UNIT 7  LAW OF DIMINISHING MARGINAL UTILITY AND EQUIMARGINAL UTILITY

Structure

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7.0 OBJECTIVES

After studying this unit, you should be able to:

- explain the concept of utility;
- discuss the comparative analysis of total utility, average utility and marginal utility;
- explain the law of diminishing marginal utility and its limitations;
- discuss the marginal utility of money;
- explain the demand for a commodity through diminishing marginal utility;
- analysis and discuss the law of Equimarginal utility and its limitations; and
- explain the concept of consumer surplus and its limitations.
7.1 INTRODUCTION

In the previous units, you have learnt the fundamental problems of economic system, basic economic laws and various forms of economic system. This unit deals with consumer's behaviour and the theory of demand. It lays some of the important theoretical foundations of economic reasoning and areas of investigation. You should note that (i) determination of, and (ii) changes in prices of various commodities are clearly connected with (i) demand for, and (ii) supply of those commodities. In effect, continuous interaction goes on between these three (that is, demand, supply and prices) - a process in which they all influence each other. Economists were always interested in finding out the way prices are determined, and the way they undergo a change. With that objective in view, they normally start with a smaller and simpler question, namely, the (i) determination of, and (ii) changes in the price of a single commodity. Its method of analysis and findings are then extended to cover a wider range of prices.

Now if you look at the price of a single commodity you find that it has two aspects. It is (i) paid by buyers and (ii) received by the sellers. In this Block you would have a close look at the first aspect, namely the behaviour of the buyers.

For this a beginning is made by selecting a single consumption commodity so that it is bought by consumers. (The case of a commodity which is an 'input' for production and is bought by producers is considered at a later stage. For the time being, we shall use the two terms 'consumers' and 'buyers' interchangeably). On the side of its buyers, similarly, the buyer selected for analysis is of the most common variety. That is to say, he is the 'typical' or 'representative of the buyers' in general. This is done so that the findings relating to the behaviour of the 'representative' buyer can be extended and applied to the entire body of buyers. Having done so, the economists put some simple but very relevant questions like the following.

Why does a typical buyer buy a commodity? Why is he ready to pay a price for it rather than go without it? How much of this commodity will he buy at different prices? The answers to these questions are collectively known as “demand behaviour” of the typical buyer of the commodity under consideration. You should note that while formulating answers to these questions, the economists take the help of the concept of utility. This is a concept with which you are already familiar to some extent. In this Unit, you would learn a little more about it, and that would help you in understanding the behaviour of a representative buyer and put it in some useful standardized form. For example, you note the fact that on the one hand, a consumer gets some utility from the commodity bought by him and on the other hand, he loses some utility in the form of a price paid for it. Accordingly, you immediately come to the conclusion that a consumer would buy a commodity only so long as the utility paid by him in the form of price is less than (or at the most equal to) the utility of the commodity for him, so, if the price goes up, the quantity of commodity purchased is again reduced.

In this manner, once you are able to put the behaviour pattern of a typical consumer in a
standardized form, you can extend it to the entire body of consumers of that commodity. You are then able to describe the manner in which its demand in the entire market shifts as its price changes.

However, before we arrive at important findings regarding the demand for a commodity, let us discuss and clarify some of the fundamentals relating to the concept of utility itself.

### 7.2 Utility

You are already familiar with the elements of this concept. You were told in an earlier unit that utility of a commodity is its want satisfying capacity. This statement, however, needs a good deal of clarification and quantification before it can be put to actual use in Economics. And that would also lead you to a more precise definition of the concept of utility.

Utility of a commodity represents satisfaction which is yet to be realized by its consumer. The satisfaction is only an anticipated one, an expected one. Therefore, there is an element of uncertainty attached to it. It is obvious that satisfaction actually received need not be equal the amount expected from it. In other words, satisfaction and utility is not the same thing. Utility is expected satisfaction and satisfaction is realized utility. But you must note one very important thing. The decision of a consumer to buy (or not to buy) a commodity depends upon its utility and not satisfaction. It is the utility (expected satisfaction) that induces a buyer to pay for it and get it. Of course, a consumer's estimate of utility of a commodity may be influenced by a number of things, such as his own past experience, the experience of other buyers, publicity and other selling tactics adopted by the sellers and so on. But all said and done, it is his estimate of the utility of the commodity which finally determines whether it would be bought or not. The consumer can derive satisfaction only after he actually consumes it; but he has to buy it before consumption.

An important feature of utility of a commodity is the fact that it is not a constant thing. It varies from consumer to consumer and even for the same consumer at different times and under different circumstances. The reasons for this phenomenon are easy to see.

**Firstly,** utility of a commodity to a consumer depends upon the intensity of the want which would be satisfied with it. It is easy to see that even the same want is not felt with equal intensity by all consumers. For example, every consumer of bread in the morning is not equally hungry.

**FOR MORE CLARITY!**

According to utilitarians, such as Jeremy Bentham (1748-1832) and John Stuart Mill (1806-1873), society should aim to maximise the total utility of individuals, aiming for "the greatest happiness for the greatest number of people". Another theory forwarded by John Rawls (1921-2002) would have society maximise the utility of the individual initially receiving the minimum amount of utility.
Secondly, utility of a commodity is the assessment of a consumer of the amount of satisfaction he expects to derive from its use. And different consumers are bound to arrive at different estimates. Utility estimated by a consumer depends upon the way he views the circumstances facing him, but there is no standard method of judging a situation and putting it in quantitative terms. Even the same consumer may view a given set of circumstances in various ways. A thirsty person, receiving a cup of water, may additionally believe that he is not going to get another drop of it for the next forty-eight hours or he may be confident that he would be able to get as much of it as he wants. For him, utility of the same cup of water would be more in the former case than in the latter.

Thirdly, it is unlikely that a commodity would be liked equally by all consumers. Other things being equal, the utility of eggs would be more for a person who likes them than for the one who does not. Similarly, utility of a medicine is only for the patient for whom it has been prescribed.

Fourthly, the set of circumstances facing a consumer keep changing. Change of season, place of residence and a lot of other things bring about a shift in the need for a commodity by the consumer causing corresponding change in its utility.

Fifthly, it is a recognized fact that when a commodity is continuously used to satisfy a want the intensity of the latter keeps decreasing. It means that additional units of the good being consumed yield a decreasing amount of satisfaction. Hence, its utility also falls.

Another important feature of the concept of utility relates to its measurement. You are familiar with the units in which length, volume, weight, time and other quantities are measured. As in other sciences, units of measurement have to be selected in measuring the quantities and variables used in economic analysis as well. The concept of utility also throws up the need for measuring it in some standard units. Unfortunately, in reality it is not possible to do so, because utility of a commodity represents a mental assessment, a viewpoint of the consumer regarding the extent of satisfaction that he expects to derive from it. To put it differently, it is not possible to measure utility in absolute or cardinal terms. At the most, a consumer can only tell us which of the two quantities of the same commodity has greater utility for him, or which of the two different commodities A and B or their combination has a greater utility. In other words, the consumer can only rank (arrange) utilities...
in their ascending or descending order. This fact is conveyed by saying that utility can be measured only in ordinal terms and not in cardinal ones. This statement has an important implication also. Since you cannot measure, in absolute terms, the utility which a unit of commodity A has for two different consumers X and Y, you cannot say which of the two consumers derives more utility from A. In economic terminology, it is stated that it is not possible to have inter-personal comparisons of utility.

Remember, however, that at this stage of study, it will be necessary for you to assume, for the sake of simplicity of analysis, that utility can be measured in cardinal or absolute terms. Some additional simplifying assumptions including the possibility of inter-personal comparison of utility and the like would also be made by you. In the subsequent unit, however, you would be introduced to ordinal measurement of utility and an analysis of consumer behaviour would be provided on that basis.

The fact that a commodity has utility for a consumer does not mean that it is beneficial or useful for the consumer for that he ought to consume it. A commodity will have utility for the consumer so long as he believes that he can use it for satisfying some want. That way, even harmful things can have utility. Some addictive drugs are considered very harmful for the user's health, but they have a utility for the drug addicts. Smoking may be considered bad for lungs, but so many people are ready to pay for cigarettes. In Economics, therefore, the concept of utility has no ethical implications.

7.3 TOTAL UTILITY, AVERAGE UTILITY AND MARGINAL UTILITY

It would be easier for you to understand these concepts with the help of a numerical example. Suppose that other things being equal, utility derived by a consumer Mr. X, from successive bananas is shown in Table 7.1. You find from the Table, the first banana has a utility of 25 units for our consumer: the second banana has a utility of 18 units and so on. The fifth banana has a utility of only three units. The sixth banana does not bring any utility for the consumer while the seventh banana has a negative utility or disutility of two units. It means that the consumer does not expect to get any satisfaction out of the seventh banana; he thinks that it would cause dissatisfaction to him.

The utility of the last unit of a commodity acquired by a consumer is called its Marginal Utility (MU). It means that while finding out MU of a commodity, it is necessary to look at the quantity of the commodity acquired by the consumer. Thus look at Table 7.1 Column 2. If the consumer buys only one banana, then MU is the utility of that banana itself, that is, 25 units. In case the consumer buys two bananas, the MU is the utility of the second banana – in this case 18 units. Similarly, with five bananas, MU of the fifth banana is 3 units, with six bananas – MU of the sixth banana is zero, and with seven bananas, it is minus two units. (The explanation for MU falling with successive additions of bananas will be found later in this Unit).
Total Utility (TU) represents the sum of utilities of all the units of a commodity acquired by the consumer. In the example provided in Table 7.1, if the consumer gets three bananas, then TU is $25 + 18 + 12 = 55$ units. The figures of TU for respective number of bananas can be read from column 4 of Table 7.1. You would note that TU is nothing but sum of successive marginal utilities and MU is nothing but the addition to TU on account of the last unit of the commodity acquired. Therefore, when MU is zero, TU remains unchanged. In our example, TU remains 65 units when sixth banana is added. Also, TU will fall if MU is negative as happens when seventh banana is added.

### Table 7.1: Utility of Bananas for the Consumer

<table>
<thead>
<tr>
<th></th>
<th>Marginal Utility (MU)</th>
<th>Average Utility (AU)</th>
<th>Total Utility (TU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>1st Banana</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>2nd Banana</td>
<td>18</td>
<td>21.5</td>
<td>43</td>
</tr>
<tr>
<td>3rd Banana</td>
<td>12</td>
<td>18.3</td>
<td>55</td>
</tr>
<tr>
<td>4th Banana</td>
<td>7</td>
<td>15.5</td>
<td>62</td>
</tr>
<tr>
<td>5th Banana</td>
<td>3</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td>6th Banana</td>
<td>0</td>
<td>10.8</td>
<td>65</td>
</tr>
<tr>
<td>7th Banana</td>
<td>-2</td>
<td>9</td>
<td>63</td>
</tr>
</tbody>
</table>

Average Utility (AU) is obtained by dividing total utility by the number of units of the commodity. In table 7.1, figures of average utility are shown in column 3. Remember that, generally, change in average utility is sale for at the most equal to the change in MU. This happens because the addition to TU caused by MU gets spread over all the units of the commodity when we consider AU. For example, when third banana is acquired by the consumer, 12 falls from 18 to 12 units or a fall of 6 units. However, the AU falls from 21.5 to 18.3 units, or by 3.2 units. Similarly, the reduction in MU is of two units when seventh banana is acquired, but the fall in AU is by 1.8 units only.

You should note that for the first of a commodity, all the three measures of utility are identical in our example, is, 25 units.
The total, average and marginal utilities of bananas can be represented graphically also. Look at Figure 7.1, Number of bananas is represented along X-axis and units of utility are measured along Y-axis. As expected all the three curves of utility start from the same point. While curves of average and marginal utilities keep falling throughout their length, this is not so with TU curve. It rises so long as MU is positive and MU curve lies above X-axis. When MU cuts X-axis, TU curve stops rising. And when the former goes below X-axis, the latter also starts falling.

Check Your Progress A

1) State whether the following statements are True or False.
   i) Utility is the same thing as satisfaction.
   ii) Utility is a subjective thing.
   iii) We can measure utility in absolute terms.
   iv) When a commodity is used continuously for satisfying a want, its marginal utility falls.
   v) Total utility is the sum total of marginal utilities.
   vi) Marginal utility is the addition to total utility on account of last unit of the commodity.
   vii) If a commodity has utility for a consumer, it must be beneficial for him to consume it.

2) Fill in the blanks out of the words provided.
i) Decision of a consumer to buy a commodity depends upon its (utility/satisfaction).

ii) Utility is a ………………… quantity (constant, changing).

iii) Utility is ……… satisfaction: satisfaction is ……… utility. (expected, realized)

iv) Utility can be measured in ……….terms only. (cardinal, ordinal)

v) Interpersonal comparison of utility is possible if utility can be measured………… (ordinally, cardinally).

7.4 LAW OF DIMINISHING MARGINAL UTILITY

You are already familiar with an important characteristic of wants, namely, that a given want can be fully satisfied, if the process of its satisfaction is not discontinued in between. As Marshall puts it in his famous book 'Principles of Economics', “There is an endless variety of wants but there is a limit to each separate want.” You also remember that utility of a commodity is its want satisfying capacity. Now put these two things together and you get an important law of economics relating to utility. As a consumer gets successive units of a commodity, other things being equal, the intensity of the want being satisfied keeps diminishing. In other words, the satisfaction which can be had by removing the want goes on falling. Each additional unit of the commodity under consideration is expected to yield less satisfaction compared with the satisfaction expected from the preceding unit. That is, marginal utility of the commodity keeps diminishing as the consumer gets additional units of it.

This fact is stated in the form of the Law of Diminishing Marginal Utility or the Law of Satiable Wants. This law says that "the additional or marginal utility which a consumer derives from acquiring one more unit of a commodity, other things being equal, keeps decreasing with every increase in the stock of the commodity which he already has.” Note that the fall in marginal utility need not be at a uniform rate. Generally, however, MU would fall very rapidly for the earlier units while it would decrease slowly for the later ones. But this need not always be so. Also note that in some cases, MU may fall to zero or become even negative if the stock of the commodity increases sufficiently. The law of diminishing marginal utility describes a basic fact and a common experience of our daily life. For example, consider the case of a person who is very thirsty and he is given cups of water one by one, to quench his thirst. Clearly, the first cup of water will yield him more satisfaction than does the second; the utility of the second cup will be greater than that of the third; and so on. Eventually, his thirst will be fully quenched and the utility of water will drop to zero. If the consumer is forced to consume one more cup of water, it can even lead to disutility. The example of bananas, presented in the form of Table 7.1 also illustrates this law.
At this stage, consider another fact relevant to the principle of diminishing marginal utility. A particular commodity can be used to satisfy one or more specified wants but not all of them. Had it been possible to use a commodity for satisfying all wants, its MU would have not fallen because human wants are unlimited and keep recurring. Their collective intensity does not fall as more of them are satisfied. It is intensity of one or some given wants that is the use of a commodity. To put it differently, a given commodity obeys the law of diminishing marginal utility because it cannot be perfectly substituted for other commodities (which are needed to satisfy other wants), but the entire income of a person, that is, all the commodities put together, need not obey this law.

**Limitations**

There are innumerable situations in which the law of dimin cannot be applied. The limitations of the law are contained in the violation of the qualifying phrase, "other things being equal” which means that nothing should happen to increase the intensity of wants for the satisfaction of which the commodity under consideration is being used. However, other things need not remain the same, the intensity of the wants in the process of satisfaction may increase and if that happens, the law of diminishing marginal utility will get violated. Thus, the limitations of the law are nothing but the most common causes leading to an increase in the intensity of wants during the process of their satisfaction and thus causing an upward shift in the MU of the commodity. Following are the limitations of this law:

1. **Suitable units**: For the application of the law of diminishing marginal utility, it is necessary that the commodity should be supplied to the consumer in suitable units. Shoes, for example, should be in pairs and not in individual pieces. Wall paper for the house should be enough for at least a particular area to be covered.

Marshall mentions the case of a short concert or a holiday. Listening to music for a very short period may increase the desire to listen and enjoy it further in which case its MU may go up.

Similarly, a holiday of a very short duration may intensify the desire for it leading to an increase in its MU.
2 **Time-factor:** A want can recur and increase in intensity if passage of time is allowed between consumption of two units of a commodity. A person may get greater utility from the second chapati if it is consumed the next day. Similarly, a second cup of water may yield greater utility if the consumer is forced to become thirstier by delaying its availability.

3 **Tastes, fashion, and income:** Given enough time, these things can undergo a change and, therefore, alter the intensity of the want. However, it is not necessary that these factors would necessarily intensify it; they may even weaken it. It is well known that a change in fashion alters the acceptability of a commodity and thereby it’s utility. Some commodities gain in utility because more people want them and in larger quantities. As against this, some commodities go out of fashion and, therefore, lose in utility. In the same way, an individual's tastes (or preferences) can also undergo a change.

A very important factor influencing the utility of a commodity is the income of the consumer. Normally, some commodities are used mainly by the poor such as coarse grains, inexpensive clothes and so on. Accordingly, they are called ‘inferior commodities’ or 'poor man's commodities'. Any person whose income goes up would like to give up the consumption of such commodities and instead go in for the so called normal or superior commodities. In other words, the very change in income of a person can change the utility of a commodity for him without changing its stock.

4 **Anticipated availability of the commodity:** If the consumer comes to believe, rightly or wrongly, that the availability of the commodity would fall in the forthcoming time interval, its MU would go up.

For example, if a thirsty person finds, after one cup of water, that he would not get any supply for the next few days, the utility of the second cup for him will immediately go up.

5 **Capacity to enjoy a commodity:** It frequently happens that the capacity of a person to enjoy a particular commodity undergoes a change during its consumption. In that case, the law of diminishing MU may not hold.

Thus a person, listening to a particular song, may be able to appreciate it better with second/third hearing.

6 **Rare collections:** Some commodities like rare coins, paintings etc., constitute a special category of their own. Their supply is usually of non-identical items and they add to the total enjoyment of the collector more than proportionately. Their increasing stock adds to the sense of enjoyment, social price, knowledge and similar other aspects of the collector's life and thus the principle of diminishing MU lose its relevance in their case.
7 Change in the availability of related commodities: Some commodities are related to each other. Two specified commodities for example, may be jointly needed for the satisfaction of a want. They are known as complementary commodities. In that case, availability of one of them is useless to the consumer; but its availability raises the utility of the complementary commodity. You can think of a large number of cases in which the availability of one commodity increases the utility of the other. Some examples are of an electric fan and electricity, Box pen and refill, cooking fuel and uncooked food and so on.

As against complementary commodities, some commodities are substitutes of each other, that is, they are used for satisfying the same want. For example, alternative food items can be used for satisfying hunger. When the availability of a commodity increases, the ability of its substitutes falls and vice-versa.

8. Position in relation to other persons: Man is a social animal. Accordingly, his desire to have possessions and to consume various commodities and services is greatly influenced by his position in the society. Therefore, the utility of a commodity to the person under study changes when its availability to other members of society undergoes a change.

You should, however, remember that the limitations of the law of diminishing marginal utility, as described above, do not violate its fundamental applicability. The law still remains applicable in its essentials. These limitations only highlight the fact that very frequently the conditions attached to the law are not satisfied and the intensity of the want in the process of satisfaction goes up. However, if the assumptions of the law hold, the law itself would be a valid one.

7.5 MARGINAL UTILITY OF MONEY

At this stage, we are faced with an important question. Is the law of diminishing marginal utility applicable to money? Opinions differ as to what the reality is because of the following reasons.

Money represents purchasing power in general. It is used for buying everything that is sold in the market. We have seen earlier that while an individual want can be fully satisfied, all wants put together cannot be. Therefore, why should MU of money fall when a person has more of it? Some thinkers, however, do not agree with this reasoning. They appeal to the general experience of our everyday life and tell us that marginal utility of money also falls when its quantity increases. We are asked to compare the indifference with which a person having a large sum of money would not worry about losing coin. But the same person, when he has a very small amount of money with him would try to recover it. Similar other examples are given to show that money is also subject to the universal law of diminishing MU.

Marshall also believes that the law is applicable to money. However, when he develops the theory of consumer behaviour and demand, he assumes that money has a constant MU. This assumption became necessary because a consumer while
7.6 DIMINISHING MARGINAL UTILITY AND DEMAND FOR A COMMODITY

MU of a commodity is closely related to its demand by the consumer. An important fact of market sales is that a consumer buys all the units of a commodity of the same price. Now as a rational person (you are already familiar with the concept of rationality) the consumer wants to ensure that he does buy an additional unit of a commodity X if the utility paid by him by way of its price is less than the utility derived from its purchase, that is, if the price is less than MU. Also he must not buy that unit if the price is more than MU. If the price and MU are equal, the consumer would be indifferent and he may or may not buy that unit. In other words, the price which the consumer is ready to pay never exceeds the MU of the commodity. Accordingly, if the consumer is to buy more of a commodity, the price he is ready to pay should decrease (since the MU of a commodity falls when more of it is bought). Alternately, one can say, that if the price of a commodity falls, a situation would emerge in which MU of the commodity will exceed its price and the consumer would buy more of it.

Let us take the example of Table 7.1. Column 2 of the Table records the MU of bananas to the consumer. Let us suppose that the price of one banana is 12 units of utility. In that case while the consumer pays for 12 units of utility for the first banana, he gets 25 units of utility from it and thereby gains 13 units of utility. Similarly, the second banana brings him a gain of 18-12=6 units of utility. The utility of the third banana, however, is equal to its price and he may or may not buy it. On the other hand, if the price falls below 12 units, the consumer would buy the third banana as well. Similarly, he would decide to buy more bananas if price falls and less of them if price rises.

The general rule is that, given the price of the commodity, the consumer decides to buy that quantity of it which equates its MU with its price.

In our example, it is not always possible for the consumer to exactly equate the two because MU changes by large quantities at a time. But the statement made above remains basically valid, and can be put in the form of what is known as the law of demand. This law says that "the demand for a
commodity (that is the quantity of it purchased during any given period of time) increases with a fall in its price and decreases with a rise in its price.”

The preceding discussion needs a modification.

In the market, price of a commodity is quoted, received and paid in units of money and not in units of utility. Every buyer pays the same money price (though when converted into utility, the price paid can differ from buyer to buyer). Therefore, it becomes necessary to express the behaviour of the buyer in money terms. In other words, we must be able to find out the quantity of commodity which the consumer is ready to buy at a given price and the price which he is ready to pay for a given quantity.

For that purpose, it is assumed that the marginal utility of money remains constant irrespective of the stock of money with the buyer. This enables us to state the price which the consumer is ready to pay for different quantities of the commodity under consideration!

This point will be further clarified if you look at Table 7.1 and assume that each rupee has the same MU, say 10 units, for the consumer. On that basis, the MU of bananas, expressed in rupee terms would be as shown in column 3 of Table 7.2.

### Table 7.2: Marginal Utility of Bananas

<table>
<thead>
<tr>
<th>No. of Bananas</th>
<th>MU (in Units of Utility) (2)</th>
<th>MU (in Rupees) (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25</td>
<td>2.50</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>1.80</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>1.20</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>0.70</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>0.30</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>7</td>
<td>-2</td>
<td>(-)0.20</td>
</tr>
</tbody>
</table>

Thus, with 1 banana MU is Rs. 2.50; with 2 bananas, it is Rs. 1.80; and so on. It follows, therefore, if bananas are priced at 70p per piece, the consumer is ready to buy 3 bananas and may or may not buy the 4th banana. For any price less than 30p, the consumer would buy 5 bananas.

### 7.6.1 The Concept of a Demand Schedule

A demand schedule presents the behaviour of a consumer in the form of a schedule (or table). It has two columns. In the first column, alternative prices
per unit of the commodity under consideration are shown. The second column shows the corresponding quantities of the commodity which the consumer is ready to buy (per period of time) at respective prices. Table 7.3 provides a typical illustration of a demand schedule of oranges by a consumer. Each pair shows the number of oranges which the consumer is ready to buy at a given price or the maximum price which he is ready to pay for a given number of oranges. Thus, for example, when the price is 50p. per orange, the consumer is ready to buy 15 oranges. On the other hand, for buying 15 oranges, he is ready to pay not more than 50p. per orange. Note that a typical demand schedule shows increasing quantities of the commodity with falling price per unit and vice-versa.

Table 7.3: Demand Schedule for Oranges

<table>
<thead>
<tr>
<th>Price per Unit (in Rs.)</th>
<th>Demand for Oranges (number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>4</td>
</tr>
<tr>
<td>0.90</td>
<td>5</td>
</tr>
<tr>
<td>0.80</td>
<td>6</td>
</tr>
<tr>
<td>0.70</td>
<td>8</td>
</tr>
<tr>
<td>0.60</td>
<td>11</td>
</tr>
<tr>
<td>0.50</td>
<td>15</td>
</tr>
<tr>
<td>0.40</td>
<td>20</td>
</tr>
<tr>
<td>0.30</td>
<td>24</td>
</tr>
<tr>
<td>0.20</td>
<td>30</td>
</tr>
</tbody>
</table>

7.6.2 The Concept of a Demand Curve

Demand behaviour of the consumer can also be represented graphically in the form of a demand curve. A demand curve is nothing but a curve obtained by plotting all the pairs of price and quantity demanded. In Figure 7.2 DD is such a demand curve which represents the demand schedule of Table 7.3. Price per orange is measured along Y-axis and the number of oranges demanded along X-axis. If you take any point on the demand curve DD' and draw perpendiculars upon the two axes, then the perpendicular distance of the point from X-axis shows the price for
Figure 7.2: Demand Curve for oranges

orange while its perpendicular distance from Y-axis shows the number of oranges that would be bought at that price. For example, take point P on the demand curve and draw the two perpendiculars PM and PA as shown. Then PM (=OA) price per unit, the number of oranges demanded is given by OM (=AP).

Note that a normal demand curve slopes downwards from left to right because of the fact that quantities of commodity demanded and price per unit move in the opposite directions. For this reason, the demand curve is also said to have a negative slope.

Check Your Progress B

1) State whether the following statements are True or False.
   i) No want can ever be satisfied fully.
   ii) Fall in MU of a commodity is always at a uniform rate.
   iii) A commodity can have a negative MU.
   iv) Anticipated availability of a commodity affects its MU.
   v) Change in tastes, fashion and income of the consumer always increase the MU of a commodity.
   vi) Inferior commodities are health hazards.
   vii) For deriving a demand curve, it is assumed MU of money remains constant.
   viii) A demand curve is a graphic presentation of demand schedule.

2) Fill in the blanks out of the words provided at the end.
   i) Two commodities are ……………………… if the availability of one raises the utility of the other.
ii) Two commodities are ................. of each other if the availability of one lowers the utility of the other.

iii) With an increase in the ................. the utility of ................. commodities to the consumer decreases.

iv) MU curve of a commodity can be used to derive its demand curve if we assume that ......................... of money remains ...........

v) For a given commodity, every buyer pays the same price in terms of .................. but not in terms of .................

vi) According to the law of demand, the amount of commodity purchased during a given period of time ............... when price and ....................... when price ............... 

**Words:** Constant, MU, utility, rises, falls, substitutes, inferior, superior, complementary, money, decreases, increases, income:

### 7.7 THE LAW OF EQUIMARGINAL UTILITY

You have seen earlier that a consumer is faced with a large number of wants and all of them cannot be satisfied. The consumer, with his limited income, has to make a choice. He has to decide which wants to satisfy and which ones to leave out. Further it is not necessary that the wants selected for satisfaction must be satisfied fully. Some or all of them may be satisfied only partially. The consumer has to take a decision in this regard also.

How would the consumer proceed? How would he decide as to which wants to satisfy and how much? The answer to these questions lie in the objective with which he decides his consumption expenditure. If he is a rational person, then his objective would be to derive maximum utility from his expenditure. We shall make the assumption that he is a rational person.

You are already familiar with the behaviour pattern of a rational consumer in the context of a single commodity. There, it is assumed that for the consumer, the price of the commodity in question is fixed and he is to decide about the number of units he is to buy. In such a situation, the consumer keeps buying the commodity so long as its MU does not fall below its price.

This method of reasoning needs a modification now. While earlier it was assumed that the consumer buys a commodity, unit by unit, and spends a given amount of money for each unit purchased, now it is assumed that the consumer spends money, rupee by rupee, and gets a given quantity of whichever commodity he buys. Let us suppose that the consumer is to choose between four commodities A, B, C and D where each commodity is subject to the law of diminishing marginal utility. Then while deciding to spend the first rupee, he picks up that commodity which brings him the maximum amount of utility for the rupee spent, and he also makes sure that the MU of money does not exceed that of the commodity bought. Similarly, having spent that first rupee, the consumer finds out which commodity brings him the maximum utility for the second rupee and spends it on that, and so on.
Let us take an illustration and explain it. In Table 7.4, MU schedules of four commodities A, B, C and D are depicted.

**Table 7.4 : Marginal Utility Schedules**

<table>
<thead>
<tr>
<th>Expenditure</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Rupee</td>
<td>30</td>
<td>35</td>
<td>36</td>
<td>26</td>
</tr>
<tr>
<td>2nd Rupee</td>
<td>25</td>
<td>28</td>
<td>29</td>
<td>23</td>
</tr>
<tr>
<td>3rd Rupee</td>
<td>20</td>
<td>22</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>4th Rupee</td>
<td>17</td>
<td>18</td>
<td>10</td>
<td>17</td>
</tr>
<tr>
<td>5th Rupee</td>
<td>12</td>
<td>15</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>6th Rupee</td>
<td>8</td>
<td>10</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>7th Rupee</td>
<td>4</td>
<td>7</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>

Thus, it is seen that the first rupee spent on A brings in 30 units of utility, the second one brings in 25 units, and so on. The seventh rupee spent on A brings in only 4 units of utility. On the other hand, successive rupees spent on commodity B bring in respectively 35, 28, 22, 18, 15, 10 and 7 units of utility. You can read the meaning of MU figures for commodities C and D also in the same manner.

Let us assume that the consumer is to spend a total of seven rupees on these commodities. On which commodity should he spend the first rupee? Clearly the answer is commodity C, since that way he gets 36 units of utility – the highest possible. Similarly, the second rupee should go to buy the commodity B (35 units of utility), the third rupee should be spent on commodity A (30 units of utility), the fourth rupee again on commodity C (29 units of utility), the fifth rupee on commodity B (28 units of utility), the sixth rupee on commodity D (26 units of utility), and the seventh rupee on commodity A (25 units of utility). If the consumer decides to spend more, then his choice between alternative commodities will follow the same rule. It, of course, should not be forgotten that MU derived from the commodity purchased with the last rupee spent must be equal to or greater than the marginal utility of the rupee spent. Thus the seventh rupee will be spent only if its MU is not more than 25 units.

You can easily extend this illustration by assuming, for example, that the consumer has 12 rupees to spend. You would find in that case that he will spend the 12th rupee of commodity C and three rupees will be spent on each of the four commodities. Similarly the 13th rupee will go to commodity B. But what about 14th rupee? It can go to either commodity A or D. However, if he spends 15 rupees, then both A and D will be bought with 14th and 15th rupees.

Though it is always understood and seldom mentioned, you should not forget an underlying condition in this analysis. The condition is that MU of money does not exceed the MU of the commodity purchased. Thus when the
consumer spends 14 rupees, he gets a MU of 17. Therefore, he would not spend the 14th rupee if MU of money is greater than 17.

The consumer follows the behaviour pattern described above in order to get maximum possible satisfaction. He is obeying what is called the Law of Equimarginal Utility (He is trying to equate MU of different purchases with each other and with that of the money he is spending). This principle is known as the Law of Substitution, the Law of Indifference, the Law of Economy of Expenditure and the Law of Maximum Satisfaction.

The Law of Equi-marginal Utility can also be represented diagrammatically by considering a case of only two commodities (for the sake of simplicity) A and B. In Figure 7.3 MU is measured along Y-axis. The amount of money spent on commodity A is measured along X-axis from the point of origin towards right, and MU, is the corresponding MU curve of commodity A. Similarly, the amount of money spent on commodity B is measured along X-axis from the point of origin towards left and MU, is the corresponding MU curve of B. Then a straight line is drawn parallel to X-axis in such a way that the distance between its points of intersection with MUA and MUR equals the amount of money to be spent. Thus when the consumer spends EF amount of money, GE portion of it is spent on commodity A and FG portion of commodity B. The consumer cannot increase his total satisfaction by shifting his expenditure from one commodity to the other.

![Figure 7.3: law of Equi marginal utility](image)

Normally, the consumer is not able to buy a commodity for a rupee at a time. He has to buy a full unit of it or not at all. And the prices of different commodities also differ from each other. Therefore, in order to arrive at MU per rupee expenditure on a commodity, the utility of the last unit of the commodity purchased (MU of the commodity) is divided by the price of the commodity. In symbols, it would be \( \frac{MU_A}{P_A} \) for commodity A, \( \frac{MU_B}{P_B} \) for commodity B, and so on. Then, according to the law of Equimarginal Utility, the consumer tries to equate these ratios with each other and also with MU of money. In symbols,
\[
\frac{\text{MU}_A}{P_A} = \frac{\text{MU}_B}{P_B} = \frac{\text{MU}_C}{P_C} \quad \text{........................ MU of Money,}
\]

**Limitations**

When it comes to limitations, this law is no exception to the other laws of economics.

1) We have assumed that the consumer is able to spend very small amounts of money on different commodities. This is not always possible. Frequently, you have to buy an item in full either because it is not sold in parts or because it is useless to buy it that way. In other words, many commodities are either technically or for economic reasons not divisible into smaller units. They have to be bought either in bulk or not at all. Accordingly, the amount of expenditure on commodity has to move in large quantities. To put it differently, many purchases are bulky (or in lumpy units) and do not allow small variations. In such cases, the consumer often fails to equate marginal utilities.

2) Ignorance of the consumer poses another problem. A typical consumer is not able to assess and compare variations in marginal utilities of different commodities. Very often the consumer is guided by his habits, past behaviour and behaviour of other consumers, and so on.

3) Another problem arises on account of the life cycle of different consumption commodities that is, the number of times they can be used. Some commodities have only one-cycle use, that is, they are consumed away in one use only. Others have multi-cyclical uses. They are usable many times over. They are referred to as consumer durables. Examples of one-cycle commodities are bread, fuel, electricity, etc. Similarly, examples of multi-cyclical commodities include cars, scooters, utensils, clothes, shoes, etc. Thus, a problem arises in the sense that while expenditure on a consumer durable is incurred during one period, utility derived from it is spread over many time periods. It becomes very difficult for the consumer to equate the MU of the services rendered by such a variety of commodities and services in each period.

4) Another limitation of this law arises from the fact that many commodities are related to each other. They are either substitutes or complementary. In this law, however, they are assumed to be independent of each other. The utilities derived are assumed to be dependent on their own respective quantities and not on those of others.

5) It is claimed that the consumer hardly tries to compare marginal utilities of different commodities when the amount of expenditure involved is very small. In that context, the law tends to be ignored by the consumer in his behaviour pattern.

6) One should remember, however, that in spite of the limitations described above, the Law of Equimarginal Utility does not lose its fundamental validity. Only its application to reality loses its exactness.
7.8 CONSUMER’S EQUILIBRIUM

With the help of the cardinal utility analysis we will draw the consumer equilibrium. We will begin with one-commodity case and extend it to two or more commodities.

a) One commodity

Suppose, the consumer wants to buy a good. Further, suppose price of good is Rs. 3 per unit. Let the utility be expressed in utils which are measured in rupees. We are given the marginal utility schedule of the consumer.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Price (Rs.)</th>
<th>Marginal Utility (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

When he purchases the first unit, the utility that he gets is 8 utils worth Rs. 8. He has to pay only Rs. 3 for it. Will he buy the 1st Unit? Obviously, yes, because he gets more than what he gives. Similarly, we compare the utility received from other units with the price paid. We find that he will buy 4 Units. At the 4th Unit, MU equals price. If he buys the 5th Unit, he is a looser because the utility that he gets is 2 utils worth Rs. 2 and what he has to pay is Rs. 3. Therefore, the consumer will maximize his satisfaction by buying 4 units of this commodity. The condition for maximization of satisfaction if only one commodity is purchased is:

\[ MU = Price \]

b) Two commodities

Suppose a consumer consumes only two goods. Let these goods be X and Y. Given income and prices \( P_x \) and \( P_y \), the consumer will get maximum satisfaction by spending his income in such a way that he gets the same utility from the last rupee spent on each good. This is satisfied when:

\[ \frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} = MU \text{ of a rupee spent on a good} \]

In order to get maximum satisfaction this condition must be satisfied else what difference will it make.

Suppose the two ratios are:
\[
\frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}
\]

It means that per rupee MUx is higher than per rupee MUy. It further means that by transferring one rupee from Y to X, the consumer gains more utility than he loses. This prompts the consumer to transfer some expenditure from Y to X. Buying more of X reduces MUx, Px remaining unchanged. MUx/Px i.e. per rupee MUx, is also reduced. Buying less of Y raises MUY. PY remaining unchanged it raises per rupee MUY. The change continues till per rupee MUx becomes equal to per rupee MUy. In other words:

\[
\frac{MU_X}{P_x} = \frac{MU_Y}{P_y} = \text{per rupee MU}
\]

**BRAIN TEASER**

**Q.1.** An equal proportionate increase in supply and demand will (i) leave the equilibrium price unchanged, and (ii) increase the equilibrium quantity. Show graphically.

**Ans.** Fig. 1

**Q.2.** Show consumer’s equilibrium with the help of cardinal analysis, if a consumer has to consume a free good (i.e., a good for which he has not to pay a price)

**Ans.** Fig. 2

**Q.3.** If a consumer has to pay a price for a commodity show his equilibrium situation graphically.

**Ans.** Fig. 3

**Q.4.** If a consumer has to choose between two commodities, graphically show the determination of consumer’s equilibrium.

**Ans.** Fig. 4

**Q.5.** Show the consumer’s scale of preferences for two commodities, X and Y.

**Ans.** Fig. 5
Q. 6. **State the consumer’s equilibrium in terms of marginal utility of money.**

**Ans.** By marginal utility of money we mean the additional utility that a consumer gets when an additional rupee is spent on other available goods in general.

A consumer would consume a commodity up to the unit where the difference between the total utility in terms of money and the total expenditure on the commodity is maximum.

**Consumer’s equilibrium with respect to the purchase of one good is attained when the difference between total utility in terms of money and the total expenditure on it is maximized.** This situation will be attained when the following condition is attained:

\[
\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} = MU \text{ of money}
\]

If the marginal utility of a rupee increases, consumer’s equilibrium will reach at a lower level of consumption. Hence, quantity demanded of the commodity will decrease.

In the given illustration, suppose the marginal utility of a rupee increases to 3. Then, the consumer will be in equilibrium when he consumes only one unit of the commodity.

We can generalize this condition for consumer’s equilibrium when two commodities are involved as follows:

\[
\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} = MU \text{ of money}
\]

**Note:** There is no defined value of marginal utility of money. It varies from person to person.

## 7.9 **CONSUMER'S SURPLUS**

The concept of consumer's surplus was introduced by Marshall. You have seen above that every consumer to buy that quantity of a commodity for which its marginal utility (that is the utility derived from the last unit of the
commodity) and the price get equated. You would remember that every commodity obeys the law of diminishing marginal utility. As more of a commodity is acquired by the consumer, its marginal utility falls. Therefore, while the utility derived from the marginal (or last) unit of a commodity is equal to the price paid for it the utility derived from intra-marginal (or earlier) units is not. It exceeds the price. The inference is that while the consumer pays full for the utility derived from the last unit, the utility derived from earlier units is only partly paid for. The consumer gets the rest of the utility free. Take the example of MU of bananas as depicted in Table 7.2 and let us assume that the price of a banana is 7 units of utility. In that case, we can argue as follows. The consumer is ready to pay a price of 25 units of utility for the first banana rather than go without it. However, he is allowed by the market to have it by paying a price of only 7 units. Thereby he gets 18 units of utility without paying for it. This is his consumer's surplus (measured in utility terms from the first banana. Similarly, the utility derived by the consumer from the second banana is 18 units but the consumer gets it by paying only 7 units. From the second banana, therefore, he gets a consumer's surplus of 11 units of utility. In the same manner, consumer's surplus derived from the third banana is 4 units and no surplus is derived from the fourth banana. Total consumer's surplus derived in this case equals 34 units of utility.

You can see on your own that if the price of a banana is reduced to 3 units of utility, the consumer's surplus goes up. In this case, it is zero from the fifth banana but the earlier bananas yield, respectively, a consumer's surplus of 22, 15, 9 and 4 (or a total of 50) units of utility. In Marshall's words, “The excess of the price which he (the consumer) would be willing to pay rather than go without the thing over that which he actually does pay is the economic measure of this surplus satisfaction. It may be called consumer's surplus.”

Thus in brief, the consumer's surplus is the excess of what the consumer is ready to pay for a commodity over what he actually pays for it. The surplus may be measured in terms of utility or in terms of money. In the explanation given earlier, the measurement runs in units of utility. Let us illustrate the concept with the help of a diagram.

![Figure 7.4: Consumer’s Surplus in Money terms](image1)

![Figure 7.5: Consumer’s Surplus in Quantitative terms](image2)
In Figure 7.4, quantity of commodity A is measured along X-axis and its MU is measured along Y-axis. MU, is the marginal utility curve of the commodity A. Let us suppose that its price per unit is equal to OB. In that case the consumer buys OM quantity of the commodity at the price of PM (OB) per unit, and therefore pays a total price equal to OBPM units of utility. The total utility derived, however, is given by the area under MU curve, that is by the area OBCPM. As a result, the shaded area BCP happens to be the consumer's surplus.

The concept of consumer's surplus can be easily expressed in units of money as well. For that both MU of the commodity and its price are stated in money terms. This can be illustrated with the help of a usual demand curve. In Figure 7.5, DD is such a demand curve with quantities of the commodity measured along X-axis and the price per unit along Y-axis. Suppose, the price is OB, OBPM per unit. The consumer then buys OM units of the commodity and pays for each unit at the rate of PM. In other words, he pays a total price of OBPM amount of money. However, as the demand curve shows, for purchasing OM quantity of the commodity, he is ready to pay a total price of OBDPM rather than go without it. Therefore, his consumer's surplus is OBDPM-OBPM—the shaded area BDP amount of money.

You should note that derivation of consumer's surplus is not due to any wisdom of the consumer. It is the result of market forces which bring him an opportunity to enjoy satisfaction without paying for it. It is related on the one hand, to the demand of the consumer and on the other, to the supply of the commodity on account of which it is available at a given price. Let us elaborate this statement.

1) The demand situation of a commodity by the consumer under consideration determines the location and the slope of the demand curve. In case the commodity is a necessity, the demand curve tends to start from a higher point on Y-axis. It means that for the initial unit (units) of the commodity, the consumer is ready to pay a very high price rather than go without the commodity. You can think of salt and other food items as an examples of such commodities. Similarly, the slope of the demand curve is determined by the quickness with which MU of the commodity falls. If MU falls slowly, demand curve will also fall slowly and the consumer is likely to buy more of it (before MU falls enough to become equal to the price of the commodity). On the other hand, if MU falls rapidly, the demand curve also falls faster. The consumer in this case will buy a smaller quantity of the commodity. It follows that given the price of a commodity, the consumer's surplus be more if:

   i) the demand curve starts a higher initial price which the consumer is ready to pay; and

   ii) the demand curve has a smaller slope.

2) The second set of forces affecting consumer's surplus work on the supply side. In the case of a competitive market (the exact meaning of which you will learn in a later Unit) the consumer is able to buy as much of a commodity as he wants at a given price. The market allows him the
possible consumer's surplus. On the other hand, in a non-competitive situation, the price of a commodity may depend upon the quantity purchased. Here, the consumer may be forced to pay more for the initial units of a commodity. Though the average price paid by him will fall, as he purchases more (and pays less for additional units), his consumer's surplus is not as large as in the case of a fixed price. He may even be forced to pay in such a manner that he is not left with any consumer's surplus at all.

You can extend this reasoning of consumer's surplus to (i) two or more commodities, and (ii) two or more consumers even the whole market. Such an extension is not always easy and can pose many difficulties. Thus, for example, when you consider consumer's surplus from the purchase of two commodities, the total can differ from the sum of the two individual quantities. Can you see why? It is because the commodities may be substitutes or complementaries and not independent of each other. You would remember that when two commodities are not independent (that is when they are related either as substitutes or complementaries) the utility of one is affected by the quantity of the other. Moreover, this influence can be quite strong or very weak depending upon the strength of their relation. Similarly, extension of the analysis to two or more consumers poses some problems which should be kept in mind.

You should note that the concept of consumer's surplus is not just an academic exercise. Though it is difficult to measure it very exactly and though it has many difficulties when we try to extend it to the market as a whole, it has a great practical relevance. For example, the authorities know that necessities bring in larger consumer's surplus. Therefore, they should tax luxuries and comforts and avoid necessities. They should also avoid taxing those commodities on which poor people spend a larger proportion of their budgets. The businessmen, similarly, can charge higher prices for those commodities which have a 'strong' demand that is, for which the buyers are ready to pay more rather than go without.

Check Your Progress C

1) State whether the following statements are True or False.

   i) Law of Equimarginal utility depicts the behaviour of a rational consumer in maximizing his satisfaction from a given expenditure.

   ii) A consumer always succeeds in applying the Law of Equimarginal Utility in maximizing utility in his consumption decision.

   iii) According to Law of Equimarginal Utility, a consumer always buys the cheaper commodity.

   iv) In the application of the Law of Equimarginal Utility, MU of a Commodity purchased can exceed the MU of money.

   v) Different commodities must have identical MU schedules for the Law of Equimarginal Utility to apply.
vi) According to the Law of Equimarginal Utility, a consumer spends equal amounts of money on each commodity.

vii) Lumpy commodities are those which are bought in bigger units.

viii) Consumer's surplus refers to those commodities which the consumer gets without paying for them.

ix) Consumer's surplus emerges because the consumer does not pay a price equal to the utility derived from the purchased commodity.

2) Fill in the blanks:

i) Applicability of the Law of Equimarginal Utility necessitates that the commodities are ........ .......... (lumpy/fully divisible)

ii) In the case of related commodities, the Law of Equimarginal Utility loses its ........... (validity/exactness)

iii) Consumer's surplus is .................. of what the consumer is .............. pay over what he actually pays. (excess/shortfall; forced to/ready to)

iv) Consumer's surplus is the result of ....................because of which a consumer can enjoy satisfaction without paying fully for it. (an opportunity/kindness of the seller)

v) There is normally speaking ..............of consumer’s surplus in necessities than in comforts. (more/less)

7.10 LET US SUM UP

The economists are interested in understanding the determination of and changes in prices in general. But they start with the price of a single commodity and find that its price is determined by an interaction between demand and supply forces.

The analysis of demand side of a single commodity is taken up with the behaviour of a single representative consumer. The consumer buys a commodity and pays a price for it because it has utility for him.

Utility is the expected satisfaction from the commodity. It is an ever changing quantity. It is a subjective thing and cannot be measured in absolute or cardinal terms. It can be measured only ordinally. For this reason, it is also not possible to have interpersonal comparisons of utility. The existence of utility does not imply that the commodity having utility is beneficial to the consumer. It may or may not be so. Utility of a commodity may be viewed in terms of total, average or marginal. Total Utility is the sum of utility derived from all the units of a commodity. Average utility is the total utility divided by the number of units of the commodity while marginal Utility is the utility of the last unit or the addition to total utility on account of the last unit of the commodity. Total utility keeps increasing only so long as marginal utility is positive.

Each commodity is subject to the law of Diminishing Marginal Utility, though in reality the law has many limitations. As far as money is concerned, opinions differ as to whether its marginal utility falls with an increase in its
quantity or not. Marshall believed that the law was applicable, though for reasons of analytical simplicity, he assumed that marginal utility of money remained constant.

Changes in marginal utility of a commodity enable us to derive the behaviour pattern of a representative consumer. By assuming that the consumer is a rational person and that marginal utility of money remains constant, it is concluded that he always tries to equate marginal utility of the commodity with its price. This leads us to derive the demand schedule of that commodity which can be represented in the form of a demand curve. The finding can be put in the form of the well-known law of demand which states that the demand for a commodity and its price are inversely related. When one falls, the other increase and vice versa. The demand curve, for this reason, slopes downwards to the right, that is, it has a negative slope.

An extension of the consumer behaviour leads us to the Law of Equimarginal Utility which is also known by other names like the Law of Maximum Satisfaction, the Law of Substitution and the Law the Indifference. This law states that when a consumer is faced with a number of commodities, he divides his total expenditure on them in such a way that the marginal utility derived from each item is equal. For two commodities, the law can also be represented in a graphical form.

The concept of consumer's surplus, introduced by Marshall, explains the fact that a buyer, in general, is ready to pay more for his purchases than he actually does. The excess of what he is ready to pay rather than go without the commodity over what he actually pays, is called the consumer's surplus. It may be expressed and measured in terms of utility or in terms of money. In the former case, use is made of MU curve. In the latter case, the demand curve is used. The amount of consumer's surplus depends upon the position and slope of the demand curve as also upon the supply conditions in the market. Though it is difficult to extend the concept of consumer's surplus to the market as a whole, it has a great practical relevance. For example, the authorities can adjust their tax structure so as to minimize the reduction in it. The sellers, on the other hand, can use the concept for increasing their profits.

### 7.11 KEY WORDS

**Average Utility:** It is the total utility divided by number of units of a commodity.

**Cardinal Measurement:** It is the measurement in absolute terms or numerical units.

**Consumer's Surplus:** It is that portion of utility derived from a commodity which is obtained in excess of the price paid by the consumer. In money terms, it is the excess of what the consumer is ready to pay for a commodity over what he actually pays.

**Demand Curve:** Graphic presentation of a demand schedule.
**Demand Schedule:** The tabular presentation of the amounts of a commodity which will be demanded at different specified prices.

**Disutility:** This term denotes that the consumption of the commodity under consideration leads to a loss of satisfaction and, therefore, a reduction in total utility.

**Inferior Commodities:** Those commodities which are believed to be bought by only persons with low incomes. Therefore, the consumer redoes the demand for such commodities when his income increases.

**Interpersonal Comparison of Utility:** It denotes the comparison of utility derived by two persons. This comparison is possible only under cardinal measurement of utility.

**Law of Demand:** It is a statement of a tendency that the demand for a commodity falls as its price rises and vice versa.

**Lumpy Goods:** Those commodities which cannot be purchased in small quantities (that is with a small amount of expenditure), it is also called bulky commodities.

**Law of Diminishing Marginal Utility or Law of Satiable Wants:** The principle according to which a given want can be satisfied fully and, therefore, the marginal utility of a commodity keeps falling as more of it is acquired.

**Law of Equimarginal Utility:** This law states that a rational consumer tries to distribute his total expenditure on different commodities in such a way that the marginal utilities derived, per rupee of expenditure from all commodities are equal.

**Marginal Utility:** It is the utility of the last unit of a commodity; it is addition to total utility on account of the last unit of a commodity.

**Negative Slope of a Curve:** It denotes the fact that the quantities measured along the two axes are inversely related: when one increases, the other falls.

**Ordinal Measurement:** The arrangement of utility amounts in ascending or descending order. Here between any two utility amounts, it is known which is more; but it is not known 'how much more'.

**Total Utility:** It is the sum of utility derived from all the units of a commodity consumed.

**Utility:** The want-satisfying capacity of a commodity, the expected satisfaction from a commodity.

### 7.12 ANSWERS TO CHECK YOUR PROGRESS

**Check your progress A**


1. i) utility, ii) changing, iii) expected; realized, iv) ordinal, v) cardinally.
Check your progress B


2. i) complementary, ii) substitutes, iii) income, inferior, iv) marginal utility; constant, v) money; utility, vi) decreases; increases; falls.

Check your progress C


2. i) fully divisible, ii) exactness, iii) excess; ready to, iv) an opportunity, v) more.

7.13 TERMINAL QUESTIONS

1) Distinguish among total utility, average utility and marginal utility.

2) State the Law of Diminishing Marginal Utility (or the Law of Satiable Wants) and its limitations.

3) Is the Law of Diminishing Marginal Utility applicable to money? Explain your answer.

4) Critically examine the Law of Equimarginal Utility.

5) Discuss the validity of the concept of consumer's surplus in the context of (a) single commodity (b) two or more commodities (c) two or more buyers.

6) Explain the concept of consumer's surplus. What are its limitations?

Note: These questions will help you in understanding the unit better. Try to write their answers. However, do not send them to the University because they are meant for your own practice only.