

## 2.4 Properties of Indifference Curve

The indifference curve possesses some important properties. But before explaining those properties, it is important to mention assumptions about the psychology of the consumer which are generally made in indifference curve analysis.

### Assumptions of Indifference Curve

**Assumption I** (non-satiety): It is assumed that the consumer will always prefer a large amount of a good to a smaller amount of that good provided the amount of other goods at his disposal remains unchanged. The consumer has not yet reached the point of satiety in the consumption of any good.

**Assumption II** (Ordinal Utility): It is axiomatically true that the consumer can rank his preferences according to the satisfaction of each basket. He need not know precisely the amount of satisfaction.

**Assumption III:** The total utility of the consumer depends on the quantities of the commodities consumed

$$U = f(q_1, q_2, \dots, q_x, q_y, \dots, q_n)$$

**Assumption IV** (Consistency and Transitivity of Choice): It is assumed that the consumer is consistent in his choice, that is, if he chooses bundle A over B, he will not choose B over A in another period if both bundles are available to him. It can be symbolically represented as

$$\text{If } A > B, \text{ then } B \not> A$$

Suppose there are three combinations of two goods: A, B and C. If the consumer prefers A over B and B over C, it is then assumed that he will prefer A over C too. The assumption of transitivity can symbolically be represented as

$$\text{If } A > B, \text{ and } B > C, \text{ then } A > C$$

**Assumption V** (Diminishing Marginal Rate of Substitution): It is assumed that as more and more units of X are substituted for Y, the consumer will be willing to give up fewer and fewer units of Y, for each additional unit of X.

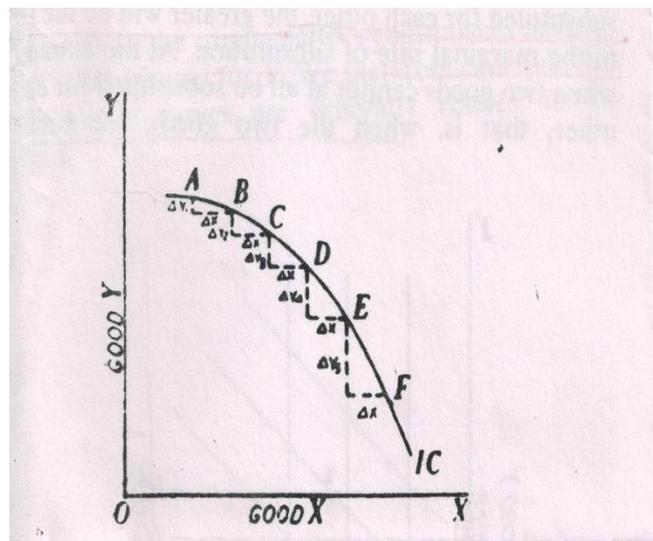
On the basis of above assumptions we may now explain the properties of indifference curves.

**Property I: Indifference curves slope downward to the right.**

This property implies that indifference curve has a negative slope. This property follows from assumption I. Indifference curve being downward sloping means that when the amount of one good in the combination is increased, the amount of the other good is reduced. This must be so if the level of satisfaction is to remain the same on an indifference curve. If, for instance, the amount of good X is increased in the combination, while the amount of good Y remains unchanged, the new combination will be preferable to the original one and the two combinations will not therefore lie on the same indifference curve. Hence, indifference curve cannot be a horizontal straight line. With similar reasons indifference curve cannot be a vertical straight line, nor upward sloping to the right. But indifference curve cannot be of this shape too. Upward – sloping curve means that the amounts of both the goods increase as one moves to the right along the curve. So the only remains is downward sloping demand curve.

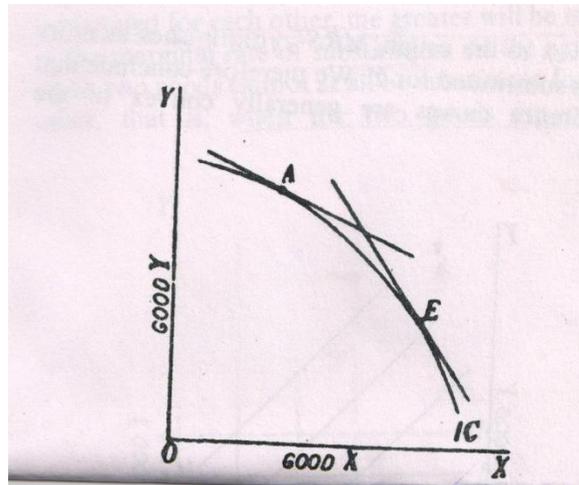
**Property II: Indifference Curves are Convex to the Origin.**

The indifference curve is relatively flatter in its right – hand portion and relatively steeper in its left – hand portion. This property of indifference curves follows from assumption V, which is that marginal rate of substitution of X for Y ( $MRS_{x,y}$ ) diminishes as more and more of X is substituted for Y. If the indifference curve were concave to the origin it would imply that the marginal rate of substitution of X for Y increases as more and more of X is substituted for Y, as is shown in figure 2.5a.



**Figure 2.5a**

The concave indifference curve shows increasing  $MRS_{xy}$  is also evident from figure 2.5b. Since slope at any point on indifference curve shows  $MRS_{xy}$  at that point, slope at point E on indifference curve is greater than the slope at point A (the tangent at E is greater than the tangent at A) showing  $MRS_{xy}$  at point E is greater than  $MRS_{xy}$  slope at point A.



**Figure 2.5b**

Likewise, indifference curve cannot be a straight line, except when goods are perfect substitutes. A straight – line indifference curve would mean that  $MRS_{x,y}$  remains constant as more units of X are acquired in place of Y.

The third possibility for indifference curve in this regard is that it may be convex to the origin and this is the shape which indifference curves normally possess.

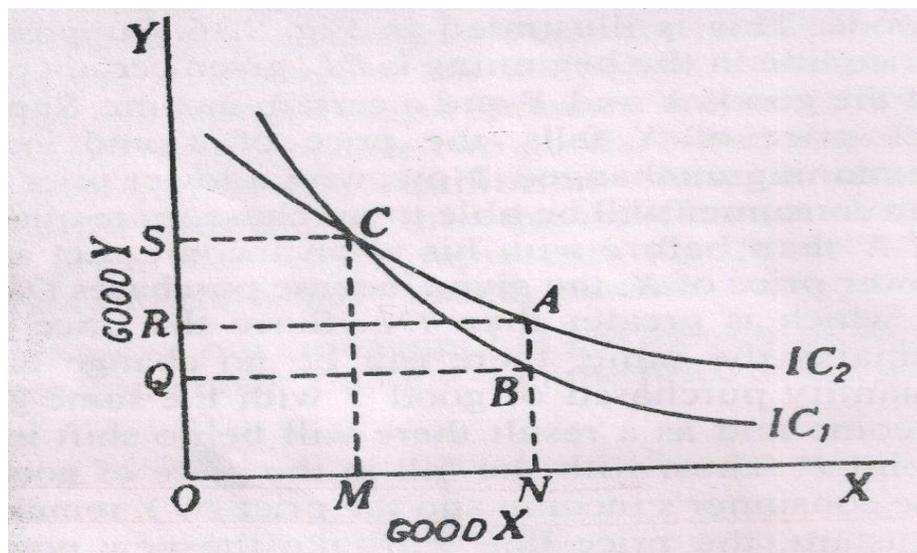
The degree of convexity of an indifference curve depends upon the rate of fall in the marginal rate of substitution of X for Y. When two goods are perfect substitutes of each other, the indifference curve is a straight line on which marginal rate of substitution remains constant. The better substitutes the two goods are for each other, the closer the indifference curve approaches to the straight line, so that when the two goods are perfect substitutes, the indifference curve is a straight line.

The greater the fall in marginal rate of substitution, the greater the convexity of the indifference curve. The less the ease with which two goods can be substituted for each other, the greater will be the fall in the marginal rate of substitution.

**Property III: Indifference Curves cannot intersect each other.**

In other words, only one indifference curve will pass through a point in the indifference map. This property follows from assumptions 1 and 2. In figure 2.6 two indifference curves are shown cutting each other at point C. Now take point A on indifference curve  $IC_2$  and point B on indifference curve  $IC_1$  vertically below A. Since indifference curve represents those combinations of two commodities which give equal satisfaction to the consumer, the combinations represented by points A and C will give equal satisfaction to the consumer because both lie on the same indifference curve  $IC_2$ . Likewise, the combination B and C will give equal satisfaction to the consumer; both being on the same indifference curve  $IC_1$ . If combination A is equal to combination C in the terms of satisfaction, and combination B is equal to combination C, it follows that the combination A will be equivalent to B in terms of satisfaction. But a glance at figure 2.6 will show that this is absurd conclusion since combination A contains more of good Y than combination B, while the amount of good X is the same in both the combinations.

Indifference curves cannot even meet or touch each other or be tangent to each other at a point.

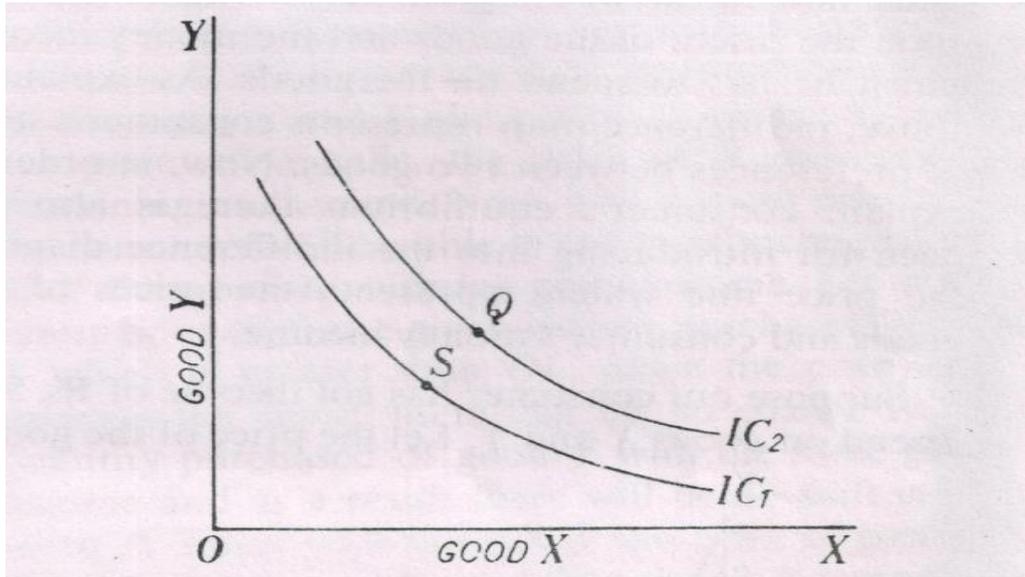


**Figure 2.6: No Two indifference Curves Intersects Each Other**

**Property IV: A higher indifference curve represents a higher level of satisfaction than the lower indifference curve.**

The combinations which lie on a higher indifference curve will be preferred to the combinations which lie on a lower indifference curve.

In figure 2.7 combination Q on the higher indifference curve  $IC_2$  will give the consumer more satisfaction than combination S on the lower indifference curve  $IC_1$  because the combination Q contains more of both goods X and Y than the combination S (assumption I). Hence by assumption I, the consumer must prefer Q to S.



**Figure 2.7: Higher Indifference Curve Shows Higher Level of Satisfaction**