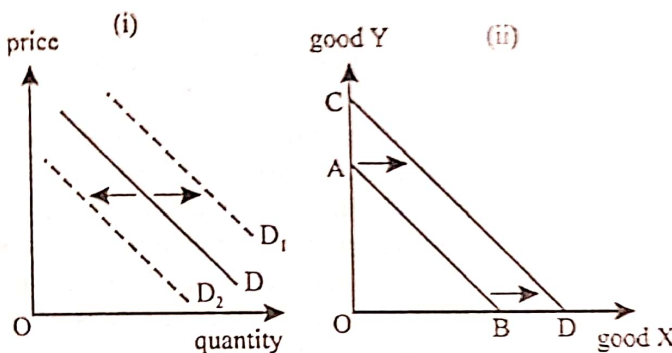


Figure (i) illustrates the effect of a rise in price of a product in terms of upward movement along the demand curve. Thus it clearly shows Q_1 the new quantity bought at a higher price P_1 . On the contrary, the effect of the rise in price of the same product is shown by a pivotal leftward shift in the budget line on x-axis. Thus it shows that less of X can be purchased at the new price but, unlike demand curve, does not point out the actual quantity bought!

(ii) The effect of a rise in consumer's income is likely to shift both the demand curve and the budget line parallel. However the direction of shift in the demand curve is subject to the consumers' view of the product. In case of a normal good, for instance, the demand curve is likely to shift parallel outward because a rise in income induces consumer to buy more of a normal good at each and every price. However, if the product is generally considered inferior than the demand curve will shift leftward that is opposite to the shift in the budget line. This is because inferior goods are associated with a negative income effect. These effects are shown in the graphs below.



In graph 1 a rise in income can bring shift in the demand curve in either direction. If, for instance, the good in question is viewed as normal then the demand curve will shift to D₁. However, in case the good in question is considered inferior than the demand curve will shift to D₂. On the other hand the budget line will always shift outward because it simply reflects the quantities that the consumer can purchase with the given prices of the two goods at the new income level.

The two curves, however, are similar in a way that both on their own cannot point out the new quantity that the consumer will buy at the new income level. In case of demand curve we need to know the supply curve in order to exactly indicate the quantity consumer will buy after a rise in income. Similarly we cannot use the budget line alone to indicate the quantity that the consumer will buy at the new income level unless we incorporate the preference curve to our analysis.

(b) The theory of consumer behaviour explains consumer equilibrium with the help of equi-marginal principle. Utility is the satisfaction that people derive from the consumption of goods and services. TU is the total satisfaction a consumer obtains from the consumption of all the units of a good

consumed. While MU utility is the satisfaction gained from consuming one extra unit of a good within a given time period. It is measured by:
 $TU_n - TU_{n-1} = MU$

The law of equi-marginal utility states that the individual consumer is in equilibrium when it is not possible to switch a single penny's worth of expenditure from one product to another and obtain an increase in total utility. This occurs when:

$$\frac{MU_A}{P_A} = \frac{MU_B}{P_B} = \dots = \frac{MU_n}{P_n}$$

Where A, B, ..., n are the various goods consumed. The above equation states that the consumer equilibrium is where the marginal utility from the last penny spent on product 'a' equals the utility from the last penny spent on product b equals the utility from the last penny spent on product n, thus taking into account all of the products the individual consumes. When this situation is reached it is not possible for the individual to increase his total utility by reallocating expenditure. So the consumer equilibrium is important for it is where the consumer has allocated his or her income in such a way that maximum utility has been achieved. The analysis assumes the following:

Satisfaction can be measured in utils. A util is an imaginary unit of satisfaction from the consumption of a good. Consumer is rational, and therefore wants to maximize satisfaction also his taste and preferences are constant. Consumer has a fixed income, and he will be spending on two normal goods a and b. Product a costing £2.00 each and product b costing £4.00 each, and that the individual has an income per time period of £16.00. The table below will help to explain consumer equilibrium.

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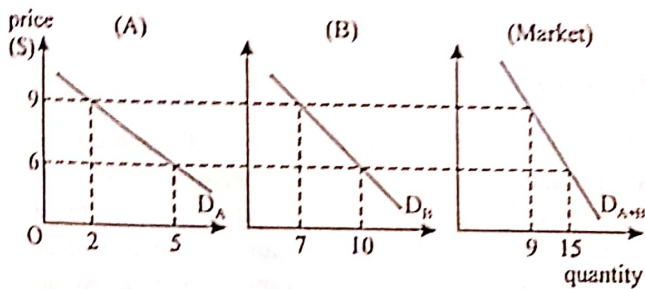
Given this situation, it can be seen that the consumer is in equilibrium when he consumes four units of product a and two of product b. Here MU/P is the same, i.e. 8 for both products. Note that in equilibrium the consumer obtains total

utility of 268 utils and it is impossible for the consumer with an income of £16.00 to obtain a higher level of total utility.

It is also possible to use marginal utility as a means of deriving a demand curve. If in the table above price of product b were to fall to £2.00, then assuming everything else remained constant, there would be a new column for MUIP and a new equilibrium would result. In order to restore equilibrium consumer would reduce consumption of product 'a' by 1 unit and increase the consumption of product 'b' by 3 units. Hence, consuming 3 units of a and 5 units of b at the new equilibrium position. Thus a fall in price of product b would result in an increase in its QD. It, therefore, generates a downward sloping demand curve.

If this is what each consumer does, it is also what all consumers taken together do. Thus the theory of consumer behavior predicts a negatively sloped market demand curve.

The market demand curve is the horizontal sum of the quantities demanded by all individual buyers at various prices per period of time. So market demand curve represents the aggregation of demand curves of all individual buyers. Assuming there are only three two buyers of the product and we have already derived the demand curve for individual buyers using utility principle. The graph below shows the aggregation.



The figure above illustrates the aggregation over consumers. At a price of \$9 consumer A buys 2 units and consumer B buys 7 units; thus together they purchase 9 units, yielding one point on the market demand curve. We generate the second point on \$6 in the same manner and hence derive the market demand curve. No matter how many consumers are involved, the process is the same. We simply need to add the quantities demanded by all consumers at each price, and the result is the market demand curve.

So, by the use of utility it is possible to demonstrate the logic of 'rational' consumer choice and derive the demand curve of an individual consumer. The market demand curve is derived simply by aggregation of individuals' demand curves.

Question 3

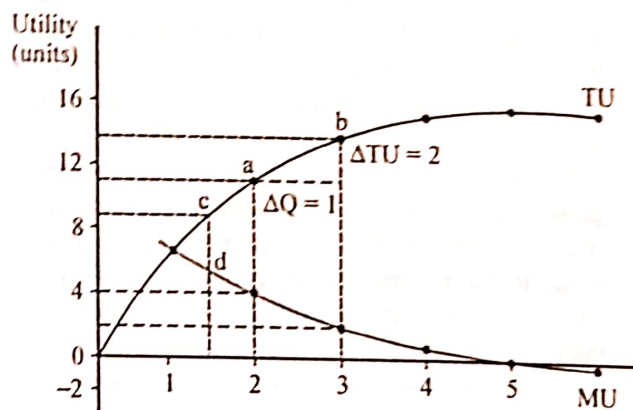
Explain the link between a consumer's expenditure and the equi-marginal principle of utility. [12]

[N11/P4/Q2(a)]

Essay

The theory of consumer behaviour explains consumer equilibrium with the help of utility analysis. Utility is the satisfaction that people derive from the consumption of goods and services. Total utility (TU) and Marginal utility (MU) are two important measures of utility. TU is the total satisfaction a consumer obtains from the consumption of all the units of a good consumed. While MU utility is the satisfaction gained from consuming one extra unit of a good within a given time period. It is measured by: $TU_n - TU_{n-1} = MU$.

According to the principle of diminishing marginal utility, as more units of a good are consumed successively, an extra unit will provide less additional satisfaction than previous unit. For example, the second cup of coffee in the morning gives us less additional satisfaction than the first cup. The third cup gives even less satisfaction. The relationship between TU and MU is shown below:



The MU curve slopes downward, simply illustrating the principle of diminishing marginal utility. The TU curve starts at the origin. When MU is positive and diminishing, TU increases at a decreasing rate. TU reaches a peak when marginal utility is zero. Marginal utility can be derived from the TU curve. It is the slope of the line joining two adjacent quantities on the curve. For example, the marginal utility of the third cup of coffee is the slope of the line joining points a and b. The slope of such a line is given by the formula:

$$MU = \frac{\Delta TU}{\Delta \text{units}}$$

We can extend our analysis of utility to explain how a rational consumer decides what combination of goods to buy from the given income. The underlying principle is called equi-marginal utility. The law states that the individual consumer is in equilibrium when it is not possible to switch a single penny's worth of expenditure from one product to another and obtain an increase in total utility. This occurs when:

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \frac{MU_n}{P_n}$$

Where A, B, n are the various goods consumed.

The above equation states that the consumer equilibrium is where the marginal utility from the last penny spent on product 'a' equals the utility from the last penny spent on product b equals the utility from the last penny spent on product n, thus taking into account all of the products the individual consumes. When this situation is reached it is not possible for the individual to increase his total utility by reallocating expenditure. So the consumer equilibrium is important for it is where the consumer has allocated his or her income in such a way that maximum utility has been achieved. The analysis assumes the following:

Satisfaction can be measured in utils. A util is an imaginary unit of satisfaction from the consumption of a good. Consumer is rational, and therefore wants to maximize satisfaction also his taste and preferences are constant. Consumer has a fixed income, and he will be spending on two normal goods a and b. Product a costing £2.00 each and product b costing £4.00 each, and that the individual has an income per time period of £16.00. The table below will help to explain consumer equilibrium.

Product A (price £2.00 each)			Quantity demanded of product A and B	Product Y (price £4.00 each)		
TU _a	MU _a	$\frac{MU_a}{P_a}$		TU _b	MU _b	$\frac{MU_b}{P_b}$
80	80	40	1	68	68	17
132	52	26	2	100	32	8
152	20	10	3	128	28	7
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Given this situation, it can be seen that the consumer is in equilibrium when he consumes four units of product 'a' and two of product 'b'. Here MU/P is the same, i.e. 8 for both products. Note

that in equilibrium the consumer spends £8 (£2 × 4) on product 'a' and £8 (£4 × 2) on product 'b' and obtains total utility of 268 utils. It is impossible for the consumer with an income of £16.00 to obtain a higher level of total utility. If the consumer were not in equilibrium it would be possible for him to reallocate his spending and obtain a greater level of satisfaction.

It is also possible to use marginal utility as a means of deriving a demand curve. If, for instance, price of product 'b' were to fall to £2.00, then assuming everything else remained constant, there would be a new column for MU/P and a new equilibrium would result. In order to restore equilibrium the consumer would reduce consumption of product 'a' by 1 unit and increase the consumption of product 'b' by 3 units. Hence, consuming 3 units of 'a' and 5 units of 'b' at the new equilibrium position. His spending on each of the two products would also change. At the new equilibrium his expenditure on product 'a' would fall to £6 (£2 × 3) and on product 'b' rise to £10 (£2 × 5). Thus a fall in the price of product 'b' would result both in an increase in its QD and consumer expenditure.

So, by the use of utility it has been possible to demonstrate the logic of 'rational' consumer choice and the changes in expenditure through derivation of demand curve.

Question 4

When buying goods not everyone buys the same standard product. There are some who want a cheap product even though it might be of poor quality, while there are those who are willing to pay more for a luxury or an individually-made product. Customers search for value but value is not just in the price.

(adapted from *New York Times in the Observer* 21.02.10)

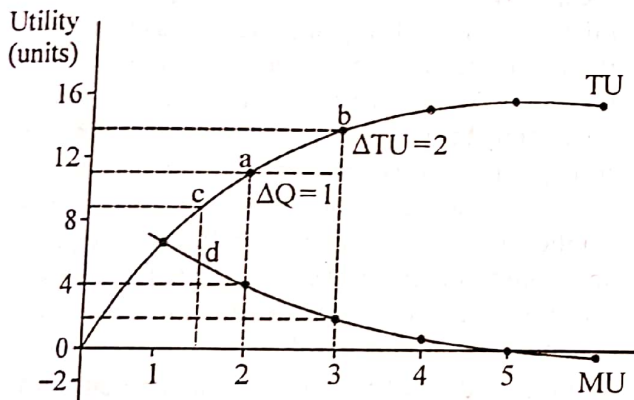
- Explain the theoretical link between utility, price and the demand for a product. [12]
- Discuss whether the economic analysis of a rational consumer estimating demand based on value (utility) is valid not only for standard products but also for poor quality and luxury products. [13]

[J12/P4/Q2]

Essay

(a) The theory of consumer behaviour explains consumer equilibrium with the help of utility analysis. Utility is the satisfaction that people derive from the consumption of goods and services. Total utility (TU) and Marginal utility (MU) are two important measures of utility. TU is the total satisfaction a consumer obtains from the consumption of all the units of a good consumed. While MU utility is the satisfaction gained from consuming one extra unit of a good within a given time period. It is measured by: $TU_n - TU_{n-1} = MU$.

According to the principle of diminishing marginal utility, as more units of a good are consumed successively, an extra unit will provide less additional satisfaction than previous unit. For example, the second cup of coffee in the morning gives us less additional satisfaction than the first cup. The third cup gives even less satisfaction. The relationship between TU and MU is shown below:



The MU curve slopes downward, simply illustrating the principle of diminishing marginal utility. The TU curve starts at the origin. When MU is positive and diminishing, TU increases at a decreasing rate. TU reaches a peak when marginal utility is zero. Marginal utility can be derived from the TU curve. It is the slope of the line joining two adjacent quantities on the curve. For example, the marginal utility of the third cup of coffee is the slope of the line joining points a and b. The slope of such a line is given by the formula:

$$MU = \frac{\Delta TU}{\Delta \text{units}}$$

We can extend our analysis of utility to explain how a rational consumer decides what combination of goods to buy from the given income. The underlying principle is called equi-marginal utility. The law states that the individual consumer is in equilibrium when it is not possible to switch a single penny's worth of expenditure from one prod-

uct to another and obtain an increase in total utility. This occurs when:

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \dots = \frac{MU_n}{P_n}$$

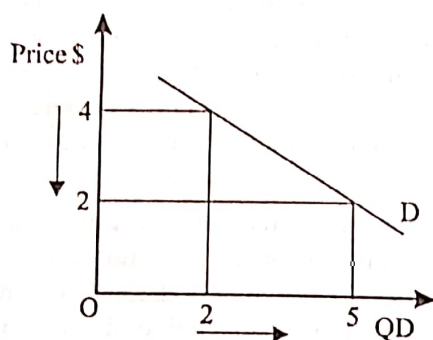
Where a, b,.....n are the various goods consumed. The above equation states that the consumer equilibrium is where the marginal utility from the last penny spent on product 'a' equals the utility from the last penny spent on product b equals the utility from the last penny spent on product n, thus taking into account all of the products the individual consumes. When this situation is reached it is not possible for the individual to increase his total utility by reallocating expenditure. So the consumer equilibrium is important for it is where the consumer has allocated his or her income in such a way that maximum utility has been achieved. The analysis assumes the following:

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It is also possible to use marginal utility as a means of deriving a demand curve. If, for instance, price of product 'b' were to fall to £2.00, then assuming everything else remained constant, there would be a new column for MU_b / P_b and a new equilibrium would result. In order to restore equilibrium the consumer would reduce consumption of product 'a' by 1 unit and increase the consumption of product 'b' by 3 units. Hence, he will consume 3 units of 'a' and 5 units of 'b' at the new equilibrium position. We can use this example to construct the consumer's demand curve for product 'b' as given below;



A decrease in P_b has resulted an increase in QD_b because with the given income and new price of product b consumers maximizes satisfaction at a higher quantity of product b. Thus it is possible to develop a theoretical link between utility, price and the demand for a product.

- (b) Economic theory of consumer behavior assumes rational choices based on costs and benefits of choosing to buy any product. Thus it involves considering the relative costs and benefits of the alternatives consumers would spend their money on. Consumers do this in order to gain the maximum satisfaction possible from their limited incomes. In other words consumers choose those items that give them the best value for their money i.e. the greatest benefit relative to cost.

So we can define rational consumer behavior as the attempt to maximize consumer surplus. We define consumer surplus as excess of what a person would have been prepared to pay for a good over what that person actually pays. The theory predicts that people go on purchasing additional units of any type of product as long as the price they are prepared to pay exceeds the price they are charged. But as more units are purchased so they will experience diminishing marginal utility i.e. they will be willing to pay less and less for the additional unit. As MU diminishes it becomes equal to price where no more consumer surplus can be attained they stop purchasing further units. At this point their

optimum level of consumption has been reached and the consumer surplus has been maximized.

This particular behavior explains why demand curves for a luxury product or a cheaper product slopes downward from left to right. So, the lower the price, regardless the type of product, the higher the quantity the consumer buys and, therefore, the higher the amount of surplus the consumer gains,

So the rational consumer behavior remains the same for all different types of products. Imagine, for instance, you are on a regular shopping trip to supermarket and you want to buy coffee and you need to choose between the top quality brand which, of course you consider a superior good or buy an ordinary cheaper brand of coffee that you feel is inferior in quality. To make a rational choice you need to weigh up the costs and benefits of each alternative. The top quality brand may give you far more satisfaction i.e. higher marginal utility, but it has a high opportunity cost; because it is expensive. You will need to sacrifice larger quantities of other goods if you decide to buy it. Instead if you buy the cheap brand however, although you may not gain as much satisfaction i.e. lower marginal utility but you will have more money left over to buy other goods so it has a lower opportunity cost. Your decision to buy one of the two depends on the amount of consumer surplus you are going to obtain from each of the two. You are more likely to choose the one that generates the highest amount of consumer surplus.

Thus a good may be cheaper but it is possible that its marginal utility is higher than its price and hence it generates a higher amount of consumer surplus than the standard or superior good. Alternatively the cheaper product might give lower amount of consumer surplus and the consumer decides to buy less of it and more of an expensive product. In both cases the marginal utility will be proportional to the price of each type of product. So the theory is as valid for cheaper products as for standard and superior good.

Question 5

A study found that demand for tickets for exhibitions at a major art gallery had unitary price elasticity.

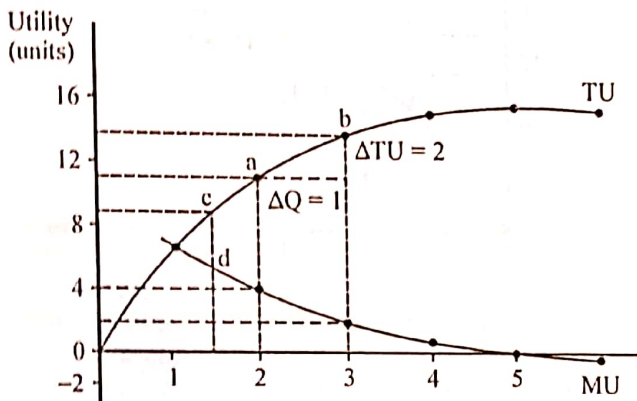
Explain how the concept of diminishing marginal utility may be used to construct a demand curve for the product and whether that analysis still applies in the case of demand for tickets for the exhibitions. [12]

[N12/P4/Q2(a)]

Essay

The theory of consumer behaviour explains consumer equilibrium with the help of utility analysis. Utility is the satisfaction that people derive from the consumption of goods and services. Total utility (TU) and Marginal utility (MU) are two important measures of utility. TU is the total satisfaction a consumer obtains from the consumption of all the units of a good consumed. While MU utility is the satisfaction gained from consuming one extra unit of a good within a given time period. It is measured by: $TU_n - TU_{n-1} = MU$.

According to the principle of diminishing marginal utility, as more units of a good are consumed successively, an extra unit will provide less additional satisfaction than previous unit. For example, the second cup of coffee in the morning gives us less additional satisfaction than the first cup. The third cup gives even less satisfaction. The relationship between TU and MU is shown below:



The MU curve slopes downward, simply illustrating the principle of diminishing marginal utility. The TU curve starts at the origin. When MU is positive and diminishing, TU increases at a decreasing rate. TU reaches a peak when marginal utility is zero. Marginal utility can be derived from the TU curve. It is the slope of the line joining two adjacent quantities on the curve. For example, the marginal utility of the third cup of coffee is the slope of the line joining points a and b. The slope of such a line is given by the formula:

$$MU = \frac{\Delta TU}{\Delta \text{units}}$$

We can extend our analysis of utility to explain how a rational consumer decides what combination of goods to buy from the given income. The underlying principle is called equimarginal utility. The law states that the individual consumer is in equilibrium when it is not possible to switch a single penny's worth of expenditure from one product to another and obtain an increase in total utility. This

occurs when:

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \frac{MU_n}{P_n}$$

Where A, B,.....n are the various goods consumed.

The above equation states that the consumer equilibrium is where the marginal utility from the last penny spent on product 'a' equals the utility from the last penny spent on product b equals the utility from the last penny spent on product n, thus taking into account all of the products the individual consumes. When this situation is reached it is not possible for the individual to increase his total utility by reallocating expenditure. So the consumer equilibrium is important for it is where the consumer has allocated his or her income in such a way that maximum utility has been achieved. The analysis assumes the following:

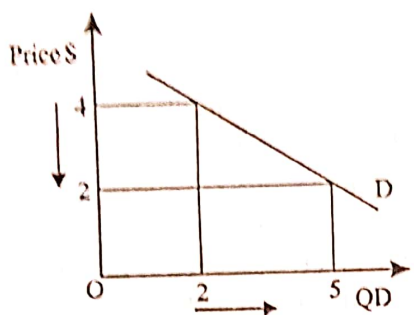
Satisfaction can be measured in utils. A util is an imaginary unit of satisfaction from the consumption of a good. Consumer is rational, and therefore wants to maximize satisfaction also his taste and preferences are constant. Consumer has a fixed income, and he will be spending on two normal goods a and b. Product a costing £2.00 each and product b costing £4.00 each, and that the individual has an income per time period of £16.00. The table below will help to explain consumer equilibrium.

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A Level Economics (Essays)

It is also possible to use marginal utility as a means of deriving a demand curve. If, for instance, price of product 'b' were to fall to £2.00, then assuming everything else remained constant, there would be a new column for MU_b / P_b and a new equilibrium would result. In order to restore equilibrium the consumer would reduce consumption of product 'a' by 1 unit and increase the consumption of product 'b' by 3 units. Hence, he will consume 3 units of 'a' and 5 units of 'b' at the new equilibrium position. We can use this example to construct the consumer's demand curve for product 'b' as given below:



A decrease in P_b has resulted an increase in QD_b because with the given income and new price of product b consumers maximizes satisfaction at a higher quantity of product b. Thus it is possible to develop a theoretical link between utility, price and the demand for a product.

Unitary elastic demand implies that the demand curve is sloping downwards from left to right i.e. a rise in P, if nothing else changes, causes QD to fall with the same proportion and vice versa. Hence the demand curve reflects diminishing marginal utility. Thus the analysis of consumer equilibrium and derivation of demand curve will apply to the demand for tickets of exhibition as much as to any other product with the normal downward sloping demand curve.

Question 6

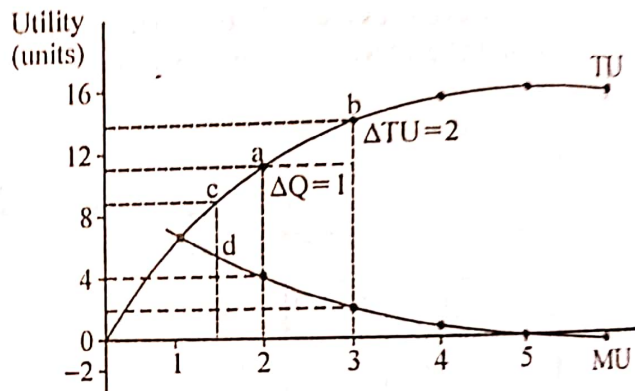
Explain how a consumer allocates expenditure according to the principle of equi-marginal utility and analyse how a change in income might affect that allocation. [12]

[J13/P4/Q2(a)]

Essay

Utility is the satisfaction that people derive from the consumption of goods and services. Total utility (TU) and Marginal utility (MU) are two important measures of utility. TU is the total satisfaction a consumer obtains from the consumption of all the units of a good consumed. While MU utility is the satisfaction gained from consuming one extra unit of a good within a given time period.

According to the principle of diminishing marginal utility, as more units of a good are consumed successively, an extra unit will provide less additional satisfaction than previous unit. For example, the second cup of tea in the morning gives us less additional satisfaction than the first cup. The third cup gives even less satisfaction. The relationship between TU and MU is shown below:



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We can extend our analysis of utility to explain how a rational consumer decides what combination of goods to buy from the given income. The underlying principle is called equi-marginal utility. The law states that the individual consumer is in equilibrium when it is not possible to switch his expenditure from one product to another and obtain an increase in total utility. This occurs when:

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \dots = \frac{MU_n}{P_n}$$

Where a, b,.....n are the various goods consumed. The above equation states that the consumer equilibrium is where the utility from the last money unit spent on product 'a' equals the utility from the last money unit spent on product 'b' equals the utility

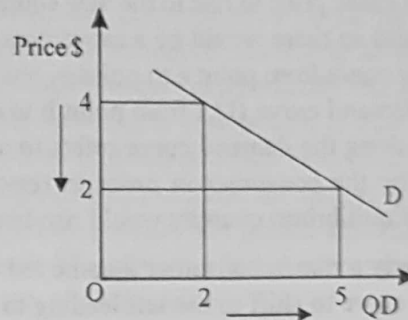
from the last money unit spent on all other products, thus taking into account all of the products the individual consumes. When this situation is reached it is not possible for the individual to increase his total utility by reallocating expenditure. So the consumer equilibrium is important for it is where the consumer has allocated his or her income in such a way that maximum utility has been achieved. The analysis assumes the following:

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It is also possible to use marginal utility as a means of deriving a demand curve. If, for instance, price of product 'b' were to fall to £2.00, then assuming everything else remained constant, there would be a new column for MU_b/P_b and a new equilibrium would result. In order to restore equilibrium the consumer would reduce consumption of product 'a' by 1 unit and increase the consumption of product 'b' by 3 units. Hence, he will consume 3 units of 'a' and 5 units of 'b' at the new equilibrium position. We can use this example to construct the consumer's demand curve for product 'b' as given below;



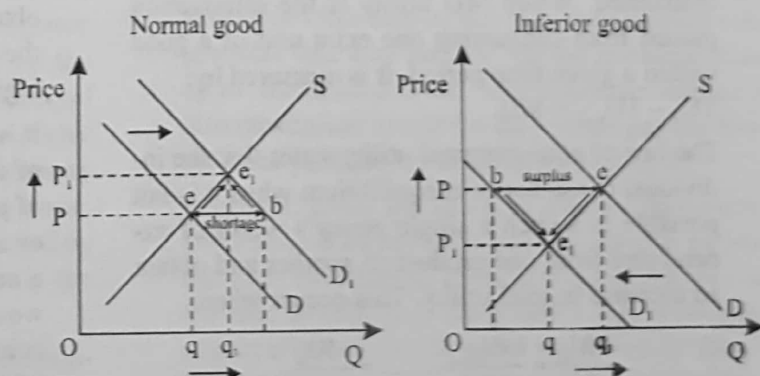
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So far we have analyzed that a change in price of a good brings a movement along the demand curve assuming money income remains unchanged. Thus each demand curve is drawn for a particular level of income therefore a change in income must lead to a shift in the demand curve itself.

When, for instance, income rises and the demand curve shifts to the right, the good is described as normal. In this case the good is said to have a positive income effect i.e. consumer wants to buy more of this good as his income increases. In other case if demand falls i.e. it shifts to the left when income rises we then describe the good as inferior and the good is associated with negative income effect. This simply means that consumption of the good falls as income rises.

The graphs below show the effect of a rise in income on the demand for a normal & inferior good.



In the figure on the left a rise in consumer income led to the demand curve shifting to D₁ leading to a shortage of e-b at the original price OP. This

would cause price to rise to the new equilibrium P_1 . As it did so there would be a movement along the supply curve from point e to point e_1 and along the new demand curve (D_1) from point b to e_1 . Movement along the demand curve refers to a readjustment by the consumer in order to restore MU/P ratio. Equilibrium quantity would rise from q to q_1 .

Similarly a rise in consumer income led to the demand curve to shift to the left leading to a surplus $e - b$ at the original price OP . This would cause price to fall. As it did so, there would be a movement downward along the supply curve from point e to e_1 and along the demand curve D_1 from point $b - e_1$. Again movement along the demand curve refers to a readjustment of allocation of expenditure in order to restore equilibrium where MU/P .

Question 7

(a) Use the theory of marginal utility to analyse how a consumer will normally buy more of a product at a lower price than at a higher price and explain how this theory can be used to derive a market demand curve. [12]

(b) Economic texts examine market equilibrium. Discuss whether it is the consumer or the producer who determines the equilibrium market price and whether consumers have the same power in all types of market structure. [13]

[N13/P4/Q2]

Essay

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The law of equi-marginal utility states that the individual consumer is in equilibrium when it is not possible to switch a single penny's worth of expenditure from one product to another and obtain an increase in total utility. This occurs when:

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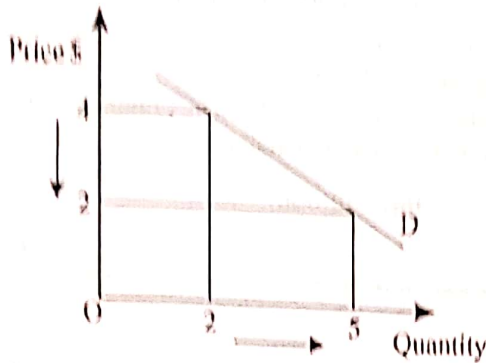
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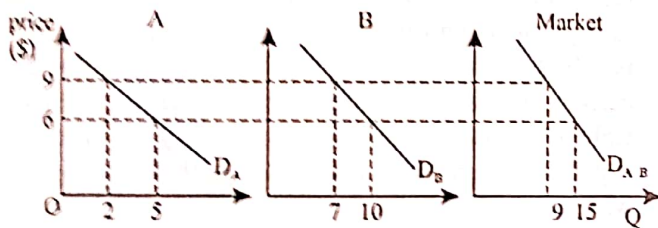
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position. We can use this example to construct the consumer's demand curve for product 'b' as given below:



A decrease in P_b has resulted an increase in QD_b , because with the given income and new price of product b consumers maximizes satisfaction at a higher quantity of product b. Thus it is possible to develop a theoretical link between utility, price and the demand for a product.

If this is what each consumer does, it is also what all consumers taken together do. Thus the theory of consumer behavior predicts a negatively sloped market demand curve. The market demand curve is the horizontal sum of the quantities demanded by all individual buyers at various prices per period of time. So market demand curve represents the aggregation of demand curves of all individual buyers. Assuming there are only three two buyers of the product and we have already derived the demand curve for individual buyers using utility principle. The graph below shows the aggregation.



The figure above illustrates the aggregation over consumers. At a price of \$9 consumer A buys 2 units and consumer B buys 7 units; thus together they purchase 9 units, yielding one point on the market demand curve. We generate the second point on \$6 in the same manner and hence derive the market demand curve. No matter how many consumers are involved, the process is the same. We simply need to add the quantities demanded by all consumers at each price, and the result is the market demand curve.

So, by the use of utility it is possible to demonstrate the logic of 'rational' consumer choice and derive the demand curve of an individual consumer. The market demand curve is derived simply by aggregation of individuals' demand curves.

(b) Markets are dominated by consumers when resources are allocated according to their wishes. This usually occurs in a perfectly free market. Consumer spending is comparable to votes in an election. The businesses which receive the most votes will be able to purchase the factors of production needed to produce the goods demanded by consumers. Therefore the firms receiving no votes will go out of business.

Total consumer sovereignty only exists if there is perfect knowledge or perfect information in the market place. If consumers are to allocate their resources in a way that maximise their utility, they need to know about the products they are buying. In many cases, consumers are well placed to make consumption decisions. A consumer, for instance, is likely to be the best judge of whether to buy bananas or apples.

So far as the theory of firms is concerned, consumer are said to be sovereign in a perfectly competitive market. Perfect competition is characterized by large number of relatively small firms producing homogeneous products in the absence of entry exit barriers. Price in such conditions is determined by total demand and supply forces in the market and each individual firm produces just a fraction of total output, therefore, a change in output by an individual firm does not affect the total market supply and hence the market price. Thus all the firms are price takers and each firm faces a perfectly elastic demand curve.

So, due to the highest degree of competition among firms, it is the collective decisions of consumers that decide what is produced, the quality, the distribution and the price charged. Firms producing products against the wishes of consumer would find it hard to survive. The consumer gains from the low price, since not only are costs kept low, but also there are no long run supernormal profits to add to cost. The consumers also enjoy allocative efficiency as not only they consume the products that they demand for but consume them up to the desired level. The consumer surplus is also maximised in that the consumers pay the lowest price possible for all quantities bought.

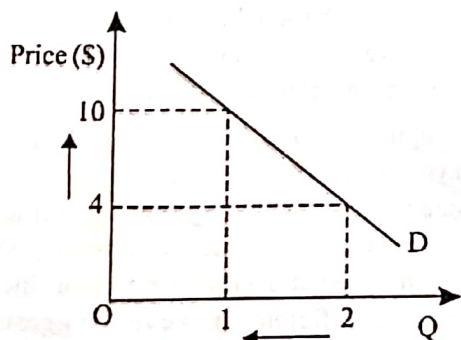
However, there are markets where consumers' dominance does not exist and they have to surrender their sovereignty to producers mainly due to the lack of sufficient competition. In a monopoly market situation the consumer would not be 'king'. This is because the producer, due to his better bargaining position, would decide on what to be produced, how to be produced, how much and for whom to be produced. The monopolist can raise its

costing £2.00 each and product b costing £4.00 each, and that the individual has an income per time period of £16.00. The table below will help to explain consumer equilibrium.

Unit	MU _a	MU _b	$\frac{MU_a}{P_a}$	$\frac{MU_b}{P_b}$
1	100	160	50	40
2	90	140	45	35
3	80	120	40	30
4	70	100	35	25
5	60	80	30	20
6	50	60	25	15
7	40	40	20	10
8	30	20	15	5

Given this situation, it can be seen that the consumer is in equilibrium when he consumes four units of product 'a' and two of product 'b'. Here MU/P for both goods is the same, i.e. 35. Note that in equilibrium the consumer spends £8 (£2 × 4) on product 'a' and £8 (£4 × 2) on product 'b' and obtains total utility of 640. It is impossible for the consumer with an income of £16.00 to obtain a higher level of total utility than this.

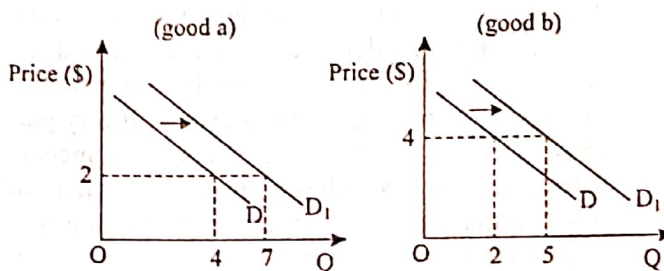
It is possible to derive a demand curve by using marginal utility. Let's assume that price of product 'b' rises to £10.00, assuming everything else constant, there would be a new column for MU/P and a new equilibrium would result. In order to restore equilibrium the consumer would reduce consumption of product 'a' to 1 unit and of product 'b' to 3 units. Hence, consuming 3 units of 'a' and 1 unit of 'b' is the new equilibrium position. His spending on each of the two products would also change. At the new equilibrium his expenditure on product 'a' would fall to £6 (£2 × 3) and on product 'b' rise to £10 (£10 × 1). Thus a rise in the price of product 'b' would result in a decrease in its QD.



The graph above shows an increase in P_b leading to a decrease in QD_b because with the given income and new price consumer maximizes satisfaction at a lower quantity of product b. Thus it is possible to develop a theoretical link between utility, price and the demand for a product. If this is what each consumer does, it is

also what all consumers taken together do. Thus the theory of consumer behavior predicts a negatively sloped market demand curve.

It is also possible to use marginal utility as a means of identifying new equilibrium position when consumer's money income rises. Let's assume that the money income of the consumer increases to £34, then assuming everything else constant, he would again make an adjustment in his purchases in order to achieve equilibrium at new quantities. The effects of rise in income on his purchases are shown on the graphs below.



At the new income level his equilibrium occurs when he buys 7 units of good 'a' and 5 units of good 'b'. Thus he purchases more of both goods and maximizes satisfaction.

So far as the advertisement is concerned its major aim is to sell the product. This can be achieved not only by informing the consumer of the product's existence and availability, but also by deliberately trying to persuade consumers to purchase the goods. Consumers need information about product characteristics and prices to make rational decisions. Advertising can be a low-cost means of providing that information.

The assertion in the question actually implies that much advertising is designed to manipulate or persuade consumers, that is, to alter their taste in favor of the advertiser's product. For instance, a television commercial indicating that a popular personality drinks a particular brand of soft drink — and therefore that you should too — conveys little or no information to consumers about price or quality. Therefore, it encourages irrational consumption and influences allocation of resources. To counter this view economists argue that consumers buy what they desire for or at least what they are made to think they crave for through advertisement. As long as they buy commodities which they feel will satisfy their craving they act rationally.

From the discussion above it follows that the theory of marginal utility can be extended to show how a consumer behaves when either the price of a good or his money income has changed. Not only has this but it also provided a logical explanation of consumer behavior when advertisement changes his taste. So it can be assessed that the marginal utility is a useful guide to consumer behavior in varying circumstances.

Question 9

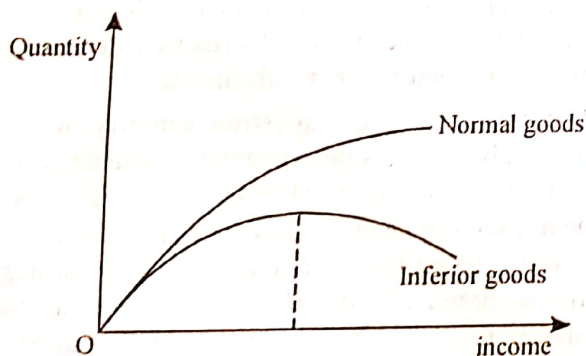
Describe how consumer theory suggests a rise in income will cause a consumer's demand to change for a normal good and for an inferior good. [12]

[J15/P4/Q2(a)]

Essay

Effective demand is the desire to buy a good backed by the ability to pay the market price. Therefore, it is obvious that there must be a relationship between demand for a product and the consumer's ability that is referred to his purchasing power. According to the consumer theory purchasing power is affected by changes in income therefore the two are closely linked. The nature of this relationship, however, depends upon the type of product in question and the level of income. It is held that if other things remaining unchanged demand for a normal good rises as income increases and vice versa. Such good is said to have a positive income effect as there exists a direct relationship between consumer's income and his demand for that good. If, however, demand for a good falls as income rises the good is said to have a negative income effect and it's identified as an inferior good.

Following graph illustrates these relationships.



It can be noted that demand for a normal good rises continuously with income. However the graph tends to flatten out at higher levels of income because people get close to their saturating point. For some normal goods such as fresh vegetables the curve flatten very quickly as people reach their desired level of consumption. We can also observe that demand for inferior goods behaves like the demand curve for normal goods at lower level of income. This suggests that all inferior goods start out as normal goods and become inferior only as income continues to rise. Initially people will increase their demand for potatoes, for instance, but as their incomes rise beyond a certain point they will buy other items of food such as meat, fish

fresh fruits etc. This is because they substitute potatoes with other food items that they regard as better food items.

In both cases how much demand responds to change in income depends on income elasticity of demand. Income elasticity of demand (YED) is the responsiveness of demand for a product to changes in income. The coefficient of YED is measured by the following.

$$YED = \frac{\text{Percentage change in the quantity demanded}}{\text{Percentage change in the income}}$$

So, the coefficient of YED tells us what the % change in the quantity demanded for a good is following a given change in the income of the consumer. These % changes are calculated by dividing the change in income by the original income and the change in quantity demanded by the original quantity demanded.

Regardless of sign when the coefficient of $YED > 1$, demand is said to be income elastic. This is the case when the percentage change in quantity demanded outweighs the percentage change in income. When, however, coefficient of $YED < 1$, demand is said to be income inelastic. In that case percentage change in income outweighs percentage change in demand. Demand is unitary elastic when proportionate changes in demand and income are identical. There may be a case of zero income elastic demand. It is when a change in income has no effect whatsoever on the quantity demanded.

With income elasticity of demand the sign attached the ratio is all important. A plus sign (+) signifies a normal good whereas a minus sign (-) reveals that the good in question is 'inferior'. For most goods the coefficient of YED is positive i.e. demand for a normal good always rises with income. Normal goods are further classified into: (i) Superior goods (luxury goods) for which income elasticity of demand is greater than unity, and (ii) Basic goods for which income elasticity of demand is less than 1.

Although the quantity demanded of a normal good always rises with income, it rises more than proportionately for a superior good, for example, luxury cars. Conversely, demand for a basic good such as detergent rises at a slower rate than income. The negative coefficient, however, suggests that demand falls as income rises or it rises when income falls. Consumers, for instance, decrease the purchase of goods, such as used clothes, as their incomes rise.

So according to the theory consumers' demand rises with income for normal goods and falls as income rises for inferior goods.

Question 10

Consumers decide what they wish to buy and as a result direct the market. Producers develop new products, which they then promote by advertising, in order to maximise profits. Without producers there would be no products to buy.

- (a) Explain how economic theory predicts what a rational consumer decides to buy. [12]

[N15/P4/Q2(a)]

Essay

- (a) Given the limited income the consumer has to make choices between all goods and services he would like to consume. He is said to act rationally if he weighs up costs and benefits of each additional unit of a good he purchases. We can use marginal utility analysis to show how a rational person decides what combination of goods to buy.

Utility is the satisfaction that people derive from the consumption of goods and services. Total utility (TU) and Marginal utility (MU) are two important measures of utility. Total utility (TU) is the total satisfaction a consumer obtains from the consumption of all the units of a good consumed. While marginal utility (MU) is the satisfaction gained from consuming one extra unit of a good within a given time period. MU is measured as:
 $TU_n - TU_{n-1} = MU$.

According to the principle of diminishing marginal utility, as more units of a good are consumed successively, each extra unit will provide less additional satisfaction than previous unit. For example, the second bar of chocolate gives us less additional satisfaction than the first bar. The third bar gives even less satisfaction.

Now we extend our analysis of utility to explain how a rational consumer decides what combination of goods to buy from the given income. The underlying principle is called equi-marginal utility. The law states that the individual consumer is in equilibrium when it is not possible to obtain an increase in total utility by switching expenditure from one product to another. This occurs when:

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} \dots \dots \dots = \frac{MU_n}{P_n}$$

Where a,b,,.....n are the various goods consumed.

The above equation states that the consumer is in equilibrium when the marginal utility from the last money unit spent on each product yields the same satisfaction. So the consumer equilibrium is impor-

tant for it is where the consumer has allocated his or her income in such a way that the maximum utility has been achieved. If the consumer is not in disequilibrium then he would continue switching his expenditure in favour of a good that gives him better value of his money until he obtains the same utility from the last money unit spent on each good.

In order to illustrate this principle we assume that satisfaction can be measured in utils. A util is an imaginary unit of satisfaction from the consumption of a good. Consumer is rational, and therefore wants to maximize satisfaction also his taste and preferences are constant. Consumer has a fixed income, and he will be spending on two normal goods X and Y. Let's also assume that good X costs twice as much as good Y but it gives three times as much satisfaction as good Y. When we apply this to the formula we obtain the following result:

$$\frac{MU_x}{MU_y} = \frac{3}{1} \text{ and } \frac{P_x}{P_y} = \frac{2}{1}$$

So with the current purchase the consumer finds that

$$\frac{MU_x}{MU_y} > \frac{P_x}{P_y}$$

In the current situation the consumer is not maximizing satisfaction and in order to achieve maximum satisfaction the consumer must increase his purchase of good X relative to that of good Y. But as he buys more of good X, according to the law of diminishing marginal utility, the marginal utility of good X will fall. Simultaneously if reduces his purchase of good Y marginal utility of good Y will rise. The consumer should stop adjusting the balance of his purchases of goods X and Y when the marginal utility ratio is the same as the price ratio. In equation we can write it as:

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$$

At this point no further gain can be made by switching from one good to the other and therefore it suggests that the consumer's total utility is maximized for any given amount of income spent on these two goods. This can be applied to any number of goods the consumer intends to purchase.

So, the consumer theory predicts that a rational consumer decides to buy certain quantities of goods by following the principle of equi-marginal utility.

Question 11

With the help of diagrams, use indifference analysis to:

- (a) explain what is meant in economic theory by consumer equilibrium and how it is related to a consumer's demand curve. [12]
- (b) discuss how this equilibrium might be affected by a government fiscal policy that raises taxes on goods. [13]

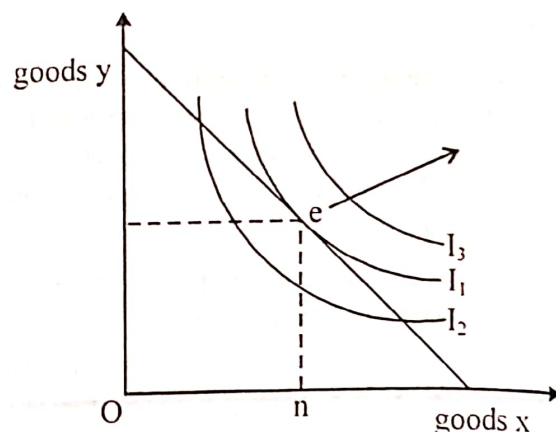
[J16/P4/Q3]

Essay

- (a) In the real world, given the limited incomes, consumers have to make choices about what to buy and how much. Since they do not want to waste their money, therefore consumer theory assumes that they act rationally i.e. they ensure that the benefits of what they are buying are worth the expense. It therefore suggests that a consumer is in equilibrium when he gets the best value for money from his or her purchases.

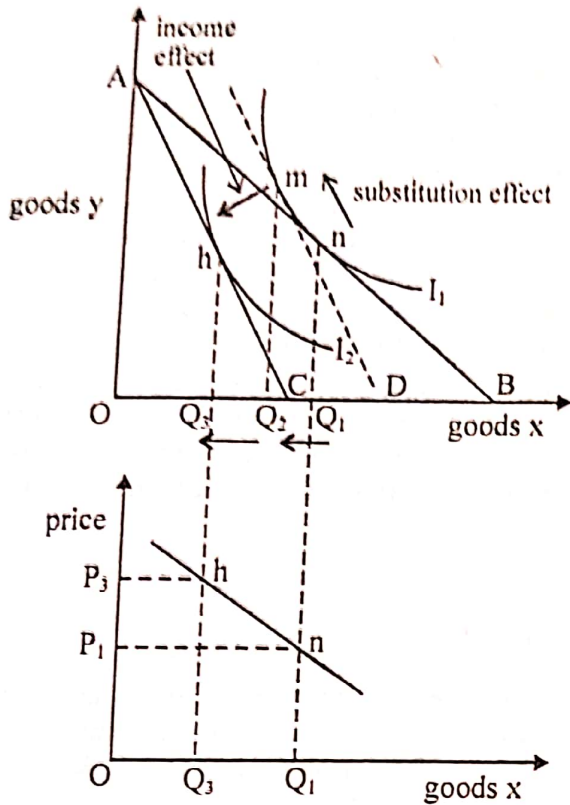
An indifference curve shows various combinations of two goods between which a consumer is indifferent i.e. those combinations that give an equal amount of satisfaction or utility. A typical I_c slopes downward from left to right and it is usually drawn bowed in towards the origin. Its slope gets shallower as we move down the curve due to the diminishing marginal rate of substitution. MRS is the rate at which the consumer is willing to substitute one good for the other maintaining the overall satisfaction intact. It therefore represents the marginal utility ratio (MU_x / MU_y). We can draw more than one indifference curves where each indifference curve further out to the right would show a combination of two goods that give a higher level of satisfaction.

An indifference map illustrates people's preferences, but the actual choices they make will depend on their incomes. The budget line, therefore, is the other important element in this analysis. The budget line shows what combinations of two goods a consumer is able to buy at given prices and or a given budget. It, therefore, represents price ratio (P_x / P_y). Let us examine the following graph where we put the two elements – the indifference map and a budget line – together. This will enable us to show how much of each of the two goods the 'rational' consumer will buy from a given budget.



Economic theory predicts that a rational consumer would like to consume along the highest possible indifference curve. This is curve I_1 at point e . Higher indifference curve I_3 , although representing higher utility than curve I_1 , represents combinations of x and y that cannot be afforded with the current budget. The consumer could consume along curve I_2 but it gives a lower level of utility than consuming at point e . The optimum consumption point for the consumer, then, is where the budget line is 'tangential' to the highest possible indifference curve. This is where the MU ratio equals price ratio. At any other point along the budget line, the consumer would get a lower level of utility.

We can establish the relationship between a consumer's equilibrium and his demand curve by using income and substitution effects of price change. Let's assume that the price of goods x rises, consumer will purchase less of it for two reasons: Firstly he cannot afford to buy so much due to the income effect. Secondly, the good is now more expensive relative to other goods. He, therefore, substitutes alternatives for it. This is the substitution effect. Consider the following graph;



The price of normal good x has risen and the budget line has pivoted inwards from AB to AC. The consumption point has moved from n to h.

Part of this fall in consumption is due to the substitution effect and part is due to the income effect. To separate these two effects a new budget line is drawn, parallel to AC but tangential to the original indifference curve I_1 . Being parallel to AC, it represents the new price ratio i.e. the higher price of good X, however, it enables the consumer to obtain the same utility as before because there is no loss in real income to the consumer. So, we have excluded the income effect and therefore the movement from Q_1 to Q_2 is due purely to a change in the relative prices of x and y.

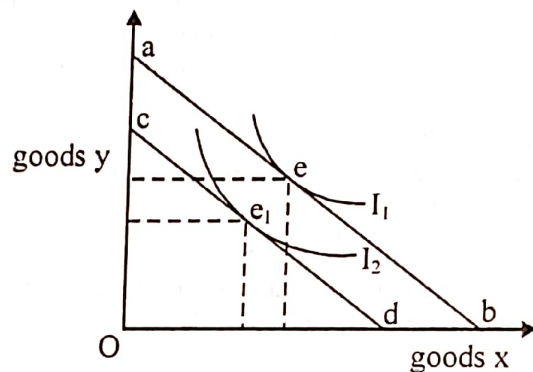
In reality, the budget line has shifted to AC and the consumer is forced to consume on a lower indifference curve I_2 : real income has fallen. Thus the movement from Q_2 to Q_3 is the income effect. In the case of a normal good, therefore, the income and substitution effects of a price change reinforce each other. They are both negative: they both involve a reduction in the quantity demanded as price rises.

In order to derive the consumer's demand curve for good x we need to show the effect on the consumption of x of a change in the price of x assuming the prices of all other goods are held constant. We illustrate the rise in price of x by pivoting the budget line inward on the upper part. It is then a

simple matter of transferring these price-quantity relationships on to a demand curve. In figure above point n and h on the demand curve in the lower part of the diagram corresponds to the two points on the upper part of the graph.

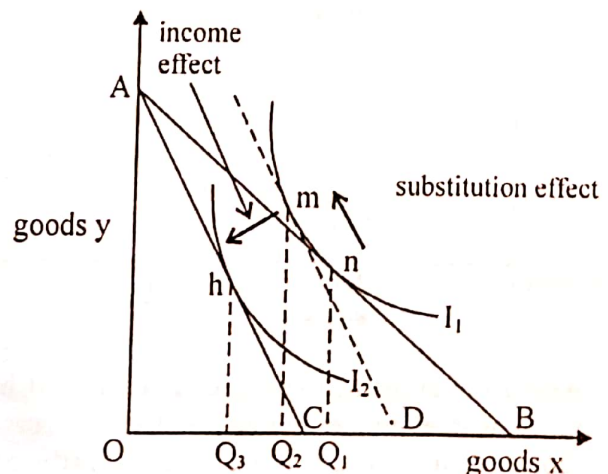
- (b) Fiscal policy involves the use of government spending, and taxation to influence both the pattern of economic activity and also the level and growth of aggregate demand, output and employment. While Deflationary fiscal policy is raising taxes in some form that is detrimental to consumer expenditure.

An increase in direct taxes, for instance, would reduce disposable incomes and therefore would influence purchases of different goods and services. Graph below explains this;



A decrease in income caused by higher rates of a direct tax, say income tax, is represented by a parallel shift inwards of the budget line assuming no change in the price of x and y. This will then lead to a new optimum consumption point e_1 on a lower indifference curve. In other words, people can buy less than they did before. A uniform increase in indirect tax on all goods might also produce the same effect on consumers' real incomes.

Indifference curve can also be used to analyse the effects on consumers' purchase of different goods when government increases tax on selected items. Consider the following graph where 'x' is a normal good.

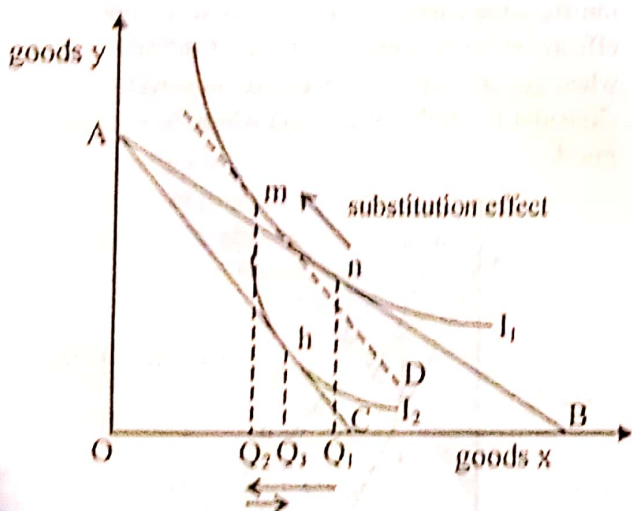


An increase in tax on good x has increased its price and the budget line has pivoted inwards from AB to AC. The consumption point has moved from point n to point h. Part of this shift in consumption is due to the substitution effect and part is due to the income effect.

In order to reach the new equilibrium at point h first the consumer would substitute good x with its relatively cheaper substitute. The substitution effect is shown by drawing a new dotted budget line parallel to BC but tangential to the original indifference curve I_1 at point m. Being tangential to I_1 enables the consumer to obtain the same utility as before, in other words, there is no loss in real income to the consumer. Thus the movement from Q_1 to Q_2 is the substitution effect. In reality, the budget line has shifted to BC and the consumer is forced to consume on a lower indifference curve I_2 ; real income has fallen. Thus the movement from Q_2 to Q_3 is the income effect. In case of a normal good, therefore, the income and substitution effects of a price change reinforce each other. They are both negative; they both involve a reduction in the quantity demanded as price rises

The bigger the income and substitution effects, the higher will be the price elasticity of demand for good x.

If the good subject to higher tax is inferior then the substitution effect will be in the same direction as for a normal good; i.e. it will be negative. People will consume less x relative to y, since x is now more expensive relative to y. For example, if the price of inferior-quality margarine went up, people would tend to use better-quality margarine or butter (good y) instead. This is illustrated in Figure below.



Again the substitution effect is indicated by a movement along the original indifference curve I_1 from point n to point m. The quantity of X

demanded falls from Q_1 to Q_2 . The income effect of the price rise, however, will be the opposite of that for a normal good. The reduction in real income from the rise in price of x will tend to increase the consumption of x, since with a fall in real income more inferior goods will now be purchased - including more x. Thus point h is to the right of point m; the income effect increases quantity back from Q_2 to Q_3 . Over all substitution effect outweighs income effect therefore QD of inferior good is likely to decrease from Q_1 to Q_3 .

It, therefore, follows that increase in tax on different goods will increase their prices which will affect their quantity demanded partly due to the substitution effect and partly due to income effect.

Question 12

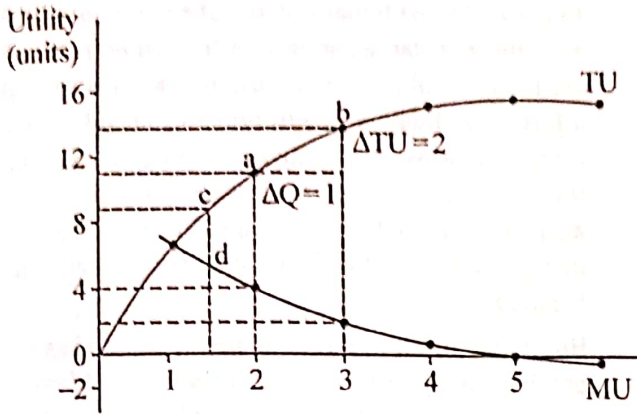
- (a) A number of consumers are deciding whether to buy a product. How far does economic theory explain the determination of the market demand curve for that product? [12]
- (b) Discuss whether that theory is still valid if the producer decides to advertise the product, and consider the effects of the advertising on the demand curve for the product. [13]

[N16/P4/Q3]

Essay

- (a) The theory of consumer behaviour explains consumer equilibrium with the help of utility analysis. Utility is the satisfaction that people derive from the consumption of goods and services. Total utility (TU) and Marginal utility (MU) are two important measures of utility. TU is the total satisfaction a consumer obtains from the consumption of all the units of a good consumed. While MU utility is the satisfaction gained from consuming one extra unit of a good within a given time period. It is measured by: $TU_n - TU_{n-1} = MU$.

According to the principle of diminishing marginal utility, as more units of a good are consumed successively, each additional unit will provide less additional satisfaction than previous unit. For example, the second cup of coffee in the morning gives us less additional satisfaction than the first cup. The third cup gives even less satisfaction. The relationship between TU and MU is shown below:



Marginal utility can be derived from the TU curve. It is the slope of the line joining two adjacent quantities on the curve. For example, the marginal utility of the third cup of coffee is the slope of the line joining points a and b. The slope of such a line is given by the formula:

$$MU = \frac{\Delta TU}{\Delta \text{units}}$$

We can extend our analysis of utility to explain how a rational consumer decides what combination of goods to buy from the given income. The underlying principle is called equi-marginal utility. The law states that the individual consumer is in equilibrium when it is not possible to switch a single penny's worth of expenditure from one product to another and obtain an increase in total utility. This occurs when:

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} \dots \dots \dots \frac{MU_n}{P_n}$$

Where A,B,,.....n are the various goods consumed.

The above equation states that the consumer equilibrium is where the marginal utility from the last penny spent on product 'a' equals the utility from the last

penny spent on product b equals the utility from the last penny spent on product 'n', thus taking into account all of the products the individual consumes. When this situation is reached it is not possible for the individual to increase his total utility by reallocating expenditure. So the consumer equilibrium is important for it is where the consumer has allocated his or her income in such a way that maximum utility has been achieved. The analysis assumes the following:

Satisfaction can be measured in utils. A util is an imaginary unit of satisfaction from the consump-

tion of a good. Consumer is rational, and therefore wants to maximize satisfaction also his taste and preferences are constant. Consumer has a fixed income, and he will be spending on two normal goods a and b. Given this situation, it can be worked out that the consumer is in equilibrium when;

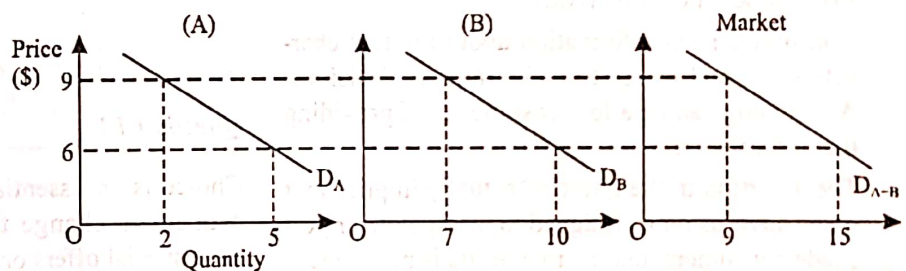
$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b}$$

In order to derive the consumer's demand curve for good a, for instance, we need to show the effect on its consumption of change in its price, assuming the prices of all other goods are constant. Say, for instance, price of good a decreases it therefore disturbs consumer's equilibrium — the two fractions are not equal any more. The situation now is;

$$\frac{MU_a}{P_a} > \frac{MU_b}{P_b}$$

In order to equate these two ratios the consumer now must purchase more of good a so that MUa decreases and hence lowers the value of its fraction until the two fractions are equal again — the equilibrium. It is then a simple matter of transferring these price-quantity relationships on to a demand curve.

The market demand curve is the horizontal sum of the quantities demanded by all individual buyers at various prices per period of time. Assuming there are only three two buyers of the product and we have already derived the demand curve for individual buyers using utility principle. The graph below shows the aggregation.



At a price of \$9 consumer A buys 2 units and consumer B buys 7 units; thus together they purchase 9 units, yielding one point on the market demand curve. We generate the second point on \$6 in the same manner and hence derive the market demand curve. No matter how many consumers are involved, the process is the same.

So, by the use of utility it is possible to demonstrate the logic of 'rational' consumer choice and derive the demand curve of an individual consumer. The market demand curve then is simply an aggregation of individuals' demand curves.

- (b) As consumers if we had unlimited income, we could consume as much as we wanted. We would not have to be careful with our money. In the real world, however, given the problem of scarcity, we have to make choices about what to buy. For instance, you may have to choose between the new books you feel you ought to buy and going to a rock concert, between a new pair of jeans and a meal out, and so on. It is here that economic theory assumes that consumers behave 'rationally'. We define rational choices as the weighing-up of the costs and benefits of our actions. As far as consumption is concerned, rational action involves considering the relative costs and benefits to us of the alternatives we could spend our money on. We do this in order to gain the maximum satisfaction possible from our limited incomes.

Sometimes we may act 'irrationally'. We may purchase goods impetuously or out of habit, with little thought to their price or quality. In general, however, it is a reasonably accurate assumption that people behave rationally. In other words, consumers learn over time the sort of products they like and therefore, they can probably make out a 'rational' shopping list for themselves.

On the other hand, the major aim of advertising is to sell the product. This can be achieved not only by informing the consumer of the product's existence and availability, but also by deliberately trying to persuade consumers to purchase the goods. Successful advertising will not only increase demand, but also make the firm's demand curve less elastic since it stresses the specific qualities of this firm's product over its rivals.

Consumers need information about product characteristics and prices to make rational decisions. Advertising can be a low-cost means of providing that information.

The assertion in the question actually implies that much advertising is designed to manipulate or persuade consumers, that is, to alter their preferences in favor of the advertiser's product. A television commercial, for instance, indicating that a popular personality drinks a particular brand of soft drink — and therefore that you should too — conveys little or no information to consumers about price or quality. Therefore, it encourages irrational consumption and influences allocation of resources. To counter this view economists argue that consumers buy what they desire for or at least what they are made to think they crave for through advertisement. As long as they buy commodities which they feel will satisfy their craving they act rationally.

In particular, with major items of expenditure such as a house, a car, a carpet or a foreign holiday, we are likely to take much more care. Take the case of a foreign holiday: you will probably spend quite a long time browsing through brochures comparing the relative merits of various holiday packages against their relative costs, looking for a holiday that gives good value for money. This is a rational behaviour.

But it may not turn out to be nearly as good as the brochure led you to believe. This is a problem of ignorance. You probably nevertheless behaved rationally in the first place, believing that you were getting value for money. We, therefore, must not confuse irrationality and ignorance. The assumption that consumers behave rationally does not mean that they have perfect information.

Also, the term 'rational' simply refers to behaviour that is consistent with consumers' own particular goals, i.e. behaviour directed to getting the most out of their limited income. People may well disapprove of the things that others buy - their clothes, their records, their cigarettes, but that is making a judgment about their goals: their taste and morality. Economic theory does not make judgment about what people's goal should be instead we use them to analyse the implications of people behaving rationally in pursuit of these goals.

Thus, it can be concluded that advertisement indeed influences the demand curve it, however, does not mean a decrease in rationality. In fact, advertisement through better information makes informed choices more likely.

Question 13

Choice is an essential part of economics. Sometimes consumers change their choices either when shops have special offers on previously very expensive luxury products, or when advertising persuades them to change their preferences.

Analyse how the economic theory of indifference curves can be used to construct a consumer's demand curve. Discuss whether this theory can explain the above changes in choice. [25]

[J17/P4/Q2]

Essay

In the real world, given the limited incomes, consumers have to make choices about what to buy and how much. Since they do not want to waste their money, therefore consumer theory assumes that they act rationally. It, therefore, suggests that a consumer is in equilibrium when he gets the best value for money from his purchases. Consumer theory of Indifference curve helps explain consumer choices in different situations.

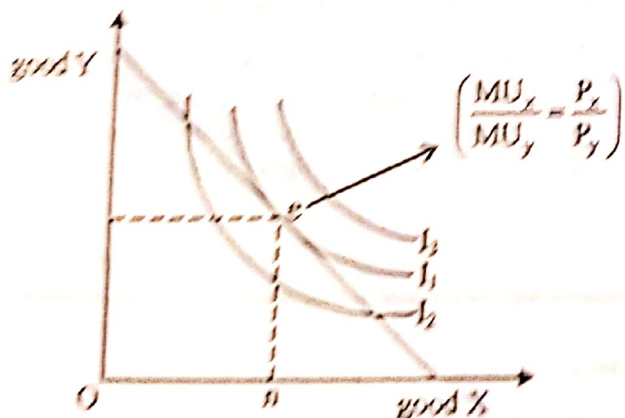
An indifference curve(Ic) shows various combinations of different quantities of two goods that give an equal amount of satisfaction or utility. A typical Ic slopes downward from left to right and it is usually drawn bowed in towards the origin. Its slope gets shallower as we move down the curve due to the diminishing marginal rate of substitution. MRS is the rate at which the consumer is willing to substitute one good for the other while maintaining the overall satisfaction intact. It, therefore, represents the marginal utility ratio

$$\left(\frac{MU_x}{MU_y} \right)$$

We can draw more than one indifference

curves where each indifference curve further out to the right would show a combination of two goods that give a higher level of satisfaction.

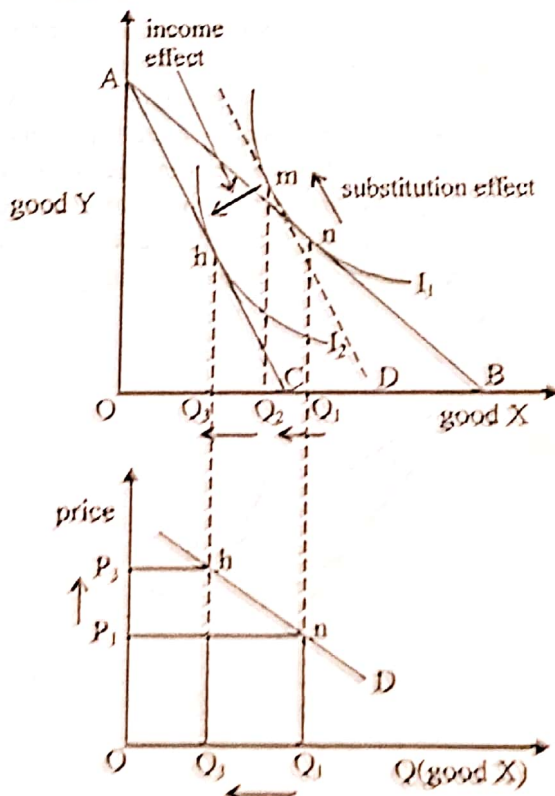
An indifference map illustrates people's preferences, but the actual choices they make will depend on their incomes. The budget line, therefore, is the other important element in this analysis. The budget line shows what combinations of two goods a consumer is able to buy at given prices and with a given budget. It, therefore, represents price ratio (P_x/P_y). Let us examine the following graph where we put the two elements — the indifference map and a budget line — together. This will enable us to show how much of each of the two goods the 'rational' consumer will buy from a given budget.



Economic theory predicts that a rational consumer would like to consume along the highest possible indifference curve with the given money income. This is curve I_1 at point e. I_2 though represents higher utility

than I_1 , but it represents combinations of X and Y that cannot be afforded with the current budget. The consumer could consume along curve I_2 but it gives a lower level of utility than I_1 at point e. The optimum consumption point for the consumer therefore is where the budget line is 'tangential to' the highest possible indifference curve. This is where the MU ratio equals price ratio.

We can establish the relationship between a consumer's equilibrium and his demand curve by using income and substitution effects of a price change. Let's assume that the price of a normal good X rises, consumer will purchase less of it for two reasons: Firstly he cannot afford to buy so much due to the income effect. Secondly, the good is now more expensive relative to other goods. He, therefore, substitutes alternatives for it. This is the substitution effect. Consider the following graph;

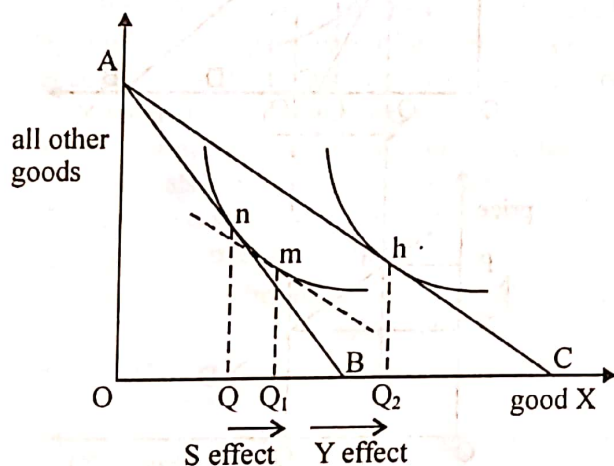


The price of normal good X has risen and the budget line has pivoted inwards from AB to AC. The consumption point has moved from n to h . Part of this fall in consumption is due to the substitution effect and part is due to the income effect. To separate these two effects a new budget line is drawn, parallel to AC but tangential to the original indifference curve I_1 at point m . Being parallel to AC, it represents the new price ratio i.e. the higher price of good X, however, it enables the consumer to obtain the same utility as before because there is no loss in real income to the consumer. So, we have excluded the income effect and therefore the movement from Q_1 to Q_3 is due purely to a change in the relative prices of X and Y.

In reality, the budget line has shifted to AC and the consumer is forced to consume on a lower indifference curve I_2 ; real income has fallen. Thus the movement from Q_2 to Q_3 is the income effect. In the case of a normal good the income and substitution effects of a price change reinforce each other. They are both negative: they both involve a reduction in the quantity demanded as price rises.

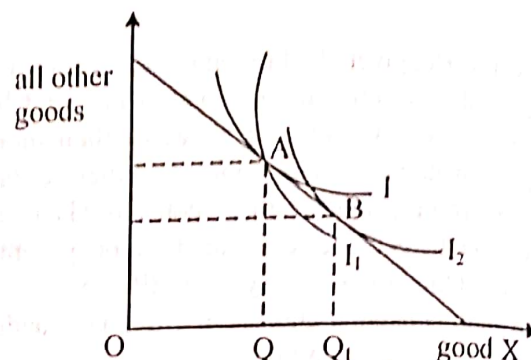
In order to derive the consumer's demand curve for good X we need to show the effect on the consumption of good X of a change in its price assuming the prices of all other goods are held constant. We illustrate the rise in price of X by pivoting the budget line inward on the upper part. It is then a simple matter of transferring these price-quantity relationships on to a demand curve. In figure above point n and h on the demand curve in the lower part of the diagram corresponds to the two points on the upper part of the graph.

We can use indifference curve theory in order to explain changes in consumer choices when shops have special offers on previously very expensive luxury products. These products usually have relatively income elastic demand. This implies that the proportionate change in QD is larger than the given change in income. This suggests that the income effect of a fall in price will have a larger share in overall change in QD.



The price of expensive luxury good X has fallen due to the special offer and the budget line has pivoted outward from AB to AC. The consumption point has moved from n to h. Part of this rise $Q - Q_1$ is due to the substitution effect and part $Q_1 - Q_2$ is due to income effect. Clearly the change in quantity of good X resulting from income effect is larger because it is a luxury good and therefore has a stronger income effect.

We know that people's preferences can also change in the real world. One obvious example is the case of advertising. If advertising is effective, it should make the advertised good more desirable i.e. it shifts consumers' preferences towards that good. Consider the consumer choice diagram below.



Say there is a successful advertising campaign for Good X. This makes Good X more desirable. In other words, the consumer would now be willing to give up more of all other goods to buy one more unit of Good X. This means that the marginal rate of substitution will now be higher than before, the indifference curve therefore becomes steeper at point A i.e. it pivots around to the curve I. Now, the bundle of goods at point A is no longer the consumer's best affordable choice. He can reach a higher indifference curve I_2 by buying the bundle of goods at point B instead that includes more of Good X and less of all other goods. So, the effective advertising campaign for Good X induces the consumer to buy more of Good X, by changing his preferences.

It therefore follows that not only can we use consumer theory of indifference curve for derivation of a consumer's demand curve but we can also show any changes in his preferences resulting from factors such as advertisement and special offers.

Question 14

- (a) Analyse how indifference curve theory explains why a consumer will normally buy more of a good at a lower price than at a higher price. [12]
- (b) Discuss why there might be exceptions to this normal response, distinguishing the income effect from the substitution effect. Consider the relevance of these exceptions to firms and the government. [13]

[N17/P4/Q3]

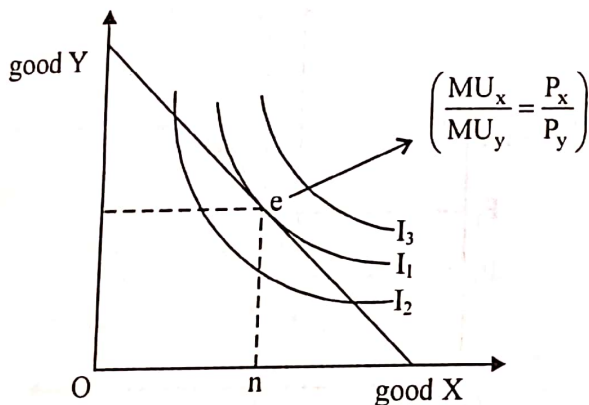
Essay

- (a) An indifference curve shows various combinations of two goods that give an equal amount of satisfaction or utility. A typical I_c slopes downward from left to right and it is usually drawn bowed in towards the origin. Its slope gets shallower as we

move down the curve indicating diminishing marginal rate of substitution. MRS is the rate at which the consumer is willing to substitute one good for the other while maintaining the overall satisfaction. An Ic, therefore, represents the marginal utility

ratio $\left(\frac{MU_x}{MU_y}\right)$. We can draw more than one indifference curves where each indifference curve further out to the right would show a combination of two goods that give a higher level of satisfaction.

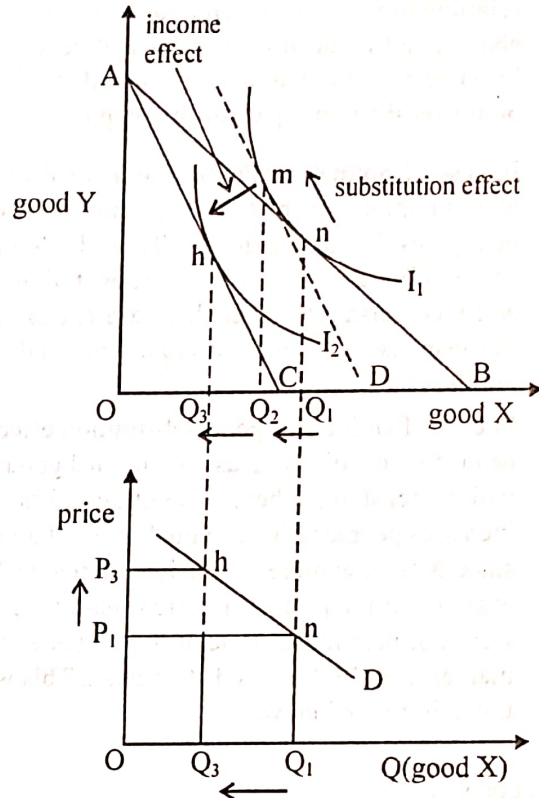
So, an indifference map illustrates people's preferences, but their actual choices will depend on their incomes. The budget line, therefore, is the other important element in this analysis. The budget line shows what combinations of two goods a consumer is able to buy at given prices and a given budget. It, therefore, represents price ratio (P_x/P_y) . Let us examine the following graph where we put the two elements—the indifference map and a budget line— together. This will enable us to show how much of each of the two goods the 'rational' consumer will buy from a given budget.



Economic theory predicts that a rational consumer would like to consume along the highest possible indifference curve. This is curve I_1 at point e . Higher indifference curve I_3 , although representing higher utility than curve I_1 , but it represents combinations of X and Y that cannot be afforded with the current budget. The consumer could consume along curve I_2 but it gives a lower level of utility than consuming at point 'e'. The optimum consumption point for the consumer, then, is where the budget line is 'tangential to' the highest possible indifference curve. This is where the MU ratio equals price ratio. At any other point along the budget line, the consumer would get a lower level of utility.

We can establish the relationship between a consumer's equilibrium and his demand curve by using income and substitution effects of price

change. Let's assume that the price of good X rises, consumer will purchase less of it for two reasons: Firstly he cannot afford to buy so much due to the income effect. Secondly, the good is now more expensive relative to other goods. He, therefore, substitutes alternatives for it. This is the substitution effect. Consider the following graph;



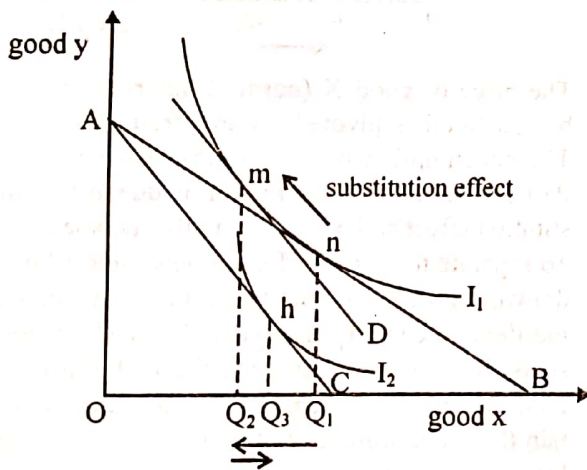
The price of good X (normal) has risen and the budget line has pivoted inwards from AB to AC . The consumption point has moved from n to h . Part of this fall in consumption is due to the substitution effect and part is due to the income effect. To separate these two effects a new budget line is drawn, parallel to AC but tangential to the original indifference curve I_1 . Being parallel to AC , it represents the new price ratio i.e. the higher price of good X , however, it enables the consumer to obtain the same utility as before because there is no loss in real income to the consumer. So, we have excluded the income effect and therefore the movement from Q_1 to Q_2 is due purely to a change in the relative prices of X and Y .

In reality, the budget line has shifted to AC and the consumer is forced to consume on a lower indifference curve I_2 ; real income has fallen. Thus the movement from Q_2 to Q_3 is the income effect. So in case of a normal good income and substitution effects of a price change reinforce each other. They are both negative: they both involve a reduction in the quantity demanded as price rises.

In order to derive the consumer's demand curve for good X we need to show the effect on the consumption of X of a change in the price of X assuming the prices of all other goods are held constant. We illustrate the rise in price of X by pivoting the budget line inward on the upper part. It is then a simple matter of transferring these price-quantity relationships on to a demand curve. In figure above point n and h on the demand curve in the lower part of the diagram corresponds to the two points on the upper part of the graph.

- (b) In case of normal goods income and substitution effects reinforce each other i.e. as price of a normal good rises QD of the good falls partly due to income effect and partly due to substitution effect and vice versa. However there are exceptions to this response when it comes to inferior and Giffen goods.

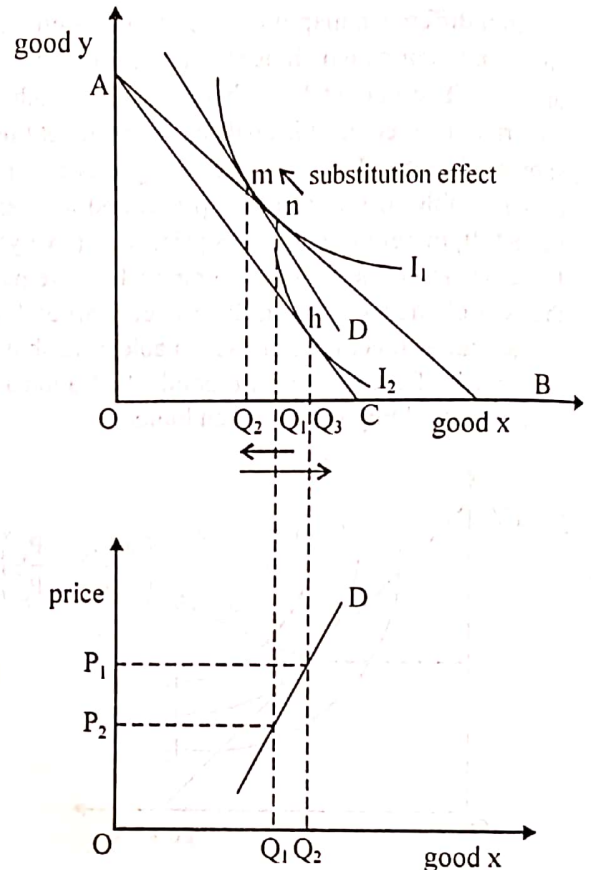
In case of an inferior good substitution effect will be in the same direction as for a normal good: i.e. it will be negative. When, price of an inferior good increases people will consume less X relative to Y, since X is now more expensive relative to Y. For example, if the price of inferior-quality margarine went up, people would tend to use better-quality margarine or butter (good Y) instead. This is illustrated in figure below.



Again the substitution effect is indicated by a movement along the original indifference curve I_1 from point n to point m. The quantity of X demanded falls from Q_1 to Q_2 . The income effect of the price rise, however, will be the opposite of that for a normal good. The reduction in real income from the rise in price of X will tend to increase the consumption of X, since with a fall in real income more inferior goods will now be purchased – including more X. Thus point h is to the right of point m: the income effect increases quantity back from Q_2 to Q_3 . Over all substitution effect out-

weighs income effect therefore QD of inferior good is likely to decrease from Q_1 to Q_3 .

The other exception is a case of a Giffen good. It is an inferior good that takes a large proportion of a consumer's expenditure. This implies that a change in price of such a good would have a significant change in consumer's real income and therefore it would result in a large income effect that outweighs substitution effect and hence producing an exceptional demand curve. Following graph illustrates this exception.

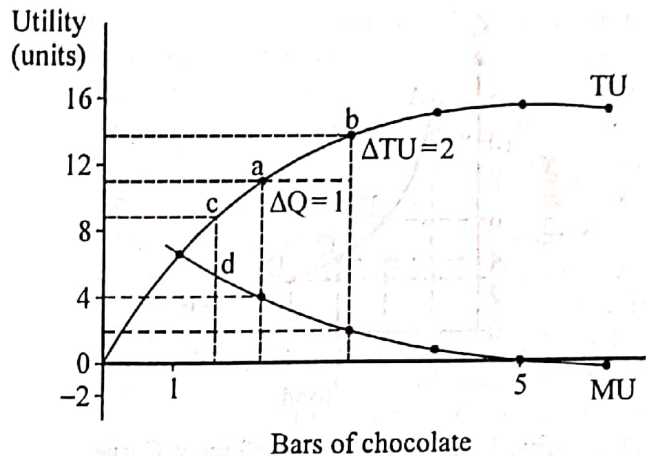


In this case an increase in price of good x, a Giffen good, causes a fall in consumption ($Q_1 - Q_2$) due to substitution effect that is more than offset by a rise in consumption ($Q_2 - Q_3$) due to a large positive income effect, hence it produces an upward sloping demand curve.

Income and substitution effect of a price change help the firms to predict the direction and the extent of changes in quantity demanded of different goods. In case of an inferior good, for instance, income and substitution effects tend to offset each other. However substitution effect outweighs income effect and makes the demand curve to slope downward from left to right but the change in QD is likely to be proportionately smaller. This implies that the PED of an inferior good is likely to be relatively low, therefore a decrease in price could result in a fall in a firm's total revenues (TR), and

increase in price could increase its TR. However in case of a Giffen good a large income effect outweighs a small substitution effect that produces an upward sloping demand curve. It implies that an increase in price would increase QD, therefore an increase in price would always increase a firm's TR. Government is also likely to generate higher tax revenues by raising indirect taxes on both these types of goods.

It therefore follows that inferior and Giffen goods are exceptions to a normal response of income and substitution effect and firms can use them to set prices of their goods and government can use them to decide changes in their tax rates.



So at zero bar of chocolate the consumer obviously gets no satisfaction and his total utility is zero. If he now consumes the first bar, his total utility is 7, and his marginal utility is also 7. If he now consumes a second bar, he gains an extra 4 units of satisfaction (MU), giving him a total utility of 11 (7 + 4). His marginal utility of the second unit has fallen because, having already eaten 1 bar, he has less craving for a second. A third bar gives him even less marginal utility that has fallen to 2, giving a total utility of 13 (11 + 2). By the time he has eaten 5 bars, he would rather not eat any more. A sixth actually reduces his total utility (from 14 to 13) because its marginal utility is negative.

Thus We derive marginal utility curve by measuring the slope of two adjacent quantities on the total utility curve by using the following;

$$MU = \frac{\Delta TU}{\Delta \text{units}}$$

It can be noted that the MU curve we derive slopes downward, simply illustrating the principle of diminishing marginal utility.

The concept of diminishing marginal utility lays foundation for the theory of indifference curve. An indifference curve is drawn showing different combinations of two goods that represent the same level satisfaction. The consumer, therefore, is indifferent in his choice of combination. A typical indifference curve slopes downward from left to right and it is usually drawn bowed in towards the origin as given in the fig. below.

Question 15

- (a) Explain, with the aid of a diagram, diminishing marginal utility and its link to indifference curves. [12]
- (b) Discuss, using indifference curve analysis, how the impact of an increase in indirect taxation on the quantity demanded of a good depends on whether it is a normal or inferior good. [13]

[J18/P4/Q2]

Essay

- (a) Utility refers to a number of imaginary units of satisfaction that a consumer obtains from his consumption of a good. Total utility (TU) and Marginal utility (MU) are two important measures of utility. TU is the overall satisfaction a consumer obtains from his consumption of all the units of a good while MU utility is the satisfaction he obtains from consuming one extra unit of a good within a given time period.

Diminishing marginal utility is an important principle for it provides the basis for analyzing consumer behavior. According to this principle, as more units of a good are consumed successively, each extra unit will provide less additional satisfaction than the previous unit i.e MU diminishes. Second bar of chocolate, for instance, gives us less additional satisfaction than the first bar. The third gives even less satisfaction than the second and so on. Diminishing marginal utility therefore signifies that with consumption of each next bar our desire is partially satisfied and hence our craving for the good is successively reduced that causes lower satisfaction from each additional unit we consume. Consider the following diagram:

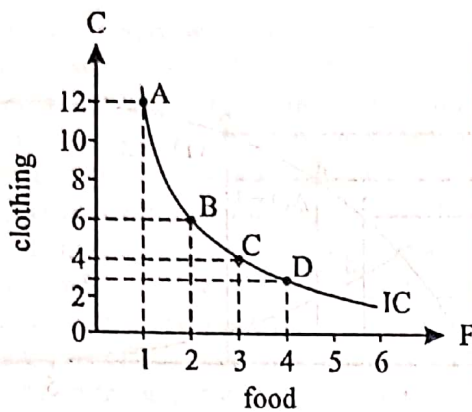


Fig. 1: A consumer's Indifference Curve

The slope of an IC curve gets shallower on account of diminishing marginal rate of substitution. MRS is the rate at which the consumer is willing to exchange one good for the other. MRS of food for clothing, for instance, is the amount of clothing whose loss can be compensated by a unit gain of food so that overall satisfaction remains the same.

In order to elaborate on this let's consider the move from point a to point b. The consumer gives up 6 units of clothing and requires 1 unit of food to compensate for the loss. The slope of the indifference curve is thus $\frac{-6}{1} = -6$. Ignoring the negative sign, $MRS = 6$. Since consumption at point a yields equal satisfaction with consumption at point b, therefore the utility sacrificed by giving up 6 units of clothing must be equal to the utility gained by consuming one more unit of food. Therefore

$\frac{MU_{\text{clothing}}}{MU_{\text{food}}} = 6$ and this is the same as MRS we

have measured between the same two points. MRS, therefore, represents marginal utility ratio between points on an indifference curve.

As we move down the curve and the slope of the curve gets less steep, the marginal rate of substitution diminishes. For subsequent exchanges, for instance, the MRS is 2 and 1 respectively. This is because as the consumer obtains more food and fewer clothing, his marginal utility from food diminishes, while that from clothing increases. Therefore he is prepared to give up fewer and fewer clothing for each additional unit of food affecting a diminishing marginal rate of substitution.

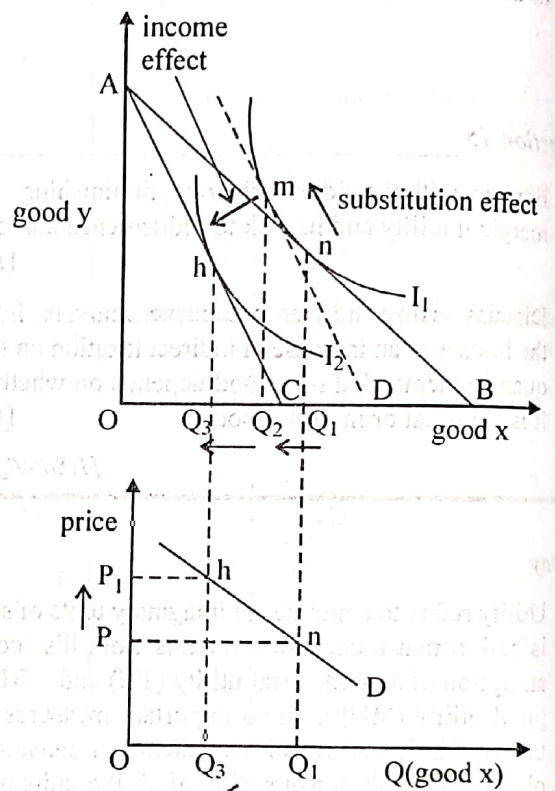
Thus we conclude that diminishing marginal rate of substitution is the link between diminishing marginal utility and indifference curves.

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Thus we conclude that diminishing marginal rate of substitution is the link between diminishing marginal utility and indifference curves.

(b) An indirect tax is imposed on consumption and it is collected by the government from producers/suppliers. Increase in such a tax on a good, therefore, adds to businesses' costs and hence causes a fall in the market supply and then an increase in price. However the extent to which it raises price of a good is subject to the ability of firms to pass on tax to the consumers.

We can use indifference curve for our analyses of the likely impact of an increase in indirect tax on quantity demanded of both normal and inferior goods. Consider the following graph where 'x' is a normal good.



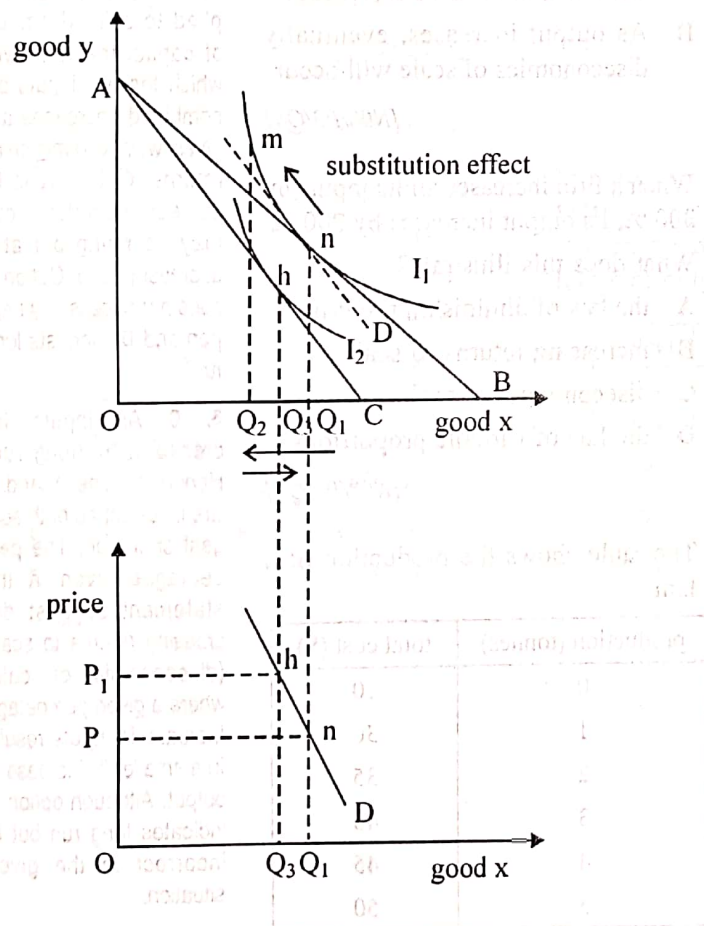
An increase in tax on good x has increased its price and hence the budget line has pivoted inwards from AB to AC. The consumption point has moved from n to h. Part of this shift in consumption ($Q_1 - Q_2$) is due to the substitution effect and the rest ($Q_2 - Q_3$) is due to the income effect.

In order to reach the new equilibrium at point h first the consumer would substitute good x with a relatively cheaper substitute. The substitution effect is shown by drawing a new dotted budget line parallel to AC but tangential to the original indifference curve I_1 at point m. Being tangential to I_1 enables the consumer to obtain the same utility as before: in other words, there is no loss in real income to the consumer and hence the fall in quantity demanded of good x from Q_1 to Q_2 is effected by the substitution effect.

However, in reality consumer's real income has fallen and the budget line has shifted to AC, therefore the consumer is forced to consume on a lower indifference curve I_2 at point h affecting a further decrease of Q_2 to Q_3 in quantity of good x demanded due to the income effect. We can trace overall change in quantity demanded of good x on the lower part of the graph and by connecting those quantities with their related prices we can derive demand curve for good x.

So far our analysis of indifference curve suggests that for a normal good the income and substitution effects of a price change reinforce each other. They both involve a reduction in the quantity demanded as price of the good rises. It therefore signifies that the bigger the income and substitution effects of a price rise, the greater will be the fall in quantity demanded of a normal good and the higher will be its price elasticity of demand.

However, when an inferior good is subject to an increase in indirect tax the substitution effect will be in the same direction as for a normal good. People will consume less of the good because now it is relatively expensive. For example, if the price of inferior-quality margarine went up, people would tend to use better-quality margarine or butter instead. This is illustrated in Figure below:



Similar to a normal good the substitution effect of a rise in price of an inferior good is indicated by a movement along the original indifference curve I_1 from point n to point m effecting a fall in quantity of good X demanded from Q_1 to Q_2 . The income effect of the price rise, however, is the opposite of that for a normal good. Since with a fall in real income more inferior goods are now be purchased – including more X, therefore a reduction in real income caused by a rise in price of good X tends to increase its consumption and hence consumption point h is located to the right of point m: the income effect increases quantity back from Q_2 to Q_3 . Over all price effect, however suggests that substitution effect outweighs income effect causing a decrease in QD of inferior good from Q_1 to Q_3 . Again we can trace this change in quantity of good x on the lower part of the graph in order to sketch its demand curve.

It, therefore, follows that an increase in an indirect tax has an impact on the quantity demanded of inferior and normal goods that is similar in direction but of varying magnitude.

