(3) In this theory difference between income effect and substitution are not explained due to the assumption of constant marginal utility of money. In this theory it is not possible to explain Giffen Goods due to non-explanation of income effect in Marshallian theory.

(4) According to Prof. Hicks, Marshallian utility theory is applicable in case of less important commodities *e.g.* alpin. Consumer spends a very small portion of income to purchase these commodities. As a result marginal utility of money can keep constant as the amount of money of the consumer more or less remain constant after purchasing these commodities. But for important commodities for which consumer spends very large portion of his income to purchase these commodity in that case marginal utility of money cannot remain constant.

(5) It is also criticised that Marshallian utility theory is based on contradictory assumptions. In this Marshallian theory it is assumed the marginal utility of money is constant even though marginal utility of commodity is diminishing. But Marshall is a neo-classical economist. In neo-classical theory it is assumed that money has no utility. Money is used only as a medium of exchange. People demand money only to purchase other commodities with the help of money. So utility of money means utility of commodity. So utility of commodities remain constant if it is assumed that utility of money is constant. So in Marshallian utility theory the assumption of diminishing utility of commodity and constant utility of money are two contradictory assumptions.

Economist Hicks, Allen etc. introduce an alternative theory to explain consumer behaviour due to the above defects of Marshallian utility theory. This theory is known as indifference curve theory.

• **2.1.3. Utility Maximization—the Ordinal Approach :** Prof. Hicks, Allen introduced a theory in the context of Marshallian utility theory which is known as indifference curve theory or indifference curve approach or ordinal approach. They explained the consumer preferences with the help of indifference curve.

❖ **2.1.3.1. Assumptions of the Indifference Curve Approach :** In indifference curve approach, the following assumptions are made :

(1) Utility cannot be measured numerically. But it is possible to arrange utility in ascending or decending order *i.e.* the consumer cannot express how much amount of utility he receives from any commodity but he can express whether he gets larger or smaller level of utility from any commodity. This means that utility is ordinally measured.

(2) Utility derived from any commodity not only depends on the consumption of that commodity but also depends on the consumption of other commodities *i.e.*, different commodities are interdependent.

(3) Consumer consumes only two commodities. Prices of the two commodities are fixed. The income of the consumer is also fixed and the consumer spends the entire amount of his fixed income for purchasing these two commodities.

(4) Both the commodities are perfectly divisible in small parts.

(5) Substitution between the two commodities exist. *i.e.*, the consumer can increase the consumption of one commodity by reducing the consumption of other commodity. Diminishing marginal rate of substitution among the two commodities exist. To increase the consumption of one unit of a commodity, how much unit of other

commodity is sacrificed to keep the level of utility at the particular level is called **marginal rate of substitution.**

(6) Consumer is not at the last limit of satisfaction for both the commodities *i.e.*, the consumer gets higher level of utility if he increases his consumption of any one or both the commodities.

(7) Consumer is a rational consumer whose objective is to maximise utility.

❖ **2.1.3.2. Definition of Indifference Curve :** The locus of the different combination of two commodities for a particular level of utility is called **indifference curve or equal utility curve.** Thus indifference curve is the such combination of two commodities from where the consumer gets equal satisfaction at every point.

Let q_1 and q_2 are the two commodities which the consumer consumes. These two commodities are perfectly divisible in small parts. It is also assumed that the fixed or particular level of utility is U_0. So the utility function or the equation of the indifference curve is

$$U_0 = f(q_1, q_2).$$

Indifference curve for a fixed level of utility is shown in Fig. 2.6.

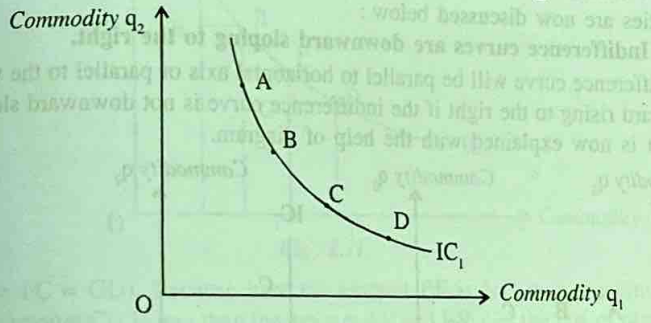

Fig : 2.6.

In Fig. 2.6., commodity q_1 is plotted on the horizontal axis and commodity q_2 is plotted on the vertical axis. Here IC_1 is an indifference curve. On this indifference curve A,B,C,D are the different points. Each point represents a particular combination of two commodities. These points are taken in such a way so that the consumer gets equal satisfaction from every points. For this the locus IC_1 which is obtained by adding these points is the indifference curve.

Therefore an indifference curve represents a particular level of utility.

❖ **2.1.3.3. Definition of Indifference Map—Description of Preferences :** An Indifference curve is obtained for a fixed level of utility. So different indifference curves are obtained for different levels of utility. In this way if there exist more than one indifference curve in a diagram then it is called **indifference map.** Fig. 2.7. represents indifference map.

In Fig. 2.7., IC_1, IC_2 and IC_3 are three indifference curves which represent three levels of utility. Indifference curve will shift in the upward direction as the level of utility increases. In the diagram indifference curve IC_2 represents higher level of utility compared to indifference curve IC_1. In the same manner indifference curve IC_3

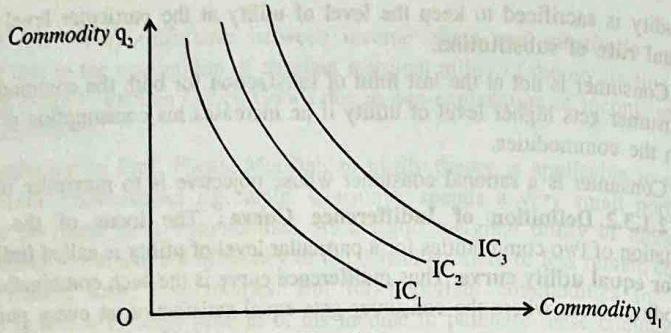

Fig : 2.7.

represents higher level of utility compared to indifference curves IC_1 and IC_2. Therefore Fig. 2.7. represents an indifference map. Thus the family of indifference curve is the indifference map.

❖ 2.1.3.4. Characteristics of Indifference Curve or Properties of Indifference Curve : There are some characteristics of indifference curve. Main characteristics or properties are now discussed below :

(1) Indifference curves are downward sloping to the right.

Indifference curve will be parallel to horizontal axis or parallel to the vertical axis or upward rising to the right if the indifference curve is not downward sloping to the right. It is now explained with the help of diagram.

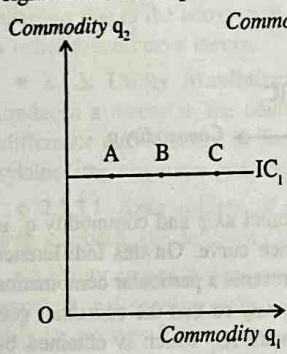

Fig : 2.8.

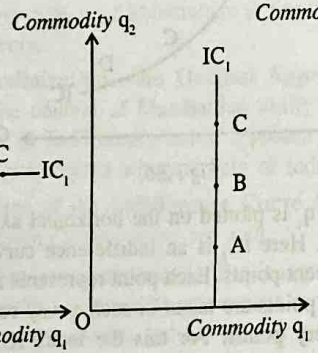

Fig : 2.9.

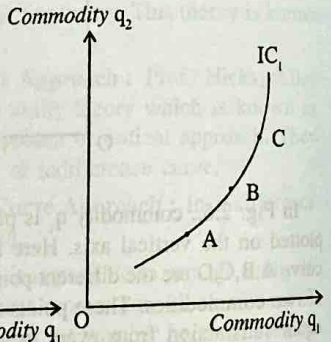

Fig : 2.10.

If the indifference curve is parallel to horizontal axis like IC_1 in Fig. 2.8., the consumer will get equal satisfaction at the points A, B, C etc. But it is not possible because the consumer gets more amount of commodity q_1 at point B and at point C than at point A though the amount of q_2 is the same. So the indifference curve cannot be parallel to the horizontal axis.

Similarly the indifference curve cannot be parallel to the vertical axis like IC_1 in Fig. 2.9. because the consumer gets more amount of commodity q_2 at point B and at point C than at point A though the amount of q_1 is the same.

Further the indifference curve cannot be upward rising to the right like IC_1 in Fig. 2.10. because the consumer gets more amount of both the commodities at point B and C than at point A.

Therefore indifference curve will be downwards sloping to the right *i.e.* the slope of the indifference curve is negative.

(2) Indifference curves are generally convex to the origin.

Indifference curves are convex to the origin due to diminishing marginal rate of substitution. Among two substitute commodities, for the increase in consumption of one unit of a commodity the amount of other commodity the consumer wants to sacrifice is called **marginal rate of substitution.** As the consumer gets more in fixed units of one commodity the amount of other commodity the consumer wants to sacrifice will be diminishing continuously. This is called **diminishing marginal rate of substitution.**

In Fig. 2.11., the points A,B,C,D on indifference curve IC_1 are taken in such a way so that EB = FC = GD. From the diagram it is seen that due to movement of the consumer from point A to point B, from point B to point C and from point C to point D, he wants to sacrifice less amount of q_2 continuously for getting the same amount

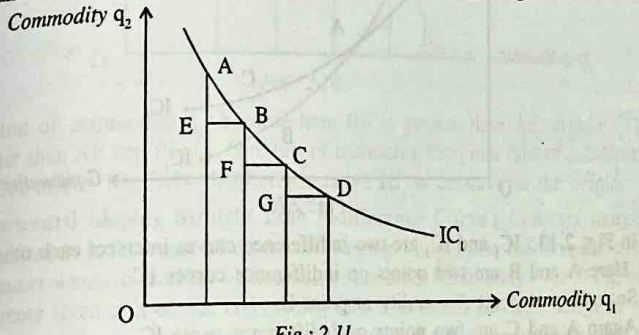

Fig : 2.11.

of q_1 (EB = FC = GD). Because here the amount BF is less than the amount AE. Further the amount CG is less than the amount AE and BF. *i.e.*, the law of diminishing marginal rate of substitution operates here. For this reason indifference curve IC_1 in Fig. 2.11. is convex to the origin.

(3) Higher indifference curves represent higher levels of satisfaction or utility.

Consumer gets higher levels of utility as he moves to the higher indifference curve in an indifference map. This is explained with the help of Fig. 2.12.

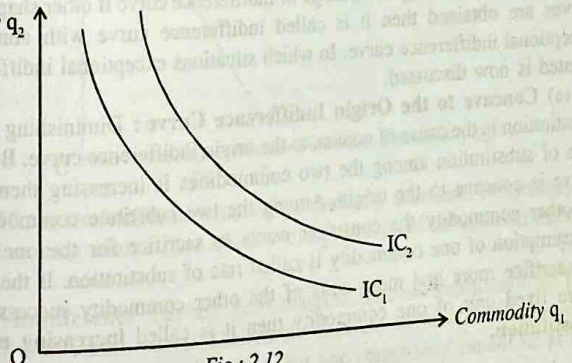

Fig : 2.12.

In Fig. 2.12., IC_1 and IC_2 are two indifference curves. Consumer gets higher level of utility at any point on indifference curve IC_2 than at any point on the indifference curve IC_1. This is because at any point on indifference curve IC_2, consumer consumes more amount of at least one of the commodities compare to any points on difference curve IC_1. Therefore the satisfaction of the consumer increases as he moves in the upward direction of the indifference map.

(4) **Two indifference curves cannot intersect each other.**

With the help of Fig. 2.13., it is now explained that two indifference curves cannot intersect each other.

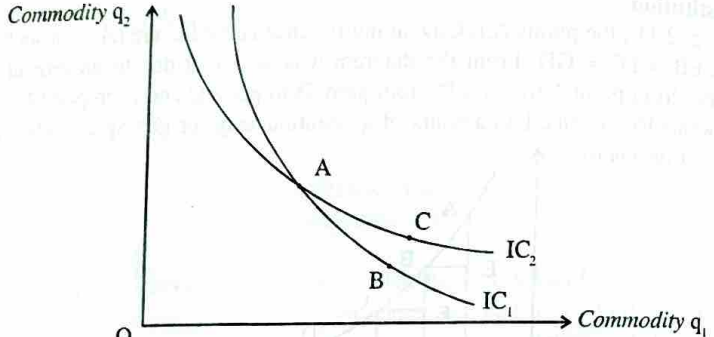

Fig : 2.13.

In Fig. 2.13., IC_1 and IC_2 are two indifference curves intersect each other at point A. Here A and B are two points on indifference curves IC_1.

So, utility at point A = utility at point B.

Again A and C are two points on indifference curve IC_2.

So, utility at point A = utility at point C.

Therefore, utility at point B = utility at point C.

But it is not possible, because the consumer gets more of both the commodities at point C than at point B. For this utility at point C is greater than the utility at point B. Therefore two indifference curves cannot intersect each other.

❑ **2.1.3.4.1. Indifference Curve with Abnormal Shapes or Exceptional Indifference Curve :** Indifference curves are generally downward sloping and convex to the origin. Apart from this general shape of indifference curve if other shapes of indifference curves are obtained then it is called indifference curve with abnormal shapes or exceptional indifference curve. In which situations exceptional indifference curves are created is now discussed.

(a) **Concave to the Origin Indifference Curve :** Diminishing marginal rate of substitution is the cause of convex to the origin indifference curve. But if the marginal rate of substitution among the two commodities is increasing then the indifference curve is concave to the origin. Among the two substitute commodities the amount of other commodity the consumer wants to sacrifice for the one unit increase in consumption of one commodity is called rate of substitution. If the consumer wants to sacrifice more and more units of the other commodity successively for getting more fixed unit of one commodity then it is called **increasing marginal rate of substitution.**

In Fig. 2.14., the points A, B, C and D on indifference curve IC_1 are taken in such a way so that EB = FC = GD. From the diagram it is seen that due to movement of the consumer from point A to point B, from point B to point C and from point C to point D the consumer sacrifices more units of the commodity q_2 successively for same amount of commodity q_1, because here BF is greater than AE. Again CG is more greater than AE and BF, *i.e.* here law of increasing marginal rate of substitution operates. For this in Fig. 2.14. indifference curve IC_1 is concave to the origin.

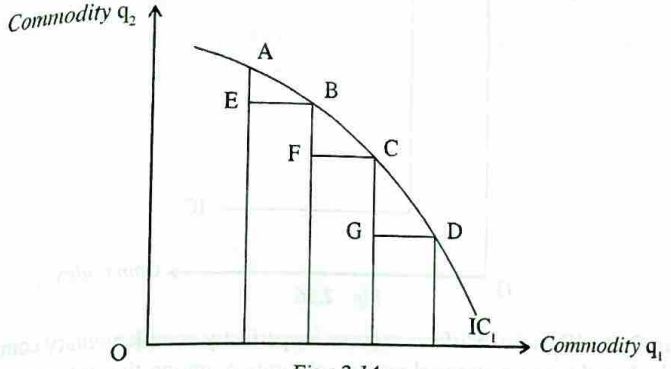

Fig : 2.14.

(b) **Downward Sloping Straight Line Indifference Curve :** Constant marginal rate of substitution is the cause of downward sloping straight line indifference curve. If the consumer wants to sacrifice a fixed unit of the other commodity even for getting more and more fixed unit of one commodity, then it is called constant marginal rate of substitution. If the two commodities are **perfectly substitute** commodity, then the marginal rate of substitution among the two commodities is constant.

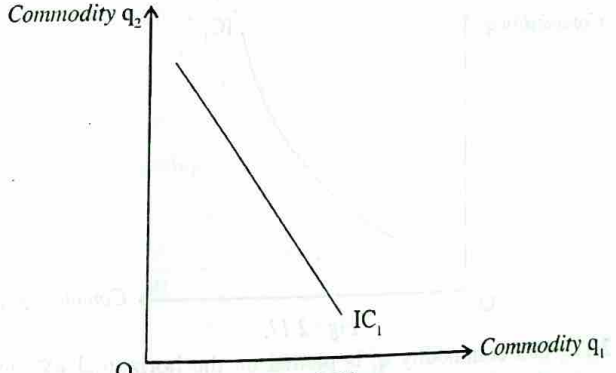

Fig : 2.15.

In Fig. 2.15., IC_1 is the indifference curve for perfectly substitute commodities. This is downward sloping straight line because marginal rate of substitution among the two commodities is constant.

(C) **L-Shaped Indifference Curve :** Zero marginal rate of substitution is the cause of L-shaped indifference curve. This means that the substitution among the commodities is not at all possible. This means that one commodity cannot be at all

used in place of other commodity. In this case two commodities are always used i a fixed proportion, *i.e.* the commodities are perfectly **complementary commoditie**

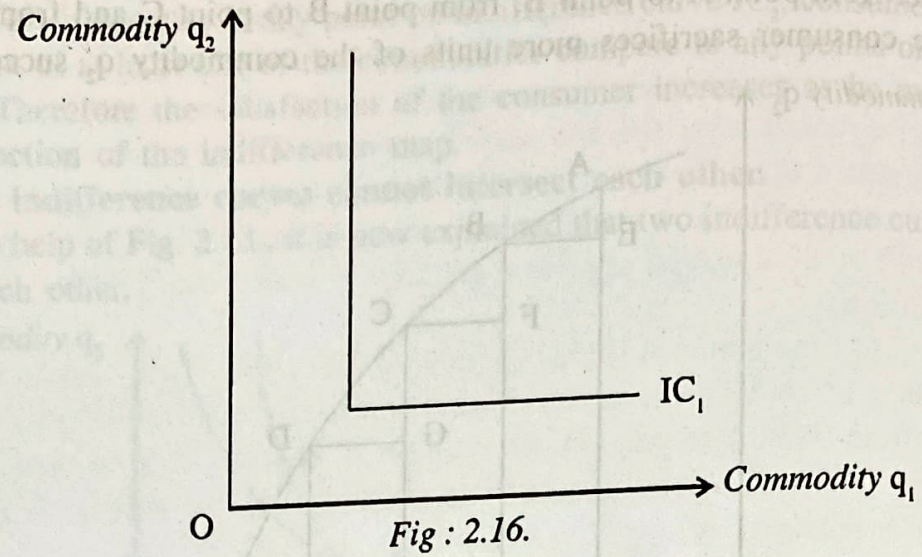

Fig : 2.16.

In Fig. 2.16., IC_1 is the indifference curve for perfectly complementary commoditie This is L-shaped because marginal rate of substitution among the two commodities i zero.

(d) **Upward Rising Indifference Curve :** Presence of bad commodity or unsuitabl for use commodity is the cause of upward rising indifference curve. The commodit whose utility decreases along with the increase in consumption of the commodity i called bad commodity. Among the two commodities if one of the commodity is economi commodity and the other is bad commodity then the level of utility of the consume will decrease if the consumer consumes more amount of the bad commodity. In thi situation the consumer will have to consume more amount of the economic commodit along with the increase in consumption of bad commodity if the consumer wants t stay on the same indifference curve or want to keep the utility level constant.

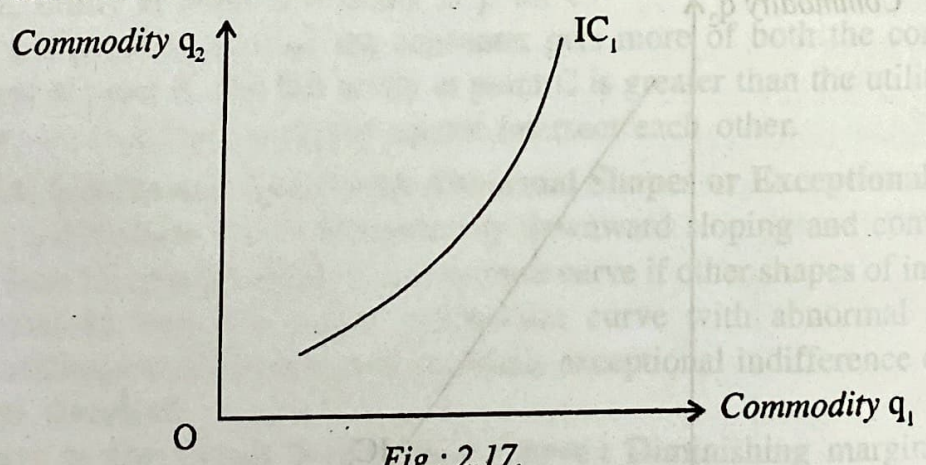

Fig : 2.17.

In Fig. 2.17., bad commodity q_1 is plotted on the horizontal axis and economi commodity q_2 is plotted on the vertical axis. In the diagram IC_1 is the indifferenc curve. This is upward rising because consumption of economic commodity q_2 i increased along with the increase in consumption of bad commodity q_1 to keep th level of utility on indifference curve IC_1 remain constant.

❖ **2.1.3.5. Definition of Budget Line—Consumption Decision and the Budge Constraint :** The amount of commodities which the consumer purchases depends o income of the consumer, price of the commodities etc. The concept of budget line i