



**B.A. PART-I (SEMESTER-I)**

**MICRO ECONOMICS AND  
INDIAN ECONOMY**

**Department of Distance Education  
Punjabi University, Patiala**

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**SECTION : A**

**LESSON NO. :**

- 1.1 : Meaning, Scope and Definition of Economics.
- 1.2 : Law of Demand, Elasticity of Demand and its Measurement.
- 1.3 : Individual Consumer's Demand : Marginal Utility Analysis.
- 1.4 : Individual Consumer's Demand : Indifference Curves Analysis
- 1.5 : Consumer's Surplus.
- 1.6 : Production Function and Law of Variable Proportions
- 1.7 : Short-Run and Long-Run Cost Curves
- 1.8 : Market Forms, Concepts of Revenue and Revenue Analysis

**Note : Students can download the syllabus from  
department's website [www.pbidde.com](http://www.pbidde.com)**

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**MEANING, SCOPE AND DEFINITION OF ECONOMICS**

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**Structure of the Lesson**

- I. Introduction
- II. Objectives of the Lesson
- III. Subject matter
- IV. Summary
- V. Key concepts
- VI. Suggested Books
- VII. Questions
  - (i) Long-answer type questions
  - (ii) Short-answer type questions

**I. Introduction**

Economics is the study of man's efforts to satisfy his unlimited wants by utilizing his limited resources. This problem of using the scarce human and non-human resources to satisfy the unlimited human wants is the basic economic problem. All other problems arise out of this one. E.R.A. Seligman is of the view that, "The starting point of all economic activity is the existence of human wants, to satisfy hunger and thirst, to secure shelter or to provide clothing were the chief aims of primitive man and constitute even today the motive force of all societies." So the primary concern of economics is to explain the principles governing the use of scarce resources in the satisfaction of unlimited human wants.

**II. Objectives**

- (i) To define economics
- (ii) To know the nature of economics
- (iii) Usefulness of the study of economics

**III. Subject-matter**

- (i) Definition of Economics
  - (a) Adam Smith's definition
  - (b) Marshall's definition
  - (c) Pigou's definition
  - (d) Robbin's definition
  - (e) Samuelson's definition

- (ii) Scope of Economics
- (iii) Nature of Economics
  - (1) Is Economics a science ?
  - (1b) Economics as science
  - (2) Economics as art.
  - (iv) Is Economics a positive or normative science?
    - (1a) Economics as a positive science
    - (2) Economics as a normative science
    - (3) Usefulness of the study of economics

(i) The definition of subject provides criterion that helps us to decide which problem falls within its preview (Scope). Most of the economists agree on the subject matter of economics, but they differ on the nature of denominator common to all economic problems. That is why Robbins said, "We all talk about the same thing, but we have not yet agreed what it is we are talking about." It is due to this difference of opinions that Barbara Wotton said, "Whenever six economists are gathered, there are seven opinions". Again Dr. J.N.Keynes was quite right, when he said "Political economy is said to have strangled itself with definitions." Different economists have given different definitions of economics. Some of which are discussed below :-

#### **(i) (a) Adam Smith's Definition**

Adam Smith, regarded as the Father of economics defined economics as the science of wealth or the science relating to the laws of production, distribution and exchange of wealth. He named his book 'An Enquiry into the Nature and Causes of the Wealth of Nations' in 1776. According to him, as the ultimate aim of economics is to make the people and the State prosperous. Adam Smith laid great stress on increasing the productive power and hence production of a country in order to make that country prosperous. J.B. Say, the most important advocate of Smith's thought, regarded economics as a study of the laws which govern wealth. Nassau Senior, the most important exponent of classical thought, opined, "The subject treated by the Political Economists is not happiness, but wealth". Thus, classical economists considered the procurement and use of wealth to be the primary subject of economics. English classical economists held a firm belief that all these economic activities which are motivated by self-interest prove beneficial to the society also.

The classical definition of economics came in for bitter criticism. Several writers including members of the Historical School denounced this definition. They criticised economics and called it a Dismal science. It was pointed that undue emphasis has been laid upon wealth. The fact is that man occupies a primary place and wealth only a secondary one. Wealth is only a means to an end, the end being human welfare.

**(i) (b) Marshall's Definition**

Prof. Alfred Marshall gave more importance to human welfare than to wealth. He regarded economics as a means to improve the condition of human life. He stressed that man and his welfare are the primary concepts of economics. He, thus, humanised the dismal science. In his book '*Principles of Economics*' (1890) he says "Political Economy or Economics is the study of mankind in the ordinary business of life; it examines that part of individual and social action which is most closely connected with the attainment and with the use of the material requisites of well being". Marshall calls earning and spending of wealth as the ordinary business of life. Economics deals with wealth getting and spending activities of man. These activities claim most of his time and they are inspired by motives that frequently exert a strong influence of his life. Thus, economics studies how producers, consumers, borrowers, lenders and other such groups are likely to act under given circumstances.

Prof. Marshall did a great service to the science of economics by stressing the human aspects of its study. He said, "It is on the one side a study of wealth and on the other, more important side, a part of the study of man". The most important fact which follows from this is that it stresses on human aspects. The ultimate object of economics is to promote welfare. The primary concern of economics is man and not wealth. Wealth is studied because it contributes to human welfare. It is concerned with earning and using requisites of well being. Economics aims at reducing the poverty of mankind. Economics, thus, deals with man as a social being. It is social science, a branch of Sociology.

**(i) (c) Pigou's Definition**

Prof. Pigou also regarded economics as a science which contributes to human welfare. According to him, "Economics is a study of economic welfare which is that part of welfare which can be brought directly or indirectly with the measuring rod of money". The merit of Pigou's definition is that it widens the scope of economics. All those commodities become the subject matter of economics which can be measured in terms of money.

These welfare definitions have also been criticised. It has been argued that basic principles of economics have relevance for all persons, whether they are members of an organised society or not. Economics should, therefore, be considered a human science rather than a social science. The second objection was that these definitions are classificatory. Here human activities are divided into two parts-economic activities and non-economic activities. But in reality every human activity has an economic aspect.

Prof. Lionel Robbins levelled a scathing criticism against Marshall's definition in his well known book, "*An Essay on the Nature and Significance of Economic Science*,"

published in 1932. He starts with Marshallian phrase, 'material requisites of well being.' He says that economics is concerned with material as well as immaterial objects. All those objects which command price fall within the preview of economics. Wages of a teacher, or those, of a juggler result from services which do not produce any material goods and these wages may be spent again on services. Their earnings are as much the subject-matter of economics as any other earnings. Even they command a price in the market. Robbins is of the opinion -that economics is concerned with all those material goods and services which command a price in the market. According to him, it is improper to define economics as a science which contributes to material welfare. He says, "Whatever economics is concerned with, it is not concerned with the cause of material welfare as such".

#### **(i) (d) Robbin's Definition**

Robbins has put forth a new type of definition of economics. According to him, "Economics is the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses." There are three fundamental points in this definition : (i) ends of human wants are unlimited, (ii) means to satisfy these wants are scarce or limited, (iii) the scarce means are capable of alternative uses. A brief explanation of these points is necessary for a clear understanding of Robbin's definition. Man has unlimited wants to satisfy and this multiplicity of wants calls for ceaseless efforts to satisfy them. If wants were limited, they would have been adequately satisfied, and incentive to economic efforts would have ceased. Since human wants are unlimited, one is compelled to choose between most urgent and less urgent wants. Thus, wants vary in their importance. The means to satisfy unlimited wants are strictly limited. Had the means of satisfaction also been unlimited, no economic problem would have arisen. The term scarcity of means does not mean absolute scarcity, but relative scarcity i.e., scarcity in relation to demand. The scarce means are capable of being put to alternative uses. Man has to exercise choice in distributing these limited resources among unlimited ends on the basis of their importance.

The economic problem is, therefore, essentially a problem arising from the necessity of choice-choice of the manner in which limited resources with alternative uses are disposed off. Scarcity of means to satisfy ends of varying importance is an almost ubiquitous condition of human behaviour. Multiplicity of ends alone or the scarcity of means alone cannot create an economic problem not merely the alternative applicability of scarce means. Prof. Robbins says, "When time and means for achieving ends are limited and capable of alternative application and the ends are capable of being distinguished in order of importance the behaviour necessarily assumes the form of choice. Only then one is confronted with an economic problem."

The Robbinsian concept of economics is more popular these days. It is more scientific. It transcends the narrow boundaries that the materialist definition has laid down.

Robbins' definition of economics is analytical as compared to Marshall's definition which is classificatory. It lays down a maxim which is true for all times and places. But Robbins is not without his critics. Economists like Beveridge, Frasser and Wotton have strongly defended the Marshallian approach. They are of the opinion that the definition given by Robbins lacks the human touch which characterises the definition offered by Marshall. They consider the definition to be too wide because the problem of choice would confront even a solitary savage, whereas economic problems as for example, the problems which emerged during that last two or three decades. These are the problems of economic instability, unemployment, relation between capital and labour and those related to economic development, the scarcity definition to be too narrow for a social study like economics. They also criticise Robbin's definition because it ignores normative or ethical aspect of economics.

But many critics have tried to prove that there is not much difference between the welfare and scarcity definitions of economics. Every economic problem has two aspects, i.e. means of satisfaction (i.e. wealth) with the help of which wants are satisfied, the scarcity definition of economics assigns the pivotal role of the scarcity of resources. But as we know only those commodities are included in wealth which are scarce. So protagonists of this line of thought argue for the inclusion of both welfare and wealth in the study of Economics because the concept of scarcity is implicit in the concept of wealth.

### **(i) (e) Samuelson's Definition**

Paul A, Samuelson has summed up the main characteristics of economic science in his definition of economics. He says, "Economics is the study of how men and society choose with or without the use of money, to employ scarce productive resources which could have alternative uses, to produce various commodities over time and distribute them for consumption now and in the future, among various persons and groups in society."

### **(ii) Scope of Economics or the extent of its Study :-**

By scope of economics we mean the area of its study or the extent of its study. It is essential to know the boundaries of the study of economics for scientific analysis of subject. In the scope of economics. We discuss its boundaries. The famous economist J.M. Keynes in his book 'The Scope and Methods of Economics' has included the following three things under the scope of economics :

- (i) Subject matter of economics
- (ii) Nature of economics
- (iii) Relationship of economics with other subjects.

**Subject Matter of Economics :-** The subject matter of economics has been controversial one. It differs from economist to economist. According to Adam Smith, it is an enquiry into the nature and causes of wealth of nations. The economist like

J.S.Mill, J.B. Say and David Ricardo regarded economics as science which studied wealth. Marshall regarded economics as a social science studying those human activities which are related to material welfare. In Robbins' opinion the problems of choice and valuation are the subject matter of economics.

The scope of economics is very wide. In economics, we study the circular flow of efforts made to satisfy wants and then the resulting satisfaction gained from these efforts.

### **(iii) Is Economics a Science ? Nature of Economics**

We are now to see whether we can do systematic study of economics as a science. In a broad sense we mean by the term science a systematised body of knowledge. A science has three main characteristics :-

1. In science a problem is fully examined and a causal relationship is built between cause and effect. A body of laws formulated in this way is known as science.
2. Every science has its special method of study. The general procedure is that a hypothesis is put up. We then proceed to verify this either by making experiments or by collecting relevant observations.
3. The inference drawn with the help of above mentioned technique is used to make predictions for the future of events.

Thus, we can say that economics is a science. Economics fulfils conditions mentioned above. Laws have been formulated in economics which establish the causal relationship between various variables. For example, the law of demand states that price and demand have inverse relationship with each other, when other things remain unchanged. If the price of a commodity falls, the quantity demanded of that commodity increases and vice - versa.

From this it is clear that change in price is the cause and change in demand is the result of that. Economic generalizations are verified by the help of experience gained in actual life. One can also predict about the future course or events on the basis of knowledge acquired from the study of economics. For example, when the price of a commodity rises we can say that, other things remaining the same, its demand will fall. So on the basis of this discussion we can say that economics is a science.

### **(iii) (a) Is Economics an Art ?**

According to J.N.Keynes, "An art is a system of rules for the attainment of given end". Most of the English economists are of the view that we would not consider economics as an art because if it is treated as an art this shall prove an hindrance in building up its scientific status and then the art of economics too shall be a very imperfect art. According to these economists, the function of economics is simply to explain and explore and not to lay down precepts for attainment of given ends. But in reality the scientific status of economics does not suffer if we consider economics as an art besides science. Rather it would facilitate the task because

every science has an 'art' or the practical side while every art has the theoretical or the scientific side. Thus, economics is both science as well as art.

**(iii) (b) Is Economics a Positive Science or Normative Science ?**

There has been a good deal of controversy on the matter whether economics is a positive science or a normative science. Some economists think that economics is a positive science, since it studies man's economic efforts and establishes causal relationships. These causal relationships are known as economic laws. But economics is also a normative science. In a normative science ends are selected and suggestions are made for policy making. A normative science tells us what ought to be. It puts forth an ideal for human behaviour.

Today the normative aspect of economics has gained importance. Economists are proving very helpful in the choice of policies that can promote economic development and growth.

We have discussed below three possible functions of economics. The first two functions i.e., description and analysis of economic activity and anticipation of future economic problems lie in the field of positive science, while the third function pertaining to suggestion of policies falls in the sphere of a normative science. It becomes quite clear after the discussion of these functions that economics is a positive as well as normative science .

Now we will discuss these points in some detail :

**1. Description and Analysis :** The first function of the economist is to describe and analyse the working of an economic system. He has to study the existing economic system and explain its working. He is to explain the inter dependence between different parts of the system. Thus, an economist has to explore the uniformities in the utilization of scarce resources for the production of wealth and thus formulate laws.

**2. Forecasts :** The economist has to anticipate future economic problems and, if possible enables them to tackle those problems. For example, when the prices are rising and employment is on the increase, the economist is not merely to analyse the problem of boom and inflation ; but also to take care of the situation arising out of hyper-inflation. It is said that economists examine and analyse only past events, they have not yet fared well in forecasting future economic events. So the economists must study the complex economic system, so thoroughly and deeply as to forecast the future events quite correctly.

**3. Suggestion for Policies :** The third function is a controversial matter. Should the economists make value judgements and suggest policies ? There is difference of opinions; Marshall, Pigou and Edgeworth firmly believe that economists should rely in making policy decisions. But Robbins is deadly against this view. According to him, economics is a positive science and role of economists is only

to explore and explain, and not advocate and condemn. An economist only explores the results which are likely to follow if certain policies are adopted.

### **III (iv) Usefulness of the Study of Economics**

The study of economics is considered very useful these days. Economic factors today play a significant role in local, national and international affairs. Economics is the intellectual religion of the day as it provides a technique of rational action. The study of economics enables us to conceive far-reaching implications of alternative economic policies and within our limitations, to act consistently.

The study of any subject, has two objectives. The first objective is to acquire knowledge and the second, to obtain practical guidance for day to day problems. The study of economics serves both of these objectives. In the words of Prof. Marshall "Economics has then as its purpose firstly, to acquire knowledge for its own sake and secondly to throw light on practical issues". He says, "The practical uses of economic studies should never be out of the mind of economist, but his special business is to study and interpret facts and to find out what are the effects of different causes acting singularly and in combination." Thus, there are theoretical as well as practical uses of the study of economics.

An individual acquires knowledge of various topics from the study of economics. He begins to understand low prices of commodities and how factors of production are determined. How trade takes place between different countries, what are the different economic systems etc. ? This knowledge helps him in becoming an intelligent citizen. It sharpens his intellect. Wotton observes, "You cannot be in any sense a citizen unless you are also to some degree an economist."

In fact, all persons faced with the problems created by scarcity of means and multiplicity of wants may gain benefit from the study of economics.

The practical importance of economics is also very great. To the statesman, the knowledge of economics gives a better grasp of political problems that face him. Industrialists, members and leaders of trade also gain from the knowledge of economics as they have better understanding of the industrial relations. Economics helps the businessman. He is equipped with the knowledge of fluctuations in prices, problems of production and marketing, price fixation and advantages of large-scale and small-scale production. This knowledge is of utmost importance to him and proves indispensable for his success in business, Economics helps to understand business trends.

### **IV. Summary**

Human welfare has been direct and primary concern of economics today. Two-third of the world population is suffering from acute poverty which is a great cause. In the backward and under developed countries the major problem is how to remove poverty and unemployment and to raise living standards. These problems can be solved by accelerating economic development. The theory of economic growth provides

the guidelines for-development of economically under developed countries. It is, possibly, this reason which has made economics one of the most important and useful sciences, particularly for a country like India which is struggling hard to remove obstacles in the way of its economic development.

In the present era of economic planning economists are being frequently consulted by planning authorities in order to formulate suitable economic policies. Thus, economics has been of immense help in eradicating and alleviating ills. It is contributing to human welfare.

### **Self-Check Questions and Key Concepts :**

#### **V.(a) Self-Check Questions :**

- (i) The welfare definition of economics was given by .....
- (ii) Is economics a ..... or an .....
- (iii) Is economics a ..... science or a ..... science ?
- (iv) The study of Economics has two objectives. The first is to acquire ..... and the second is to get ..... guidance for daily functions

#### **Answers of Self-Check Questions :**

(i) A. Marshall, (ii) Science, art, (iii) Positive, normative, (iv) knowledge, practical guidance.

#### **V. Key concepts**

- (i) **Economics :** Economics relates to the study of man's efforts to satisfy his unlimited wants by using his scarce (limited) resources. It describes optimum use of the scarce resources to get maximum benefits.
- (ii) **Science :** It is a systematised body of knowledge that studies cause and effect relationship in a process/phenomenon that takes places.
- (iii) **Art :** Art is the practical application of rules of the science and art uses these rules/principles in actual practice in society.
- (iv) **Economics as a Positive Science :** Economics is a positive science as it studies, what is and not related to ethics.
- (v) **Economics as a Normative Science :** Some economists like Marshall, Pigou, Frazer, etc. say that Economics is a normative science as it studies what ought to be and which takes into consideration the value judgements.

#### **VI. Suggested Books**

- (i) H.S.Stonier & D.C. Hague : A Text Book of Economic Theory.
- (ii) H.L. Ahuja : Principles of Micro Economics
- (iii) J.R. Hicks : Value and Capital
- (iv) M.L. Jhingan : Micro Economic Theory

#### **VII. Questions**

- (i) Long-answer type questions

(ii) Short-answer type questions

**(i) Long-answer type questions:**

1. State and criticise Marshall's definition of Economics.
2. Discuss whether economics is a science or an art.

**(ii) Short-answer type questions**

1. What is positive economics ?
2. Write on the optimum use of resources.
3. Any two points on usefulness of economics.
4. Value judgements.

**LAW OF DEMAND, ELASTICITY OF DEMAND AND ITS MEASUREMENT****Structure of the Lesson**

- I. Introduction
- II. Objectives of the Lesson
- III. Subject matter
- IV. Summary
- V. Key concepts
- VI. Suggested Books
- VII. Questions
  - (i) Long-answer type questions
  - (ii) Short-answer type questions

**I. Introduction**

We know that man has a number of wants. In order to satisfy these wants we need goods and services. This need makes us desire for certain commodities. But the mere desire for a commodity does not constitute demand in economics. For example, a man standing at a sweets shop may feel a strong desire for the varieties on display. But if this man has money in his pocket and he is prepared to spend on sweets, his desire becomes demand. Thus, desire turns into **demand** when it is backed by ability and willingness to pay for things that we desire to acquire.

A good is demanded because of the utility it possesses and it is paid for because it is scarce. Demand, therefore, always has a reference to price and it can, thus, be defined as that quantity of a good which is bought at a given price.

Demand plays a very important role in economics. Consumer's demand is the main spring of all economic activities. Producers prefer to invest in those lines of production, the demand for the output of which is not only high, but is also continuous. This ensures them more profits than would otherwise be the case.

**II. Objectives of the Lesson**

- (i) Introduction (To know the meaning of Demand)
- (ii) To know about the Demand Schedule and Demand Curve
- (iii) Law of demand
- (iv) Elasticity of demand

**III. Subject matter****(i) (a) Demand Schedule**

As already mentioned, demand is always at a price. If the price changes, the amount

demanded will also change. This relationship between the two is usually shown in the form of a list or a table known as Demand Schedule which may be defined as a tabulate statement that the consumers are willing to buy per unit of time.

Demand Schedule indicates quantities of commodity demanded at different possible prices assuming that other factors do not change. Since a change in price leads to a change in demand. Demand and price are related, this relationship is often known as the functional relationship.

A hypothetical demand Schedule, given in Table No. 1 indicates a consumer's demand for sugar at various prices.

**Table No. 1**  
**Demand Schedule for Sugar**

Price per Kg. (in Rs.)	Demand (in Kgs.)
14	5
13	9
12	12
11	15

A careful look at this table reveals that the just mentioned relationship between price and demand is of an inverse type, i.e., movements in price and demand are in the opposite direction.

### **(i) (b) Market Demand Schedule**

The demand schedule for the whole market is obtained by adding the quantities demanded by all the prospective buyers in the market. In other words, the market demand in a market may be quite large, but it is often divided for this purpose into a number of categories and demand coming from various categories is aggregated to obtain the market demand at various prices.

Table No. 2 gives an illustration of market demand schedule for oranges.

**TABLE NO. 2**  
**Market Demand Schedule for Oranges**

Price per Orange (in Rs.)	Demand			Total
	A	B	C	
5	100	75	25	200
4	200	150	50	400
3	400	200	100	700
2	550	300	150	1,000
1	800	400	300	1,500

Let us suppose that there are three different categories of consumers. A, B and C in the market, at price of Rs. 5 per orange the market demand is 200 oranges, when price falls to Rs. 4 per orange, the market demand increases to 400 oranges and so on.

**Difficulties in Preparing a Demand Schedule :** It is very difficult to prepare an actual demand schedule. It is not easy to know how much of a commodity a consumer will buy at any particular price. All figures used for this purpose are therefore, imaginary. The problem is all the more complicated in the case of a market demand schedule where the number of consumers is very large. In spite of good guess as to how much people are likely to buy at various prices these figures are often used by businessmen and taxation authorities to take certain important decisions.

### (ii) (a) Demand Curve

A demand schedule can be converted into demand curve. We measure the quantities demanded on the X-axis and the prices on the Y-axis. In case of the example given in Table No. 2 we take the number of oranges on the X-axis and their price, on the Y-axis. We then draw perpendiculars from points indicating quantities demanded as well as from points indicating price. These perpendiculars will intersect at points A, B, C, D and E. These points, when joined by a free hand curve will give us a curve  $DD_1$  known as the demand curve. This curve is also called the price quantity curve because it expresses a relationship between price on the one hand and quantity demanded on the other. This reveals that as the price of oranges falls, the number of oranges demanded goes on increasing. For example, when oranges are sold at Rs. 3 each, the demand is of 700 oranges. When the price falls to Rs. 2 per orange, the demand increases to 1000 oranges.

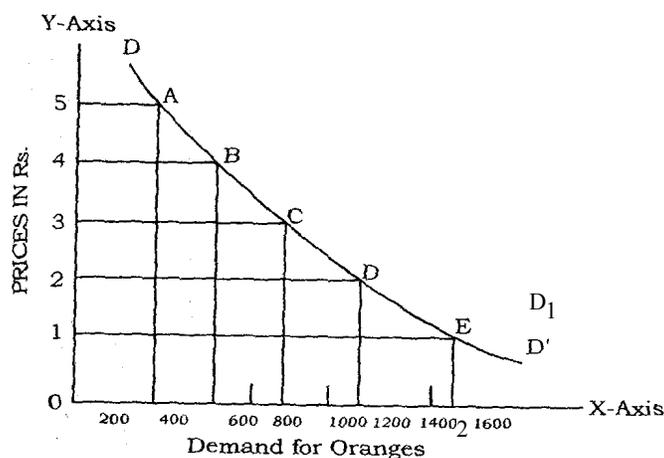


Fig. 1 (B. A. Part-1, Lesson-3)

That is why the demand curve slopes downwards from left to right.

### **(ii) (b) Law of Demand**

The relationship between price and quantity demanded can be expressed in a very general form. We have already noted that more of a commodity is bought at price lower than a given price and vice-versa. The law of demand, therefore, states other things remaining the same, the quantity of a commodity demanded varies inversely with price. In the words of Prof. Marshall "greater the amount to be sold the smaller must be the price at which it is offered in order that it may find purchasers for, in other words, the amount demanded increases with a fall in price and diminishes with a rise in price". The phrase, other things remaining the same, is quite important and it denotes the assumptions that (i) people's tastes and income do not change, (ii) prices of other goods do not change, (iii) there are no substitutes for the commodity in question (iv) people do not expect a further change in the price of the commodity. In reality, however, these assumptions do not always hold and the law consequently fails to hold under those circumstances.

According to this law, as the price of a commodity falls, its demand goes up. This is due to two reasons :

**(i) Income Effect :** The people who used this good before, they demand more of it now since its price has fallen. A fall in the price of a commodity amounts to increase in the consumer's income. For example, if the price of a commodity falls from Rs. 5 to Rs. 3 consumer may have to pay only Rs. 9 to buy 3 units of it instead of Rs. 15 and he will be richer by Rs. 6. In other words, the purchasing power of money increases and with same amount of money which consumers used to spend on this particular commodity, they can buy more of it.

**(ii) Substitution Effect :** When the price of a commodity falls, this means that (other things being equal) it has become cheaper, relatively to other goods. This fall in its price makes it more attractive as against its substitutes whose prices have not fallen. This makes people substitute it in place of other goods.

Out of these two effects substitution effect is stronger because the consumer will always substitute the cheaper commodity for the dearer commodity. Further, whereas substitution effect is always positive the income effect may be positive in some cases and negative in other e.g., in the case of an inferior commodity, the income effect is negative. But since a consumer spends only a small fraction of his income on a particular commodity the income effect is generally very weak and the substitution effect is generally so powerful that the net result is positive.

**Exception to the Law of Demand :** There are some situations where the law of demand does not apply. These are given below :

- (i) When the people expect that the price of a good will rise in future, they will buy more of it even at a higher price for fear of a further rise in its price.

This is what happens during war times, especially in the case of necessities of life.

- (ii) The demand for things, which are symbols of social prestige and which confer a distinction on the holder does not behave according to this law. The demand for such things increases with a rise in their price because such commodities are demanded because of their high price.
- (iii) The demand for the so called inferior goods also provides an exception to this law. According to this law, as the price of a good falls, the quantity demanded increases and vice-versa. But the demand for inferior varieties of good behave in the opposite direction, i.e., a fall in their prices tends to reduce their demand and rise in their prices increase demand for these. For example, poorer sections of a community cannot afford to buy superior varieties of foodgrains like wheat etc. and are hence contented with inferior varieties like maize. Now when the price of maize falls there is an increase in their real income. Consequently, they do not buy more of maize as the law of demand will require. They will begin to demand superior variety to substitute it for maize.
- (iv) When a thing goes out of fashion, demand for it will not go up even if its price goes down. In the opposite case when the fashion for article is growing people will buy more of it even though its price may be rising. In both of these cases the law of demand is violated. These exceptions, however, do not invalidate the law of demand which holds in the case of commodities sold in the market though in certain instances some of the individuals may not act according to this law yet, broadly speaking the law of demand does operate.

**(iii) Factors on which Demand Depends**

We now come to "other things" which were assumed to remain constant, while stating the law of demand. It is, therefore, not only changes in price which bring changes in demand. Changes in other factors can do the same as explained below :

- (a) **Change in Income** : This change exerts a great influence on demand because when a person's income rises, his ability to pay increases and naturally he can buy more of a good than before. Changes in the income distribution in favour of the poorer sections of the community increase purchasing power of these sections and their demand for goods in general and for necessities of life in particular is bound to increase. On the other hand, the demand for costly articles generally purchased by the rich will go down.
- (b) **Change in Size and Composition of Population** : Increase in the

population of a country exerts an important influence on demand because, large the number of persons to be fed, greater will be the quantity of a commodity demanded. The age structure of the population affects not only the size of demand, but also the composition of demand.

- (c) **Change in Tastes and Fashions** : Change in tastes and fashions also affect demand. The growing fashion of wearing cotton cloth has reduced the demand for synthetic cloth. The popularity of coffee these days has reduced the demand for tea. In big cities regular number of people take this in hotels and this has increased demand for hotels. But when thing go out of fashion, demand for these disappears altogether.
- (d) **Technical Progress** : Technical progress makes manufacturing of new and better variety of articles possible and these reduce the demand for articles which go out of date. For example, invention of television reduced the demand for radios.
- (e) **Prices of Substitutes** : Demand for a commodity also depends on the availability and prices of substitutes. A rise in the price of a commodity will make people use more of substitute because this provision is available at a cheaper price. This will reduce the demand for the commodity in question and increase the demand for the substitute. For example, if price of tea rises, people will start taking coffee and demand for coffee will go up. A fall in the price of tea may, on the other hand, reduce demand for coffee.
- (f) **Change in Season** : Demand for certain commodities will change with the change in season. For example, the demand for woollen clothes increase in the winter season. Similarly, fans and cold drinks are in great demand during the summer season.
- (g) **Expectation about Future Prices** : If there is a general feeling among people that price in future will go up, there will be a great demand for the good and everyone will buy more than his normal requirement. If however, price in future is expected to go down people will try to postpone the purchases and would wait for the fall in price.  
This will reduce the present demand for goods to a considerable extent.

## 7. Increase and Decrease in Demand

We have noted about the demand that it depends on price and some other factors like consumer's income, their tastes etc. The influence exerted by price is distinct from the influence exerted by other factors. The law of demand takes into consideration the effect produced by price alone. Therefore, when demand rises due to fall in price, or falls due to rise in price, this is called extension of demand and contraction of demand respectively. It is change in the quantity demanded since we remain on the existing demand curve. Thus, a change in price leads only to

change in the quantity demanded.

When however, factors other than price influence demand, they change the conditions of demand as a result of which more or less is demanded than before at the same price. This is not a change in quantity demanded, but a change in demand itself and it is known as increase or decrease in demand. An increase in demand implies that more of good is demanded at the same price or the same quantity of that good is demanded at a high price. Here we are on a new demand curve which is to the right of the old demand curve. A decrease in demand, means that less of a good is demanded at same price, same quantity of that good is demanded at a lower price. Here too, we are on a new demand curve which is to the left of the old demand curve. Both increase and decrease in demand are shown in Diagram No. 2.

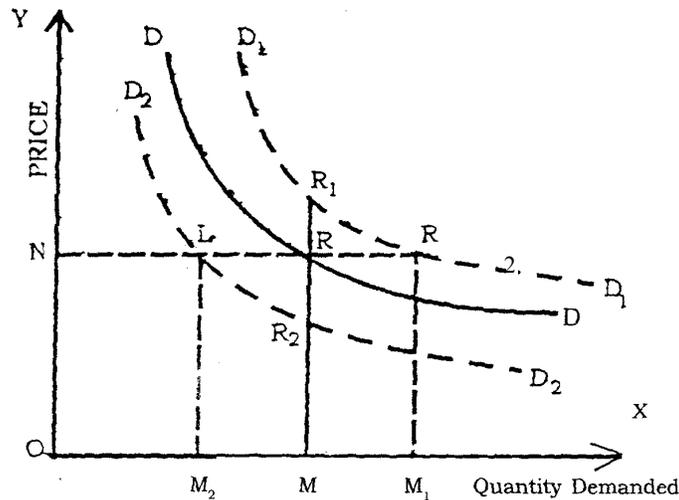


Fig. No. 2 (B.A.-I, Lesson No. 3)

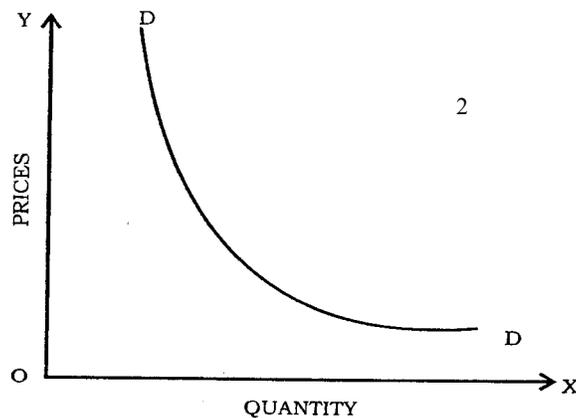
At Price ON (= MR), OM of a good is demanded. Curve  $D_1 D_1$  indicates increase in demand because the same quantity OM, is now demanded at a higher price  $MR_1$  or at the same price MR quantity demanded has increased from OM to  $OM_1$ , Curve  $D_2 D_2$  indicates decrease in demand because the same quantity OM in now demanded at price  $MR_2$  or, at the same price MR, demand has decreased from OM to  $OM_2$ .

Marshall says, when we say that a person's demand for any thing increases we mean that he will buy as much of it as before at a higher price. A general increase in his demand is an increase throughout the whole list of prices at which he is willing to purchase different amounts of it and, or merely that he is willing to buy more of it at the current price.

**(iii) 2 Types of Demand**

The quantity of consumer's goods bought depends on prices of those goods, price of substitutes and consumer's income. Thus, there are three types of demand, price demand, income demand and cross demand.

- (a) **Price Demand** : We have already discussed the relationship between demand and price. Price demand, therefore, refers to those quantities of a commodity which consumers demand at various prices under the assumption that other things remain the same. The law of demand deals with this type of demand and its graph is shown in Fig. No. 3.



**Fig. No. 3 (B.A.-I, Lesson No. 3)**

- (b) **Income Demand** : This refers to those quantities of a good which consumers will buy at different levels of their income under the assumption that prices of the good in question and those of its substitutes will remain the same. Income replaces price. In this case we can prepare an income demand schedule from which an income demand curve can be drawn. Such a curve is shown in figure No. 4(a) and it indicates that as the level of income rises demand for a commodity also increases.

But we know that there are goods (known as inferior goods) the quantity demanded in case of which decreases, as the consumers income increases. The income demand curve for such cases is shown in Figure No. 4b.

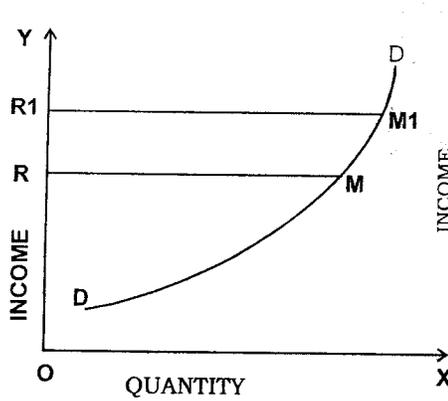


Fig. No. 4 (a)

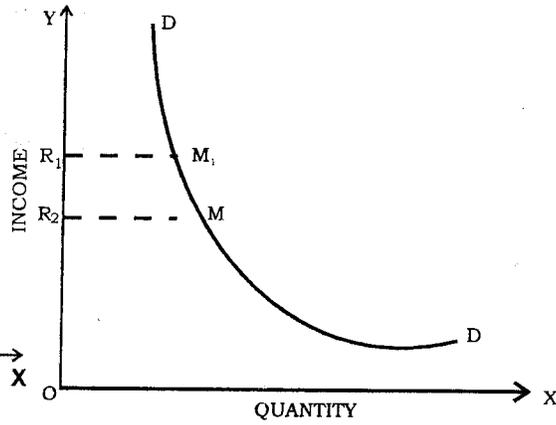
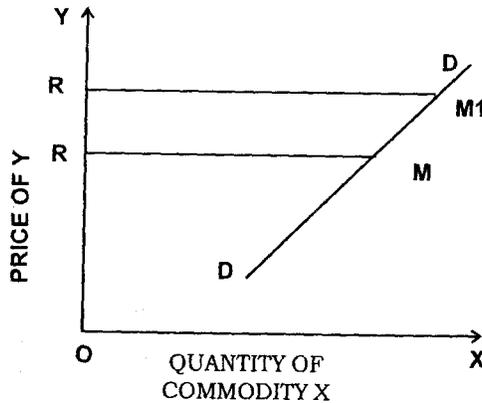


Fig. No. 4 (b)

(B.A. - I, Lesson No. )

**(c) Cross Demand :** Cross demand denotes the different quantities of a commodity which consumers buy at different prices of a related good under the assumption that price of the commodity in question and the level of consumer's income do not undergo a change.

There are certain goods which are either substitutes or complements to other goods. In the case of former, a rise in the price of one good may increase the demand for the other and this case is shown in Figure No. 5



**Fig. No. 5 (B.A.-I, Lesson No. 3)**

Coming to the case of complementary goods we know that these goods are jointly demanded, if the price of good rises, demand for it may go down and consequently demand for the allied good will also go down, this case has been shown in Fig. No. 6

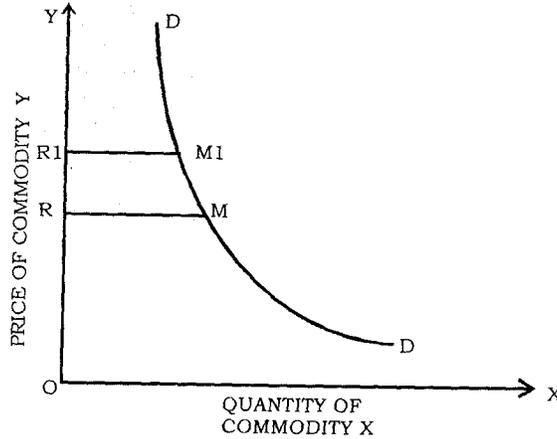


Fig. No. 6 (B.A. - 1, Lesson No. 3)

**(iv) Elasticity of Demand**

**Meaning :** The law of demand reveals the inverse relationship between price and demand and a change in price will, therefore, bring a change in the quantity demanded. The responsiveness of the quantity demanded to changes in price is called elasticity of demand which may be defined as the degree of response to change in price. A.L. Meyers says, “The elasticity of demand is a measure of the relative changes in amount purchased in response to relative changes in price on  $e_p$  given demand curve.” In the case of certain goods the quantity demanded increases more relatively to the fall in its price, but in the case of others, quite a big fall in price does not lead to any material increase in the quantity demanded. The demand for former type of goods is relatively elastic, while that for the later type, relatively inelastic. According to Prof. Marshall, “The elasticity (or responsiveness) of demand in a market is great or small according as the amount demanded increases much or little at a given price, and diminishes much or little for a given rise in price.” It should, however, be remembered that all demands are elastic to some extent and the difference is only of a degree.

$$\text{Price elasticity} = \frac{\text{Proportionate change in quantity demanded}}{\text{Proportionate change in price}}$$

$$E_p = \frac{\frac{\text{Change in quantity demanded}}{\text{Original quantity demanded}}}{\frac{\text{Change in Price}}{\text{Original Price}}}$$

or, in symbolic terms

$$e_p = \frac{\frac{\Delta q}{q}}{\frac{\Delta p}{p}} = \frac{\Delta q}{q} \times \frac{p}{\Delta p} = \frac{\Delta q}{\Delta p} \times \frac{p}{q}$$

Where,  $e_p$  stands for Price Elasticity

$q$  stands for quantity demanded.

$e_i$   $p$  stands for price

$\Delta$  stands for infinitesimal change

We know that the consumer's income and prices of other goods all affect demand for a commodity. The change in the quantity demanded in response to these influences is known as income elasticity and cross elasticity of demand respectively.

**The income elasticity** of demand may be defined as the ratio the proportionate change in the quantity demanded of a good to proportionate change in income.

$$\text{Income elasticity} = \frac{\text{Proportionate change in quantity demanded}}{\text{Proportionate change in income}}$$

$$\text{Change in quantity demanded}$$

$$e_c = \frac{p_y}{p_y} = \frac{\text{Original quantity demanded}}{\frac{\text{Change in income}}{\text{Original income}}}$$

$$\text{i.e.,} = \frac{\frac{\Delta q}{q}}{\frac{\Delta y}{y}} = \frac{\Delta q}{q} \times \frac{y}{\Delta y} = \frac{\Delta q}{\Delta y} \times \frac{y}{q} p_y$$

Where,  $q$  stands for the quantity demand

$y$  stands for income

$\Delta$  stands for infinitesimal change

$e_i$  stands for income elasticity of demand

**The cross elasticity** of demand measures the degree of change in demand for one good in response to the change in price of related good.

$$\text{cross elasticity of demand of x and y} = \frac{\text{Proportionate change in quantity of demanded of X}}{\text{Proportionate change in the price of good Y}}$$

$$\text{or} \quad \frac{\frac{\Delta q_x}{q_x}}{\frac{\Delta p_y}{p_y}} = \frac{\Delta q_x}{q_x} \cdot \frac{p_y}{\Delta p_y}$$

$$e_c = \frac{\Delta q_x}{\Delta p_y} \times \frac{p_y}{q_x}$$

Where  $e_c$  stands for cross elasticity of demand of x and y

$q_x$  means original quantity demand of x.

$\Delta q_x$  stands for change in quantity demand of x.

$p_y$  stands for the original price of good y.

$\Delta p_y$  stands for a small change in the price of y.

We have discussed above three main types of elasticity of demand. In the rest of this lesson, however, we confine ourselves only to price elasticity of demand.

**Five Degrees of Elasticity of Demand :** Goods differ so far as the change in the quantity demanded consequently from a change in price is concerned. In some of the cases, this response is negligible whereas in other, it is considerable. Elasticity of demand therefore varies between zero and infinity.<sup>2)</sup> But the five well known categories are mentioned below.

- (i) **Perfectly Elastic Demand :** The demand for a commodity is said to be perfectly elastic when at the same price consumers will buy all that they can obtain of the commodity, while at even slightly higher price they will buy nothing at all. The demand curve in this case is parallel to the X axis as is shown in Figure No. 7

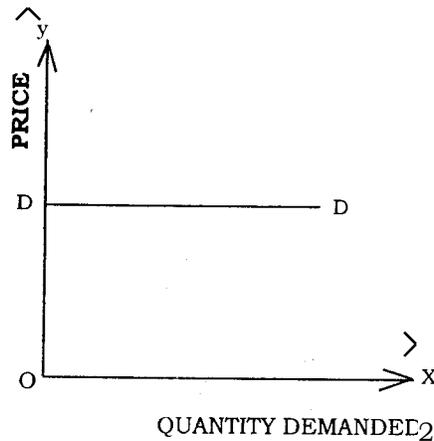


Fig. No. 7 (B.A. - I, Lesson No. 3)

- (ii) **Perfectly Inelastic Demand :** When a sharp rise or considerable fall in price is not followed by any change in the quantity demanded, the demand is said to be perfectly inelastic. The demand curve in the case is a vertical straight line parallel to the Y axis as shown in Fig. No. 8.

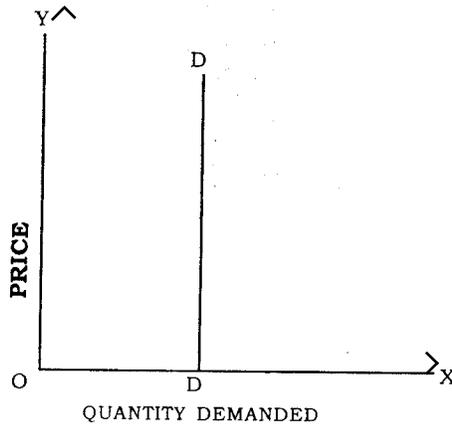


Fig. No. 8 (B.A. - 1, Lesson 2 o. 3)

- (iii) **Demand with Elasticity Greater than Unity** : When the percentage change in quantity demanded is greater than the percentage change in price, elasticity of demand is said to be greater than one. For example, the demand for radios and fans rises considerably in response to a small fall in their price. Fig. No. 9 illustrates this case.

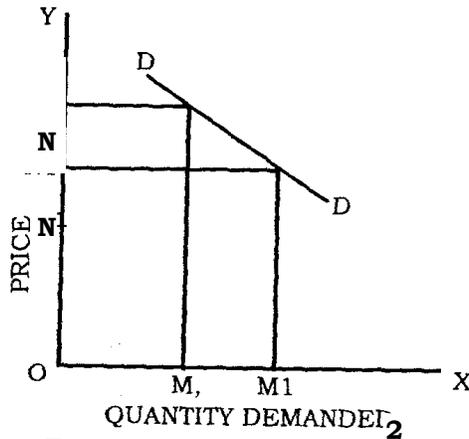


Fig. No. 9 (B.A.I, Lesson No. 3)

- (iv) **Demand with Elasticity Less than Unity** : When the percentage change in the quantity demanded is less than the percentage change in price, elasticity of demand is said to be less than unity. Most of the necessities of life belong to this category of goods. Fig. No. 10 illustrates this case.

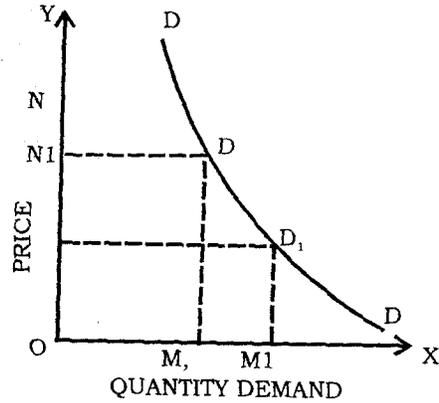


Fig. No. 1C A. I, Lesson No. 3)2

- (v) **Demand with Elasticity Equal to Unity** : When the percentage change in quantity demanded is equal to the percentage change in price, elasticity of demand is said to be equal to unity. For example, if the price of the commodity doubles and its quantity demanded is reduced to one half of that previously demanded, the elasticity of demand is equal to unity. Fig. No. 11 illustrates this case.

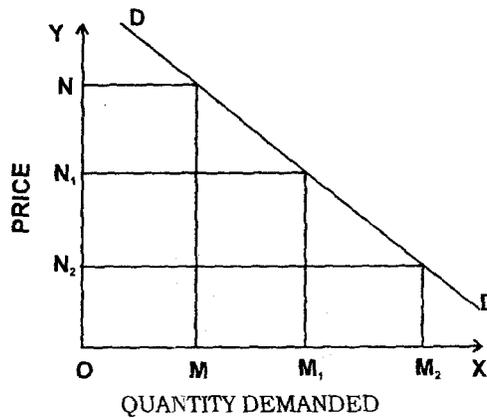


Fig No. 11 P. I. (B.A. I, lesson No. 3)

**(v) Measurement of Elasticity of Demand**

Elasticity of demand can be measured in various ways. The following methods are very commonly used :

- (a) Total outlay Method
- (b) Percentage Method

(c) Point Method

**(a) Total Outlay Method :** It was first introduced by Marshall in his book '*Principles of Economics*'. According to Marshall, if a fall in price results in an increase in total outlay and a rise in price results in a fall in total outlay, the elasticity of demand is more than unity. If after a fall or rise in price, the total outlay remains constant the elasticity of demand is equal to unity. If a rise in price results in increased outlay and fall in price results in decreased outlay, the elasticity of demand is, less than unity. This can be explained with the help of Table-3

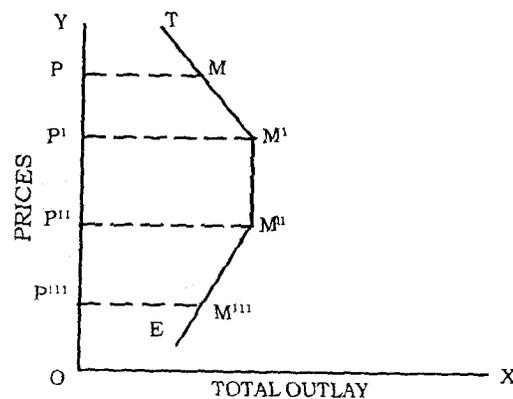
**TABLE NO. 3.**

Sr. No.	Price (Per Kgs) in (Rs.)	Demand (Kgs.)	Total outlay (In Rs.)
1	1.00	4	4.00
2	0.75	6	4.50
3	0.50	9	4.50
4	0.30	12	3.60

Fig. No. 12 (B.A.-I, Lesson No. 2)

The above table consists of four columns. The first column shows serial number, the second shows the price per kg. of a commodity and the third column quantity demanded. By multiplying the price with the corresponding quantity demanded, we get outlay as shown in column No. 4. Demand between serial no. 1 and 2 has elasticity more than unity, between serial no. 2 and 3 demanded has unity elasticity and between serial no. 3 and 4 elasticity is less than unity.

This can be illustrated by means of diagram. The curve TE in Fig. No. 12 shows total outlay at various prices.



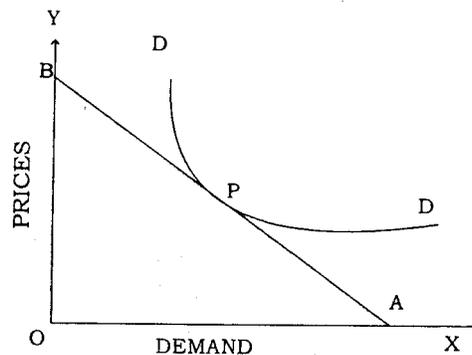
**Fig. NO. 12 (B.A. - I, Lesson No. 3)**

At price OP, the outlay is PM. When price falls from OP to  $OP^1$  the total outlay increases from PM to  $P^1M^1$  and elasticity of demand is more than unity. Similarly, when price falls to  $OP^{11}$  total outlay is  $P^{11}M^{11}$  which is the same as  $P^1M^1$ . Here the elasticity of demand is equal to unity. When the price falls  $OP^{11}$  to  $OP^{111}$  total outlay falls from  $P^{11}M^{11}$  to  $P^{111}M^{111}$ . Here the elasticity of demand is less than unity.

**(b) Percentage Method :** The second method measures elasticity by dividing the percentage change in quantity demanded by the percentage change in price. Here the elasticity of demand is equal to percentage change in quantity demanded divided by percentage change in price.

According to Marshall, if a given proportionate fall or rise in price causes an equal proportionate rise or fall in the quantity demanded the elasticity of demand is equal to unity. In other words, if 1% fall or rise in price leads to 1% rise or fall in the quantity demanded, elasticity of demand is equal to unity, 1% fall or rise in price leads to less than 1% rise or fall in demand, elasticity is less than unity. Thus, elasticity is the ratio of the percentage change in the quantity demanded or the percentage change in the price charged.

**(c) Point Method :** (or Geometric method) Since the degree of elasticity of demand may vary on different parts of demand curve, we are sometimes interested in measuring elasticity of demand at a particular point.



**Figure No. 13 (B.A. - I, Lesson No. 3)**

Figure No. 13 shows how to measure this elasticity, P is any point on demand curve DD. A tangent is drawn to this curve at P and this tangent cuts X axis at A and Y axis at B. The elasticity of demand at P is given by the ratio PA/PB. Since PA is longer than PB, elasticity of demand at P is greater than one. The following formula is used for measuring elasticity of demand at a point.

$$ED = \frac{\text{Length of lower section of tangent at a point}}{\text{Length of upper section of tangent at that point}}$$

**(vi) Factors Affecting Elasticity of Demand**

We have seen that elasticity of demand is different for different goods. This is because of following reasons :

- (a) In general, the demand for necessities of life (e.g., food, cloth etc.), is inelastic and the demand for luxury goods is elastic. This is because consumption of certain minimum of these necessities is indispensable for human existence. However, high the price of these goods may be, nobody can survive without these. But on the other hand, demand for luxuries can be cut short if their prices rise above a certain level. A necessity does not necessarily mean a necessity of life. If a person gets accustomed to the consumption of a thing it becomes an indispensable part of his consumption pattern and consequently his demand for it becomes inelastic. The elasticity of demand of wine for an addict is less than unity.
- (b) Elasticity of demand also depends upon the number of alternatives used to which a thing can be put. If a good has several uses its demand will be elastic. For example, coal can be used in workshops, railway, factories and domestic purposes. If the price of coal falls, it will begin to be used where before the fall in price it was not worthwhile to use. Goods which have specific use have inelastic demand.
- (c) The goods having substitutes, have elastic demand. For example, if the price of coffee rises, people will turn to tea and demand for coffee will fall to a large extent.
- (d) The elasticity of demand for a particular good also depends upon the possibility of the postponement of its use. Goods, the demand for which can be postponed have elastic demand. The demand for those commodities, consumption of which cannot be postponed is inelastic.
- (e) The elasticity of demand depends on the prevailing level of prices. If the price of a good is very high, the amount of demand will not increase much in response to any small fall in its price. A very steep fall in price will be required to increase demand. If the price of a good is very low, further, fall may not lead to any appreciable increase in demand because most of the people must have already bought of it. When the prices are already too high or too low, a small change in them will not affect the demand much. Thus, the demand is inelastic when the price is too high, or too low, but elastic in the middle range of price.
- (f) Elasticity of demand also depends upon the proportion of consumer's income spent on the commodity in question. If a consumer spends

only a very small proportion of his income on a particular good, the quantity demanded will not change due to change in its price. In other words, the demand for such things is inelastic.

- (g) Standard of living of the people is another factor which determines the elasticity of demand. We know that rich people are less affected by change in price. It can, thus, be said that elasticity of demand for a commodity is usually low in that part of country where standard of living of the people is high as compared to the part which may be inhabited by the people with low standard of living.

### **(vii) Importance of Elasticity of Demand**

The concept of elasticity of demand has a great significance in economics as discussed below:

- (i) The producers under imperfect competition and monopolistic competition are both guided by elasticity of demand for their products while fixing their prices. In case the demand for a commodity is inelastic, a monopolist can fix a high price for it because in such cases, he is almost sure about the sale of his product. Again it is the knowledge about the elasticity of demand for his product in different markets that helps a monopolist in practising price discrimination.
- (ii) The concept is very useful to the government in framing its taxation policies. If the government wants to increase its income from indirect taxes, these taxes should be imposed only on those goods which have inelastic demand.
- (iii) Elasticity of demand determines the extent to which a particular factor of production can get its remuneration raised. For example, if in the construction industry demand for a particular type of labour is inelastic, it can be paid higher wages as compared to those paid to other categories.
- (iv) The concept plays an important, role in the determination of terms of trade between the two countries when international trade is going on. Terms of trade will move in favour of that country whose demand for the product of the other is comparatively more elastic.

### **IV. Summary**

In this chapter law of demand, types of demand, demand curve, exceptions to the law of demand and factors on which demand depends have been explained. Similarly, elasticity of demand, its types, measurement and importance has clearly been made understandable. The knowledge of demand and its elasticity is very useful for individual and the government to formulate the appropriate policies for development and welfare of the individuals.

**V. Key Concepts :**

**(i) Law of demand :** When the price of a commodity increases, the quantity demanded of the commodity would fall and vice-versa provided the prices of other related commodities and tastes of the consumer remain the same.

**(ii) Elasticity of demand :** It shows the proportionate (degree) of change in the quantity demanded of a commodity due to proportionate (relative) change in the price of the commodity.

**(iii) Income Elasticity of demand :** It is taken as the ratio for the proportionate change in the quantity demanded of a good to proportionate change in income.

**VI. Suggested Books**

- (i) M.L. Jhingan : Microeconomic Theory
- (ii) J.R. Hicks : Value and Capital
- (iii) Y.C. Halan : Advanced Economic Theory
- (iv) H.L. Ahuja : Principles of Micro Economics

**VII. Questions****(i) Long-answer type questions**

- (a) What do you mean by demand? Explain the law of demand.
- (b) Explain the different methods of measuring the elasticity of demand.

**(ii) Short-answer type questions**

- (a) What is income elasticity of demand?
- (b) Write any four factors that affect the elasticity of demand.

**INDIVIDUAL CONSUMER'S DEMAND - MARGINAL  
UTILITY ANALYSIS****Structure of the Lesson**

- I. Introduction
- II. Objectives of the Lesson
- III. Subject matter
- IV. Summary
- V. Key concepts
- VI. Suggested Books
- VII. Questions
  - (i) Long-answer type questions
  - (ii) Short-answer type questions

**I. Introduction**

An individual consumer has to satisfy his numerous wants. He goes to the market and makes a number of purchases of goods and services which he needs. He purchases them at various prices which rule in the market on a particular day. Like him many more consumers do the same. Thus, they create either separately, the individual demand or collectively, the market demand for various goods. We are mainly concerned here with demand for good which possess some power to satisfy human wants. We are to inquire into the economic tools namely the marginal utility analysis and the indifference curves analysis, which help us in a better understanding of the meaning and nature of demand, consumer's equilibrium with regard to the purchase of various goods and the maximisation of satisfaction which he strives for. But here we will deal with only the former technique, that is marginal utility analysis and use it for analysing the problems of a consumer's demand in the market. The tool of indifference curves will be explained in the next lesson.

**II. Objectives**

- (i) To know about the concept of utility.
- (ii) To know about the laws of diminishing marginal utility and of equi-marginal utility.
- (iii) To show the consumer's equilibrium by using utility.
- (iv) Critical evaluation of utility analysis.

**III. Subject-matter**

Since we are already familiar with the basic concepts of demand, individual and

market, and the respective demand schedules, we propose to deal with the topic hereafter in the following manner :

- (i) The meaning of utility and the concepts of marginal utility, average utility and total utility.
- (ii) The law of diminishing marginal utility and the law of equi-marginal utility and also the relationship between the law of diminishing marginal utility and the law of demand.
- (iii) The individual consumer's equilibrium with the help of utility analysis in the case of :
  - (a) Single commodity, and
  - (b) Two or more than two commodities
- (iv) Assumptions of the utility analysis.
- (v) Shortcomings of the utility analysis.

### (i) Meaning of Utility

The term utility is not to be confused with either satisfaction or usefulness. **Satisfaction** precisely speaking, is the state of mind of consumer soon after the act of consumption. Similarly, the **usefulness** gives the idea of whether the consumption or use of good is good or bad from the point of the consumer. In economic terminology, **utility** means the power possessed by a good to satisfy a human want. Whether it satisfies a good or a bad want, it has nothing to do with the definition itself.

It will be appropriate to mention here that utility in a commodity is often added or created through the act of (i) changing the form of a good, (ii) changing the place of a good and (iii) carrying the good over a different period. All these acts add to the utility of a good if it is not already there.

**Average, Marginal and Total Utility :** Average Utility and Total Utility can be better illustrated with the help of the table given below :

**TABLE NO. 1.**

No. of Units	Marginal Utility (MU)	Total Utility (TU)	Average Utility (AU)
1	-	20	20
2	15	35	17.5
3	10	45	15
4	7	52	13
5	3	55	11
6	0	55	9.1
7	-5	50	7.1

**NOTE :** Assumption of the table is that utility can be measured.

A consumer has the above mentioned schedule of utility from the various units of the goods consumed. His marginal utility will be given to the last until where the consumer stops the consumption. Let us suppose he stops at the 5th unit, it will be 3. This is clearly shown by the table, thus, we are in a position to define the term marginal utility. It is defined as the utility derived from the last unit of a commodity consumed. If total utility from the various units is given, the marginal utility can be easily calculated, i.e., total utility from 5 units minus the total utility from 4 units (say  $55-52=3$ ). It simply means the addition to the total utility by the consumption of one more unit. Algebraically, it can be written like this :

**Marginal utility = Total utility of n units - Total utility of (n-1) units.**

It may be pointed out that as the marginal consumption shifts, the marginal utility changes. Thus, the marginal utility is variable, as is clear from the Table No. 1. The concept of total utility is very simple. It means the sum total of the utility derived from the various units consumed. In other words, the sum total of the marginal utility will give us the total utility. For example, the total utility from 5 units is 55. Total utility varies according to the marginal utility. Since marginal utility diminishes in accordance with the law of diminishing marginal utility, total utility increases but at a diminishing rate. It is, in fact, the marginal utility that determines the shape and slope of total utility curve. This is clear from Figure No.1. The average utility is derived by dividing the total utility by the number of units consumed. For example, if the consumer stops at the fifth unit, the total utility is 55 and hence average utility will be 11. It may be pointed out that the average utility will increase or decrease as and when the marginal utility increases or decreases. This point is again illustrated with the help of Fig. I.

Certain important points in Fig. No. 1 may be stressed. These points are :

- (i) Total utility curve is a rising one, though rising at a diminishing rate. It starts falling only when the marginal utility is negative, that is, when the 6th unit is consumed.

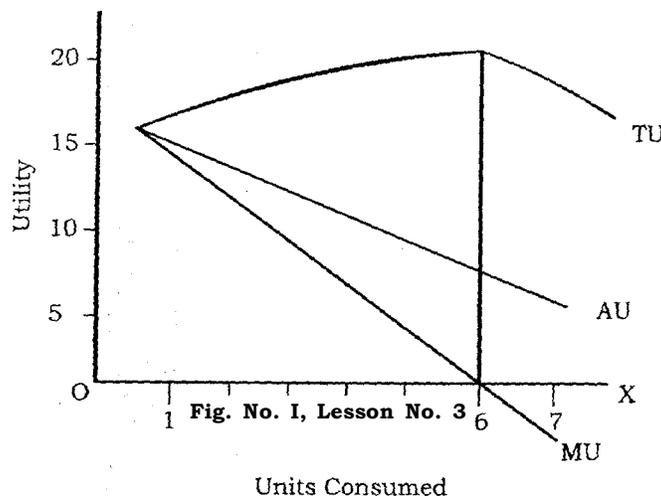
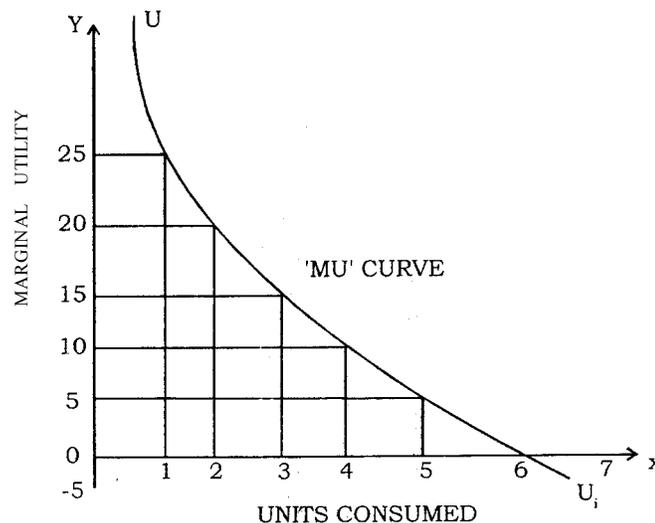


Fig No. 1 (B.A. - I F. 4)

- (ii) Marginal utility falls, though at an uneven rate. It could be negative as shown in the diagram.
- (iii) Average utility also falls in sympathy with the marginal utility. But average utility remains above the marginal utility.

### (ii) (a) The Law of Diminishing Marginal Utility

Let us now explain a fundamental law of economics. This law is called the law of diminishing marginal utility. The law simply states that when a person has more of a certain thing, his keenness to have still more of that decreases. His urge for the successive units of the same good diminishes with every increase of his stock of a thing, he already has. This is simply a common experience. The statement of the law can be explained with the help of utility schedule and Table No. 1. The marginal utility goes on falling as successive units are consumed. The marginal utility decreases from 20 to 15, falling then to 10 and so on for the additional units. If units are consumed up to the 6th or 7th unit the marginal utility may become even zero or negative, as is evident from the Table No. 1. The law can be illustrated with the help of the following diagram :



**Fig. No. 2 (B.A. - 1, Lesson No. 3.)**

Units of the commodity consumed are measured along X-axis and units of utility along Y-axis. The marginal utility curve is falling from left to right indicating the fact that, as we consume more of a commodity, the marginal utility for it goes on diminishing.

Like all economic principles, the law of diminishing marginal utility is also hypothetical in nature. It is based on the following assumptions :

- (i) Normal behaviour on the part of consumer.
- (ii) No time interval between the consumption of successive units.

- (iii) Standard sized units rather than very small ones.
- (iv) Units of uniform quality and
- (v) Limited means at the disposal of the consumer.

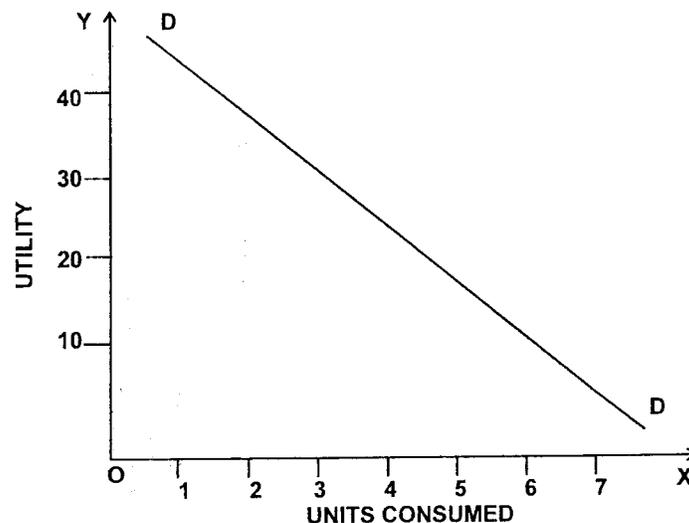
Though this law may not operate under certain exceptional circumstances such as in the case of rare articles or hobbies, yet it is almost universal in nature. It applies to all commodities including even money.

### (iii) Relationship between the Law of Diminishing Marginal Utility and the Law of Demand.

We know the law of demand states that more of a good will be demanded at lower price and less of the same good will be demanded at a higher price, other things remaining the same. It may be recollected for our benefit that other things refer to factors such as the size of income, the size of population and its composition, weather and seasonal changes, supply of money and its velocity of circulation and also the prices of others goods.

In accordance with this law, the demand curve slopes downward from the left to right. Under certain exceptional circumstances, namely in the case of shortages, and scarcities etc. the demand curve may slope upwards from left to right.

Why does the demand curve slope downward is shown in the Fig. No. 3.



**Fig. NO. 3 (B.A.-I, Lesson No.3)**

There are specific reasons for the slope. These are as follows :

- (i) Units which give a consumer less utility are bought only when the price falls. Since a consumer always weighs the marginal significance (M.U.) of a unit in terms of price paid for it; units yielding less utility will be bought only when the price falls.

- (ii) Similarly, when the price of a good falls, it becomes comparatively cheaper. The buyer purchases it in greater quantities in place of other goods. A substitution effect takes place. (More of it, will be discussed later on).
- (iii) In the case of market demand curve, besides these reasons, poorer class of buyers enter the market when the price of a good falls. Hence the conclusion is that utility in the background influences the total demand of an individual consumer and in the same way the market demand.

### **(iii)(1) Individual Consumer's Equilibrium with the help of Utility Analysis**

We know that a consumer buys more of a thing at a lower price and less of the same thing at a higher price, other things remaining the same. But now the question is : given a price of a good, the price of other goods and the size of the income at his disposal, up to what extent a consumer will make his purchases ? When will he be in equilibrium ? All of these we are to explain with the help of utility analysis. Before taking up the analysis of the consumer's equilibrium, it may be useful to explain the term **equilibrium**. By equilibrium of the consumer we mean such a position of the consumer reached after spending his income on a single good or two goods, that he does not feel the need for rearranging his pattern of consumption expenditure, for he feels that he has maximized his satisfaction from the goods purchased. With this simple meaning in our mind we approach the problems of consumer's equilibrium in the following manner :

- (a) Consumer's equilibrium in a single commodity case with the help of utility analysis.
- (b) Consumer's equilibrium in a two commodity case with utility analysis.

#### **(iii)(a) Consumer's Equilibrium: Single Commodity Case**

We approach the problem with the following assumptions-:

- (i) Limited income at the disposal of the consumer.
- (ii) Price of the good is given.
- (iii) Prices of other goods are given.
- (iv) Rational behaviour on the part of the consumer ; and
- (v) Apparatus of utility is given.

Under the set of these assumptions, a consumer will spend his income on the commodity in such a way that at the margin when the consumer stops the purchase of goods under reference the utility derived from the good is just equal to the disutility of the money spent (price paid) on the acquisition of the unit of the good i.e., utility derived from the last unit. Only when this condition is fulfilled, the consumer maximizes satisfaction, he feels that he is in equilibrium. This can be illustrated with the help of the table given below :

TABLE No. 2

Units purchased	Units of utility	Price per unit (in Rupee)
1	20	5
2	15	5
3	10	5
4	5	5
5	3	5

**Assumptions:** (i) Let us suppose that one unit of utility is equal to Re 1.

(ii) Price remains the same, market being perfectly competitive.

The consumer under these circumstances will buy up to the 4th unit, as this will equate marginal utility, which is 5 at the price of Rs. 5 per unit. This will ensure the consumer the maximum satisfaction. Now alternative rearrangement will give the same amount of total utility. Let us suppose he buys the 5th unit. His marginal utility being 3 and price being Rs. 5, he will lose more of money that warranted by the marginal utility of the commodity. The position will equally be so if the consumer buys only 3 units (Please draw the diagram based on the law of diminishing marginal utility. The only addition to be made therein is drawing a horizontal line indicating the price).

### (iii)(b) Consumer' Equilibrium : Two-Commodity Case

With the same set of assumptions as mentioned above in case (a) a consumer will spend his income on two or more than two commodities in such a way as will equalise the marginal utility obtained from the various commodities. In simple words, a consumer will stop the purchase of various commodities when the marginal utility obtained from commodity by spending the last unit of money on it is the same in all cases. The following table clarifies this point further.

TABLE No. 3

Units of money Spent (Rs.)	Marginal Utility of Commodity A	Marginal utility of Commodity B
1	40	30
2	32	23
3	24	16
4	16	10
5	10	5
6	9	4
7	3	2

Assumptions : The following are the assumptions underlying the Table :

- (i) Size of income is limited to Rs. 7.
- (ii) There are only two commodities.
- (iii) Law of diminishing marginal utility holds.
- (iv) Price of both the commodities is Re. 1 per unit.

It is evident from the table that out of Rs. 7, the consumer will spend four rupees on A and three rupees on B. This arrangement of expenditure will equalise the M.U. from both commodities. According to the law of maximum satisfaction, this will ensure him the maximum satisfaction, say 181 units of utility. This is an ideal pattern of consumption expenditure and the consumer will not shift from this position of equilibrium. Any other arrangement of his expenditure will reduce his total utility. Suppose he spend rupees five on A and rupees two on B, then the marginal utility from A is 10 and from B is 23 and the two are not equal.

The equilibrium position of the consumer can be expressed more precisely and exactly in another way as was done by Prof. K. Boulding. A consumer will maximize his utility satisfaction if he distributes his expenditure on the purchase of various goods in such a way that he will equalise the weighted marginal utilities of the commodities bought. In mathematical term, the maximum satisfaction is obtained when

$$\frac{\text{M.U. of A}}{\text{Price of A}} = \frac{\text{M.U. of B}}{\text{Price of B}} = \frac{\text{M.U. of C}}{\text{Price of C}} \text{ and so on}$$

The term marginal utility of A divided by price of A is called weighted marginal utility of A. With the help of data given in Table 4 below, we can easily calculate the total satisfaction and so determine the consumer's equilibrium position.

**TABLE No. 4**

<b>Units of Goods Purchased</b>	<b>M.U. of A</b>	<b>M.U. of B</b>
1	50	30
2	35	22
3	22	16
4	14	11
5	8	6

The assumptions of the table are :

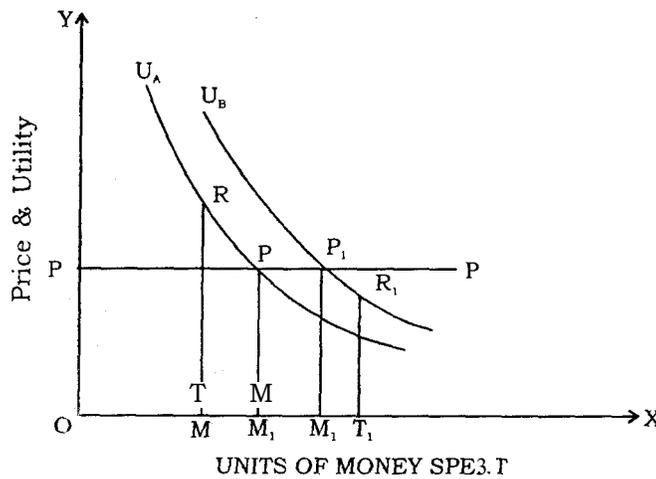
- (i) Size of income is Rs. 20.
- (ii) Price of A is Rs. 4 per unit and that of B is Rs. 4 per unit.

It is clear from the table that the consumer will spend Rs. 12 on A and Rs. 8 on B. The arrangement will equalize his weighted marginal utility from A and B and,

thus, give him the maximum satisfaction. Any other arrangement, say Rs. 2 on A will not ensure him the same satisfaction as his weighted marginal utilities would not be equal. He is not in the equilibrium position.

$$\frac{\text{M.U. of A}}{\text{Price of A}} = \frac{\text{M.U. of B}}{\text{Price of B}}$$

the equilibrium position will be attained



**Fig No. 4 (B.A. I, Lesson No. 4)**

The consumer's equilibrium can be illustrated with the help of Fig. 4. The consumer spends OM and OM<sub>1</sub> unit of money on A & B commodities, when the utility curves U<sub>A</sub> and U<sub>B</sub> of both the commodities respectively are given. This arrangement equalises the marginal utility of A (PM) and marginal utility of B (P<sub>1</sub>M<sub>1</sub>) giving, thus, the maximum satisfaction to the consumer. This is the position of equilibrium. Now let us suppose that he spends OT and OT<sub>1</sub> units of money on A and B respectively. Now the marginal utility of A and marginal utility of B are RT and R<sub>1</sub>T<sub>1</sub> respectively, both are not equal, resulting in reducing the total satisfaction. The addition (P<sub>1</sub>R<sub>1</sub>T<sub>1</sub>M<sub>1</sub>) to total satisfaction is comparatively less than the low (PRTM) to total satisfaction. (Diagram is sketched in accordance with Table No. 4).

Thus, from the above discussion we can easily conclude as to what quantities of commodities a consumer will buy given the size of his income, price of the goods and his rational behaviour etc. With the help of the utility apparatus we have been able to chalk out his demand for a commodity at a certain price, variation in his demand because of a change in price and also his pattern of expenditure on various goods he buys and the resultant demands for various goods. The basis of all this discussion was the utility approach.

Let us examine the assumptions of marginal utility analysis :

**III(iv) Assumptions of the Marginal Utility Analysis**

As pointed out above, the utility approach provides frame work for the analysis of the consumer's demand and his equilibrium in regard to his purchase in a given set of circumstances: The assumptions, enunciated from time to time by various advocates of the utility approach are as follows :-

- (i) The utility (or satisfaction), though subjective, is yet measurable. As a result all concepts such as marginal utility, average utility and total utility could be measured, though not very precisely.
- (ii) The utility system is cardinal in nature. The utility from the various units can be summed up and total utility calculated. Thus, total satisfaction can be found out.
- (iii) The utility of the infra-marginal units (units before the marginal units) is something absolute and fixed. It is not subject to variation if additional stock of the good is acquired. (See in Table 2, the utility of 1st, 2nd, 3rd and 4th units does not undergo any change when more units are being purchased).
- (iv) The marginal utility of money (income) is assumed to be constant. Advocates of utility approach, particularly Dr. Marshall ignored the variation in the stock of utility of money caused due to variation in the stock of money.
- (v) Certain important factors which effect consumer's demand and his equilibrium are assumed to be constant i.e., the size of income, the price of other related goods and the tastes and likings of the people. Thus, the entire analysis with the above mentioned assumptions, makes the approach rather static in nature in scope of its operations. The analysis fails to answer many questions posed by economists like Prof. J.R Hicks, Prof. Samuelson etc. It fails also to provide solution to many vexing problems. Therefore, let us examine the short comings of utility analysis.

**III.(v) Short Comings (Criticism) of Marginal Utility Analysis**

We need not layout this point that the marginal utility analysis suffers from many drawbacks. It is recognised by all that its theoretical validity as an economic tool for analysing the problem relating to demand is limited. It is replaced by the tool of indifference curves and revealed preference theory etc. which are being consistently advocated by the modern economists. It is no exaggeration to say that the latter tool has already been constantly used by the new generation of economists in the analysis of demand theory.

The marginal utility analysis suffers from the following drawbacks

- (i) Marginal utility being something subjective and relative, cannot be measured. Therefore, the concepts of marginal utility, average utility

and total utility suffer badly in their scientific and precise calculation. As a result, the analysis based on these concepts suffers from similar limitations.

- (ii) Since utility can neither be measured nor added, the concept of maximum satisfaction cannot operationally be sound and scientific. Additive or cardinal nature of the utility system has, therefore, to be discarded.
- (iii) The objection is also taken to the assumption of constancy in the matter of utility of the intra-marginal units. The utility of these units is subject to variation when additional stock is acquired, a process of continued evaluation of utility of these units must be there. This is such a change which will jeopardize the whole system.
- (iv) Prof. Hicks and others also take strong exception to the assumption on constancy of marginal utility of money. The law of diminishing utility applies as much to money as it does to other commodities. Therefore, while calculating the maximum satisfaction obtained by the consumer, the variation in the utility of money should be taken into consideration. Unfortunately, the utility analysis ignores this fundamental point.
- (v) The utility analysis does not provide an approach to the demand theory but this approach is only partial. The law of demand is stated under static conditions. Prices of the related goods and size of income are assumed to be constant. Hence the analysis suffers badly in not treating the demand problem dynamically.
- (vi) The utility analysis also fails to underline, the precise relationship between price and demand. It only talks about the price effect i.e., the effect of change in price on demand, a simple and direct effect. It does not go deep into the factors bringing about this effect. It does not spotlight the income-effect and substitution effect which alter the demand as a result of a change in price.

#### **IV. Summary**

In this lesson, consumer's demand has been estimated with the help of utility analysis in case of single commodity and also two commodities, besides assumptions & shortcomings have been discussed. The utility analysis was the first systematic attempt to know the consumer's demand in a market at any given time. The importance of this analysis cannot be underestimated, though some new theories to know demand level of a commodity have been introduced.

#### **V. Key Concepts :**

**(i) Diminishing Marginal Utility :** When amount of a particular commodity increases with a person, his willingness to have more of the commodity decreases.

**(ii) Consumer's Equilibrium :** It is a situation where a consumer gets maximum satisfaction and does not prefer either to increase his expenditure on the given commodity to purchase more or to decrease his expenditure to buy less of the commodity.

**(iii) Utility :** It is the power of a good that satisfies a particular want of a person.

#### **VI. Suggested Books**

- (i) H.L. Ahuja : Principles of Micro Economics
- (ii) M.L. Jhingan : Micro Economic Theory
- (iii) J.R. Hicks : Value and Capital

#### **VII. Questions**

##### **(i) Long-answer type questions**

- (a) Describe consumer's equilibrium with the help of marginal utility analysis in case of two commodities.
- (b) Explain the assumptions and limitations of marginal utility analysis.

##### **(ii) Short-answer type questions**

- (a) What is utility ?
- (b) Why constant utility of money is assumed ?
- (c) Can utility be measured ?

**INDIVIDUAL CONSUMER'S DEMAND : INDIFFERENCE  
CURVE ANALYSIS****Structure of the Lesson :**

- I. Introduction
- II. Objectives of the Lesson
- III. Indifference Curves
  - A. Concept of Indifference Curves
  - B. Properties of Indifference Curves
  - C. Consumer's Equilibrium
  - D. Price, Income and Substitution Effects
  - E. Derivation of individual demand with the help of indifference curves
  - F. Superiority of indifference curves over utility techniques
  - G. Criticism of indifference curves technique
- IV. Summary
- V. Suggested Readings
- VI. Questions for Practice

**I. Introduction :**

We have already explained the nature of individual consumer's demand with the help of utility analysis in the previous lesson. The utility analysis, as it was based on certain unreal assumptions (already explained), could not deal with certain aspects of the individual demand in a detailed manner. This approach was criticised by Prof. J.R. Hicks and Prof. P.A. Samuelson owing to certain shortcomings, particularly the unreal assumptions of constancy of marginal utility of money and also the measurement of utility. They have tried to replace that approach by the techniques of indifference curves and revealed preference respectively.

**II. Objective of the Lesson :**

Here in this lesson, we are mainly concerned with analytical tool, i.e., the indifference curves analysis. We shall try to analyse the problems of individual consumer's demand and the consumer's equilibrium with the help of this tool.

We propose to analyse the various problems relating to individual consumer's demand.

**III. Indifference Curves**

We know that neither utility can be measured nor can it be added. Therefore, the question of maximization of utility (or satisfaction) does not arise at all. The

consumer's equilibrium becomes meaningless under these unreal assumptions. Therefore, Professor Hicks and Allen devised the technique of indifference curves. Without depending, in any way on the much criticised assumptions of marginal utility analysis, they gave the indifference curves technique based on method to analyse the theory of demand. Their technique of indifference curves is based on the following assumptions :

- (i) The scale of preference of a consumer is given. The consumer knows in his mind whether he likes commodity A more than commodity B.
- (ii) The size of the income of a consumer is given.
- (iii) The prices of goods being consumed are also given in the market.
- (iv) The level of satisfaction (indicated by the respective indifference curves) can be distinguished ordinally, i.e., in order of higher or lower level as compared to other levels of satisfaction ; and
- (v) The consumer knows the state of his mind when he becomes indifferent to various combinations which ensure the same level of satisfaction.

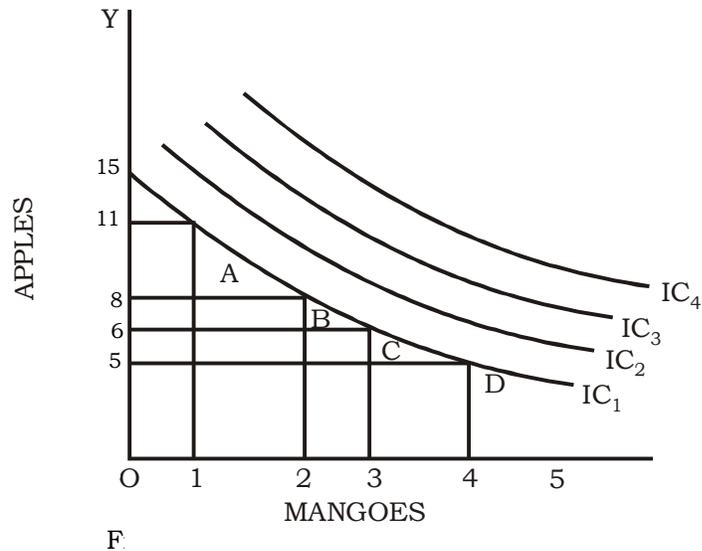
The technique, as developed by Hicks and Allen, can best be explained with the help of the following table.

**TABLE No. I**

<b>Combination</b>	<b>Apples</b>	<b>Mangoes</b>	<b>M.R.S of Mangoes for Apples</b>
1st	15	0	---
2nd	11	1	4:1
3rd	8	2	3:1
4th	6	3	2:1
5th	5	4	1:1

**Note :** This is based on the above mentioned assumptions viz. the size of the income, price of both the goods and scale of preference etc. are given.

From Table No. 1, it is clear that consumer, under a given set of assumptions likes to have the 1st combination of 15 apples and zero mangoes or even the 2nd combination of 11 Apples and one Mango. or, for that matter say a combination of 8 apples and 2 mangoes, 6 apples and 3 mangoes and so on. The point, an important one, is that all these combinations give the consumer the same level of satisfaction. The consumer is, in fact, indifferent to any of the combination in the matter of satisfaction as each one gives him equal satisfaction. The indifference curve of the consumer is geometrically illustrated in the diagram given below :



As shown in the Diagram No. 1, all the combinations which give the consumer the same level of satisfaction lie scattered on the same curve i.e., IC<sub>1</sub>. This curve IC<sub>1</sub> is termed as the indifference curve. We may say that the consumer is indifferent between all those combinations of apples and mangoes which give him the same level of satisfaction and are represented by the curve IC<sub>1</sub>, passing through A, B, C, and D. These combinations occupy the same position in the consumer's scale of preference. Similarly, we show various other combinations of apples and mangoes based on different set of assumptions, representing lower to higher satisfaction. For example, IC<sub>2</sub> and IC<sub>3</sub> curves represent higher levels of satisfaction in the altered situation of either higher income or lower prices of both the goods (again an increase in real income). All these curves IC<sub>1</sub>, IC<sub>2</sub>, IC<sub>3</sub>, IC<sub>4</sub> and so on constitute the map of indifference curves.

One of the two points by way of explanation in connection with the above diagram may be mentioned for our benefit :

1. Firstly, it may be stated that any indifference curve may start from either of the axes. This could be so if any combination starts from zero quantity, of either of the two commodities. But generally speaking, a curve touches Y axis, if combination with zero units of the commodity plotted on the X axis is possible.
2. Secondly, the curves are numbered as 1,2,3, and so on. It simply means that curve number 2 is higher than curve number 1; and curve number 3 is higher than curve number 2 in matter of satisfaction. By how much different curves differ in the matter of satisfaction is not known.

3. The levels of satisfaction indicated by  $IC_1$  and  $1C_2$ , cannot be added to give us the level of satisfaction indicated by  $IC_3$ .
4. All the curves slope downward just like demand curves without cutting each other (more of this later on).

Another significant point and of course of far reaching importance which is illustrated in table No. 1 is the rate at which mangoes are being substituted in place of apples by the consumer without disturbing in any way the level of satisfaction. It is clear from that table that the rate of substitution of mangoes for apples has been 4:1, 3:1, 2:1 and 1:1 when combination 2nd, 3rd, 4th and 5th are being chosen by the consumer. The rate of substituting mangoes in place of apples is a diminishing one. This economic statement is given the name of the law of diminishing marginal rate of substitution. It simply states that a consumer while remaining on the same level of satisfaction, will part with increasingly less quantity of one good, say apples whose stock is decreasing, in place of a given unit of another good mangoes, whose stock is increasing. This rate of substitution will go on diminishing at the margin. In more technical terms, we may define the marginal rate of substitution of X for Y as the quantity of Y, which just compensates the consumer for the loss of the marginal unit of X.

It may be pointed out for one benefit that this law of diminishing marginal rate of substitution replaces with law of diminishing utility which is used in utility approach to consumer's demand. It serves practically the same purpose though in a better way. (This will be explained later on.)

### B. Properties of the Indifference Curves

We have already explained the meaning of indifference curves. Let us now examine their characteristics. The following are the main properties of indifference curves.

(a) Indifference Curves must slope downwards from left to right. All curves must slope downward. This is on an account of the fact that in order to have more of one thing, consumer must have less of the other thing while enjoying the same satisfaction. The property can be explained as follows

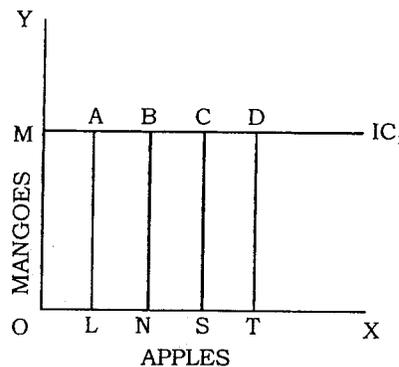
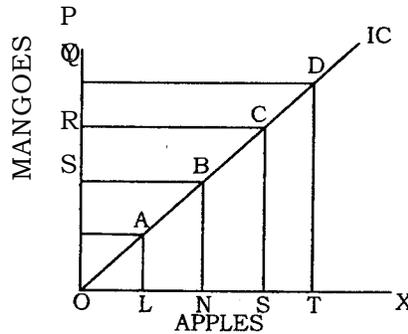


Fig. 2 (a) (B.A.-I, Lesson No. 4)

(i) Let us suppose that the indifference curve is like  $IC_1$  in Diagram No. 2, a horizontal line parallel to X axis. Points A,B,C, and D on this curve indicate various combinations which give the same level of satisfaction. But this is evidently wrong. A combination of OL of apples and OM of mangoes cannot give the same level of satisfaction as yielding by a combination of ON of apples and OM of mangoes. The consumer must get higher satisfaction when he has no more of one commodity, say ON of apples while consuming the same quantity of the other commodity. Therefore, A and B or C and D cannot lie on the same curve. Hence our supposition is wrong. The curve must slope in some other direction.

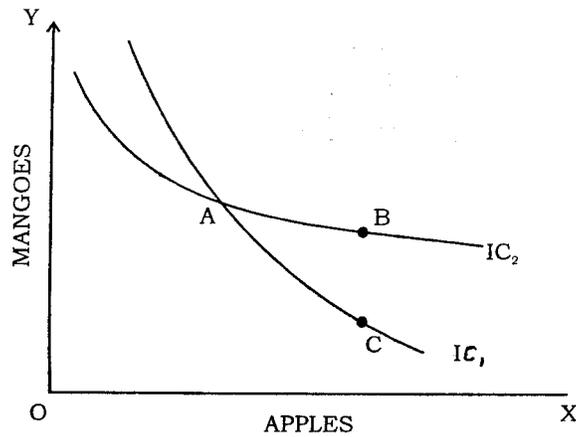


**Figure No. 2 (b) (B.A.-I, Lesson No. 4)**

(ii) Let us now suppose that the curve slopes upward as in diagram No. 2 (b). All combinations A,B,C and D ensure the same satisfaction. But even this is wrong. A combination at B (ON & OR of the respective goods), or. at C (OS & OQ) means consumption of more quantities of both the goods in comparison to the combination at A (OL and OS) and consequently the combination must lie on different curves indicating higher satisfaction. They cannot lie on the same line, hence the curve cannot slope upward.

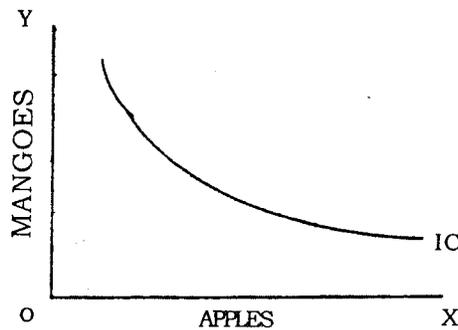
Thus it is clear that the indifference curve must slope downward.

- (a) Indifference curves cannot intersect each other ; Since points A and B (Diagram No. 3) lie on the same curve, i.e.,  $IC_2$  combination indicated by A and B gives the same satisfaction.



**Fig. No. 3 (B.A.-I, Lesson No. 4)**

- (b) Similarly, the points A and C lie on the curve  $IC_1$ , therefore, the combination indicated by A and C must give the same level of satisfaction as indicated by the curve  $IC_1$ . Thus, it is evident that point A and its corresponding combination on the two curves gives same level of satisfaction. It is something contradictory. Hence the supposition that indifference curves can intersect is wrong.



**Fig. No. 4 (B.A. - I, Lesson No. 4)**

- (c) Indifference curves are generally convex to the point of origin. Generally, all indifference curves must slope downward and are convex to the point of origin. This property is based on the diminishing marginal rate of substitution. As we acquire more of commodity X, the quantity of commodity Y needed to be replaced, a unit of X decreases. This is clear from Diagram No. 4.

**Self-Check Exercise**

1. What are indifference curves?
2. Can indifference curves intersect? Why, or why not?

**C. Consumer's Equilibrium and Price Line or Budget Line**

We noted in the utility analysis of demand how a consumer maximizes his satisfaction by following the law of equi-marginal utility. In the indifference curves approach also we will study how a consumer maximizes his satisfaction.

We can draw a map of indifference curve of a consumer under the following assumptions :

- (i) His income is constant;
- (ii) His scale of preference is given;
- (iii) He behaves in a rational manner
- (iv) Prices of goods are given ;

Now suppose that a consumer has 25 rupees which he has to spend on mangoes and guavas. Suppose further that the price per mango is Re 1 and that per guava is 25 paise. The consumer will buy that combination of mangoes and guavas which will give him maximum satisfaction. If he spends the entire amount on mangoes he can buy 25 of them and if he does the same on guavas, he can buy 100 of them. The line AB in Diagram No: 5 indicates the various alternative combinations that he

Fig. No. 5 (B.A-1, Lesson No. 4)

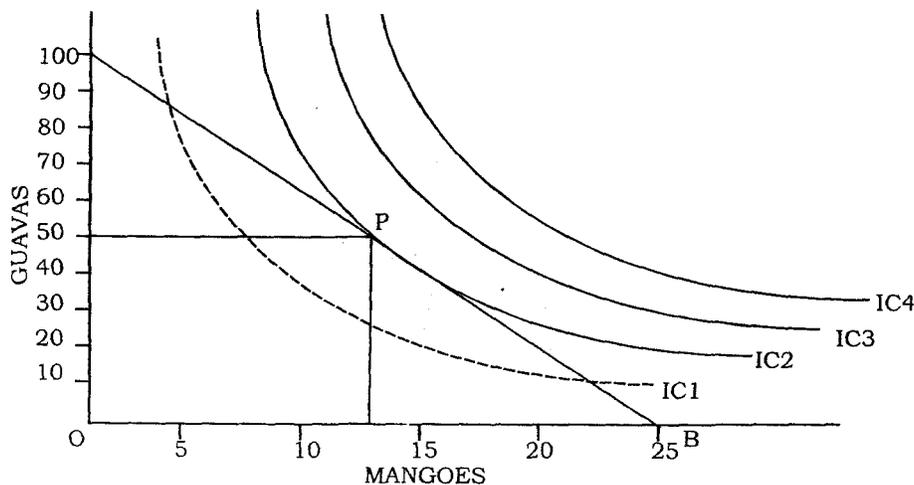


Fig. No. 5 (B.A. - I; Lesson No. 5)

Now which of these combination, he will buy, depends on his choice. The line AB is known as the income - price line or simply the price line or the budget line. This line also indicates the ratio between prices of mangoes and guavas, that 25

mangoes are equal to 100 guavas. A consumer will buy that combination of these commodities which is on the price line, that is, which is within his reach to buy. Any combination that is away from this line is beyond his means to buy and any combination that lies below this line cannot give him maximum satisfaction. As shown in Diagram No. 5 combinations on  $IC_3$  and  $IC_4$  are beyond the limited income of the consumer. If he buys any combination on  $IC_1$  he gets less satisfaction and by using the same amount he can buy certain combinations on the higher indifference curve  $IC_2$ . He gets maximum satisfaction on point P and not So on other combinations on the curve gives him more satisfaction. In other words, point P indicates the equilibrium position of the consumer,

At this point P the price line AB is tangent to the curve  $IC_2$  at P and that of the price line is equal. At this point the marginal rate of substitutions is also equal to the ratio between the price of the two commodities. The basic condition for the equilibrium of the consumer is that the marginal rate of substitution of mangoes for guavas should be equal to the -price ratio between the two. More precisely the equilibrium position will be indicated by the following condition :-

$$\text{MRS mg} = \frac{\text{Price of G}}{\text{Price of M}}$$

The case explained above deals with two commodities only. The use of this technique can be explained in the case of more than two commodities also, but it is difficult to illustrate it by a diagram. To simplify this problem, money is taken as representative of a collection of goods. So the equilibrium of the consumer is studied by taking money on one axis and commodity on the other.

So far we have examined the problem of consumer's demand or equilibrium when certain assumptions are made. That is, the treatment has been somewhat static in nature. Let us now analyse the problem rather dynamically. This could be possible if we try one by one to work out the effects of this on the consumer's demand for goods.

#### D. Price, Income and Substitution Effects

We worked out the consumer's equilibrium on the preceding assumptions of given (i) money income ; (ii) price of commodities A and B, (iii) the scale of preference and (iv) rational behaviour. Let us now relax our assumption regarding price of commodities A or B and work out its effect on equilibrium position of the consumer. This could be illustrated better with the help of Diagram No. 6.

Let us suppose that the price of commodity A falls while that of B remains the same as shown in Diagram No. 6. The income is also constant. The price line shifts from AB to  $AB^1$ . Consequently, the consumer's equilibrium position shifts from P to  $P^1$  on the indifference curve  $IC_2$ . The consumer will, as a result of a fall in the price of A, buy more of commodity A and less of commodity B. In simple words,

the fall in price of A will induce the consumer to buy more of the commodity. The line joining the points P,  $P^1$  and  $P^{11}$  will be termed as price consumption curve. It shows the functional relationship between price of a commodity and its demand.

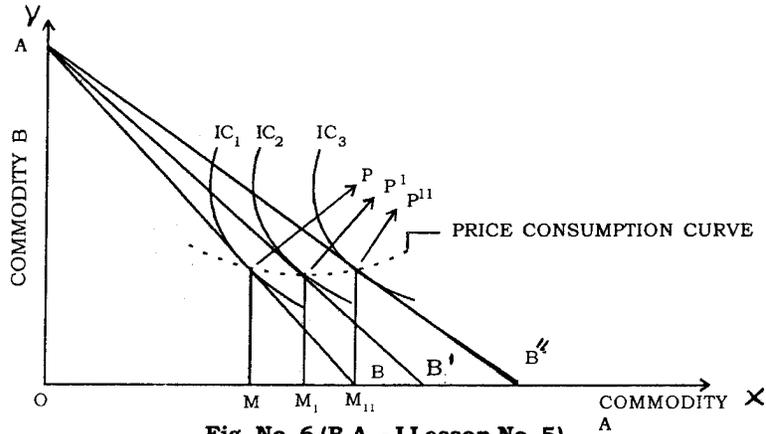


Fig. No. 6 (B.A. - I Lesson No. 5)

It also show the income and substitution effects due to the fall in the price of commodity. These effects are examined below :

- (ii) Income Effect: Let us now relax the assumption that the size of money income is given. Let us assume that the size of the income goes up the same Fig. No. 7(b) (B.A.-I, Lesson No. 4) with the help of the diagram given below :

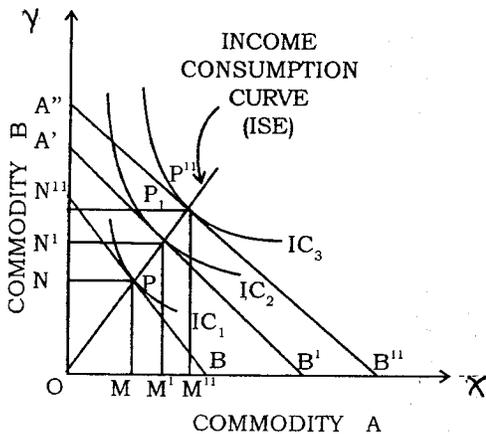


Fig. No. 7 (a) (B.A. - I, Lesson 5)

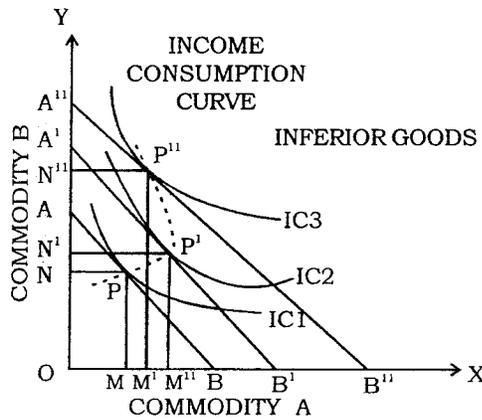


Fig. No. 7 (b) (B.A. - 1, Lesson No.5)

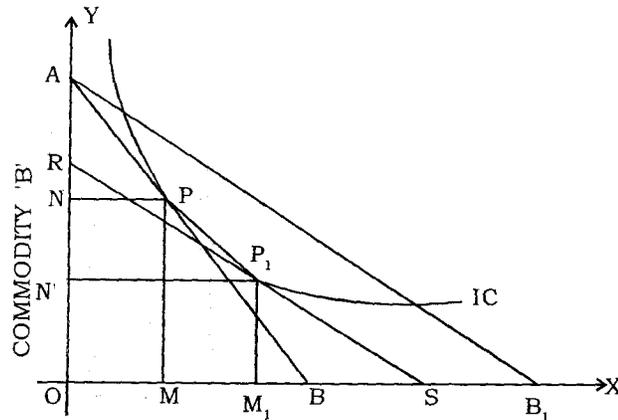
In diagram 7 (a) the size of the money income goes up. The price line (or the budget line) shifts upwards, indicating that more could be bought of both commodities. The consumer can buy now OB to OB<sup>1</sup> and so on of commodity A and similarly OA<sup>1</sup> to OA<sup>11</sup> of commodity B with increased money income. The consumer would also move his equilibrium position from P to P<sup>1</sup> and then to P<sup>11</sup>.

As we would consume more quantities of both the goods i.e.,  $OM$ ,  $OM^1$  and  $OM^{11}$  of A and  $ON$ ,  $ON^1$ ,  $ON^{11}$  of B as an income effect. He would also be on a higher level of satisfaction with each increase in his money income. He would be on  $IC_3$  if the goods are normal ones or either of the two belongs to an inferior category,

The line joining the points P, P' and P'' will be termed as income consumption curve. It is an upward sloping curve showing the positive effect of increased money income on the demand for both goods.

In diagram No. 7 (b) the effect of increased money income is shown on an inferior good, say A, while B commodity is a normal one. Increased money will induce the consumer to buy more of the normal goods (say  $ON$ ,  $ON^1$  and  $ON^{11}$  of B) and less quantities of an inferior good (say  $OM$ ,  $OM^1$  and  $OM^{11}$  of A). It may be pointed out that in the first instance the quantity purchased of inferior good may also increase (See the Diagram No. 7 (b), though ultimately demand for it will decrease. It is daily experience that once income rises substantially, the people may buy less of inferior goods. The same fact is illustrated in this diagram.

**(iii) Substitution Effect :** A substitution effect occurs, it <sup>COMMODITY 'A'</sup> may be pointed out, when relative prices of goods change in such a way that the consumer is neither better off nor worse off than he was before, but he has to rearrange his purchases of goods in accordance with the new relative prices. This could again be illustrated with the help of diagram no. 8, which is given below :



**Fig. No. 8 (B.A. -I, Lesson No. 4)**

Other things remaining the same, let us suppose that price of commodity A has fallen. This would disturb the equilibrium position of the consumer. He would have to rearrange his purchases.  $ON$  of B, but in the case of substitution effect the consumer should neither be better off nor worse. Let us now suppose that income of the consumer is changed from  $AB$  to  $RS$  budget line. Thus, he has realised through the substitution of  $MM_1$  of A (whose price has fallen and become cheaper) in place of  $N^1N$  of B (a relatively dearer commodity). This is described as the substitution effect. It simply states that a consumer will buy more of relatively cheaper good.

**Self-Check Exercise**



OA/OB'''

OM'''

---

The demand curves of various individuals, thus, derived could give us the market demand curve.

### **F. Superiority of Indifference Curve Technique**

The method of indifference curve as developed by Prof. Hicks and Allen was a significant contribution to the box of analytical economic tools. The new technique is positively a superior method of economic analysis in the field of demand theory as compared to the marginal utility approach. It has the following points of superiority over the utility approach :

- (i) This method does not rest on the unreal assumption of measurability of utility. Again, it does not rest on the additive nature of utility. The indifference curves technique simply avoids the drawbacks of the utility analysis.
- (ii) The technique of indifference curve explains the phenomenon of marginal rate of substitution in a better and more comprehensive way than done by marginal utility analysis. It explains the significance of both the goods when their stock changes.
- (iii) This technique explains the price-demand relationship in more detailed manner. It shows that the price effect is the result of income effect and substitution effect. The ordinary law of demand based on utility approach could not explain the reasons behind the price effect.
- (iv) The technique could also throw light on the nature of demand for inferior goods. The utility approach could not explain the theory of demand in the case of inferior goods.
- (v) This technique examines the theory of demand more dynamically than done by the utility analysis,

Thus, it is admitted on all sides that this approach has freed the theory of demand of many unwanted assumptions. It has placed at the disposal of student of economics a better economic tool which could be widely used with a greater degree of reliance.

### **G. Criticism**

The technique, though widely and much praised, has provoked much criticisms at the same time. The following points may, in brief, be mentioned.

- (i) The technique is based on the assumption of scale of preference and given tastes and likings. In the background of the assumption of scale of preference, the concept of utility works. A consumer prefers the good which give more utility.
- (ii) The technique of indifference curves assumes that the consumer becomes indifferent and that he knows his state of mind. But Professor P.A. Samuelson is of the opinion that the consumer rather reveals his

preference. He knows which combination is preferable under a given set of assumptions. Thus, according to him, the basis of theory of demand should be the revealed preference rather than the state of indifference of consumer.

- (iii) The indifference curve method has given only new names to old terms and concepts. Some examples are quite clear, as the law of diminishing marginal rate of substitution in place of the law of diminishing marginal utility, the principle of marginal significance of good being equal to its price, in place of principle of proportionality between marginal utilities and their prices. Again, in the case of consumer's equilibrium we now say that a consumer will be in the equilibrium when the marginal rate of substitution between two commodities is equal to their price ratio. Critics, thus, say that the indifference approach supplies old wine in new bottles.
- (iv) This approach cannot analyse the demand problem in the midst of risk and uncertainty.

This is how this technique is criticised. New tools are being perfected, even the old ones utility tools are being refashioned. The theory of demand for its complete analysis yet needs better and more satisfactory treatment.

#### **IV. Summary :**

In this lesson we have studied about the concept of indifference curves, their properties, equilibrium of consumer using the technique of indifference curves, as well as the superiority of this technique over the utility analysis.

#### **V. Suggested Readings :**

1. A. Koutsoyiannis : Modern Microeconomics
2. H.L. Ahuja : Principles of Microeconomics

#### **VI. Questions for Practice :**

##### **A. Long Answer Questions :**

1. Discuss the properties of indifference curves.
2. Discuss consumer equilibrium with the help of indifference curves.

##### **B. Short Answer Questions :**

Define : (i) indifference curves (ii) substitution effect

**CONSUMER'S SURPLUS****Structure of the Lesson :**

- I. Introduction
- II. Objectives of the Lesson
- III. Consumer's Surplus :
  1. Meaning
  2. Measurement
  3. Assumptions
  4. Criticism
  5. Rehabilitation of Consumer's Surplus by Hicks
  6. Importance
- IV. Summary
- V. Suggested Readings
- VI. Questions for Practice

**I. Introduction :**

We have seen the working of the various tools and concepts in economic analysis in the previous two lessons which we discussed under the heading: Utility Analysis and Indifference Curves Technique. To these two tools must now be added the important concept of consumer's surplus. Many times, when an individual buys a thing, he feels that he has bought the thing at a price lower than what he was willing to pay. This difference in what he paid and what he was ready to pay is consumer's surplus. This concept is important for measuring welfare and even in tax imposing decisions of government.

**II. Objectives of the Lesson :**

Consumer's surplus is an important concept. The objective of this lesson is to provide clarity regarding this concept as well as how to measure it.

**(1) Meaning of Consumer's Surplus**

A consumer goes to the market and buys a few units of a particular commodity. While paying the price for the said commodity, he feels that the money he had required to pay is much less than the total utility he would derive from the consumption of the commodity. He feels that he gets a surplus of satisfaction from the said transaction. This is his daily experience in the market . Particularly in case of necessities of life, he is prepared to pay much more than what he actually pays for commodity as per the market price. He, thus, enjoys a surplus of satisfaction

which he would not have had if he had paid according to the total satisfaction. This surplus can be called as the consumer's surplus. Though this term was crudely explained by the earlier economists, Prof. Marshall was the first economist to give a scientific explanation and make it a permanent tool of economic analysis.

Prof. Marshall defines the term consumer's surplus as the excess of price which a consumer would be willing to pay rather than go without the thing over that which he actually does pay. It is the economic measure of this surplus satisfaction. It may be called consumer's surplus. In simple words, consumer's surplus is what one is prepared to pay minus what he actually pays. For example, if he is willing to pay for a commodity Rs. 15/- and he actually pays Rs. 12/- for it, Rs. 3/- would be the surplus which can also be regarded as extra satisfaction which he could derive from the expenditure of this amount of Rs. 3/- on other goods.

As already mentioned this surplus mostly arises in the case of necessities of life where the consumer would like to pay an abnormally high price than what he actually does pay rather go without them. This may not be so in the case of luxuries.

## **(2) Measurement of Consumer's Surplus with the help of Utility Analysis and its Diagrammatic Representation**

The concept of consumer's surplus is related to the law of diminishing marginal utility. We know that the marginal utility derived from the consumption of successive units of the same commodity goes on diminishing ; the other things remaining the same. A consumer will stop the utility derived from the last unit purchased when it is just equal to the marginal disutility of the money spent. Since in the market (a perfectly competitive market) all the units are available at the same price he would pay total amount of money equal to units purchased multiplied by the price (i.e., No. of Units  $\times$  Price) or total amount paid will be equal to marginal utility ( $=$ price)  $\times$  No. of units purchased. This could easily be illustrated with the help of the following table :

**TABLE NO. 1**

No. of Units Purchased	Marginal Utility	Total Utility	Price (In Rs.)
1st	20	20	5
2nd	16	36	5
3rd	12	48	5
4th	7	55	5
5th	5	60	5
6th	2	62	5

The table is based on law of diminishing marginal utility and given price. From Table No. 1 it is clear that total satisfaction derived is always higher than the total

price paid for various units of the commodity. Let us suppose that the consumer stops his purchase at the fifth unit where his M.U. is equal to price. He gets total utility equal to 60 units and the price he would be willing to pay is Rs. 60/-. But actually he pays only Rs. 25, Rs. 5 being the price of each unit. Thus, an economic measure of this surplus is  $60 - 25 = \text{Rs. } 35/-$

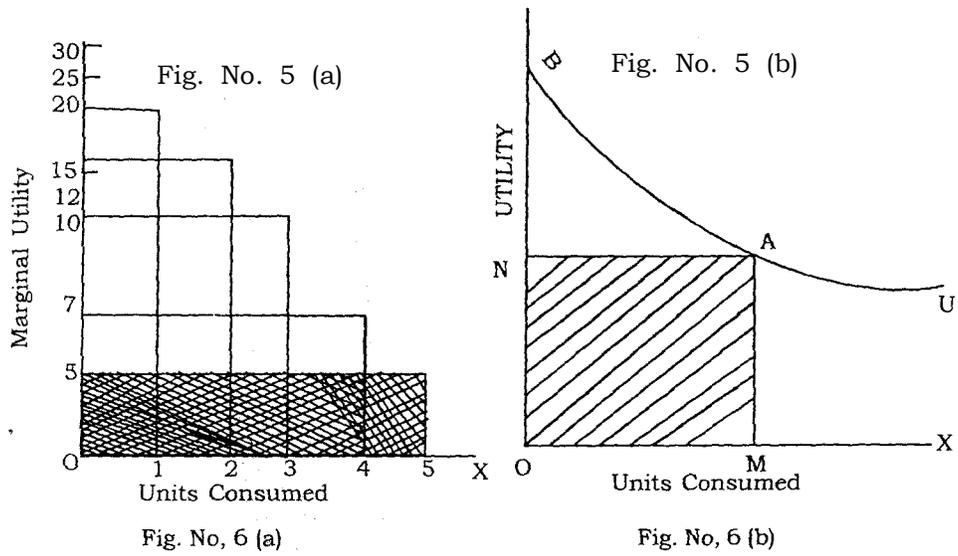
Thus, consumer's surplus could be measured with the help of total utility and marginal utility (or price). For example of units.

C.S. = T. U. - M. U. multiplied by the No. of units he buys.

It may be stressed for our benefit that the measurement of consumer's surplus is feasible when the market price is given and the consumer equates the marginal utility of a good to its price.

The measurement of the consumer's surplus with the help of utility analysis can be illustrated with a diagram also.

In diagram No. 1 (a), the MU or price is Rs. 5 and the No. of units purchased is 5. Hence the total price paid is equal to the shaded area, and the unshaded area represents the consumer's surplus. This diagram is based on the assumption of sufficiently large units of the commodity so that marginal utility of each unit is measured by its respective rectangle. If the units are very small as in diagram No. 5 (b) the utility curve will be a smoothly sloping curve. In diagram No. 5 (b) the M.U. or price is measured by AM or ON and number of units consumed are OM. Hence the total price paid is indicated by shaded area NAMO. The total



(B.A. - I, Lesson No. 6)

utility is represented by BAMO (TU = Sum. of MU). The consumer's surplus is illustrated by the area BAN unshaded area in the diagram.

### (3) Assumptions of Consumer's Surplus

Like all other economic terms and principles this concept is also hypothetical in nature. Its measurement is possible under a given set of circumstances or situations. The following points must be mentioned by way of assumptions of the concept of consumer's surplus :

1. A complete list of demand prices must be available so as to give the correct picture of the quantities demanded by the consumer. A complete list of prices and the individual consumer's demand will facilitate the measurement. Its absence will complicate the calculation of consumer's surplus.
2. The marginal utility of money must remain constant, whatever may be the variation in the stock of money. As already explained, it is a fundamental assumption of the utility approach which is used for the measurement of consumer's surplus.
3. Similarly, another fundamental assumption of the utility analysis is that the marginal utility of the intra-marginal units (the units preceding the marginal unit) must not undergo any change in spite of the increasing stock now being acquired by the consumer.
4. The income of consumers must not differ. In case it is so, exact measurement of consumer's surplus will be difficult.
5. Similarly, consumers must not have different aptitudes and tastes. Their likings for a particular good must not be different. Otherwise prices, that different consumer's would be prepared to pay for a product must vary and that will give rise to varying measure of consumer's surplus.
6. The goods must be such as are normally used for satisfying necessities of life and goods used for distinction and goods having substitutes are excluded from the scope of measurement of consumer's surplus, in the case of latter goods is not possible to attain.

Thus, it is evident from the above mentioned set of assumptions that the exact measurement of consumer's surplus is practically an impossible task. Nevertheless a consumer does feel a sort of surplus in marketing purchase of certain goods for which prices appear cheap (relatively) to their need for them. No one questions this basic truth of the concept.

#### **Self-Check Exercise :**

1. What is Consumer's Surplus?
2. How will you measure consumer's surplus?

### (4) Criticism of Consumer's Surplus

As already mentioned above, the concept of consumer's surplus is as much hypothetical in nature as other economic concepts. Its measurement is possible if the utility analysis/apparatus could be relied upon. But unfortunately this is not so as we have seen in the previous topics. Hence the concept has been criticised

by the economists like Davenport, Cannon and Nicholson. Their main attack is against its theoretical validity and measurement, but not against its practical utility. The following points are made by way of criticism of the concept.

1. Since the measurement of the concept relies on the measurability of utility, the consumer's surplus is very difficult to measure. We know that the various relevant concepts of utility such as total utility, marginal utility etc. are not measurable because utility is something relative and subjective. Hence the exact measurement of consumer's surplus is difficult.

2. On another account also the measurement of consumer's surplus appears difficult i.e., the marginal utility of the infra-marginal units does not remain absolute and fixed. Rather the marginal utility of these units varies with each increase/decrease in the stock of a commodity.

3. Another point of criticism that is levelled against this concept is the assumption of constancy of marginal utility of money while measuring consumer's surplus the changes in the stock of money are assumed to affect the marginal utility of money in the least. Thus, a very important factor which could influence the measurement of consumer's surplus is completely ignored.

4. In the case of necessities of life, the measurement of consumer's surplus is impossible, for example, the consumer would be willing to pay a very high price for a commodity as in the case of a match box or a glass of water in a desert. To say that the difference will represent the surplus is stretching the definition of the terms too far.

5. The schedule of demand prices and also the individual demand at this price is not readily available. To assume its availability is extremely hypothetical.

In the light of the above mentioned criticism, the concept appears to be imaginary, illusionary and hypothetical. The exact measurement appears to be entirely out of question. Consequently, it is said the concept should be left out of economic literature.

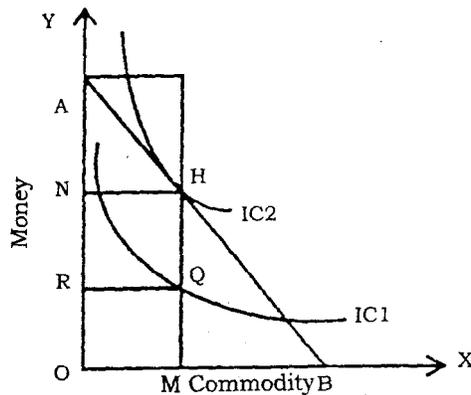
But fortunately for economic literature and particularly for economics of welfare the concept has been rehabilitated by Prof. Hicks with the device of indifference curves. Since critics refuted its practical utility and application to certain economic policies and the main criticism was made against its method of measurement. Prof. Hicks has restructured the useful tool of consumer's surplus discarding the Marshallian method of calculating the surplus and replacing that by a more scientific technique of indifference curves. The new device of measuring this surplus has spared it of all shortcomings and made it an important tool of economic analysis.

Let us now examine the measurement of consumer's surplus with the help of indifference curve technique.

#### **(5) Rehabilitation of Consumer's Surplus via Indifference Curves Technique**

We know that the utility analysis (having many shortcomings as pointed out in

previous lessons) has given place to indifference curves analysis in the field of demand theory. A similar change has also taken place in the treatment of the concept of consumer's surplus. Hicks demonstrates the measurements of consumer's surplus with the help of indifference curve technique, without assuming the unwarranted conditions which hedged the Marshallian version of consumer's surplus. This could better be illustrated with the help of the following diagram :



**Fig. No. 2 (B.A. -1, Lesson No. 5)**

We measure the units of commodity along the X axis and the units of money along the Y-axis. Given the scale of preference a consumer would like to keep OA of money and zero unit of the commodity. He would, thus, be on the curve  $IC_1$ , or he should like to have the combination indicated by point Q on  $IC_1$ , i.e., OR of money and OM of commodity. While enjoying this level of satisfaction indicated by  $IC_1$  the consumer is parting with AR of money for acquiring OM of commodity, retaining OR of money. Now let us suppose that the price of commodity is given in the market. price line AB indicates this price. Now the consumer in view of his scale of preference and the price of the commodity would like to have OM of the commodity and ON of money, a combination indicated by the point on the curve  $IC_2$ . The consumer under these circumstances will part with AN of money for acquiring OM of commodity. But certainly, his combination gives more satisfaction as he has climbed up from  $IC_1$  to  $IC_2$ . In monetary terms, the consumer has saved money equal to NR (AR which he was willing to pay minus AN which he actually pays). This is, thus, the money measure of the consumer's surplus.

We must also mention that we explained the measurement of consumer's surplus with the help of indifference curves in its simplest form. Prof. Hicks illustrates the measurements of the concept in various forms.

### Self-Check Exercise

1. What are the main points of criticism of consumer's surplus?

**(6) Importance or Practical Utility of Consumer's Surplus**

As already mentioned, the concept has its practical importance in applied economics. No economist denies that it is of immense use in the theories of taxation, monopoly price and international trade. This concept is also important in the field of public finance, particularly when new taxes are imposed. The finance minister of a country levels new taxes on the commodities which have a lot of consumer's surplus for the buyers. Since these commodities possess consumer's surplus, the consumer's are willing to pay higher price for them than the prevailing prices. No new taxes can be imposed on goods having no consumer's surplus.

Similarly, in the fixation of monopoly prices a monopolist takes into consideration the surplus or satisfaction which accrues to consumers. Price of such commodities as gives the buyers enough of consumer's surplus could easily be raised by monopolist. It will have no adverse effects on demand for his product and total receipts. On the contrary, the price of a commodity, the purchase of which yields no consumer's surplus could not be raised without having harmful effects. That way the consumer's surplus is an important consideration with the monopolist in fixing the price.

The concept of consumer's surplus is also used in the field of international trade. The imported goods, without which we cannot do in life are available to us at cheap rates. We would have obtained those goods either at higher prices or produced them at higher costs within the country if no international trade had been there. Consumer's surplus also helps in distinguishing the value-in-use from value in-exchange of a commodity. Consumer's surplus is the difference between two values, the value-in-use meaning total utility and the values in exchange the marginal utility. The consumer's surplus is equally useful in analysing the comparative situation which various consumers face. It can clearly show that the various consumers enjoying the same income may have a different measure of economic welfare owing to the availability of many facilities and amenities. A person residing in a modern city might have more satisfaction than a similarly placed person in a village as the former may enjoy a surplus in many of its applied sense, it is an important economic tool, particularly in the field of welfare facilities.

Thus, the concept of consumer's surplus is useful and is of practical utility. In its applied sense it is an important economic tool, particularly in the field of welfare economics.

**IV. Summary :**

Consumer's surplus can be defined as the difference between what an individual is ready to pay for a thing and what he actually pays. The concept has practical importance in applied economics, theories of taxation, fixation of monopoly prices, etc. However, it is difficult to measure consumer's surplus, as its measurement depends on utility.

**V. Suggested Readings :**

1. A. Koutsoyiannis : Modern Microeconomics
2. H.L. Ahuja : Principles of Microeconomics

**VI. Questions for Practice :**

1. Define consumer's surplus. What are the main criticisms against it?
2. Derive consumer's surplus with the help of indifference curves techniques.
3. What are the assumptions of consumer's surplus?

**SUGGESTED QUESTIONS****FOR PRACTICE ONLY (L.No. 1.1 to 1.5)**

1. Define economics and highlight its subject matter.
2. Discuss the nature of economics.
3. State and criticise Robbins' definition of economics. How does it differ from Marshall's definition.
4. Show the difference between micro and macroeconomics and describe the importance of microeconomic analysis.
5. Describe the deductive and inductive methods alongwith their merits and demerits.
6. What is meant by demand in economics ? Explain the law of demand.
7. What is elasticity of demand ? How would you measure it ?
8. What is demand curve ? Show the difference between extension in demand and increase in demand with the help of diagrams.
9. What is utility ? Explain the law of equi-diminishing marginal utility.
10. Describe the assumptions of the law of marginal utility and explain their relevance in the real life.
11. Explain the properties of indifference curves with the help of diagram.
12. Draw consumer's demand curve with the help of indifference curves. Write a detailed note on consumer's surplus.

**SHORT QUESTIONS (FOR PRACTICE ONLY)**

1. Is economics a Science or an art??
2. Define inferior goods.
3. Is economics a positive science ?
4. What do you understand by deductive method?
5. Briefly explain the importance of micro economics.
6. What is meant by value and price ?
7. Prepare a demand schedule.
8. What is cross elasticity of demand ?
9. What do you understand by income effect?
10. Why Marshall has assumed the utility of money as constant ?
11. Can utility be measured ?

12. Describe any four points of weakness of utility analysis.
13. What is meant by consumer's equilibrium ?
14. Describe the limitations of cardinal system.
15. What is marginal rate of substitution ?
16. Define Indifference Curves.
17. What is meant by consumer's surplus ?
18. Describe in brief the importance of consumer's surplus.

**PRODUCTION FUNCTION AND THE LAW OF VARIABLE PROPORTIONS****(A) Production Function : An Introduction :**

A product is the outcome of the co-operation of all the factors of production-land, labour, capital and organisation. All factors contribute in their own way to the final product produced by a firm. In mathematical terms, this fact can be stated like this:

$P = f(L, L_r, C, O)$ , where L stands for land,  $L_r$  stands for labour, C for capital and O for organisation. P stands for product, f stands for the function i.e., the way product is related to the various factors of production. An increment in the various factors of production will cause a change in quantity of the product produced which may be either proportionate or more/ less than proportionately in comparison to the change mentioned above. In fact, the function stresses the most evident relation existing between the factors of production and the output. Whether or not the output changes proportionately in response to the increased/decreased quantities of factors of production depends upon many other factors such as technology, the scale of production, the internal economies etc. Apart from these conditions and the functional relationship, the variations in quantity of production to variations in the inputs of factors of production is related.

Let us now examine these important economic conditions which would influence the production function and give us varying rates of output in response to various proportions of inputs. We, first of all, explain below economies of scale of production.

**(B) Economies of Scale of Production : Internal and External Economies :** As already mentioned above, whenever the quantities of inputs (factors of production) are raised, production is increased. In the initial stages of this enlarged scale of production the firm reaps many economies in the cost of the production of the product. Increased output is obtained at falling cost of production. It is not only the firm alone, even the entire industry comes to enjoy certain economies because of its large scale of production. These economies are named as Internal and External economies respectively.

**Internal Economies :** These economies are enjoyed by a particular firm in the market. These arise on account of the internal organisation, scale of production and the quality of inputs used by firm. Other firms in the industry may not be having the advantage in the process of production. These economies become available due to specialisation and indivisibilities of factors of production. These economies are explained below :-

**(i) Managerial Economies :** A firm may have a manager or a supervisor with great experience, acumen, calibre and drive. A large scale or production has enabled this firm to engage such a manager. Certainly his experience, organisational skill and drive would materially bring down the cost of production. A similar experience may not be the fate of another firm in the market.

**(ii) Labour Economies :** A firm, because of its large scale of production, may have certain labour economies such as specialisation and division of labour. We know what economies accrue from the introduction of division of labour and specialisation. Reduction in the cost of production is the most important economy. Other firms having a smaller scale of production may not enjoy such economies.

**(iii) Technical Economies :** These economies may be due to the size of the plant and the nature of the plant. We know that the use of ultra-modern methods of production by big plants have drastically brought down the costs. Only a firm with a large scale of production could take advantage of the economies resulting from these methods.

**(iv) Marketing Economies :** A particular firm having large scale of production and affording a fleet of transport vehicle may reap certain types of economies from large scale buying and large scale selling. They can buy cheap and sell dear by rigging the market. A smaller firm may be ineffective from this point of view.

**(v) Financial Economies :** Similarly, the large scale production unit finds it easy to borrow funds and that too at cheap rates of interest. The unit has sufficient financial reserves and backing of the investment houses to undertake huge ventures in research and other innovational experiments. No small firm could think of affording such a venture.

Sometimes these economies are seen from another angle, particularly by the British economists. They call them the “indivisibilities” of various factors of production. According to them, these economies result from the increasing use of bit-sized inputs. For example, a bitsized plant, underutilised before, may now be used according to its capacity. This enlarged scale of utilisation would explain the downward sloping part of the long-run AC curve.

But in time of the expansion of a firm it may give rise to diseconomies and, therefore, higher per unit costs. The main factor causing diseconomies of scale has to do with certain managerial problems which typically arise as a firm becomes a largescale producer. The expansion in the depth and

width of management becomes unwieldy and this impairs the efficiency of a firm and leads to higher costs.

### **External Economies**

These economies benefit all firms within the industry as the size of the industry expands. These economies arise not because a firm expands, but because the industry expands and firms in turn benefit from industry's expansion. Such economies accrue to firms when the industry is localised in a particular area, makes inventions and evolves specialisation of production processes. External economies include economies of concentration, economies of information, economies of welfare and economies of specialisation. But these economies of scale cannot continue indefinitely. A time comes when further expansion leads to diseconomies in place of economies. And this puts limits to large scale production.

### **Self-Check Exercise :**

1. Define a Production function.
2. What do you understand by external economies?

### **(C) The Law of Variable Proportions**

The production is subject to laws of production. The output may change at increasing rate, constant rate or diminishing rate. In conventional terms the various laws of production i.e., law of increasing returns, constant returns or diminishing returns may operate, or in yet another known terminology, the law of variable proportions may apply. Since there has been confusion in the use of various terms so it is desirable to explain the laws rather more clearly. In modern treatment the principles of production are dealt with two lines :

**(1) Law of Variable Proportions :** (1) The law of variable proportions embraces the various phases of the law of production i.e., increasing, constant and diminishing returns (Product) and (2) Return to scale exhibiting the same phases too. Let us, therefore, examine these two approaches of principles of production.

**Returns to Variable Proportion :** As already stated, when the proportion of the factors are changed, resultant output would vary at different rates i.e. marginal increment in output may increase, remain constant or diminish. In fact, the following laws of production would govern the output:

- (i) Law of increasing returns :
- (ii) Law of constant returns : and
- (iii) Law of diminishing returns.

Translated in terms of costs, these laws are known as laws of diminishing costs, constant costs and increasing costs.

The above mentioned law could be explained with the help of the following table:

The table is based on the assumption that the size of land remains the same. A dose consists of say 1 units of capital unit of supervision and 2 units of labour.

**Table No. 1**

<b>No.of doses of other factors</b>	<b>No. of acres of land</b>	<b>Total Returns</b>	<b>Average Returns</b>	<b>Marginal Returns applied</b>
1. dose	07 acres	25 quintals	25 quintals	25 quintals
2. doses	"	55 "	27.5 "	30 "
3. doses	"	90 "	30 "	35 "
4. doses	"	125 "	31.25 "	35 "
5. doses	"	156 "	31.20 "	31 "
6. doses	"	180 "	30 "	24 "
7. doses	"	196 "	28 "	16 "

From the above table, it is clear that the total returns go on increasing right from the start from 25 quintals to 196 quintals. But it should be noticed, that these increase at the increasing rate in the beginning, at constant rate in between and at diminishing rate in end. In fact, the behaviour of the marginal returns indicates the trend in the total returns. The marginal returns increase in the first instance, that remain constant for sometime and then start falling. The average returns show almost the same trend. In technical terms, we can say that the law of increasing marginal returns applies midway and the law of diminishing marginal returns applies in the later stages. In this table, the law of increasing marginal returns operates when first three doses are applied to a fixed size (07 acres) of land. When third and fourth doses are used, the law of constant marginal returns applies. From fifth dose onwards the law of diminishing marginal returns operates.

As already stated above, all these phases of the production are due to the mixing of the fixed factors with variable factors of production. According to Marshall, who applies the law mostly to agriculture, the law of diminishing marginal returns can be stated as follows :

“When variable factors, capital and labour are used with fixed factor of production such as land, they cause generally, after a stage is reached, the successive returns to fall, provided there are no improvements in the soil and also in the technique of cultivation.”

It may be pointed out that the law of diminishing marginal returns operates only when a certain stage has been reached. In fact, so long as the variable factors of production are not scarce in relation to the size of the fixed inputs, the increase in the variable factors i.e., the law of increasing marginal returns can be found in the following arguments:

- (i) Large scale production makes it possible to take advantages of division of labour and specialization. Other economies too result from the large scale production.
- (ii) The land, an indivisible and lumpy unit, too is better used when increased quantities of other inputs are used.

But this situation cannot continue for long. Further increase in other factors of production would result in constant returns. The law of constant marginal returns would operate. Here the following reasons account for this tendency:

(i) All factors of production are being fully utilised. Neither of the factors, fixed or variable, is idle or partially used. Hence economies of scale are neutralised by the diseconomies of large scale production.

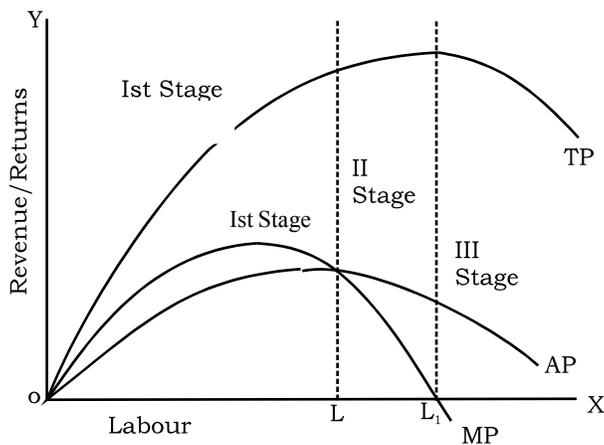
(ii) Further increase of variable factors lead to fuller use of land.

Similarly, the law of diminishing marginal returns would operate on account of the following reasons :

(i) The fixed factors become scarce, and the variable factors are in plenty in relation to it. Now the fixed factor is over-used and the variable factors are partially used.

(ii) Because at the enlarged scale of production, the economies give way to diseconomies, particularly due to difficulties of supervision and organisation. After all the human capacity to manage big undertaking is limited.

(iii) It is said that even the quality of the variable factors suffers with each increase in demand for them. Further, the supply of even these is not unlimited.



Labour  
Fig. 1

The above diagram shows how the various laws operate in regard to the marginal returns as well as average returns. Both curves rise gradually and then remain constant over a few dose of inputs. Ultimately the curve starts falling down (Please note that the MP curve cuts AP curve at the highest point).

It may be pointed out here that Marshall's formulation of the law (particularly of the law of Diminishing Marginal Returns) is outdated. It is necessary to assume that the size of land alone is fixed : other factors being always

variable. In fact, the modern formulation permits any factors, say capital or labour to be treated as scarce. According to Mr. Benham, "As the proportion of one factor in a combination of factors is increased after a point, the marginal and averaged product of that factor will diminish." This assumes that the state of knowledge is given and that there are no economies of scale. Similarly, Mrs. John Robinson and Mr. Chapman have stressed the scarcity and inferior quality of a factor being responsible for the operation of this particular principle.

Laws of production can also be expressed in terms of costs. As already referred to above, the various phases of the law of variable proportions may yield returns at various costs of production. This could be illustrated with the following table:

**Table No.2**

<b>Doses of Labour and Capital</b>	<b>Cost (Rs.)</b>	<b>Output (Kg.)</b>	<b>Average Cost</b>	<b>Marginal Cost</b>
1	100	25	4.00	4.00
2	200	55	3.70	3.33
3	300	90	3.33	2.85
4	400	125	3.20	2.85
5	500	156	3.20	3.22
6	600	180	3.33	4.16

**Note:** This table is based on Table No. 1 One dose of Labour and Capital Costs Rs. 100.

It will be seen from the above table that the law of diminishing costs (corresponding to the law of constant returns) in the middle and law of increasing costs operates at the end. The last named law corresponds to law of diminishing returns.

**(2) Return to Scale:** The relationship described above in terms of various laws will hold good even if all the factors of production are varied in the same proportion. It is observed and recognised that variations in the variable factors alone would not be responsible for operation of the various laws of production; rather varying the factors in the same proportion and enlarging the scale of production would also subject the resultant outputs to various rates of increase. This could be brought out clearly with the help of the table No. 3.

**Table No. 3**

<b>Sl. No.</b>	<b>Units of Factors Used</b>	<b>Total Returns (in Quintals)</b>	<b>Average Returns (in Quintals)</b>	<b>Marginal Returns (in Quintals)</b>
1.	1 Lab+1 acre land +1 unit capital +1 unit organisation	25	25	25
2.	2 Lab+2 acres Ld + 2cpt Lab + 2 Org.	60	30	35
3.	3 Lab+3 acres Ld+ 3cpt Lab + 3 Org.	100	33.3	40
4.	4 Lab+4 acres Ld+ 4cpt + 4 Org.	160	40	60
5.	5 units of each factors	220	44	60
6.	6 units of each factors	264	44	44
7.	7 units of each factors	301	43	37

Note : Lab - Labour; Ld - Land; Org - Organisation; Cpt - Capital

It is clear from the above table that the marginal returns increase upto the application of the 4th dose of all factors. After this marginal returns remain constant for the 4th & 5th doses. But from the 6th dose onwards, the marginal returns start falling.

In fact the marginal, average and total returns behave in the same manner, as the laws of production based on change in proportionalist factors. Yet a few of the differences may be pointed out, which are as follows :-

- (i) Since all factors can be changed in view of their availability, scale of production can be enlarged to take advantage of various economies.
- (ii) The law of increasing returns will operate for a pretty long time as through increased supplies of various factors and perfect adjustments, the application of the law could be sustained.
- (iii) But to say that the law of diminishing returns would not apply, is equally wrong. Ultimately this law would operate.
- (iv) The reason for the ultimate operation of the law of diminishing returns could be found in the limits power after a certain point in the scale of production, the human factor may find it difficult to organise, supervise and control production. Hence the returns to various doses of investments may successively start falling.

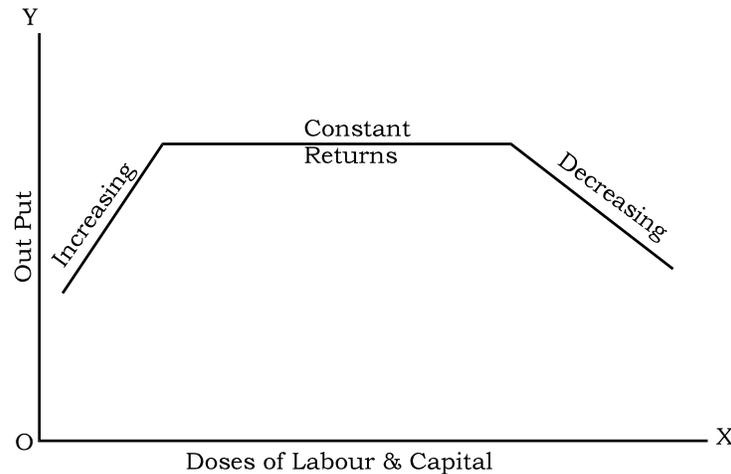


Fig. 2

Fig. 2 shows the increasing, constant and decreasing returns to scale as a result of proportionately equal change in the quantities of all the inputs used in the production process.

### Self-Check Exercise

1. State the Law of Constant Returns to Scale.

### (D) Principle of Diminishing Marginal Returns : Some Special Feature :

After discussing in detail the returns to proportions and scale, let us explain some special features of the most fundamental law of production i.e., law of diminishing returns.

The special features which deserve our attention are as follows :

**1. Assumption of the Law :** The Law, though very fundamental and universal in nature and operation, is hypothetical. It is based on certain assumptions which are as follows :

- (i) It applies only when a certain stage in production has reached. This is when the factors are not mixed in exact and right proportions.
- (ii) The technique of cultivation should not undergo change for improvement. Any improvement in methods would prolong the operation of the law of increasing returns and would keep the law of diminishing returns in abeyance.
- (iii) Even the soil must be new.

### 2. Why does the Law Apply to Agriculture More than it does to Industry?

According to Marshall, this law operates, rather quickly in those situations where nature plays a more important role and where the man wields a greater role, the law of increasing returns operates. Since agriculture comes under the first category the law of diminishing returns applies here quickly as compared to industry. The reasons are :-

- (i) Division of labour and specialisation are not possible in the case of agriculture.
- (ii) Since agriculture is spread over vast areas, human supervision is rather difficult.
- (iii) Agriculture does not permit use of many technological innovations.
- (iv) Since agriculture is an open-air industry the natural factors influence it more and set the law in motion.
- (v) Land, after a point, becomes scarce.

Thus, all these factors explain the operation of the law in relation to agriculture. Its application in industry, where division of labour and specialisation are possible and technological innovations are used frequently, could be explained in terms of greater economies in industry. The law of increasing returns operates for sufficiently long time. Only that far-stretched scale of production would give us the operation of the law of diminishing returns.

### **(E) Importance of these Principles (Particularly of the Law of Diminishing Returns)**

As already explained above, the principles of production are of immense importance to the main body of economic theory. The nature of the cost curves : average and marginal and also total, is determined by the operation of these principles. The curves both in the short or long period, would exhibit the influence on the price formation through moulding the nature of the supply curves of the industry. It is admitted by all that the application of various laws of the industry would affect the normal price of the product of that industry.

Even a policy of taxation and subsidy be worked out on the basis of the laws of production. An industry subject of the law of increasing cost/diminishing cost/constant cost would call forth for a measure of taxation/subsidy. In many more fields the laws prove their utility. But out of all that the law of diminishing returns is the most fundamental and universal in application. For example :-

- (i) Law of diminishing returns helped Malthus in formulation of his theory of population.
- (ii) Law of diminishing returns explains the theory of rent as advocated by Richardo. Extensive or intensive cultivation results in diminishing returns.
- (iii) Law of diminishing returns shows the need for new invention and innovations in the technique of cultivation with a view to increasing the product. In the absence of these changes the diminishing returns would set in.
- (iv) The law shows the reality of the economic situations. In the absence of its operation, one acre of land would have raised sufficient produce to feed the entire world.

Thus, this law is of great importance.

**(F) Suggested Readings :**

1. A. Koutsoyiannis : Modern Microeconomics
2. H.L. Ahuja : Principles of Microeconomics

**(G) Questions for Practice :**

1. State and explain the Law of Diminishing Returns.
2. Define : (a) Internal Economies (b) Technical Economies
3. Explain the concept of Returns to scale.

## SHORT-RUN AND LONG-RUN COST CURVES

### Introduction :

Every producer tries to expand his production up to the optimum. in order to maximise his profit. There are two forces which help the producer to increase his profits, namely the cost and price. A producer can therefore, increase his profits either by reducing cost or by raising price. But price is controlled by market forces and the producer normally cannot change it by his individual action. The only way to increase profits, therefore, is to adopt those measures which can enable him to reduce his cost of production. This cost of production is the most important item in the whole process of production. The various concepts of costs are :

- (i) Supplementary Costs or Fixed Cost and Average Fixed Cost.
- (ii) Variable Costs or Prime Cost and Average Variable Cost.
- (iii) Total Cost.
- (iv) Average Cost and
- (v) Marginal Cost.

**Fixed Cost and Average Fixed Cost :** Fixed cost remain unchanged during the short period whatever may be the scale of production. For example, rent of the building, the rate of interest on the borrowed funds for plant, the salary of the manager etc. would remain the same irrespective of production. These costs would remain stationary in the short-run though, in the long run, these costs may vary. This could be explained with the help of the following table :-

**Table No. 1**

(Cost in Rupees)

1	2	3	4	5	6	7
Units Produced	Fixed Cost	Average Cost	Fixed Variable Cost	Average Variable Cost	Total Cost	Average Marginal Cost
1	100	100	25	25.0	125	125
2	100	50.0	45	22.5	145	72.5    20
3	100	33.3	60	20.0	160	53.3    15
4	100	25.0	75	18.7	175	43.3    15
5	100	20.0	95	19.0	195	39.0    20
6	100	16.6	120	20.0	220	36.6    25
7	100	14.3	180	25.7	280	40.0    60
8	100	12.5	260	32.5	360	45.0    80

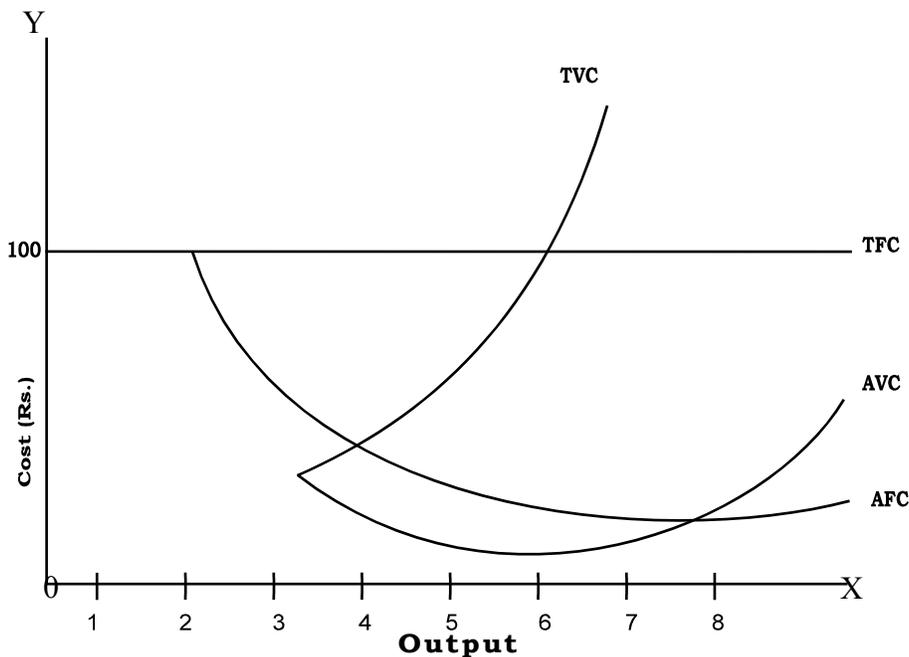
From Table I it is clear that the fixed cost remain static i.e., Rs. 100/- whether the output is 1 unit, or 8 units.

**Average Fixed Cost :** This cost is given by the total fixed costs divided by the number of units produced. For example, average fixed cost goes on diminishing from Rs. 100/- to 50/- Rs. 33.3 and so on.

**(ii) Variable Cost :** These costs vary with the number of units produced, increasing with each increase in number of units produced. In the first instance (e.g., from first unit to 2nd unit) variable costs increase at a diminishing rate. And then, by constant rate between 3rd and 4th units. These costs are also called prime costs and these include the costs incurred on raw material, labour, electricity, water etc. These costs must vary when the scale of production varies.

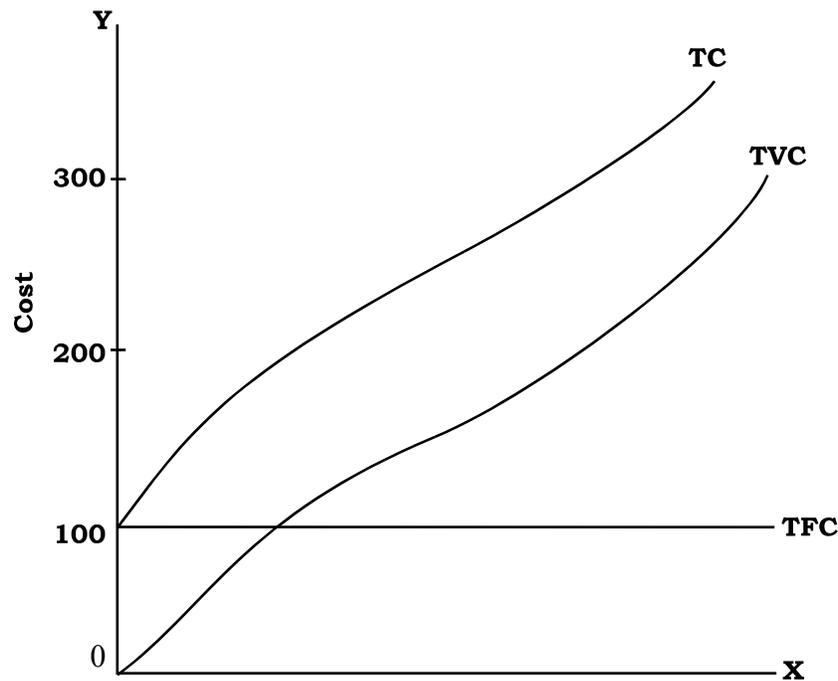
**Average Variable Cost :** Total variable costs divided by the number of units will give us the average variable cost. These costs too show the same tendency i.e., diminishing constant and then rising, depending on the assumption of the operation of the laws of production.

It may be clarified here that in the long-run, the distinction between fixed costs and variable costs disappears. All costs, become variable costs, because even the fixed costs change when scale of production is increased or enlarged.



**Fig. 1**

Let us explain the above mentioned costs with the help of a diagram. From Figure no. 1 it is clear that total fixed costs curve is a straight line parallel to X-axis. Total variable cost curve goes on increasing (sloping upwards, though the curve shows variation in the rate of increase as stressed already). Average fixed cost curve slopes downwards from the left-hand side, declining at faster rate in the beginning and then tapering off gradually. Average variable cost curve falls first and then upwards after, remaining constant for sometime.



Output  
Fig. 2

**(iii) Total Costs :** These costs include both the fixed and variable costs. The total fixed costs plus total variable costs incurred on the production or say four units come to Rs. 175/-. As is clear from diagram No. 2 the total costs curve rises upwards.

**(iv) Average Costs (Average Total Cost) :** This is obtained by dividing the total costs by the number of units produced. For example, the average cost for the four units comes to 43.3 rupees. For six units, the average cost is 36.6 rupees. In figure 2 the average cost curve slopes downward, remains virtually constant for some time and then starts rising for the units produced thereafter.

**(v) Marginal Cost :** The concept of marginal cost is the most important of all. It means the addition to total costs by the production of one more unit. It may be the last unit produced, whatever the size of the output. Mathematically, it can be put like this :-

$$\text{M.C.} = \text{T.C. on } n \text{ units} - \text{T.C. of } n-1 \text{ units}$$

In Table 1, the marginal cost of 8 units is Rs. 80. But if the production is stopped at fifth unit, the marginal cost will be Rs. 20/-. Thus, marginal costs will vary with change in the size of output. In figure 3, the marginal cost curve gradually slopes downward, then becomes almost constant and afterwards starts rising upward. The laws of production are responsible for this shape of the curve.

### Marginal and Average Cost Relationship

As we have noticed, there appears to be an intimate relationship between the marginal cost and average cost. The relation is rather definite and certain. The marginal cost shows the rate at which the total costs increase. Decreasing, constant and increasing marginal cost impart the same nature to that total cost as already mentioned above. Consequently, the average cost is influenced in that manner. Generally, both the curves follow the same pattern, sloping down, remaining constant and then rising under the laws of production.

The relationship could be illustrated with the help of the following diagram:-

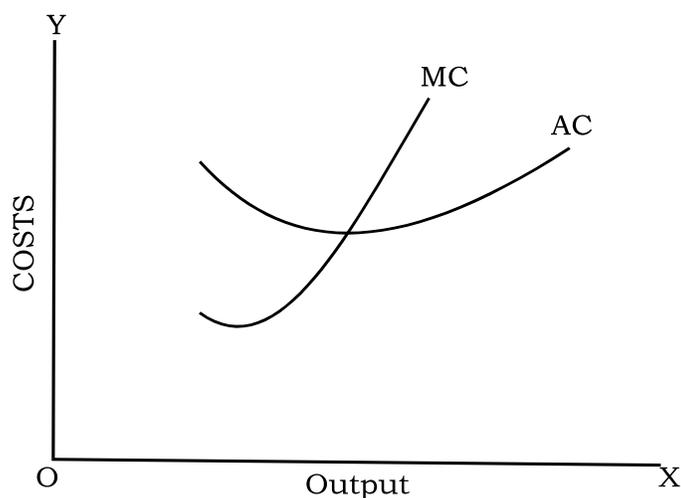


Fig. No. 3

In this diagram units of output are represented along OX, while marginal cost and average cost are represented along OY. MC is marginal cost curve

and AC the average cost curve. We find that up to certain points the curves continue to fall and then they start rising. In the beginning MC is below AC, but a stage comes when MC crosses AC. This stage will always be indicated by a point where AC is at its lowest point and it just starts rising.

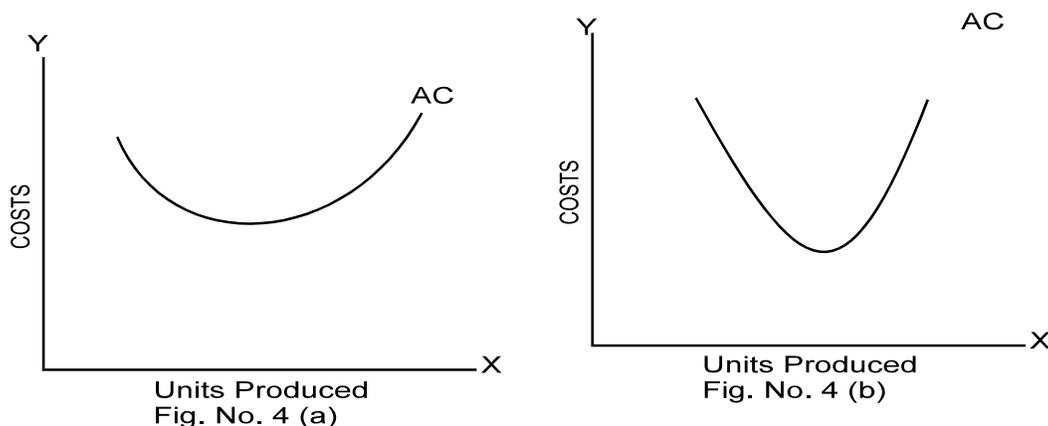
There is, thus, a definite relationship between marginal and average costs. As long as marginal cost is less than average cost, average cost falls. When marginal cost is more than the average cost, average cost will rise. We may explain the same thing in an other way. When average cost is falling marginal cost will be less than the average cost, when average cost is rising, marginal cost will be more than the average cost.

Similar relationship also exists between the marginal cost and average variable cost. Marginal cost curve would intersect the average variable cost curve at the lowest point of the later.

After discussing this relationship, let us now examine the nature of short-run and long-run average cost curve.

### **Nature of the Short-run Average Cost Curve**

As already mentioned above, the average cost curve, short-run and long-run both, would be behaving practically in the same manner. The curves must gradually slope downward, remain constant for some size of the output and then rise upward. But even then there are some slight differences in the nature of the curves and very important factors are responsible for such differences.



The short-run average cost curves will fall rather rapidly in the initial stages of production under influence of the law of diminishing costs (e.g., law of increasing returns). For the very small size of the output, average cost curve may be under the influence of the constant cost (e.g., law of constant returns). Similarly, in the later stages of production, the cost curve must rise under the influence of the law of increasing cost (e.g., law

of diminishing returns). Figure 3 given above shows this nature of the short-run average cost curve.

In fact, the short-run average cost curve may be U-shaped as illustrated in Figure 4a. But sometimes it could be V-shaped with sharp falling and rising wings on both sides (as shown in Figure 4b).

(i) In the initial stages of production, the fixed cost get spread over the enlarged size of output. There is sharp decrease in the average fixed cost in the beginning (see Table No. 1) Later on, when the output increases, there is no perceptible decrease in the average fixed cost.

(ii) The law of variable proportions applies. Costs fall in beginning and then start rising (More of this in the next topic).

(iii) In the initial stages of production certain economies of scale arise and they push down the cost, particularly the average cost. These economies are labour economies on account of division of labour and specialisation, market, economies of buying and selling, managerial economies, financial economies and certain economies of better machines and techniques of production. But in the later stages these economies of scale dry up and give place to diseconomies of large scale production, such as lack of supervision, scarcity of factors of production, say land or capital in relation to other factors.

(iv) In the short-run the size of the plant is given and hence it cannot be enlarged. It is an indivisible unit and has a certain capacity. In the beginning when it is under-utilised, increased dose of factors of production enable optimum use of the plant. Consequently, the costs fall. But after the plant capacity is fully utilised, further increase in the doses of factors of production would turn output only at increasing costs. This is called the concept of indivisibility of factors of production.

Thus, on account of the above mentioned reasons, the average cost curve behaves as explained above.

### **Derivation of the Long-run Average Cost Curve and its Nature**

It may be pointed out at the very outset that long-run average cost curve (LRAC) shall be based on the short-run average cost curves. Just as short run plans, say annual plans comprise the long-run plan, similar is the case with the long-run average cost curve. We know that in the short run the size of the plant is given. But in the long-run all the factors of production are variable. Even the size of the plant can be changed to a bigger one or to a smaller one depending upon the need of the moment. Under such circumstances the producer would switch on at once to a scale of production which gives increased output at the lowest cost.

The LRAC curve is the locus of these points the derivation of the long-run average curve with the help of the diagram is given below :-

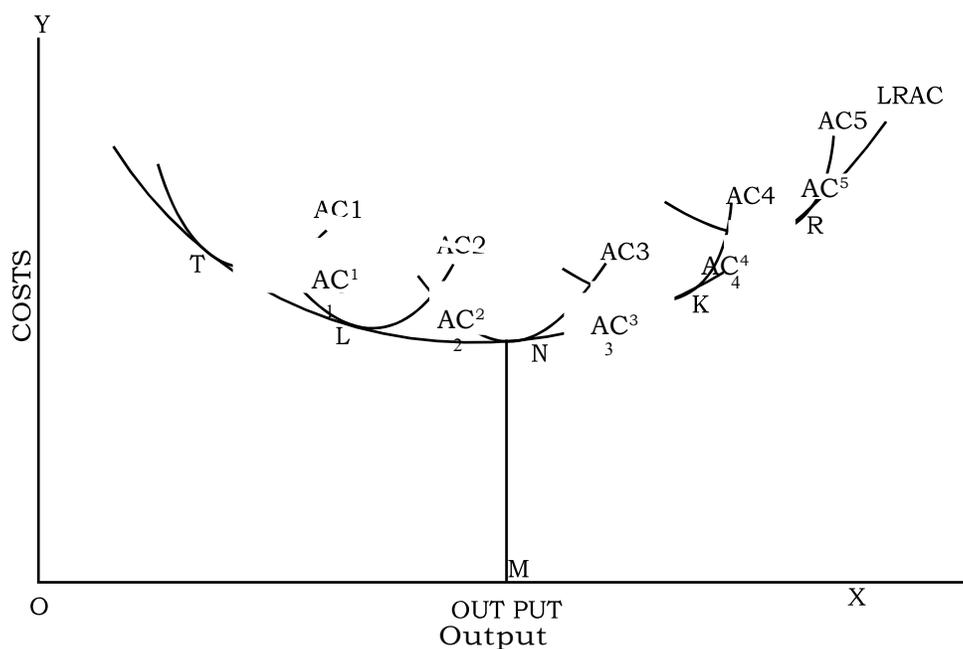


Fig. 5

In Fig. 5 we have various operations as indicated by their respective short-run average cost curves. We have infinite plants of varying capacities such as  $AC^1$ ,  $AC^2$ ,  $AC^3$ ,  $AC^4$  and  $AC^5$ . The producer would be operating during the short period along with these individual plants. But in the long-run, the producer would be operating along the LRAC curve which is virtually tangent to all the short-run average cost curves. Since this curve envelops all short-run curves. It is sometimes called 'Envelope Curve'. A few points may be noted about the nature of this newly-derived curve, (i) In no case the short-run average cost will be less than the long-run average cost, as all the points TLNKR lie on the LRAC (ii) At some output, the short-run and long-run average cost must be equal as the producer must be producing the optimum output at its minimum cost of both types. In this diagram this output is OM at cost NM (short as well as long-run cost), (iii) This long-run average cost curve is not essentially tangent to all short-run cost curves at their minimum cost of production except in the case of the most efficient scale of output. (iv) The long-run average cost curve, thus, derived is almost U-shaped. We know that as the firm grows in its size there are economies of scale. As a result of these economies, cost per unit of output diminishes as the size of it increases. Economies, however, have their limits and beyond a point, diseconomies, outweigh the economies and cost per unit of output begins to rise. The LRAC, therefore, slopes downward in the initial stages, but after a point it rises upwards. So LRAC is U-shaped curve, but with a flat bottom like depth of a disc.

As already pointed out, the long-run average cost curve is more flat at the bottom. Even the fall and rise in cost are gradual. It is something in contrast to the nature of the short-run cost curve. The reasons for flat-bottomed nature of the curve are as follows:

(i) Since all the factors, including the size of the plant are variable, thus, indivisibilities in certain factors do not arise. This eliminates the possibilities of certain cost benefits in early stages of production. It is equally true in the case of later stages of production when the diseconomies do not appear all of a sudden.

(ii) Since all costs are variable, no substantial advantage accrues when scale is enlarged as no fixed costs are there to be spread over the output.

(iii) Since all the factors can be varied in required quantities, returns to scale apply rather than returns to proportions. Long period facilitates the mixing of factors in right proportions, giving rise to law of constant costs rather than to the other two laws. Hence the curve under reference gradually rises.

A reference may be made here to the nature of the short-run and long-run marginal costs. In the short period, the marginal cost curve will follow the pattern of its sister curve of average cost. It will be almost U-shaped too. Similarly, in the long-run it will be comparatively more flat, having features-comparable to those of a long-run average cost curve. The long-run marginal cost curve is also a U-shaped curve. The only difference is that in the short-run, the change in total variable cost divided by change in output gives the marginal cost. In the long-run distinction between fixed cost and variable cost disappears. In the long-run, therefore, marginal cost is difference in the total cost when a unit change is made in the output.

### **Suggested Readings :**

1. A. Koutsoyiannis : Modern Microeconomics
2. H.L. Ahuja : Principles of Microeconomics

### **Questions for Practice :**

1. What is the shape of the long run average cost curve?
2. Define : (i) Total Cost  
(ii) Average Cost  
(iii) Relation between MR (Marginal Revenue) and AR (Average Revenue)

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**LESSON NO. 1.8**

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**MARKET FORMS, CONCEPT OF REVENUE AND  
ANALYSIS OF REVENUE**

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- 1. Introduction**
- 2. Objective**
- 3. Meaning of Market**
- 4. Types of Markets**
- 5. Concepts of Revenue**
- 6. Question for Practice**
- 7. Suggested Readings**

**1. Introduction:**

The level of price and production of different goods depend on some factors like type of market form in which these goods are produced, the conditions of sale and purchase of that commodity in the market. Economists classified the different market forms like perfect competition, monopoly, monopolistic competition etc. according to different conditions like number of buyers, number of producers, nature of the product, price determination etc.. So, in the first part of this lesson we will discuss about the different market forms. And in the second part we will discuss about the concept of revenue. Because every producer wants to know the revenue from the sale of his product and the revenue of the product depends on the demand of those products. So in this lesson, all the concepts of revenue curves and different market forms are discussed.

**2. Objectives :**

After having gone through this lesson, you would be able to:

- \* understand the meaning of market.
- \* discuss about the different types of market forms like perfect completion, monopolistic competition, monopoly, oligopoly etc.
- \* know the meaning of revenue and different types of revenue.
- \* discuss the different revenue curves under different market forms.
- \* established the relationship of elasticity of demand with average and marginal revenue.

**3. Meaning of Market :**

The term “market” refers to a particular place where goods are purchased and sold. But, in economics, market is used in a wide perspective. In economics, the term “market” does not mean a particular place but the whole area where the buyers and sellers of a product are spread.

According to Prof. R. Chapman, “The term market refers not necessarily to a place but always to a commodity and the buyers and sellers who are in direct competition with one another.” In the words of A.A. Cournot, “Economists understand by the term ‘market’, not any particular place in which things are bought and sold but the

whole of any region in which buyers and sellers are in such free intercourse with one another that the price of the same goods tends to equality, easily and quickly.”

#### 4. Types of Market:

On the basis of Area:

- a) **Local Market:** The local market is that market when a commodity is sold and purchased in a small area.
- b) **National Market:** When a commodity is sold and purchased in a country.
- c) **International Market:** When a commodity is sold and purchased in different countries.

On the basis of Time:

- a) **Very short period market:** It is a market of perishable goods like milk, vegetables, food products etc.
- b) **Short period market:** It is a market where the supply of goods can be increased according to demand.
- c) **Long period market:** It is a form of market where there cannot be change in the supply according to demand.
- d) **Very long period market:** The time period is very long in this market. New industries according to demand can be established.

In **economics**, **market structure** (also known as **market form**) describes the state of a **market** with respect to **competition**.

The major market forms according to competition are:

- (1) Perfect Competition
- (2) Monopoly
- (3) Monopolistic Competition
- (4) Oligopoly
- (5) Duopoly

Now we will discuss these market forms in brief:

**(1) Perfect Competition:** Generally, a perfectly competitive market exists when every firm in the market are **price takers** and no one is able to charge a different price without losing business. Specific characteristics of perfect competition includes:

- **Large number of buyers and sellers:** There are many buyers who are willing to buy the product at a certain price and there are many sellers who are willing to sell the product at a certain price.
- **No barriers to entry and exit:** There are no barriers to entry and exit for firms and firms are able to enter or leave the market without any issues.
- **Perfect information:** All buyers are assumed to know the price of the product set by all sellers and sellers are assumed to know the production methods of their competitors.

**(2) Monopoly: Monopoly is** a market structure characterized by a single seller, selling a unique product in the market. In a monopoly market, the seller faces no competition, as he is the sole seller of goods with no close substitute. In a monopoly market, factors like government license, ownership of resources, copyright and patent and high starting cost make an entity a single seller of goods. All these factors restrict the entry of other sellers in the market. Monopolies also possess some information that is not known to other sellers.

Characteristics associated with a monopoly market make the single seller the market controller as well as the price maker. He enjoys the power of setting the price for his goods.

**(3) Monopolistic competition:** Monopolistic competition is a market form. Like with Perfect competition, there are many buyers and sellers. But the market is not perfect. This is because the products are not homogeneous, or because the buyers have explicit or implicit preferences. This market form is quite common. As an example, take a bakery. There are many bakeries in the town, but one of those bakeries can demand a slightly higher price for bread, because it is the only one in a certain part of the town. Monopolistically competitive firms are able to gain a greater degree of market share and as a result, increase prices. If a particular bakery is known for selling the best pies and pastries in town, they can increase their prices for pies and pastries as they know consumers will pay slightly more for a superior product. This is known as establishing a brand name and brand loyalty.

**(4) Oligopoly:** An oligopoly is a market form in which the market or industry is controlled by a small number of sellers. Usually, the market has high barriers to entry, which prevents new firms from entering the market or even be able to have a significant market share. There are two types of oligopoly.

(a) Pure Oligopoly: When all the firms produce homogenous goods.

(b) Differentiated Oligopoly: When all the firms produce differentiate good.

**(5) Duopoly:** A duopoly is a situation where two companies own all, or nearly all, of the market for a given product or service. A duopoly is the most basic form of oligopoly, a market dominated by a small number of companies. A duopoly can have the same impact on the market as a monopoly if the two players collude on prices or output. In a duopoly, two competing businesses control the majority of the market sector for a particular product or service they provide. A business can be part of a duopoly even if it provides other services that do not fall into the market sector in question. For example, Amazon is a part of the duopoly in the e-book market but is not associated with a duopoly in its other product sectors, such as computer hardware.

Now we discuss the different market forms through a table given below:

TYPES OF MARKET FORMS AND THEIR CHARACTERISTICS						
Forms of Markets	Number of Firms	Nature of Product	Barriers to Entry	Price Elasticity	Degree of Control Over Price	Non-Price Competition
Perfect Completion	Many	Homogenous	No	Infinity	No	No ion
Monopolistic Competition	Many	Heterogeneous	No	More	Some	Product Differentiate and Advertisement
Monopoly	One	Special Product without any close substitute	Yes	Very Less	Very Large	No ion
Pure Oligopoly	Few	Same	Yes	Less	Some	No ion
Differentiated Oligopoly	Few	Differentiate	Yes	Very Less	Large	Product Differentiate and Advertisement

**5. Concept of Revenue:** Revenue, in simple words, is the amount that a firm receives from the sale of the output. According to Prof. Dooley, “ The Revenue of a firm is its sales receipts or income.’ In a firm, revenue is of three types:

- 1) Total Revenue
- 2) Average Revenue
- 3) Marginal Revenue

Let’s look at each one of them in detail:

**4) Total Revenue**

The Total Revenue of a firm is the amount received from the sale of the output. Therefore, the total revenue depends on the price per unit of output and the number of units sold. Hence, we have

$$TR = Q \times P$$

Where,

TR is Total Revenue, Q is Quantity of sale (units sold), P is Price per unit of output

**5) Average Revenue:**

Average revenue is the revenue that a firm earns per unit of output sold. Therefore, you can get the average revenue when you divide the total revenue with the total units sold. Hence, we have,

$$AR = TR / Q$$

Where,

AR is Average Revenue, TR is Total Revenue, Q is Total units sold

**6) Marginal Revenue:**

Marginal Revenue is the amount of money that a firm receives from the sale of an additional unit. In other words, it is the additional revenue that a firm receives when an additional unit is sold. Hence, we have  $MR = TR_n - TR_{n-1}$  Or

$$MR = \Delta TR / \Delta Q$$

Where,

MR – Marginal Revenue,  $\Delta TR$  – Change in the Total revenue,  $\Delta Q$  – Change in the units sold,  $TR_n$  – Total Revenue of n units,  $TR_{n-1}$  – Total Revenue of n-1 units

MR pertains to a change in TR only on account of the last unit sold. On the other hand, AR is based on all the units that the firm sells. Therefore, even a small change in AR causes a much bigger change in MR. In fact, when AR reduces, MR reduces by a far greater margin. Similarly, when AR increases, MR increases by a greater extent too. AR and MR are equal only when AR is constant. It is also important to note that the firm does not sell any unit if the TR or AR becomes either zero or negative. However, there are times when the MR is negative (especially if the fall in price is big).

**The relationship between TR, AR, and MR:**

In order to understand the basic concepts of revenue, it is also important to pay attention to the relationship between TR, AR, and MR.

The relationship between TR, AR and MR can be expressed with the help of a table given below:

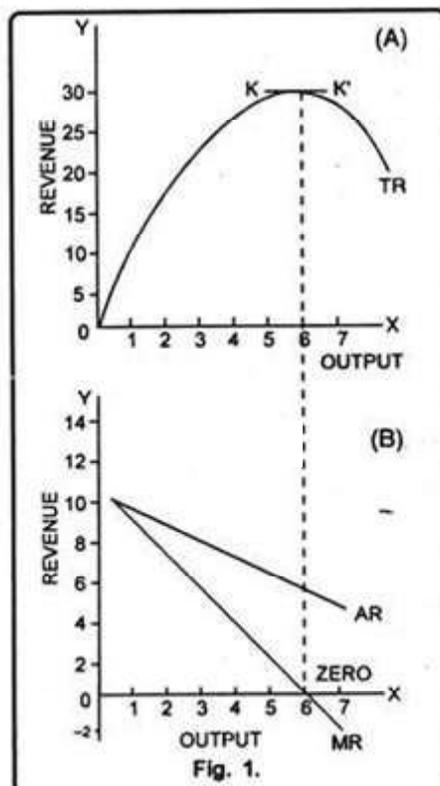
**TABLE-1**

Unit (q)	TR/q AR or Price	(Pq) TR	(TR <sub>n</sub> -TR <sub>n-1</sub> ) MR
1	10	10	10
2	9	18	8
3	8	24	6
4	7	28	4
5	6	30	2
6	5	30	0
7	4	28	-2
8	3	24	-4
9	2	18	-6
10	1	10	-8

From above table we can draw the idea that as the price falls from Rs. 10 to Re. 1, the output sold increases from 1 to 10. Total revenue increases from 10 to 30, at 5 units. However, at 6th unit it becomes constant and ultimately starts falling at next unit i.e. 7th. In the same way, when AR falls, MR falls more and becomes zero at 6th unit and then negative. Therefore, it is clear that when AR falls, MR also falls more than that of AR: TR increases initially at a diminishing rate, it reaches maximum and then starts falling.

In fig. 1 three concepts of revenue have been explained. The units of output have been shown on horizontal axis while revenue on vertical axis. Here TR, AR, MR are total revenue, average revenue and marginal revenue curves respectively. In figure 1 (A), a total revenue curve is sloping upward from the origin to point K. From point K to K' total revenue is constant. But at point K' total revenue is maximum and begins to fall. It means even by selling more units total revenue is falling. In such a situation, marginal revenue becomes negative.

In fig. 1 (B) MR is the marginal revenue curve which slopes downward. It signifies the fact that MR with the sale of every additional unit tends to diminish. Moreover, it is also clear from the fig. that when both AR and MR are falling, MR is less than AR. MR can be zero, positive or negative but AR is always positive.



This brings us to the consideration revenue aspect of the firm. In this connection, we have three concepts (i) total revenue (ii) average revenue and (iii) marginal revenue : if they are represented diagrammatically, then we get accordingly the (i) total revenue curve (ii) average revenue curve : and (iii) marginal revenue curve. Total revenue of the firm denotes the total amount of receipts when the firm sells a given amount of production. Clearly this total revenue will change as the level of output is changed. If with increasing output, the price has to be reduced, then the total revenue will increase less the increase in production. On the other hand, if the price per unit does not change, then increase in total output increases total revenue in the same proportion. Under conditions of perfect competition a firm can sell any amount it likes at a given price fixed in the market by forces of total demand and total supply for the industry as a whole. A change in the output of the firm in question does not change the price at which it can sell additional amount of production. In the case of imperfect competition or monopoly, however, firm has to reduce the price if it wants to sell more and, therefore, under market conditions the addition to revenue is less than the addition to output.

Average revenue is the revenue per unit, or price per unit. Average revenue curve (AR) is the same thing as the demand curve for the product of the firm. It has already been mentioned that under perfect competition the firm can sell as much as it likes at the market price. This means that the average revenue curve in this case is a straight line running parallel to X-axis, when we measure the price along Y-axis and the quantity sold along X-axis. We can also say that the demand for the output of such a firm will be perfectly elastic. When, however, the competition is not perfect, demand curve will not run parallel to X-axis i.e., the demand will not be perfectly elastic and firm will not be able to sell increased amount of production at the same price. It will have to reduce price in order to sell more. In case of an industry the demand curve slopes downwards to the right showing that the industry has adopted low price if it wants to sell more. Now under the condition of monopoly, for example, there is no distinction between a firm and industry. The firm itself is an industry also. Therefore, in this case the firm has to reduce the price if it wants to sell more. Similarly, under conditions of imperfect competition we get a situation in which the firm possess some features of the industry as far as demand is concerned, and in this case, therefore, the demand curve slopes downward that is the average revenue curve slopes downward.

Now we come to the marginal revenue. Marginal revenue is the addition to total revenue when one more unit is sold. It is easy to understand that if the commodity does not change when more output is sold then the average price or the average revenue will remain the same and it will be equal to additional revenue. In other words, the average and marginal revenues will be equal to each other, if the price per units remains constant. This is if the average revenue curve is running parallel to X-axis and shows a constant average revenue then the marginal revenue curve will also run parallel to X-axis and will coincide with AR curve. It is easy to see that if at any stage AR becomes constant, MR will at once become equal to it so that at this stage, MR curve will join the AR curve. If, however, the average revenue is sloping downwards, then the marginal revenue will slope downwards faster because the revenue on the existing sales goes down. In the accompanying figure, we depict two cases of average and marginal revenue curves. In figure No. 1(A) AR is denotes the average revenue and AR running parallel to X-axis and the MR coincides with it. In the figure no.1 (b) we see that AR is sloping downwards and the MR lies below it.

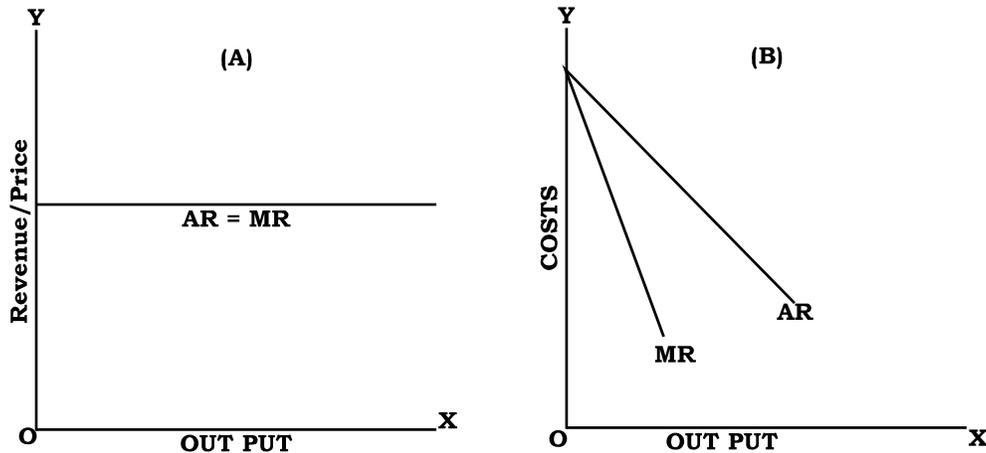


Fig. No. 1

In the case of perfect competition the demand curve (which is nothing but the AR curve for the firm) runs parallel to the X-axis and, therefore, in this case the AR and MR coincide. On the other hand, in the case of monopoly and imperfect competition, since the demand curve (AR curve) slopes downward to the right the MR lies below AR. This particular relationship between AR and MR is useful for analysing the equilibrium of the firm.

Average revenue and marginal revenue are also related to the elasticity of demand. We know that elasticity of demand at a point on a straight line demand curve can be found by dividing lower segment of the demand curve by the upper segment. With this measure of point elasticity of demand we are able to study the relationship between average and marginal revenue. At any point the relationship can be written as

$$\text{Elasticity of demand} = \frac{\text{Average Revenue}}{\text{Average Revenue} - \text{Marginal Revenue}}$$

In symbolic form :

$$e = \frac{A}{A - M}$$

Where, A = Average Revenue

M = Marginal Revenue

e = point elasticity on the average revenue curve.

It follows from this that

$$eA - eM = A$$

$$\text{or } eM = eA - A$$

$$\text{or } eM = A(e-1)$$

$$M = A \frac{(e-1)}{e}$$

Similarly, since  $eA - eM = A$ , it means

$$\text{or } eM = eA - A$$

$$\text{or } \frac{eM}{e-1} = A$$

$$\text{or } A = M \left( \frac{e}{e-1} \right)$$

$$\text{Average Revenue} = \text{Marginal Revenue} \times \left( \frac{e}{e-1} \right)$$

$$\text{Marginal Revenue} = \text{Average revenue} \times \left( \frac{e-1}{e} \right)$$

Marginal revenue equals half average revenue. Marginal revenue is always positive at any output where the elasticity of the average revenue curve is greater than one. Moreover, where elasticity is less than one, marginal revenue is always negative. This can be seen by applying the above given formula. If point elasticity of demand on the average revenue curve is known to us, we can discover marginal revenue at any output and average revenue at the same output with the help of the above given formula.

### **Suggested Readings**

1. H.L. Ahuja : Principles of Micro Economics Analysis
2. A.W. Stonier : A Text Book of Economic Theory  
& D.C. Hague
3. K.K. Dewett : Modern Micro Economic Theory
4. Koutsoyiannis : Modern Micro Economics

### **Long Answer Type Questions (For Practice)**

1. Discuss Cost Curves.

### **Short Answer Questions (For Practice)**

1. Discuss the different Market Forms.
2. Discuss the different concept of Revenue.