Centre for Distance and Online Education

Punjabi University, Patiala

Class : BBA-Part-I   **Semester : I**
Paper : BBA-102 (Business Economics-I) Unit: I
Medium : English

Lesson No. (Updated on: 21St June 2023)

Department website : www.pbidde.org

BBA-102: BUSINESS ECONOMICS-I

Time Allowed: 3 Hrs.   Max Marks: 100

Theory: 60

Internal Assessment: 40

Instructions for Paper-setters/Examiners

The question paper covering the entire course shall be divided into three sections as follows:

Section-A

It will consist of four essay type questions set by the examiner from Part-I and the candidate shall be required to attempt two. Each question shall carry ten marks; total weight of the section is 20 marks.

Section-B

It will consist of four essay type questions set by the examiner from Part-II and the candidate shall be required to attempt two. Each question shall carry ten marks; total weight of the section is 20 marks.

Section- C

It will consist of ten short answer questions. All questions are compulsory. Each question shall carry two marks; total weight of the section is 20 marks.

Course Input:

Part-I

Nature and Scope of Economics; Consumer's Behavior; Utility Approach: Brief
Outline of Law of Diminishing Marginal Utility and Law of Equi-Marginal Utility; Indifference Curve Approach: Consumer Equilibrium; Income. Price and Substitution Effect. Revealed Preference Theory; Meaning of Demand and Its Types; Law of Demand; Derivation of Law of Demand. Elasticity of Demand: its measurement: Price, Income and Cross Elasticities of Demand.

Theory of Production

Law of Variable Proportion: Total; Average and Marginal. Physical Product; Production Possibility Curve, Marginal Rate of Technical Substitution; Returns to Scale.

Part-II

Theory of Cost :

Short and Long Period Costs, Concepts of Total Cost, Marginal and Average Cost. Concept of Revenue: Total Revenue; Average Revenue; Relationship between Average and Marginal Revenue and Elasticity of Demand: Break Even Analysis and Profit Forecasting in Short Run.

Equilibrium of Firm and Industry:

Perfect Competition; Assumptions; Price Determination; Monopoly; Concept; Assumption; Price Determination; Monopoly Power, Control and Regulation; Discriminating Monopoly.

Recommended Readings:

Koutosoyianni's : Modern Micro Economics

Ahuja, H.L. : Advanced Economic Theory

Stonies and Hague :A Textbook of Economic Theory

LESSON NO. 1.1   DR. PARMOD K. AGGARWAL

NATURE AND SCOPE OF ECONOMICS

STRUCTURE

1.1.1 Objectives of the lesson

1.1.2 Introduction

1.1.3 Nature of Economics

      1.1.3.1 Economics : Science or Art?

      1.1.3.2 Economics : Positive or Normative

      1.1.3.3 Economics : Static or Dynamic?

      1.1.3.4 Self Check Exercise

1.1.4 Micro and Macro- Economics

1.1.5 Deductive and Inductive Method

1.1.6 Equilibrium

      1.1.6.1Partial Equilibrium and General Equilibrium

1.1.7 Economic System and Its Problems

      1.1.7.1 How to Make the Economy Grow ?

      1.1.7.2 Categories of Producers

      1.1.7.3   Self Check Exercise

1.1.8 Summary

1.1.9 Glossary

1.1.10 Questions for Exercise

1.1.11 Suggested Readings

1.1.1 OBJECTIVES OF THE LESSON

The main objectives of this lesson is to make students familiar with

- Nature of economics
- Types of economics
- Various types of economic system prevalent in the economy.

1.1.2 INTRODUCTION

The status of the subject would have lost its room in the building of knowledge, if there would have been no concept like "Economy". An economy exists because of two facts. Firstly, human wants for goods and services are unlimited and secondly, productive resources to produce goods and services are scarce in nature. That being the case, an economy has to decide how to use its scarce resources to obtain the maximum possible satisfaction of the members of the society. Thus, the subject matter of economics is economic activity i.e., the problems arising from production,

distribution and exchange. Following definitions give a better explanation of the subject.

(a) Economics means "The practical science of the production and distribution of wealth": J. S.Mill.

(b) Lionel Robbins defines Economics as "The science which studies human behaviour as a relationship between the ends and scarce means which have alternative uses".

(c) Marshall defines Economics as "A study of mankind in the ordinary business of life; it examines that part of individual and social action which is most closely associated with the attainment and with the use of the material requisites of well being".

(d) Jacob Viner has given a pragmatic definition of Economics like "Economics is what economists do".

But all the above definitions are not sufficient and relevant for recent developments in economics during the last four decades, especially the emergence of Keynesian theory of Income and Employment determination, and of the economics of growth have necessitated a restatement of the definition. Accordingly, an adequate definition was given by economists as "Economics is a social science concerned with the proper use and allocation of resources for the achievement and maintenance of growth with stability and with determinants of income and employment".

1.1.3 NATURE OF ECONOMICS

1.1.3.1 ECONOMICS : SCIENCE OR ART

The English Classical School of Economists were of the view that it was a science, pure and simple. As such its function is merely to explain the causes of economic phenomena. Like other sciences it is simply a study of causes and effects.

But the economists on the continent of Europe and Indian economists hold a different view. They think that to regard Economics as merely a science is to rob it of its utility. They emphasize the "art" side of Economics and point out the great practical utility of the study of Economics. It has got a theoretical side as well as a practical or applied side. It is thus a science, both "light-giving and fruit bearing".

1.1.3.2 ECONOMICS: POSfTIVE OR NORMATIVE

Whether Economics is Positive or Normative was sometimes the controversial issue among the policy makers. Positive economics is concerned with explaining what that is, it describes theories and laws to explain observed economic phenomena. Whereas normative economics is concerned with what should be or what ought to be the things. Positive economics explains the determination of relative prices and the allocation of resources between different commodities. But the question of what price should or ought to be fixed comes under the purview of normative economics. That is why the normative economics is also called the "Prescriptive Economics". It involves value judgments (i.e., conception of the people about what is good or bad).

1.1.3.3   ECONOMICS: STATIC OR DYNAMIC?

Pure economic theory falls under two broad headings: economic statics and economic dynamics. An economic variable is said to be stationary if the value of the variable does not change over tirne, or remains constant overtime. Economic statics refers to that type of analysis where we establish the functional relationship between two variables whose values relate to the same point of time or the same period of time. It is quite possible that whereas a variable may be changing from the micropoint of view but you may remain stationary from the macro point of view. On the other hand, an economic dynamics consider the relationship between certain variables, the values of which refer to the different points or different periods of time.
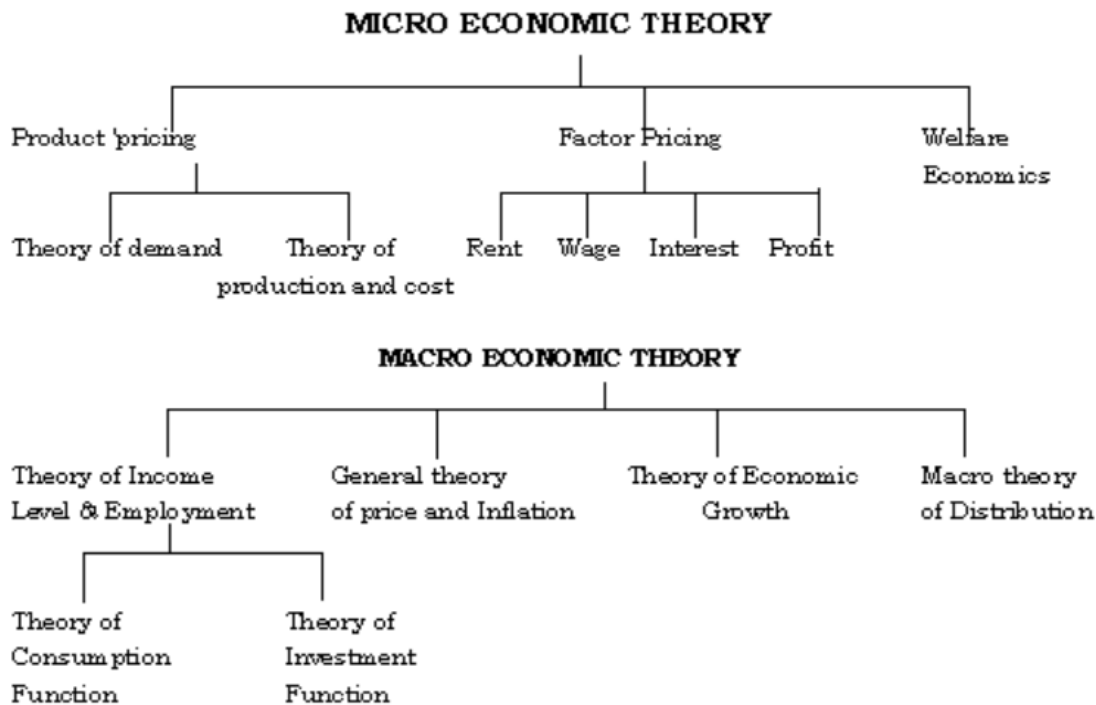
But, from strictly scientific point of view, economic dynamics is much more appropriate than economic statics as the later cannot faithfully portray the living world which is characterised by dynamism with uncertainty. It is to be noted that the change or movement in a dynamic system is endogenous, that is it goes on independently of the external changes in it; one change grows out of the other.

1.1.3.4 Self Check Exercise : 1

1.   Define Economics. Is it a science or an art ?

1.1.4 MICRO AND MACRO - ECONOMICS

Ragnar Frisch developed and used the term Micro and Macro which has been now used by economists all over the world. The former is derived from the Greekword mikros, meaning"small" and the latter is derived from the Greek word makros meaning "large". Thus, micro economics deals with the analysis of small individual units of the economy such as individual consumers, individual firms and small aggregates such as various industries and markets. On the other hand, macroeconomics concerns itself with the analysis of the economy as a whole and its large aggregates such as total national output, total employment, total consumption, aggregate investment etc. Both Micro and Macro economic theory can be presented in the following manner.

MICRO ECONOMIC THEORY

Product pricing — Factor Pricing — Welfare Economics

Theory of demand — Theory of production and cost

Rent — Wage — Interest — Profit

MACRO ECONOMIC THEORY

Theory of Income Level & Employment — General theory of price and Inflation — Theory of Economic Growth — Macro theory of Distribution

Theory of Consumption Function — Theory of Investment Function

Though, a dividing wall is there between the two but they are interdependent. Some macroeconomic aggregates are derived with the help of theories of individual behaviour. To be further clear, the theory of relative prices of products and factors are essential in the explanation of the determination of general price level.

1.1.5 DEDUCTIVE AND INDUCTIVE METHOD

The method, the English classical economists used is called as Deductive, Analytical, Abstract or A Priori method. The main steps in the application of deductive method are (a) perception of-problem-to-be investigated; (b) defining the technical terms and making appropriate assumptions. (c) deducing hypothesis i.e. deriving generalisations and (d) testing or verification of the hypothesis. David Ricardo along with Senior, Mill, Cairnes were the chief experts of this method. But this method proves particularly dangerous when universal validity is claimed for generalizations based on imperfect or incorrect assumptions, when attempts are made to forrnulate

practical policies of a nation in the light of these generalizations. Economists like Roscher, Hilderbrand and Fredrick List advocated a method which has come to be known as Historical, Inductive or Realistic. This method insists on the examination of facts and then laying down general principles. Here, we go up from "particulars" to "general", whereas in deductive method we come down from "general" to particular. The main weapons in the hands of inductive economists are (a) observation (b) experimentation and (c) statistical or econometric method. This method has the merit of being based on facts and having, therefore, a surer foundation.

The modern economists, however, do not rely on one method to the exclusion of the other. It is realised that theories without facts are barren and facts without theories are meaningless. Both the methods are needed for scientific thought, as the right and left foot are both needed for walking.

1.1. 6   EQUILBRIUM

Equilibrium means a state of balance. When forces acting in opposite directions are exactly equal, the object on which they are acting is said to be in a state of equilibrium.

Stable equilibrium: A system is said to be in stable equilibrium if, when any small disturbance takes place, forces come into play to reestablish the initial position. When the word equilibrium is used to qualify the terrn value, then according to Prof. Schumpeter "a stable equilibrium value is an equilibrium value that, if changed by a small amount, calls into action forces that will tend to reproduce the old value".

Neutral equilibrium: A neutral equilibrium value is the state when the disturbing forces neither bring it back to the original position nor do they drive it further away from it. It rests where it has been moved.

(Stable Equilibrium)

(Neutral Equilibrium)

(Unstable Equilibrium)
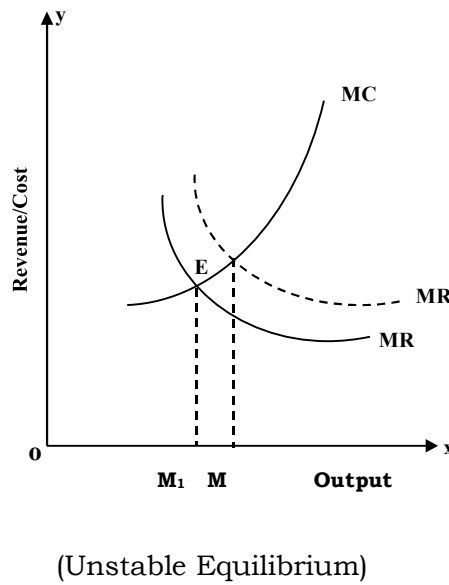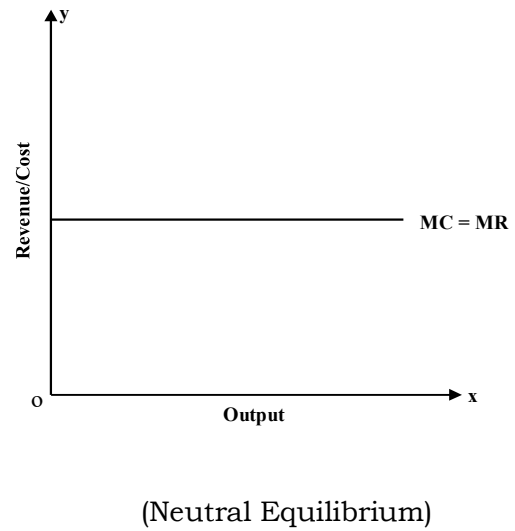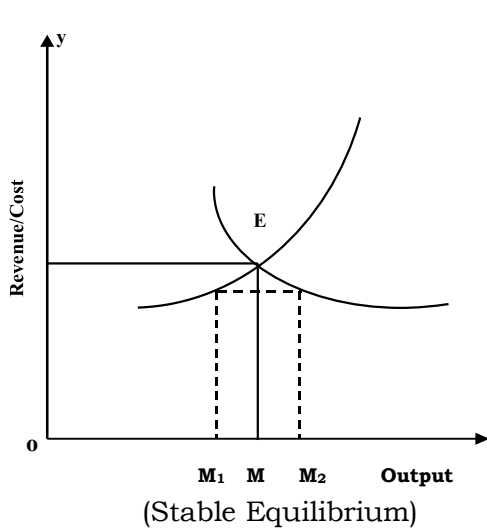
Unstable equilibrium: An unstable equilibrium value is an equilibrium value, change in which calls forth forces which tend to move the system further and further away from the equilibrium value.

1.1.6.1   PARTIAL EQUILIBRIUM AND GENERAL EQUILBRIUM

Partial equilibrium analysis is the analysis of an equilibrium position for a sector of the economy or for one or several partial groups of the economic units corresponding to a particular set of data. This analysis excludes certain variables and relationships from the totality and studies only a few selected variables at a time. Marshallian theory of value is a case of partial equilibrium analysis. But this analysis was abandoned because of its unrealistic assumptions and the concept "Ceteris Paribus". Therefore, a general approach was adopted to take account of the basic mechanics of the whole economy.

Equilibrium in general sense requires the harmony of the multitude of forces emanating from the multitude of decision-making units so as to equate the demand and supply for each product and each factor at completely inter-related and consistent set of prices. Walras was the first person to build a model of general equilibrium of a purely competitive economy in order to express theoretically and identify practically the various rackets through which the mechanism of interdependence works to bring about general equilibrium.

1.1.7 ECONOMIC SYSTEM AND ITS PROBLEMS

Economic system refers to the system or the process in which economic activities are organised. It is a social organism constituted of all those individuals, households, firms, factories etc. which engage themselves in economic pursuit of their choice.

The system often works smoothly even if there is nobody to control and regulate these activities. Everyone fulfills his requirements. The mechanism behind this is what Adam Smith calls "Invisible hands" the market forces of demand and supply. But all the concerned object of an individual consumer or producer is not fulfilled because of the fact that resources are scarce in supply. It is also another fact that each producer or consumer cannot take his independent decision in various economic systems (capitalism, socialism and communism). Again two-thirds of the world is living in poverty. The problem of scarcity is present there in full strength and affluence for them is still a far cry. In view of the scarcity of resources and unlimited wants for more and more production countries have to use their resources so as to get more out of them. In doing so they have to solve some basic problems, called the central problems of an economy which are explained below:

(I)   WHAT TO PRODUCE?

The problem "What to produce" can be divided into two related questions, Firstly, which goods are to be produced and which not and secondly, in what quantities of those goods, the economy has decided to produce, are to be produced. Since resources are in fact, scarce relative to human wants, an economy must choose among different alternative collections of goods and services.

If the society decides to produce a particular good in larger quantity, it will then have to withdraw resources from the production of other goods. Further, an economy has to decide how much resources should be allocated for the production of consumer goods and how much for capital goods. The choice between consumer goods and capital goods involves the choice between the present and the future. Society has to decide not only the relative amounts of consumer and capital goods to be produced but it has also to determine the specific quantities of each type of capital goods and consumer goods. But, all these depend upon the type of economy. If it is a capitalist or free-market economy, the problem of resource allocation is solved by price mechanism. If it is a socialist economy the Central, planning authority allocates the resources of the economy among the different uses. The Government is guided in this process of allocation by the present and future needs of the economy. In a mixed economy set-up, the production of basic goods is undertaken by the state and that of others is left to the private sector.

(II)   HOW TO PRODUCE?

The problem of "how to produce" means which combination of resources is to be used for the production of a thing and which technology is to be made use of in production. Obviously, this is a problem of the choice of production techniques. Different methods or techniques of production would use different quantities of various resources.

For instance, the production of cloth with handloom would make use of more labour and less capital. Production by handloom is, therefore, called labour intensive technique of production. Production of cloth with powerlooms or automatic looms utilises less labour and more'capital. Thus, production with powerloans is called capital intensive technique of producing cloth. Thus, the economy has to choose whether it wants to produce with labour intensive or capital intensive methods of production. But the most efficient method is to be adopted because of scarcity' of resources.

(III)   FOR WHOM TO PRODUCE?

Once, the problems of "what" and "how" to produce are solved, the goods are then produced. Then the economy is faced with the third basic problem "For whom to produce". It means how the national produce is to be distributed among the members of the society. Distribution of the national product depends on the distribution of national income. As such larger income groups get larger quantities of goods and services whereas the lower income group have less purchasing power to buy the things. But now the question arises that how is the national income distributed ? Should the people get equal incomes and hence equal shares from the national product or whether the distribution of the national income should be done on the basis of Marxian principle "from each according to his ability and to each according to his needs", or should the distribution of national income be in accordance with the contribution made to total production, that is, should everybody get income exactly to what he produces?

1.1.7.1   HOW TO MAKE THE ECONOMY GROW?

The process whereby an economy increases the amount of goods and services overtime is called economic growth. The problem in under developed countries is how to make the economy grow at an increasing rate, while in developed economies the problem is how to maintain a steady rate of growth. In order to have a rapid rate of growth, the economy must increase its rate of savings and investment, lower the population growth and adopt new and improved techniques of production. On the other hand, the maintenance of steady growth requires real income and output should expand at the same rate at which the productive capacity is increasing.

(i)   GOODS AND THEIR CLASSIFICATION

Goods in economics means those things, material or non-material, which have the power to satisfy human wants. All goods possess utility. In other words they have the essential quality and capability of satisfying some wants. Pen, pencil, copy books, tables and chairs, all satisfy some wants and hence are called goods. Also included in the category of goods are the services of the doctors, lawyers, teachers etc.

(ii)   Material and Non-material Goods

Material goods include all such things which are external to a man. These are the objects which can be seen, touched or transferred from one place or person to another. The agricultural output, industrial goods, machines, buildings, tools and implements, are all the examples of material goods.

Non-material goods are generally those which are non- transferable. They include the personal qualities of a man, his ability and willingness to do some work. The skill of a technician or the ability of a doctor are the examples of non- material goods.

(iii)   Free Goods and Economic Goods:

Free goods are those which have been given to us by nature, such as air, sunshine, heat and light. These goods are not produced by human efforts. Since these goods are found in unlimited quantities and their supply is beyond the control of man, they do not create any economic problem. People are not supposed to pay any price for them.

Economic goods are those which are limited in quantity as compared to their demand. Whether supplied by nature or produced by man, the essential quality of economic goods is their scarcity. Land, for example, is a free gift of nature. But even then we have to pay a price for the purchase or use of land. This is because land is scarce. Goods like food, clothing, houses, chairs, tables etc. are all economic goods. The concept of free and economic goods is relative to place and time. Goods which are free at one place become economic at others. Water is a free good in the village, but the people living in cities have to pay for it. Sand in the desert is free, but for being used in construction at a distant place it has to be purchased.

(iv) Consumer Goods and Producer Goods:

Consumer goods are those which directly satisfy the human wants. They are ready for consumption without being put to any further process of production. The food we consume, the clothes we wear or the furniture we use, are all examples of consumer goods.

(a)   Single-use Consumer goods: Of these consumer goods, some are such that they are used-up in a single act of consumption. They lose their utility at being used only once. Bread, for example loses all its utility in a single act of consumption.

(b)   Durable-use Consumer goods: On the other hand, there are consumer goods, which keep on being used for a considerable period of time. Houses, furniture, radio sets, bicycles, motor cars etc. are the examples of such goods. These goods can be used time and again.

(c)   Producer goods: Producer goods are those goods which are used in the production of-other goods. Machines, factory buildings, raw materials etc. are

the examples of such goods. These goods are not used for direct consumption, but help to produce consumer goods. Therefore, the demand for producer goods is derived from the demand for consumer goods.

(d) **Single-use and durable-use Producer goods:** A distinction may also be made between single use and durable use varieties of producer goods. Some producer goods are used up in a single act of production where other goods may continue to produce more goods for a longer period of time. Raw materials, for example are producer goods, but the moment we use them to make some commodities they change their original shape and are used up to form a new commodity. The same is the case with flour, oil, electricity, etc. Semifinished and unfinished goods are categorised as intermediate goods because they have to pass through further processing before, they can be put to final use. Durable use producer goods are those which are being used for production for a longer period of time. They include the instruments of production such as machines, plants, tools and implements.

Further, purchase of single use goods is generally frequent and regular because the wants for these commodities have to be satisfied more or less continuously. We take food today, will take it tomorrow and also the day after tomorrow. It is taken at fairly regular intervals as long as we live. Therefore, the purchase of these goods must be regular. But, the purchase of durable use goods is rather irregular. Since the commodity, by definition, is to last for a fairly long period of time after purchasing it, we will not have more of it till this wears out. So, the purchase will be rather irregular.

(e) **Intermediate and Final Goods:** Intermediate goods or intermediate product is sort for raw materials and other intermediate goods and services. A product is intermediate in nature if it is further processed before use, or is resold by the acquirer in the same year. The product is final in nature if it is neither further processed nor resold but is kept by its acquirer. The basis of the distinction is not the product itself but the use made of it. For example, wheat flour bought by the baker is intermediate, but if purchased by the household it is final, coal - in the factory is intermediate while if used in the domestic kitchen it is final. But if the wheat flour purchased by the baker or the coal purchased by the factory is neither used up in production in the same

year nor resold but is accumulated as stocks then they are treated as final products.

 In practice, a product is treated as intermediate if it is acquired by an enterprise and is used up in the same year either through reprocessing or being resold. A product is treated as final if it is purchased by a household or consumer or if it adds to stocks of either of the enterprise producing it or of the enterprise acquiring or purchasing it.

Consumers' products are goods and services which satisfy the wants of consumers. These consumers may be households or the government. For example, foodstuffs, domestic electrical appliances, the services of the hair dresser launderer, defence, general government administration, etc. Producers' goods and services are acquired by enterprises as intermediate products or to increase their capital stocks. They help or enable further production.

(f)   **Inventory Investment and Fixed Investment :** Stocks of single-use producer's goods are known as working capital and their accumulation is called inventory investment. Inventory investment in a year, therefore, equals the output of single-use producer's goods in the year minus the single-use producer's goods used-up in the year.

   Stocks of durable-use producer's goods are known as fixed capital because, their use is specific or fixed. Their accumulation is called fixed investment. The output of durable use producer's goods is known as gross fixed investment. But these goods depreciate in the course of production during the year so that gross fixed investment does not represent an increase in the stock of fixed capital in the economy. This increase, known as net fixed investment, equals gross fixed investment minus depreciation.

1.1.7.2 CATEGORIES OF PRODUCERS

The goods and services are produced by production units known in economics as enterprises. Farms which produce foodgrains, textile mills which produce cloth, huge factories that produce steel, cinema houses which display screen movies, bases and trains which transport men and materials and the barber saloons which provide haircuts, are some examples of production units. The enterprises or the production

units, are, thus, the basis of the production process. When we think about the production process, we think first of the production units which exist in the economy. The production units existing in an economy are classified into three broad categories or types, namely, (i) household enterprises (ii) firms or business enterprises and (iii) government or public sector enterprises.

(i) **Household Enterprises:** The "household enterprises" include all production units owned and managed by family members. The family members may make no distinction between their consumption activities and their production activities. Their production activity is aimed more at meeting their own consumption requirements than at selling and making profits from their output. In this sense, production is more a way of life and not a business for them. A large number of farms in India are of this type. Cottage industries are also largely of this type.

Non-profit institutions like hospitals, schools and colleges, research institutions etc. are also often included under 'household enterprises'. The reason is that while these institutions need not be, and are often not, family units, yet they produce not for making profits but for rendering service to the society.

(ii) **Business Enterprises:** The category 'business enterprises' or 'firms' includes all production units which undertake production in order to make profits. The objective of their production activity is purely commercial. These production units may be organised as proprietorships, partnerships, joint stock companies or corporations, or as cooperatives. The common characteristic of these production units is that the goods and services they produce are meant for sale with a view to making profits.

(iii) **Government Enterprises:** The 'government enterprises' comprise production units owned and managed by the government. These may be a part of the general government both administratively and financially like the Indian Railways or they may be autonomous bodies like public corporations, as is the case with Life Insurance Corporation of India. Many public sector enterprises are run in the form of joint stock companies with the entire or majority of the share capital owned by the Government.

Government enterprises may or may not be run on a no-profit no-loss basis. But they differ from the household and business enterprises in that the latter are owned and managed by persons in their private capacity for their private benefit, while government enterprises are managed by persons in their official capacity as government employees for the benefit of society. While government enterprises may make profits, these profits are not appropriated by the persons running the enterprises but are meant to be used in the interests of society. For these reasons government enterprises are treated as a separate category.

The relative importance of these three categories of enterprises differs from one economy to another. The production process of a traditional economy is based on household enterprises. The production process of a modern capitalist economy is based largely on business. Enterprises and that of a modern socialist economy on government enterprises. All three types may co-exist in an economy like India which is partly traditional and partly modern, mixed, capitalist, enterprise economy.

1.1.7.3 Self-Check Exercise
2.   What are the problems of an economic system ?

1.1.8 SUMMARY
Economics is a social science concerned with the proper use and allocation of resources to maintain growth and stability. It is thus a science both light-giving and fruit-bearing. The central problems of an economy are : what to produce ? how to produce ? and for whom to produce ? The production process of a traditional economy is based on household enterprises. The production process of a modern capitalist economy is based on business enterprises and that of a modern socialist economy on government enterprises. In India, all three types co-exist.

1.1.9 GLOSSARY

1 **Unstable equilibrium**: An unstable equilibrium value is an equilibrium value, change in which calls forth forces which tend to move the system further and further away from the equilibrium value.

2 **Neutral equilibrium**: A neutral equilibrium value is a state when the disturbing forces neither bring it back to the original position nor do they drive it further away from it. It rests where it has been moved.

5 **Government Enterprises**: The 'government enterprises' comprise production units owned and managed by the government.

1.1.10 QUESTION FOR EXERCISE
1. Discuss the nature and Scope of Economics.
2. Explain the different Central Problems of an Economy.
3. Describes Various categories of goods.
4. Explain types of producers.
5. Short notes
   - Micro Economics
   - Macro economics
   - Stable Economics
   - Intermediate goods

1.1.11 SUGGESTED READINGS
1. Dewett, K.K. :   Modern Economic Theory.
2. Samuelsen, P.A.   :   Economics : An Introductory Analysis.
3. Puri and Misra   :   Modern Economic Theory.

CONSUMER BEHAVIOUR : UTILITY ANALYSIS

1.2.1 Objectives of the lesson

The main objectives of the lesson is to make student familiar with

- Law of diminishing marginal utility

- Types of consumer equilibrium

- Marginal utility analysis

- Limitations of marginal utility analysis

1.2.2 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 herewith 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 Curve Analysis, which will help us in having 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 in analysing the problems of a consumer's demand in the market. The tool of indifference curves will be explained in the next lesson.

We propose to deal with the topic hereafter in the following manner :

      A.   The meaning of Utility and the concepts of Marginal Utility, Average Utility and Total Utility.

      B.   The Law of Diminishing Marginal Utility and the Law of Equimarginal Utility and also the relation between the Law of Diminishing Marginal Utility and the Law of Demand.

      C.   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.

     D. Assumptions of the Utility Analysis.

     E. Shortcomings of the Utility Analysis.

1.2.3 Meaning of Utility

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

It will be appropriate to mention 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 good if it is not already there.

Marginal, Average & 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	Total Utility	Average Utility
1	20	20	20
2	15	35	17.4
3	10	45	15
4	7	52	13
5	3	55	11
6	0	55	9 nearly
7	**-5**	**50**	**7 nearly**

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

A consumer has the above-mentioned schedule to utility from the various units of the good consumed. His marginal utility will be given at the last unit where the consumer stops the consumption. Let us suppose, he stops at the 5th unit, the marginal utility for the fifth unit 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 on n units - Total utility of (n - 1) units.

It may be pointed out that as margin of 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, it is total utility that determines the shape and slope of total utility curve. This is clear from Figure No. 1.
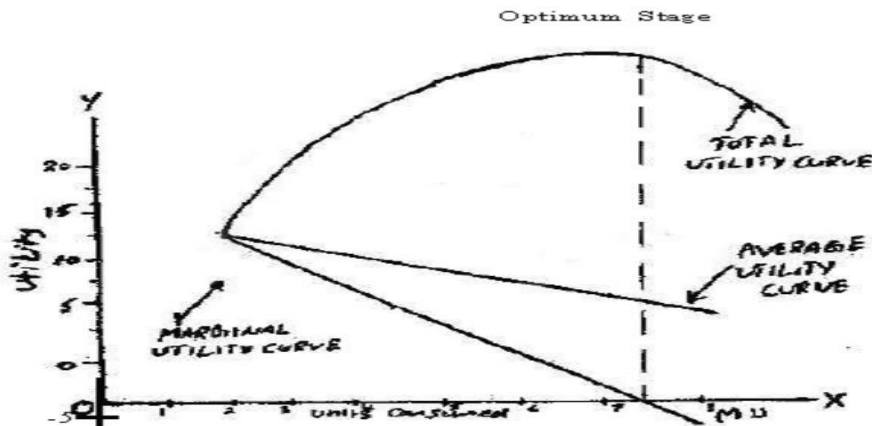

Fig. No. 1

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 55 and 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. The point is again illustrated with the help of Fig. No.1.

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

     (i)   Total Utility Curve is a rising one, through rising at a diminishing rate. It starts falling only when the marginal utility is negative, that is when the 7th unit it consumed.

     (ii)   Marginal utility is -ve 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.

1.2.4   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 the stock 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 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. The law can be illustrated with the help of the following diagram :
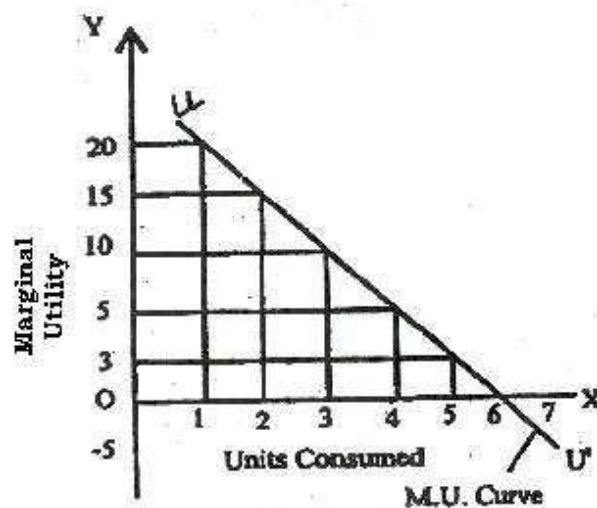

Fig No. 2

Units of the commodity consumed are measured along OX and units of utility along OY. The marginal utility curve is falling from left to right indicating the fact that, as we consume more of a commodity, the marginal utility 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)   The utility can be measured in cardinal numbers.
     (ii)   Normal behaviour on the part of the consumer.
     (iii)   No time interval between the consumption of successive units.
     (iv)   Standard sized units rather than very small ones.
     (v)   Units of uniform quality and
     (vi)   Limited means at the disposal of the consumer.
     (vii)   No change in tastes and preferences of the consumer.
     (viii) No change in prices and income of the consumer.

1.2.4.1 Self check exercise 1

1 Explain law of diminishing marginal utility in detail?

1.2.5 Relation between the Law of Diminishing Marginal Utility and the Law of Demand.

The price that a consumer pays for a commodity is equal to its marginal utility. According to law of diminishing marginal utility, as a consumer goes on purchasing more and more units of a commodity, its marginal utility goes on diminishing. As such, a consumer will buy more units of a commodity only when its price goes down. When marginal utility is expressed in terms of money, in that case, positive part of marginal utility curve will be the demand curve. When marginal utility is shown on OY-axis then the curve obtained will be called marginal utility curve. In case, price is shown on OY-axis then the curve obtained will be called demand curve, as is indicated in Fig (i) and Fig (ii) respectively.
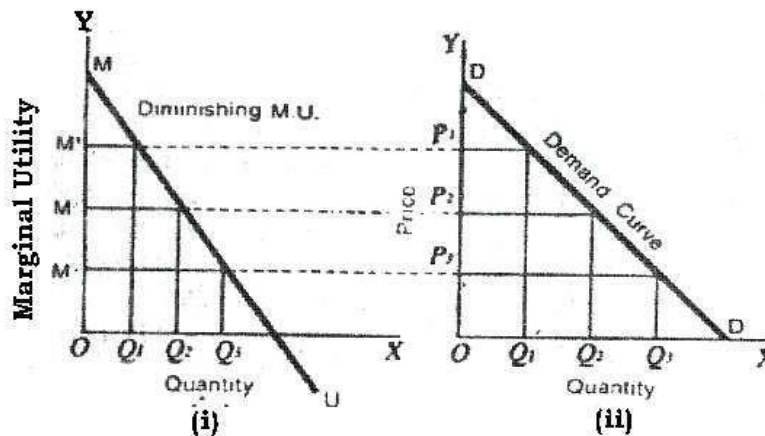

Fig. No. 3(i)   Fig. No. 3(ii)

Fig. (iii) represents marginal utility curve and Fig. 3 (iv) demand curve. This DD demand curve has been drawn with the help of MU marginal utility curve.

1.2.6 Individual Consumer's Equilibrium with the help of the 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 the price of 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 technique.

Before taking up the analysis of the consumer's equilibrium, it may be useful to explain the term equilibrium of the consumer. 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 need for rearranging his pattern of consumption expenditure for, he feels that he has maximised his satisfaction from the goods purchased. With this simple meaning in our mind, we approach the problems of consumers 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.

(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) Price of other goods are given.

(iv) Rational behaviour on the part of the consumer; and (v) Apparatus of utility analysis is given.

Under the set of the 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 good under reference the utility derived from the good is just equal to the disutility of the money spend (price paid) on the acquisition of the unit of the good i.e. utility derived from the last unit purchased is equal to the disutility of units of money spent on this unit. Only when this condition is fulfilled, the consumer maximises satisfaction and 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 Paise)
1	20	5
2	15	5

3	10	5
4	5	5
5	3	5

Note : (i)　　Let us suppose that I unit of utility is equal to 1 Paisa.

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

The consumer under the circumstances will buy up to the 4th unit, as this will equate marginal utility, which is 5 to the prices of 5 paise. This will ensure the consumer the maximum satisfaction. No 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 5 paise, 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 (you have to draw the diagram yourself based on the Law of Diminishing Marginal Utility. The only addition to be made therein is drawing a horizontal line indicating the price).

(b) Consumer's Equilibrium Two-Commodity Case

With the same set of assumption 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.)	M.U. of Commodity A	M.U. of Commodity B
1	40	30
2	32	23
3	24	16
4	16	10
5	10	5
6	6	4
7	3	2

Note : The following are the assumption 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 Rs. 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. for both commodities. According to the Law of Maximum Satisfaction, this will ensure him the maximum satisfaction say 8 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 spends rupees five on A and rupees two on B, then the marginal utility from A is 10 from B 13 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 maximise his utility/satisfaction if he distributes his expenditure on the purchase of various goods in such a way that will equalise the weighted marginal utilities of the commodities bought. In mathematical terms, the maximum satisfaction is obtained when

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

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

TABLE NO. 4

Units of goods purchased	M.U. of A	M.U. of B
1	50	30
2	35	22
3	22	16
4	16	11
5	8	6

Note : The assumptions of the table are :
(i)   Size of income is Rs. 10.
(ii)   Price of A is Rs. 2 per unit and that of B Rs. 1 per unit.

It is clear from the table that the consumer will spend Rs. 6 on A and Rs. 4 on B. The arrangement will equalise his weighted marginal utility from A and B and thus, give him the maximum satisfaction. Any other arrangement, say Rs. 2 on B and Rs. 8 on A will not ensure him the same satisfaction, as his weighted marginal utilities would not be unequal. He will be in equilibrium position only where the :

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

Fig. No. 4

Fig No. 5
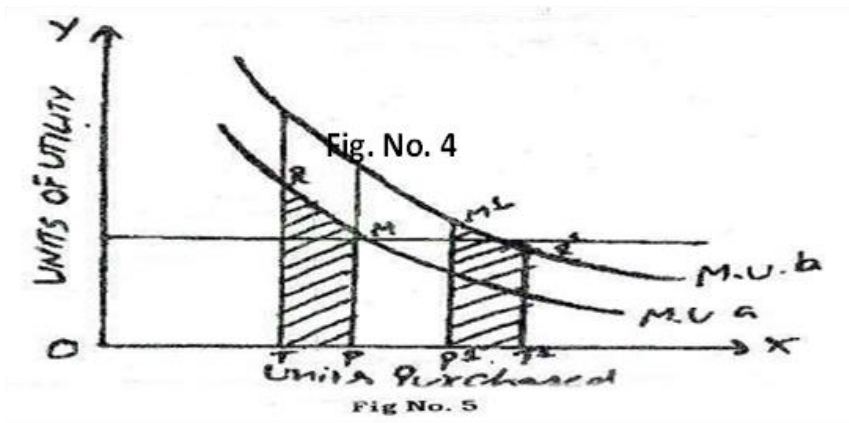
The consumer's equilibrium can be illustrated with the help of fig. 4. The consumer spends OM' and OM units of money on A & B commodities; when the unity curve Ua and Ub of both the commodities respectively are given. This arrangement equalises the marginal utility of A (P'M') and marginal utility of B (PM) giving thus, the maximum satisfaction to the consumer. This is his position of equilibrium. Now let us suppose that he spends OT' and OT units of money on A and B respectively. Now the marginal utility of A and marginal utility of B , R' T' and RT respectively both are not equal, resulting in reducing the total satisfaction. The addition P'R'T'M' to total satisfaction is comparatively less than the low (PRTM) to total satisfaction. (Diagram is sketched in comparatively less than the low (PRTM) to total satisfaction. (Diagram is sketched in accordance with Table 4).

Thus, from the discussion above, 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 assumption of Marginal Utility Analysis.

D. Basic 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 is 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 intra-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 Ist, 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. Advocated of utility approach, particularly Dr. Marshall ignored the variation in the stock of utility of money caused by variation in the stock of money.

(v) Certain important factors which affect consumer's demand and his equilibrium are assumed to be constant; e.g., the size of income, the prices of other related goods and the tastes and preferences of the people. Thus, the entire analysis with the above-mentioned assumptions, makes the approach rather static in nature and scope of its operation. 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 vexed problems Therefore, let us examine the shortcomings of utility analysis.

1.2.6.1 Self check exercise 2

2 Explain the consumer equilibrium in case of one commodity and two commodity?

1.2.7 Shortcoming of Marginal Utility Analysis

We need not labour 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 problems 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 so 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 continuous 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 of constancy of marginal utility of money. The law of diminishing marginal 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 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 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 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.

Thus, it is clear that the analysis based on the utility approach is defective and another analysis is gradually taking its place to treat the various aspects of the Demand Theory in a more satisfactory manner. This approach has come to be known as the Indifference Curves Analysis. We will deal with this approach in our next lesson.
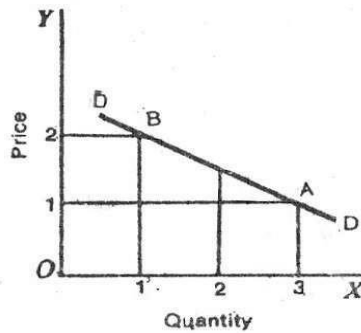
1.2.8 Derivation of Demand Curve through the Law of Equi-marginal Utility

Demand curve can also be derived through the law of equi-marginal utility Suppose a consumer buys two commodities 'A' and 'B' MU_A and MU_B are their respective marginal utilities and P_a and P_b are their respective price. A consumer will be in equilibrium when he spends his income on different goods in such a manner that the ratio of marginal utility and price of each commodity is equal.

The position of consumer's equilibrium can be explained through table No.1 Suppose a consumer has Rs. 5.00 to be spent on potatoes and peas. Price of each vegetable is Re. 1.00 per kg.

Table No. 5 : Derivation of Demand Curve

Quantity in kg.	M.U. of Peas	M.U. of Potatoes
1	12	10
2	10	(8)
3	(8)	6
4	6	4
5	4	2

Table No. 5 shows that the consumer will spend Rs. 3 on peas and Rs. 2 on potatoes. In other words, at the price of Re. 1.00 per kg. he will buy 3 kgs of peas and 2 kgs of potatoes. The last unit of money so spent will yield the consumer equal marginal utility (8 units). The consumer thus fulfils the following condition of equilibrium :

$$\frac{MU\ of\ Peas\ 8}{Price\ of\ Peas\ (Re\ 1)} = \frac{MU\ of\ Potatoes\ 8}{Price\ of\ Potatoes\ (Re\ 1)}$$

$$or\ \frac{8}{1} = \frac{8}{1} = 8\ utils.$$

Suppose the price of peas rises to Rs. 2.00 per kg. while the income of the consumer and the price of potatoes (Re. 1 per kg.) remain unchanged. The consumer will so change the demand for both the commodities that the marginal utility per rupee of each commodity becomes equal.

$$\frac{MU\ of\ Peas\ 12}{Price\ of\ Peas\ (Re\ 2)} = \frac{MU\ of\ Potatoes\ 6}{Price\ of\ Potatoes\ (Re\ 1)}$$

$$\frac{12}{2} = \frac{6}{1} = 6\ utils.$$

Thus, at Rs. 2.00 per kg. the consumer buys only kg. of peas whereas at Re. 1.00 per kg. he was buying 3 kg. of peas. To be in equilibrium, the consumer will buy 1 kg. of peas and 3 kgs of potatoes, because then alone the marginal utility per rupee of peas and potatoes becomes equal (6 utils).

On the basis of the above data regarding change in the price of peas and consequent change in its demand, the following demand Schedule and demand curve of peas can be made.

Table No. 6 : Demand Schedule of Peas

Price	*Quantity demanded (kg.)*
Re. 1	3
Rs. 2	1

Fig. No. 5

In Fig. No. 5 quantity of peas is shown on OX-axis and price on OY axis. When price of peas is Re. 1 per kg. then demand is for 3 kg. as shown by point 'A'. On the other hand, when price rises to Rs. 2 per kg. then Lewand contracts to 1 kg. as shown by point 'B'. By joining points A and B we get DD demand curve of peas.

1.2.9 SUMMARY

Consumer equilibrium refers to the point at which a consumer maximizes their utility or satisfaction, given their limited budget and the prices of goods and services in the market. It is a fundamental concept in microeconomics that helps understand how consumers make choices to allocate their income among various goods and services.

1.2.10 GLOSSARY

1 **Utility:** utility means the power possessed by a good to satisfy human wants.

2 **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.

3 **Consumer equilibrium**: It is a situation where the consumer has the maximum satisfaction and he/she is not in the situation to change the present spending.

4 **marginal utility**: It is the additional satisfaction derived from consumption of one more unit of the commodity.

1.2.11 QUESTIONS FOR EXERCISE

1. Define the following terms : Marginal Utility, Average Utility and total Utility.
2. Explain the Law of Diminishing Marginal Utility. Explain its assumptions.
3. Give the reason for the downward slope of Consumer's Demand Curve. Does the same reasons hold true for the Market Demand Curve ?
4. What is meant by Consumer's Equilibrium ? Explain the consumer's equilibrium in case of two commodities.

5. Examine the assumptions (postulates) of the Utility Analysis. How far are these true in modern times ?
6. Explain the shortcomings of the Utility Analysis.
7. What is meant by Consumer's equilibrium ? Use Marginal Utility Approach to explain it in the case of two commodities.

1.2.12 SUGGESTED READINGS

1. Dewett, K.K.   :   *Modern Economic Theory.*
2. Samuelson, P.A.   :*Economics : An Introductory Analysis.*
3. Stonier, A.W. & Hague, D.C. :*A Text Book of Economic Theory.*

BBA PART-I
SEMESTER 1 PAPER : BBA-102
BUSINESS ECONOMICS-I

LESSON NO.1.2 AUTHOR: DR UPINDERJIT KAUR

INDIFFERENCE CURVES ANALYSIS

1.3.1 OBJECTIVES OF THE LESSON

The main objective of the lesson is to make students familiar with

- Concept of indifference curve
- Properties of indifference curve
- Major limitations of indifference curve.

1.3.2 Introduction

The Utility Analysis, as it was based on certain unrealistic 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 unrealistic cardinal 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. Here in this lesson, we are mainly concerned with the former analytical tool,

i.e., Indifference Curve 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 in the manners given below :

   (A)   Indifference Curves, Map of Indifference Curves and the Marginal Rate of Substitution;

   (B)   Properties of the Indifference Curves;

   (C)   Consumer's Equilibrium including the Price Line;

   (D)   Various Effects : Price, Income and Substitution effects;

   (E)   Derivation of Individual Demand with the help of Indifference Curves.

   (F)   Superiority of the Indifference Curves technique; and

   (G)   Criticism of the Indifference Curves technique.

1.3.3 Indifference Curves

We know that utility cannot be measured nor can it be added. Therefore, the question of maximisation of Utility (or satisfaction) does not arise at all. The consumer's

equilibrium becomes meaningless under these unrealistic assumptions. Therefore, Professors 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 method to analyse the theory of demand. They based their technique of Indifference Curves on the following assumptions :

   (i)   The scale of preference of a consumer is given. A 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 price 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 ensures the same level of satisfaction.

   (vi)   There is consistency in consumer's behaviour i.e., if at any given time a consumer prefers A combination of goods to B combination then at another time he will not prefers B combination to A combination.

   (vii) The consumer is rational in his behaviour.

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

TABLE NO. 1

Combination	Apples	Mangoes	MRS of Mangoes for apples
Ist	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.

For table No. 1, it is clear that consumer, under a given set of assumptions likes to have the Ist combination of 15 Apples zero Mango or even the 2nd combination of say 11 Apples 1 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 these combinations in the matter of satisfaction as each one gives him equal satisfaction, the indifferences of the consumer is geometrically illustrated in the diagram given below :
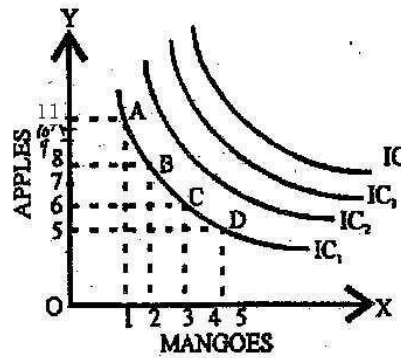
Fig. No. 1

As is shown in the Diagram No. 1 above, all the combinations which give the consumer the same level of satisfaction lie scattered on same curve i.e. IC_1. This curve IC_1 is termed as the indifference curve. We may say that the consumer is indifferent between all these combinations of apples and mangoes which give him the same level of satisfaction and are represented by the curve IC_1 passing 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 warranted by a different set of assumptions, representing lower higher satisfaction. For example, IC_4 and IC_3 curves represent higher levels of satisfaction in the altered situation of either higher income or lower prices of both goods (again an increase in real income). All these curves IC_1, IC_2, IC_3, IC_4, and so on constitute the Map of Indifference Curves. One or 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 axis. 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 a combination with zero units of the commodity plotted 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 IC_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.

Another significant point and of course of far-reaching importance, which is illustrated by table No. 1, is the rate at which mangoes being substituted in place of apples, by the consumer without disturbing, in any way, are level of satisfaction. It is clear from the 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 say mangoes, whose stock is increasing. This rate of substitution will go on diminishing. In more technical terms, we may define the Marginal Rate of Substitution of X for Y as the quantity of Y which would just compensate the consumer of the loss of the marginal unit of X. It may be pointed out for our benefit that this law of Diminishing Marginal Rate of Substitution replaces the law of Diminishing Marginal Utility which is used in utility approach to a consumer's demand. It serves practically the same purpose though in a better way. This will be explained later on.

1.3.4 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) Higher Indifference curve represents higher level of satisfaction

An Indifference curve that lies above and to the right of another Indifference curve represents higher level of satisfaction.
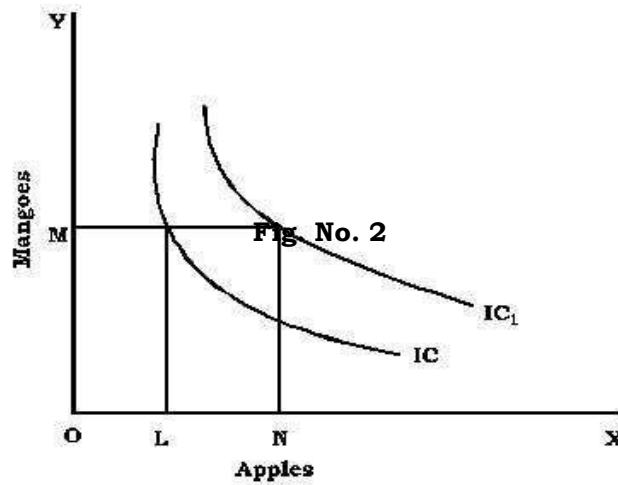
Fig. No. 2

In Diagram No. 2 the Indifference Curve IC_1 lies above and to the right of IC. Since IC_1 is a higher Indifference curve it shows more units of apples although the consumption of mangoes continuous to remain the same.

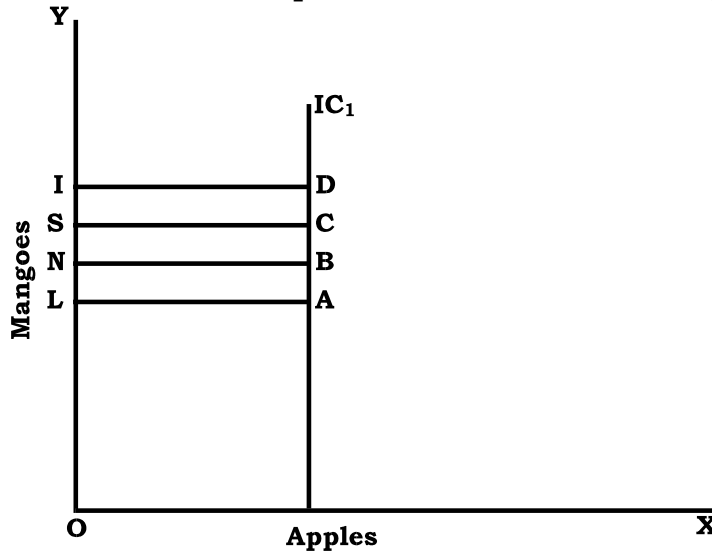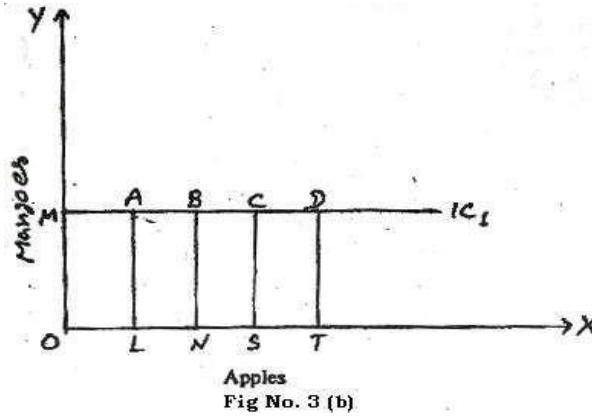**(b) Indifference Curves must slope downward from left to right**

Fig. No. 3 (a)

(a) Let us suppose that the indifference curve is like IC, in Diagram 3(a). Points A,B,C and D on this curve indicate various combinations which give same level of satisfaction of Apples, But the satisfaction obtained from mangoes is continuously increasing from point A to B to C and D which is not possible. In accordance with the law of Diminishing Marginal Rate of Substitution, in order to obtain more units of mangoes, the consumer will have to sacrifice some units of apples at a diminishing rate. All curves must slope downward. This is on account of the act 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 :

Apples
Fig No. 3 (b)

(i)   Let us suppose that the indifference curve is like IC_1 in Diagram No. 2(a) Points A, B, C and D on this curve indicate various combinations which give the same level of satisfaction. But the satisfaction obtained from Apples is continuously increasing from point A to B to C and D which is not possible. In order to have more units of apples, the consumer must sacrifice some units of mangoes.

APPLES
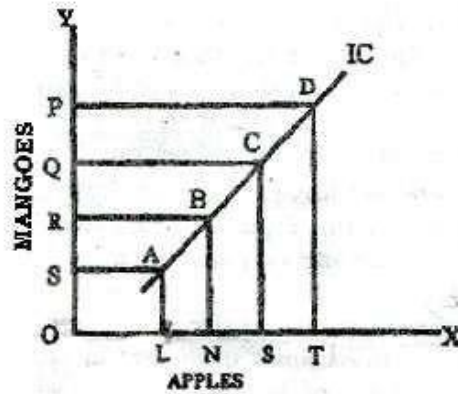
Fig. No. 3(c)

(ii)   In Diagram No. 2 (b) the consumer is able to consumer more and more units of mangoes as well as oranges as is clear from combinations A, B, C and D. But this is against the assumption of diminishing marginal rate of sale situation. Which states that in order to consume more units of apples, the consumer will have to sacrifice some units of mangoes.

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

(c) Two Indifference curves cannot intersect each other :
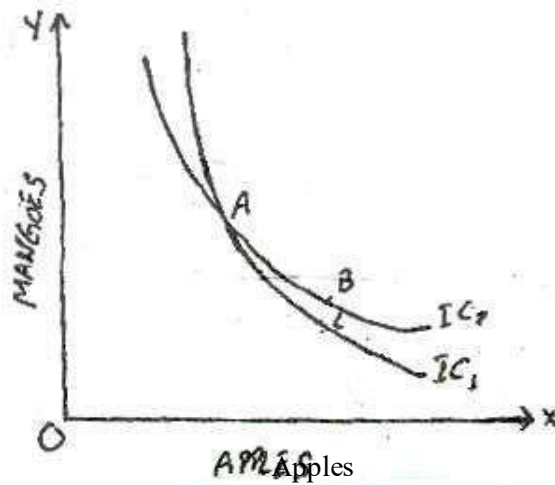
Fig. No. 4

Since points A and B (Diagram No. 4) lie on the same curve i.e. IC$_2$, combinations indicated by A and B give the same satisfaction. Similarly, the points A and C lie on the Curve, IC$_1$ therefore the combinations 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 combinations on the two curves give same levels of satisfaction. It is something contradictory. Hence the supposition that indifference curves can intersect is wrong.
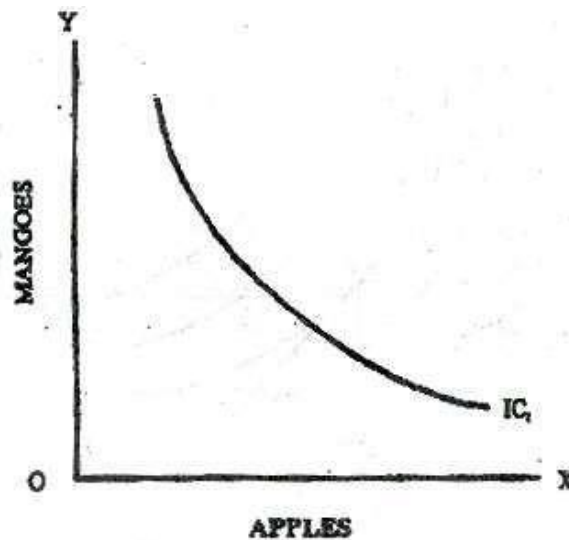
Fig No. 5

(d) Indifference Curves are generally convex to the point of origin : Generallyall indifference curves must slope downward and the 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 replace a unit of X decrease. This is clear from Diagram No. 5

1.3.4.1 Self check exercise 1

1 Explain the properties of indifference curves?

1.3.5 Consumer's Equilibrium and Price Line

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

We can draw a map of indifference curves 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 and wants to obtain maximum satisfaction.

(iv)   Prices of goods are given.

(v)   He can spend his income in small amounts.

Now suppose that a consumer has 50 rupees which he is to spend on mangoes and guavas. Suppose further that the Price per mango is 2 rupees and that per guava is 50 paisa. 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 A, B in Diagram No. 6 indicates the various alternative combinations that he can buy.
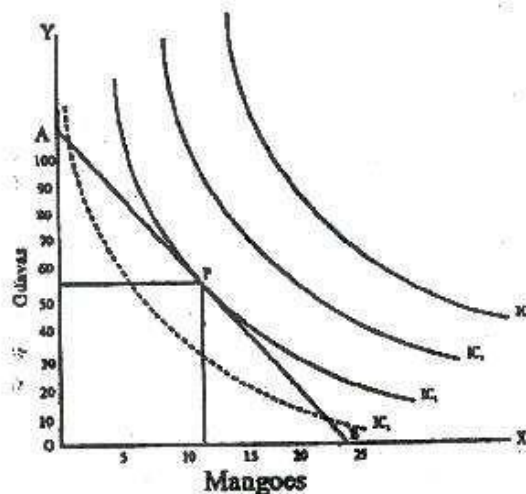

Fig. No. 6

Now which of these combinations he will buy depends on his choice. The line AB is shown as simply the Price Line or the Budget Line. This line also indicates the ratio between price 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 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 at point P and so other combination on the curve gives him more satisfaction. In other word, point P indicates the equilibrium position of the consumer.

At the point P the price line AB is tangent to the curve IC_2 that is the slope of the indifference curve IC_2 and P and that of the price line are equal. At this point the marginal rate of substitution is also equal to the ratio between the price of the two commodities. The basic condition for the equilibrium of the consumer is this 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 :

$$MRS \text{ mg} = \frac{\text{Price of Mangoes MRS}}{\text{Price of Guavas}}$$

The case explained above deals with two commodities only. The use of this technique can be explained to the case of more than two commodities also but it is difficult to illustrate that by a diagram. To simplify this problem, money is taken as representative of a collective of goods. So, the equilibrium of the consumer is studied by taking of 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 examine the various effects. We would follow the method of releasing our assumptions one by one and try to work out the effects of this on the consumer's demand or goods.

1.3.6 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. 7 given below :
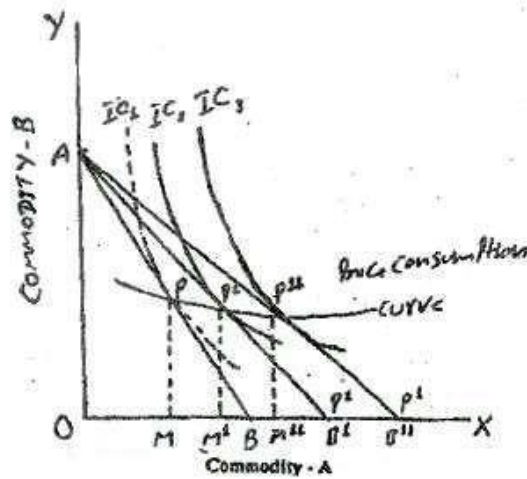
Fig. No. 7

Let us suppose that the price of commodity A falls while that of B remains the same as shown in Diagram No. 7. The income is also constant. The price line shifts from AB to AB' and then to AB". Consequently, the consumer's equilibrium position shift from P to P' and to P" on the indifference curve IC_1, IC_2 and IC_3. The consumer will, as a result of a fall in the price of A, buy more of commodity as indicated by OM_2 OM' and OM". 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 individual's demand for that commodity. It also shows the income and substitution effect due to the fall in the price of a commodity. These effect are examined below.

(i)　　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 while the price remains the same, what will be effect of this on the consumption of commodities A and B. This could again be illustrated with the help of the diagram given below :
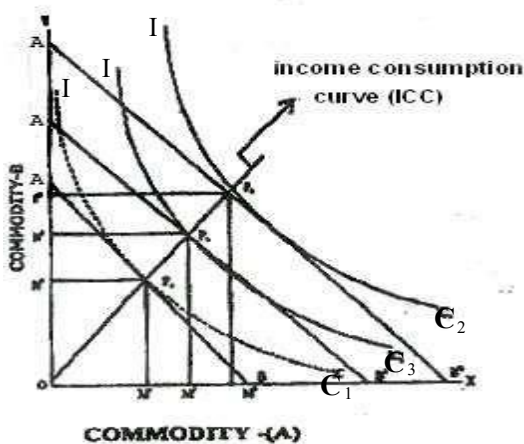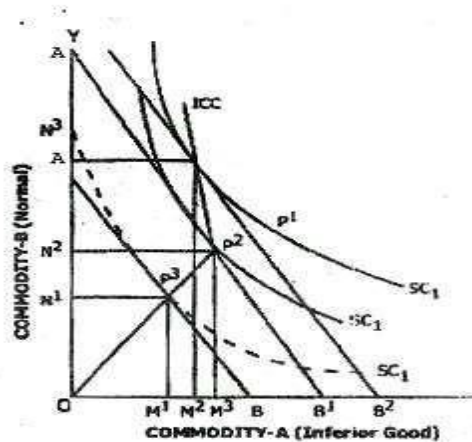

Fig. No. 8(a)

Fig. No. 8(b)

In Diagram 8(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 with increased money-income OB to OB" and so on of commodity A and similarly OA, OA" of commodity B with increased money income. The consumer would also more his equilibrium position from P^1 to P^2 and then to P^3. As he would consume more quantities of both the goods & i.e. OM^1, OM^2 and OM^3 of A and ON^1, ON^2 and ON^3 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_1 IC_2 and IC_3. But this is the effect of increased money income provided both of the goods are normal goods.

The line joining the points P^1, P^2 and P^3 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 8(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^1, ON^2 and ON^3 of B) and less quantities of an inferior good (say OM^1, OM^2 and OM^3 of A). It may be pointed out that in the first instance the quantity purchased of inferior good may also increase (See the Diagram 8 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.

     (ii)   Substitution Effect : A Substitution effect occurs, it may be pointed out, when relative price 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 purchase of goods in accordance with the new relative prices. This could again be illustrated with the help of Diagram No. 9 which is given below :
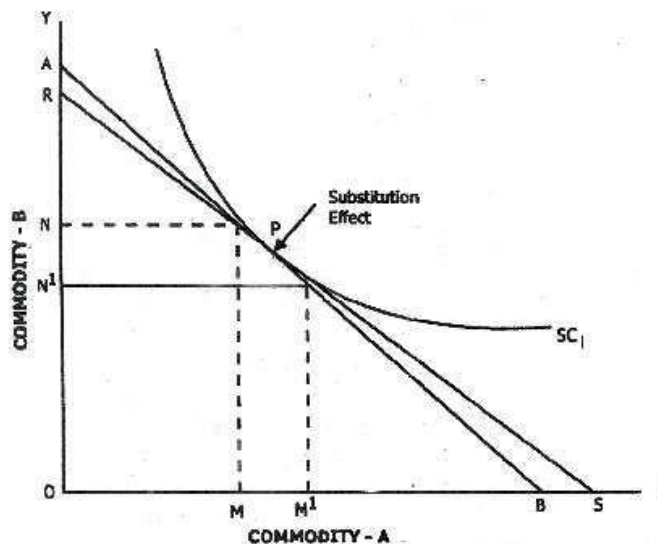

Fig. No. 9

This would disturb the equilibrium position of the consumer. He would have to rearrange his purchases. If he was at point P on IC_1, he preferred the combination on P i.e. OM of A and ON of B. But in the case of a substitution effect the consumer should neither be better off nor worse off. Let us suppose that the income of the consumer is changed from AB to RS budget line so that consumer being at point P and IC_1, is neither better off nor worse off in the matter of satisfaction. This he has realised through the substitution of MM' of A (whose price has fallen and become cheaper) in place of NN' 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.

1.3.6.1 Self check exercise 2
2 Explain the consumer equilibrium in case of indifference curve analysis?

1.3.7 Derivation of Individual Consumer's Demand Curve
The technique of indifference curves could profitably be used for the derivation of individual consumer's demand curve. This could be illustrated with the help of the following diagram No. 10.
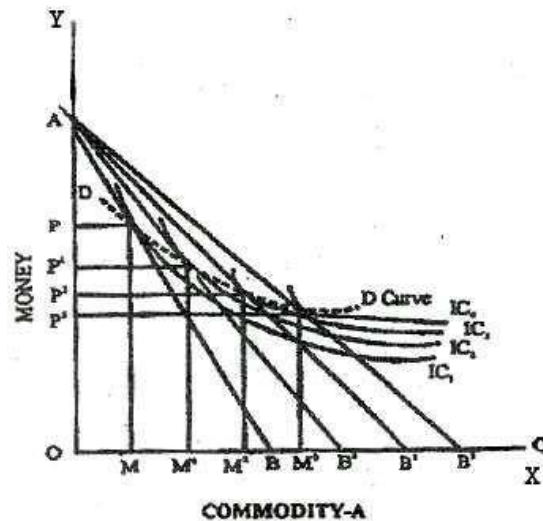

COMMODITY-A

Fig. No. 10

Let us measure commodity A along the X-axis and commodity B, which is money in this case, along the Y-axis. Further, suppose that the price of A falls, the point of consumer's equilibrium will shift from P to P' and then to P^2 and so on P^1. As the price falls, a consumer would buy more of A, such as OM_1 OM_2 and then OM_3. This shows the working of the law of demand. The line joining the points on various curves IC_1, IC_2, IC_3 and IC_4 gives the individual consumer's demand curve. A separate demand curve can be plotted on the basis of data which are deduced from the above diagram as given below.

Price per unit	Quantity of Demanded
OA/OB	OM
OA/OB^1	OM_1
OA/OB^{11}	OM_{11}
OA/OB^{111}	OM_{111}

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

1.3.8 Superiority of Indifference Curves Technique

The method of indifference curves 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 analysis.

(i) The 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 pitfalls of the utility analysis.

(ii) The technique of indifference curves explains the phenomenon of falling 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 a more detailed manner. It shows tha 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 reason behind the price effect.

(iv) This technique could also throw light on the nature of demand for inferior goods. The utility approach could not explain the theory of demand in case of these goods.

(v) This technique, with fewer assumptions explains in a better way a large number of problems in the field of demand.

(vi) 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 a 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 criticism 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 gives 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 the state of indifference of consumer.

      (iii)   The indifference curves method has given only new name to old terms and concepts. Some examples to quote 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 new approach supplies old wine in a new bottles.

      (iv)   This approach cannot analyse the demand problems in the midst of risk and uncertainty.

This is how this technique is criticised. New tools are being perfected. Even the old ones utility tool-are being refashioned. The Theory of Demand for its complete analysis yet needs better and more satisfactory treatment.

1.3.9 Summary

Indifference curve analysis helps economists understand consumer preferences, demand patterns, and how individuals make choices given their limited resources and budget constraints. By studying indifference curves, economists can predict how changes in prices, income, or preferences can affect consumer behaviour and market equilibrium. This analysis is a cornerstone in microeconomic theory and provides valuable insights into individual decision-making processes.

1.3.10 Glossary

  1. **Indifference Curve:** A graphical representation that shows different combinations of two goods or services that provide the same level of satisfaction or utility to an

individual. Points along the indifference curve are considered equally preferred by the individual.

2. **Utility:** The level of satisfaction or happiness that an individual derives from consuming a particular combination of goods or services.

3. **Marginal Rate of Substitution (MRS):** The rate at which a consumer is willing to trade one good for another while keeping the same level of utility. It represents the slope of the indifference curve at a specific point.

4. **Diminishing Marginal Rate of Substitution:** A property of indifference curves where the MRS decreases as one moves along the curve from left to right. This reflects the idea that as an individual consumes more of one good, the willingness to trade it for another decreases.

5. **Indifference Map**: A collection of indifference curves representing different levels of utility for an individual. Higher (outer) indifference curves represent higher levels of utility.

1.3.11 QUESTIONS FOR EXERCISE

1. Explain the properties of Indifference Curves. Illustrate with diagrams where necessary.

2. Explain the meaning of Consumer's Equilibrium. Explain it with the help of Indifference curve Technique.

3. Define the concepts of Price Effect, Income Effect and Substitution Effect. Give diagrams to illustrate them.

4. What will be the effect of increase in money income on the demand for a 'normal good' and that for an 'inferior good' ? Explain with diagrams.

5. How is the Individual Consumer's Demand Curve derived with the help of Indifference Curves Method ? Illustrate with a diagram.

6. In what respect is the Indifference Curves Technique superior to the Utility analysis ?

7. Explain the assumption of the Indifference Curves Technique. Give the criticism of this approach also.

8. Write short answers of the following questions :
   1. Define Indifference Curves.
   2. Map of Indifference Curves.
   3. Marginal rate of substitution.
   4. Price consumption curve.
   5. Substitution effect.

1.3.12 SUGGESTED READINGS

1. Dewett, K.K.   :   *Modern Economic Theory.*
2. Stonier, A.W. and Hague, D.C :   *A Text Book of Economic Theory.*
3. P.A. Samuelson :   *Economics : An Introductory Analysis.*

REVEALED PREFERENCE THEORY OF DEMAND

1.4.1 Objectives of the lesson

After studying this lesson, the students will be able to understand the

- The theory of revealed preference theory
- Various assumptions underlying the theory
- Choice revealed preference

1.4.2 Introduction

After the Marshallian theory of utility analysis for demand and Hicks Allen Indifference theory of demand, the Revealed Preference theory of demand was put forward by Prof. Samuelson. The theory seeks to explain consumer's demand for his actual behaviour in the market in various price-income situations. Revealed preference theory is behaviouristic-explanation of consumers demand. The Revealed preference theory is regarded as scientific (behaviouristic) explanation of consumer's behaviour as against the psychological explanation provided by Marshallian, Hicks and Allen theories of demand. This shift from psychological to behaviouristic explanation of consumer's behaviour is a landmark in the development of the theory of demand.

1.4.3   Revealed Preference Theory

Prof. Samuelson's revealed preference theory has preference hypothesis as a basis of his theory of demand. According to this hypothesis, when a consumer chooses a combination A, it means he considers all other alternative combination which he could have purchased to be inferior to A.

Therefore, choice of a combination A reveals his definite preference over all other rejected combinations.

Let us graphically explain the preference hypothesis. Given the prices of two commodities X and Y and the income of the consumer, price line PL is drawn in the figure.
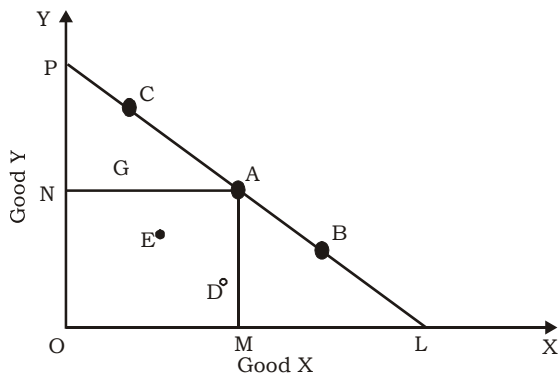
PL   =   Price Line

OPL =   Area of Choice

E   =   Inferior to point D

A=   Preferred to point E and D

1.4.3.1   Assumptions of the Theory

1.   Tastes and Preferences of the consumer should be constant.

2.   The behavior of the consumer is assumed rational. He always prefers that commodities which include more quantities of commodities to less. Like utility analysis and indifference curve analysis, the consumer is not assumed to maximise satisfaction from his purchases.

3.   This theory based on transitivity which means if A is preferred to B and B to C, then consumer must prefer A to C also.

4.   Income elasticity of demand of a consumer must be positive.

5.   The consumer is consistent in his choice. If the consumer prefer A good over B good, then he will not choose B good over A good in another situation.

1.4.3.2 Choice Reveals Preference

The price line PL represents the given price-income situation. Here a consumer can buy any combination lying within or on the triangle OPL in other words, all combinations lying on the line PL such as A, B, C and lying below the line PL such as D.E.F. and G are alternative combinations open to him, from which he has to choose any combination. If our consumer chooses combination A out of all those open to him in the given price-income situation it means he reveals his preference for An overall other combination such as B,C,D,E and G which are rejected by him. As shown in the figure that at combination A the consumer is buying OM quantity of commodity X and ON quantity of commodity Y.

Thus, in revealed preference theory, strong-ordering preference hypothesis has been applied. The strong ordering implies that there is definite ordering of various combinations in consumer scale of preferences. Under strong ordering relations of indifference between various alternative combinations is ruled out. Under strong ordering the chosen position is shown to be preferred to all other positions in and on the triangle while under weak ordering it is preferred to all positions within the triangle, but may be indifferent to other positions on the same boundary as itself.

1.4.4   CRITICAL APPRAISAL OF REVEALED PREFERENCE THEORY

Although Samuelson's revealed preference theory has made some important improvement upon the earlier theories of demand but it is not free from all flaws. Various criticisms levelled against it are :

1. Firstly, Samuelson does not admit the possibility of indifference in consumer's behaviour. According to Samuelson's strong ordering hypothesis when a consumer chooses a combination A, he considers all other alternative which could have been purchased to be inferior to A. But it has been pointed out that if preference is to be judged from a large number of observations, then the possibility of indifference also emerges.

2. Samuelson's Revealed preference theory does not determine the substitution effect.

3. Samuelson's revealed preference theory cannot enunciate the demand theorem when (i) the income elasticity is negative and the negative income effect is smaller than the substitution effect and (ii) the income elasticity is negative and income effect is greater than the substitution effect.

4. Samuelson's theory can not account for Giffen's Paradox. According to Samuelson, the demand theory establishes only inverse relationship between price and demand. But this is so in case of inferior goods, where the demand changes in the same direction as the price.

5. Lastly, Samuelson's axiom choice reveals preference is invalid where the individual choosers are capable of employing strategies of a game theory.

In the end, we may conclude that Samuelson's Revealed preference theory is important due to the behaviouristic method to the demand and his strong ordering hypothesis.

1.4.4.1 Self check exercise

1 Explain the revealed preference theory in detail?

1.4.5 Summary

Revealed Preference Theory provides a powerful tool for economists to analyse consumer behavior and make predictions about market outcomes without requiring direct knowledge of individual utility functions. It allows for the understanding of preferences based on actual market behavior and is widely used in microeconomic analysis and consumer theory

1.4.6 Glossary

1. **Revealed Preference Theory**: An economic theory that infers a consumer's preferences based on their observed choices in the market, without requiring direct measurement of utility.

2. **Preference Ordering**: The ranking of different bundles of goods or services based on a consumer's utility. Consumers prefer bundles that rank higher in their preference ordering.

3. **Choice Behavior**: The actual choices made by consumers in the market when faced with different price and income levels.

4. **Weak Axiom of Revealed Preference (WARP**): The principle that states if a consumer chooses bundle A over bundle B in one situation and then chooses bundle B over bundle C in another situation, it implies that the consumer also prefers bundle A over bundle C. Violation of WARP indicates inconsistent preferences.

1.4.7   QUESTIONS FOR EXERCISE

1.   Critically examine the Revealed Preference Theory of demand.

2. Explain revealed preference hypothesis?

1.4.8 SUGGESTED READINGS

1. H.L. Ahuja, Advanced Economic Theory S. Chand & Company Ltd. Delhi, 1994.
2. D.N. Dwedi, Managerial Economics, Vikas Publishing House, Delhi, 1992.
3. P.L. Mehta, Managerial Economics, Sultan Chand & Company Ltd., Delhi, 1992.

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LESSON NO. 1.5   **AUTHOR : DR. UPINDERJIT KAUR**

THEORY OF DEMAND

1.5.1 Objectives of the lesson

After studying this lesson, the students will be able to understand

- The concept of demand
- Demand schedule
- Law of demand
- Types of demand

1.5.2 Introduction

We know that man is a bundle of wants. In order to satisfy these wants we need goods and services. This need makes us desire certain commodities. But the mere desire for a commodity does not constitute demand in Economics. For example, a man standing at a sweet 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 it on these sweets then, his desire becomes demand. Thus, desire becomes 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 reason of all economic activity. Producers prefer to invest in those lines of production, 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.

1.5.3 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 tabular statement that the consumers are willing to buy per unit of time.

The 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, thus, demand and price are related and 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 demand and price is of an inverse type, i.e., movements in price and demand are in the opposite direction.

1.5.4 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, they are 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 (Rupees per orange)	Demand of A	B	C	Total Market Demand
5	100	75	25	200

4	200	150	50	400
3	400	200	100	700
2	550	300	150	1,000
1	800	450	250	1,500

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

1.5.4.1 Self check exercise

1 Explain the demand with the help of demand schedule?

1.5.5 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 because here the number of consumers are very large. In spite of this difficulty a hypothetical demand schedule serves, within certain limits, as a very good guess as to how much people are likely to buy at various prices and these figures are often used by businessmen and taxation authorities to take certain important decisions.

1.5.6 Demand Curve

A demand schedule can be converted into a 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.
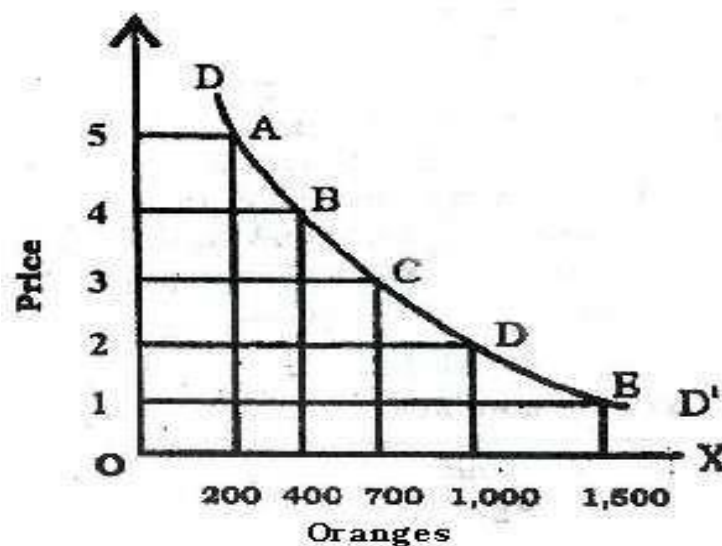

Fig. No. 1

When joined by a free hand, it will give us a curve DD' which is known as the market 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 us that as the price of oranges falls, the number of oranges demanded goes on increasing. For example, when oranges are sold at Rupees 3 each, the demand is that of 700 oranges. But when the price falls to Rupees 2 per orange, the demand increases to 1000 oranges. That is why the demand curve slopes downward from left to right.

1.5.7 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 a 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. Marshal, "great 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 assumption that (i) people's taste and income do not change, (ii) prices of other related 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 good and the law consequently fails to hold under certain particular 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 have used this good before, its demand is more now since its price has fallen. A fall in the price of a commodity amounts to an increase in the consumer's real 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 feel 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 substitutes whose price have not fallen. This makes people substitution it in place of other goods. For example, with the fall in the price of tea, coffee's price remaining the same, tea will be substituted for coffee. In other words, the demand for tea would go up.

Out of these two effects substitution effect is stronger because the consumer will always substitute the cheaper for the dearer commodity. Further, whereas substitution effect is always positive the income effect may be positive is some cases and negative in others e.g. in the case of an inferior commodity, the income effect is negative. But since a consumer er 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.

1.5.8 Exceptions 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 like diamonds and jewellery does not behave according to this law. The demand for such things increases with a rise of their price because such commodities are demand 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. For example, the 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. Rather they will begin to demand superior variety like wheat to substitute if for maize.

(iv)   When a thing goes out of fashion the demand for it will not go up even, if its price goes down. In the opposite case, when the fashion for a 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 gets violated.

These exceptions, however, do not invalidate the law of demand which holds in the case of number 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.

### 1.5.9 Factors on which Demand depends

We now come to 'other things' which were assumed to remain constant, while stating the law of demand. It there fore's not necessary that only changes in price will bring change in demand. Change in other factors can do the same as explained below:

(a)   **Price of a Commodity :** The most important factor affecting quantity demanded is the price of the commodity. Normally, rise in price is accompanied by fall in demand and fall in price is accompanied by rise in demand. This relationship between price and demand is called the law of demand.

(b)   **Change in Income :** This change exerts a great influence on demand because when a consumer's income rises, his ability to pay also increases and naturally he can buy more of a good than before. Changes in the income distribution in favour of the pooror 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 generally purchased by the rich will go down.

(c)   **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 mouths to be fed greater will be the quantity of a commodity demanded. The age structure of the population also affects not only the size of demand, but also the composition of demand.

(d)   **Change in Tastes and Fashion :** Changes 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 their meals in hotels and this has increased demand for hotels, when things go out of fashion, demand for these disappear altogether.

(e)   **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 had reduced the demand for radios.

(f)   **Prices of Substitutes :** Demand for a commodity also depends on the availability and price of substitutes. A rise in the price of a commodity will make people use of a substitute for this provided that 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 other hand, reduce demand of coffee.

(g) **Change in Season :** Demand for certain commodities will change with the change in season. For example, the demand for woollen clothes increases in the winter season. Similarly, fans and cold drinks are in great demand during the summer season.

(h) **Expectation about Future Price :** If there is a general feeling among people that prices in future will go up, there will be a greater demand for goods and everyone will buy more than his normal requirement. If however, prices in future are expected to go down, people will try to postpone their purchases and wait for the fall in prices. This will reduce the present demand for goods to a considerable extent.

Extension and Contraction in demand is due to fall and rise in price when prices rise demand contracts and vice versa.
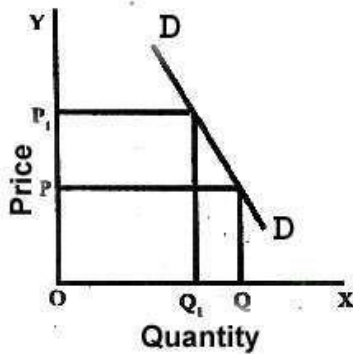

In this figure, when price is P, quantity is Q. Now there is price rise from OP to OP_1, then quantity demanded will decrease from OQ to OQ_1. This is known as contraction in demand. Similarly, price is OP_1 demand is OQ_1. now fall in price from OP_1 to OP will lead to increase in demand from OQ_1 to OQ. This is called extension in demand. Extension and Contraction can be shown on same demand schedule.

1.5.10 Increase and Decrease in demand

We have noted above that demand on price and some other factors like consumer's income, their tastes etc. But the influence exerted by price is distinct influence exerted 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 a 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 and more 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
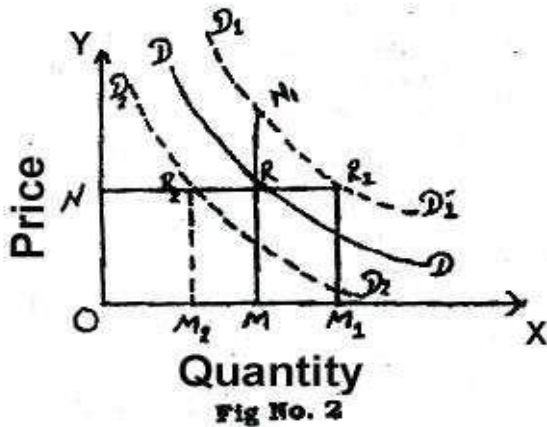
At price ON (=MR) Om of a good is demanded. Curve $D_1 D_1$ indicates increase in demand because the same quantity OM. is now demanded at a higher price MR_1 of at the same price MR quantity demanded has increased from OM to OM_1. Curve D_2D_2 indicates decrease in demand because the same quantity OM in now demanded at price MR or, at the same price MR_2 demand has decreased from OM to OM_2.

Marshall says, "when we say that a person's demand for any thing, increase 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 amount of it and or merely that he is willing to buy more of it at the current price."

1.5.11   Types of Demand

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

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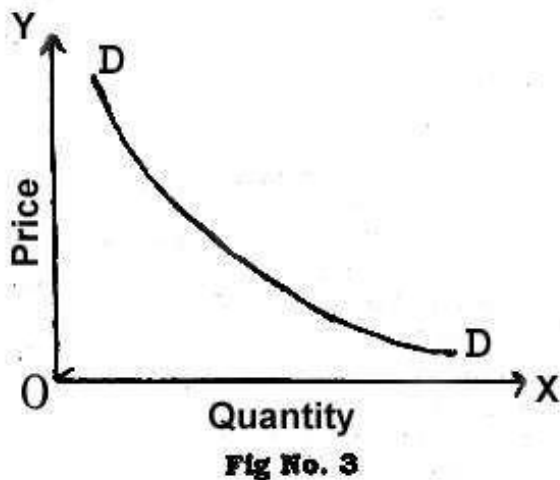
(a) Price Demand : We have already discussed the relationship between demand and price. Price demand therefore, refers to those quantities of a commodity which consumers demand at various prices under the assumption that other things remain the same The law of demand deals with this type of demand and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

(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 price 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 (know as inferior goods) the quantity demanded in the case of which decreases as the consumer's income increases. The income demand curve for such cases is shown in Figure No. 4 (b).
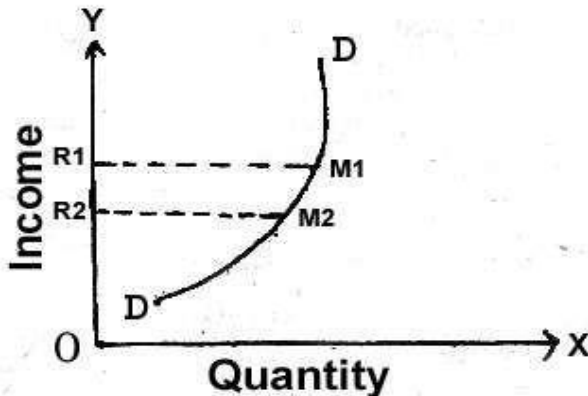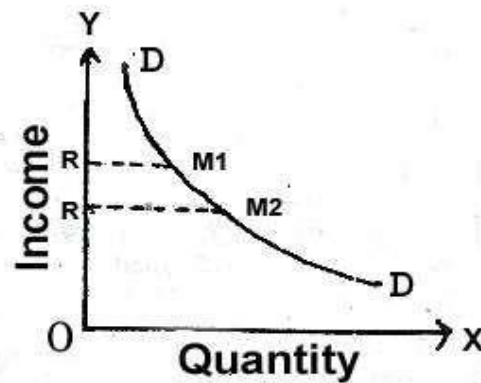

Fig No. 4 (a)   Fig No. 4 (b)

(d) 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 the 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.
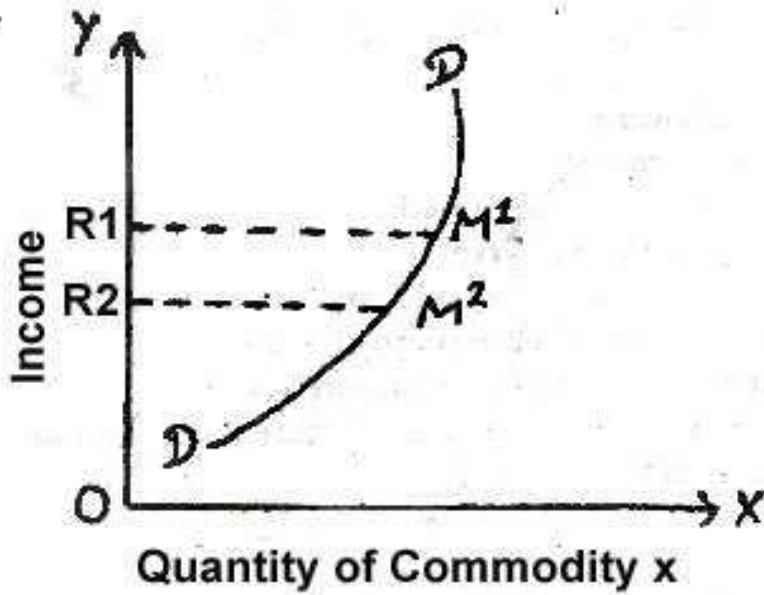
Quantity of Commodity x

Fig No. 5

Coming to the case of complements, we know that these goods are jointly demanded e.g. scooter, petrol, bread butter, pen-ink etc. 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 Figure No. 6 e.g. price of scooter rise then demand for scooter will fall, at the same time demand for petrol will fall.
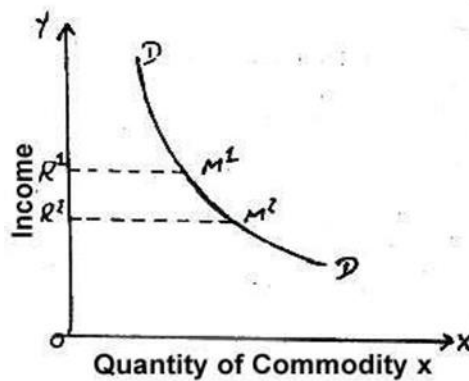

Quantity of Commodity x

Fig No. 6

1.5.12   Summary

The law of demand is an important concept for understanding how customers react to price changes and how demand and supply interact to produce market equilibrium. It assists firms, governments, and economists in making pricing, production, and market intervention choices.

1.5.13 Glossary

1. **Law of Demand**: The fundamental economic principle stating that there is an inverse relationship between the price of a good or service and the quantity demanded by consumers. When the price increases, the quantity demanded decreases, and vice versa, ceteris paribus.
2. **Quantity Demanded**: The specific quantity of a good or service that consumers are willing and able to purchase at a given price during a particular period.
3. **Demand**: The entire relationship between the price of a good or service and the quantity demanded by consumers at different price levels, represented by a demand curve.
4. **Demand Curve**: A graphical representation of the law of demand, showing the quantity demanded on the y-axis and the price on the x-axis. The curve slopes downward from left to right.

1.5.14 Questions for exercise

1 short notes
- Demand
- Cross demand
- Demand curve

2 Explain the types of demand

3 Explain the demand schedule?

1.5.15 Suggested readings

1.   H.L. Ahuja, Advanced Economic Theory S. Chand & Company Ltd. Delhi, 1994.
2.   D.N. Dwedi, Managerial Economics, Vikas Publishing House, Delhi, 1992.
3.   P.L. Mehta, Managerial Economics, Sultan Chand & Company Ltd., Delhi, 1992.

LESSON NO. 1.6   **AUTHOR : DR. UPINDERJIT KAUR**

ELASTICITY OF DEMAND

1.6.1 Objectives of the lesson

1.6.2 Introduction

1.6.3 Meaning

1.6.4 Degrees of Elasticity of Demand

1.6.5 Measurement of Elasticity of Demand

    1.6.5.1   Self check exercise 1

1.6.6 Factors Affecting Elasticity of Demand

1.6.7 Importance of Elasticity of Demand

1.6.8 Summary

1.6.9 Glossary

1.6.10 Questions for exercise

1.6.11 Suggested readings

1.6.1 Objectives of the lesson

The major objective of this lesson is the make students familiar with

- concept of elasticity of demand
- degrees of elasticity of demand
- factors affecting elasticity of demand
- relevance of elasticity of demand

1.6.2 Introduction

The law of demand reveals the inverse relationship between demand and price 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 a 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 substantial increase in the quantity demanded. The demand for former type of goods in relatively elastic while that for the later type, relatively inelastic.

1.6.3 Meaning

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 for a given fall in 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.

is only of a degree.

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

$$= \frac{\dfrac{\text{Change in demand}}{\text{Original demand}}}{\dfrac{\text{Change in price}}{\text{Original price}}}$$

or, in symbolic terms

$$ep = \frac{\dfrac{\Delta q}{q}}{\dfrac{\Delta p}{p}} = \frac{\Delta p}{q} \times \frac{p}{\Delta p} = \frac{\Delta q}{\Delta p} \times \frac{p}{q}$$

Where, ep stands for Price elasticity

q stands for quantity demanded.

P stands for Price.

Δ stands for infinitesimal change.

We know that the consumer's income and prices of other goods all effect 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 of the proportionate change in the quantity demanded of a good to proportionate change in income.

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.

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

$$= \frac{\dfrac{\text{Change in demand}}{\text{Original demand}}}{\dfrac{\text{Change in price}}{\text{Original price}}}$$

In symbols,

$$ey = \frac{\dfrac{\Delta q}{q}}{\dfrac{\Delta y}{y}} \qquad = \frac{\Delta q}{q} \times \frac{y}{\Delta y} - \frac{\Delta q}{\Delta q} \times \frac{y}{q}$$

Where,   q stands for quantity demanded.

y stands for income.

O stands for infinitesimal change.

e 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.

Coefficient of cross elasticity of demand of x for y =

$$\frac{\text{Proportionate change in quantity demand of X}}{\text{Proportionate change in price of good Y}}$$

$$\text{or } es = \frac{\dfrac{\Delta q_x}{q_x}}{\dfrac{\Delta p_y}{p_y}} \; = \; \frac{\Delta q_x}{q_x} \times \frac{P_y}{\Delta p_y}$$

$$\frac{\Delta q_x}{\Delta p_y} \times \frac{P_y}{q_x}$$

Where,   es stand for ross elaticity of demand of x for y.

q_x means original quantity demanded of x.

Δq_x stands for change in quantity demand of x.

Py stands for the original Price of good y.

ΔPy stands for change in the Price of good 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.

1.6.4 Degrees of Elasticity of Demand

Goods differ so far as the change in the quantity demanded consequent from a change in price is concerned. In some cases, this response is negligible whereas in others it is considerable. Elasticity of demand therefore, varies between zero and infinity. 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 the case is parallel to the X-axis as shown in Figure No. 7
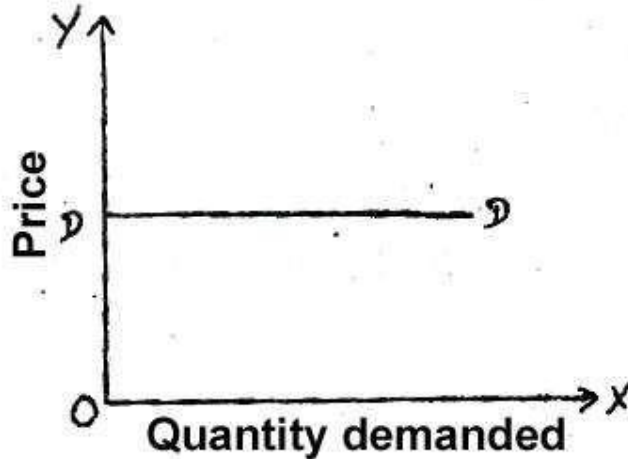

Fig No. 7

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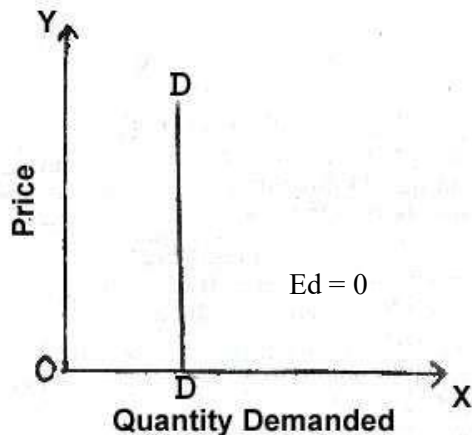

Fig No. 8

(iii)   Demand with Elasticity Greater than Unity : When the percentage change in quantity demanded is greater than percentage change in price, elasticity of demand is

said to be greater than one. For example, the demand for colour televisions and air conditioners rises considerably in response to a small fall in their price. Fig. No. 9 illustrates this case.

(iv) Demand with Elasticity Less than Unity : When the percentage change in the quantity demand is less than the percentage change in price, elasticity of demand is said to be less than unity. Most of the necessities like wheat, rice or
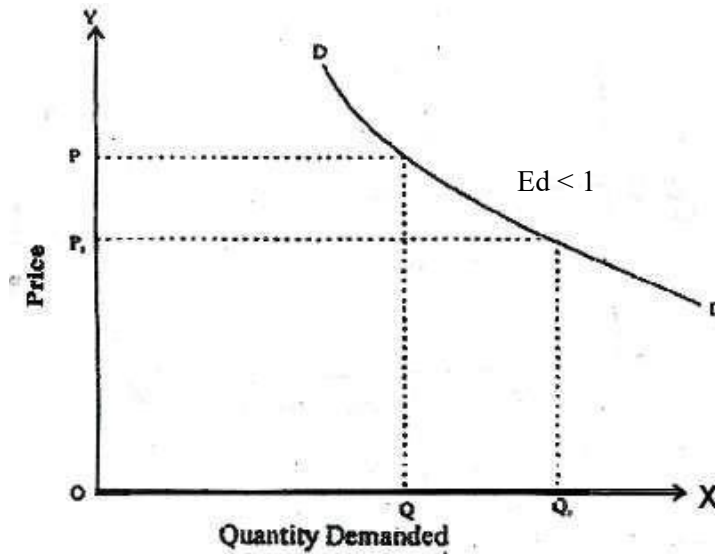
Fig No. 9

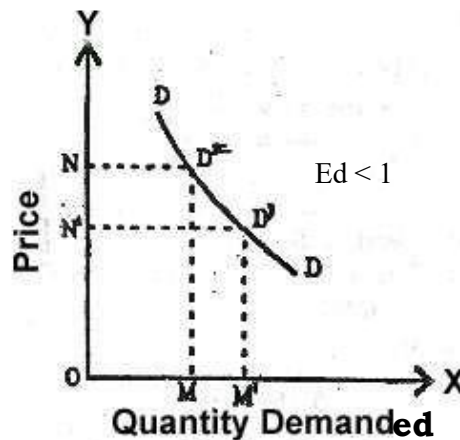sugar of life belong to this category of goods. Fig. No. 10 illustrates this case.

Fig No. 10

(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 demanded is equal to unity. Fig. No. 11 illustrates this case.
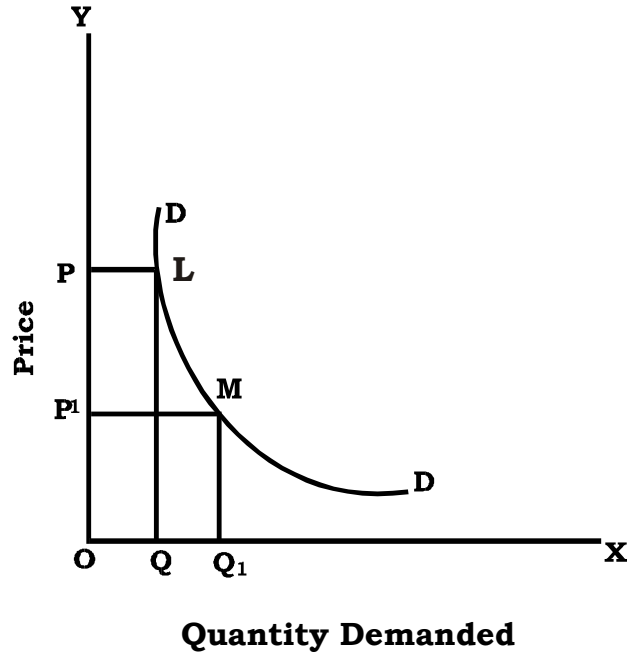

Quantity Demanded
Fig. No. 11

1.6.5 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 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 a 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 a fall in price results in decreased outlay, the elasticity of demand is less than unity. Under this method we measure elasticity by examining the change in total outlay due to change in price. This can be explained by means of a table.

TABLE NO. 1

Sr. No.	Price (per Kg.) 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

The above table consists of four columns. The first column shows the 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 demand has unity elasticity and between serial No. 3 and 4 the elasticity is less than unity.

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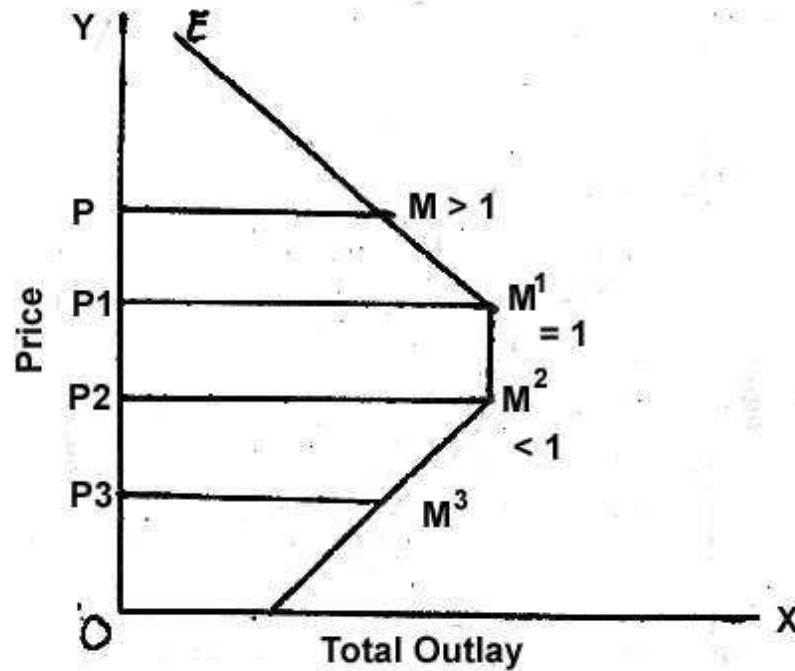

Total Outlay

Fig No. 12

At price OP, the total outlay is PM, When price falls from the OP to OP¹ the total outlay increases from PM to P_1M_1, and elasticity of demand is more than unity. Similarly, when price falls from OP¹ and OP² total outlay is P_2M_2 which is the same as P_1M_1. Here the elasticity of demand is "equal" "to" unity. When the price falls from OP² to OP³ total outlay falls P_3M_3. Here the elasticity of demand is less than unity.

(b)   Percentage Method : The second method to measure elasticity is explained by diving the percentage change in quantity demand by the percentage change in price. Here the elasticity of demand is equal to percentage change in quantity demanded 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 or in other words, if 1% falls or rise in price leads to 1% rise or fall in the quantity demanded, elasticity of demand is equal to unity, if 1% fall or rise in price leads to less than 1% rise or fall in demand, elasticity is more than unity. Thus, elasticity is the ratio of the percentage change in the quantity demanded or the percentage change in the price charged.

$$\text{i.e., Price Elasticity} = \frac{\text{Proportionate change in demand}}{\text{Proportionate change in Price}}$$

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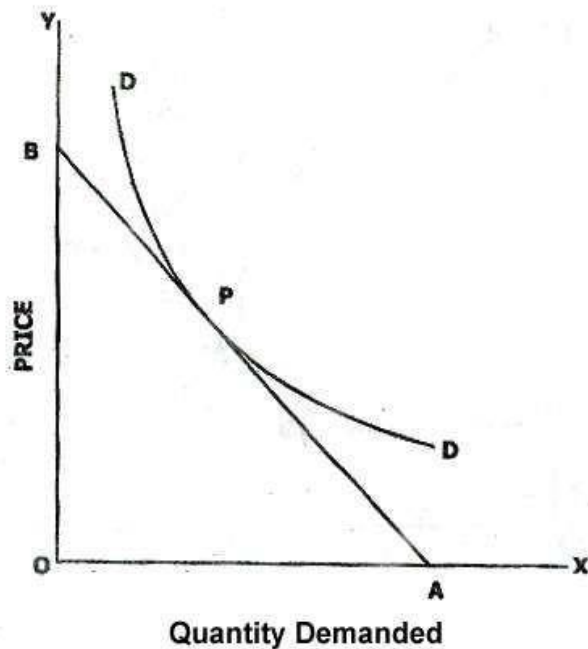

Quantity Demanded
Fig No. 13

Figure No. 13 shows how to measure this elasticity. If P is any point on a demand curve DD. A tangent is drawn to this curve at P and this tangent touches 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.

$$ED_P = \frac{\text{Lower tangent}}{\text{Upper tangent}}$$

1.6.5.1 Self check exercise

1 Explain the types of elasticity of demand?

1.6.6 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 necessaries 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 necessaries is indispensable for human existence. However high the price of these goods may be, no body can live without them. 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 for wine for an addict is less than unity.

(b) Elasticity of demand also depends upon the number of alternative uses 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, railways, factories and for domestic purposes. If the price of coal falls, it will begin to be used where before the falls in price, it was not worthwhile to use. Goods which have specified 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 large extent.

(d) The elasticity of demand for 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 these 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 demanded 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, all may not lead to any appreciable increase in demand because most of the people must have already bought 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 much as a result of a 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 a country where standard of living of the people is high as compared to that in the other part which may be inhabited by the people with low standard of living.

1.6.7 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 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 two countries when international trade is going on Terms of trade will move in favour of that country whose demand for the product is comparatively more elastic.

1.6.8 Summary

Demand elasticity is critical for many economic decisions and policy decisions. This concept is used by businesses to determine optimal pricing strategies because raising or lowering prices can have different effects on revenue depending on demand elasticity. Additionally, governments consider demand elasticity when imposing taxes or implementing subsidies, as these measures can influence consumer behavior and market outcomes. Different products and services can have varying degrees of elasticity depending on factors such as availability of substitutes, necessity or luxury status, time horizon, and consumers' income levels. Understanding elasticity of demand allows businesses and policymakers to make informed choices that can lead to more efficient resource allocation and improved market outcomes.

1.6.9 Glossary

1. **Inelastic Demand**: If the elasticity value is less than 1, the demand is considered inelastic. Here, a change in price causes a proportionally smaller change in the quantity demanded. Consumers are relatively insensitive to price fluctuations, and their buying behavior remains relatively stable.

2. **Unitary Elastic Demand**: When the elasticity value is exactly 1, the demand is said to be unitary elastic. In this scenario, the percentage change in quantity demanded perfectly matches the percentage change in price, resulting in constant total revenue for the producer.

3. **Elasticity of Demand**: A measure of the responsiveness of quantity demanded to changes in the price of a product or service.

4. **Cross-Price Elasticity of Demand**: Measures the responsiveness of quantity demanded of one product to changes in the price of another product. It helps determine whether products are substitutes or complements

1.6.10 SUGGESTED QUESTIONS FOR YOUR PRACTICE

1.   Explain the concept of elasticity of demand and give the various methods of measuring elasticity of demand. What is its importance in Economics?

2.   Write short answers of the following questions :

(1)   Explain the concept of Elasticity of Demand.

(2)   Give various methods of measuring Elasticity of Demand.

(3)   What is cross price elasticity of demand.

(4)   How elasticity of demand can be measured with the total outlay method?

(5)   What are the factors affecting elasticity of demand.

3.   Explain the law of Demand why does a demand curve slope downwards from left to right ?

4.   Explain the factors which determine the demand for a good.

1.6.11 BOOKS FOR STUDY

1.   Dewett, K.K.   :   *Modern Economic Theory.*

2.   Stonier, A.W. and Hague, D.C.   :   *A Text Book of Economic Theory*

3.   Lipsey, R.G. and Steiger, P.O.   :   *Economics*

LESSON NO. 1.7   **AUTHOR : DR. UPINDERJIT KAUR**

THEORY OF PRODUCTION AND THE LAW OF VARIABLE PROPORTIONS

1.7.0 Objectives of the lesson

The major objectives of the lesson are as follows

- To study the concept of the production function
- Develop familiarity with the concept of the law of variable proportion
- To understand the various types of economies of scale

1.7.1 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: $P = f (L, Lr, C, O)$, where L stands for land, Lr stands for labour, C for capital and O for organization. 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 proportionate in comparison to the change mentioned above. In fact, the function stresses the most evident, relationship, 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.

Every producer is interested in maximizing the output from a given combination of inputs. Or if he has decided to produce a given output, he is anxious to find out the minimum combined cost of various inputs that will produce this output. The production function is, therefore, a statement of technical facts which the producer uses to obtain the least cost combination of inputs required to produce an output. Let us 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.

1.7.2 Economies of Scale of Production : Internal & External Economies

As already mentioned above, whenever the quantities of inputs (factors of production) are increased, 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 a 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.

1.7.3 Internal Economies : These economies are enjoyed by a particular firm in the market. These arise on account of the internal organization, 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 specialization and indivisibilities of factors of production. These economies are explained below :

(i) **Managerial Economies :** A firm may have a manager or a supervisor of great experience, acumen, calibre and drive. A large scale of production has enabled this firm to engage such a manager. Certainly his experience, organization, 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 specialization and division of labour. We know what economies accrue from the introduction of division of labour and specialization. Reduction in the cost of production is the most important economy. Other firms having a smaller scale of production may 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 the use of ultra modern methods of production by big plants has drastically brought down the cost. 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 transport vehicle may reap certain types of economies from large 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 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.

(vi) **Transport and Storage Economies :** A big firm has its own feet of trucks to carry raw material and finished products. The firm also has its own storage and godown facilities. It can, therefore, store its products when

prices in the market are not favourable. The transport and storage facilities help the firm to sell its product at the opportune time and at favourable price.

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 bit sized plant, underutilized before, may now be used according to its capacity. This enlarged scale of utilization would definitely give rise to economies (fixed costs per unit would be reduced). This explains the down sloping part of the firm – 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 large scale 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.

1.7.4 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 the industry expands and firms in turn benefit from industry's expansion. Such economies accrue to firms when the industry is localized in a particulars area, makes inventions and evolves specialization of production processes.

These economies are explained below:-

(i) **Economies of Concentration :** When several firms of an industry establish themselves at one place then they enjoy many benefits together like

availability of developed means of transport and communication etc. Besides, some subsidiary industries may come into being and commercial and financial institutions may be set up. All these facilities help the firms to develop and progress.

(ii) **Economies of Information :** When the number of firms in an industry increases it becomes convenient for them to collect necessary information through scientific and trade journals. These journals provide sundry information like new markets pertaining to the goods produced by the firms and development of new production techniques abroad etc.

(iii) **Economies of Disintegration :** When an industry develops the firms engaged in mutually agree to divide the production process among themselves. Every firm specializes in the production of a particular item pertaining to that industry. For example, in case of cycle industry localized at a particular place, some firms specialize in the manufacture of free wheels, offer specialize in cycle chains, still others in pedals, rims and hubs etc. It is called disintegration.

1.7.5 Diseconomies of Scale

A firm or an industry enjoys economics only upto a certain limit. Having reacted this limit, these very economies turn into diseconomies. In other words, a given percentage increase in all the factors causes less than proportionate increase in output, after a point. Consequently, diminishing returns to scale operate. These diseconomies are explained below:-

(i) Internal Diseconomies: These diseconomies arise when a given firm increases its scale of production beyond a point. Further, these are of two types.

(a) **Unwidely Management :** When a firm expands, difficulties of management go on multiplying. In a big firm, it becomes pretty difficult to co-ordinate the work of different sections. It becomes a tough problem to supervise the work spread all over. It adversely affects operational efficiency of the firm.

(b) **Technical Difficulties :** Another cause of internal diseconomies is the emergence of technical difficulties. There is an optimum point upto which technical improvement can be carried out. Beyond this optimum point, technology becomes uneconomical causing diseconomies of scale.

(ii) External Diseconomies : When an industry in a given area expands beyond certain limit then firms operating in that industry suffer external diseconomies. Because of large demand for raw material, it becomes scarce and expansive. Besides, availability of skilled labour, power, transport and finance becomes difficult and expensive. The cost of land for the new firms becomes prohibitive. All this leads to closure of several firms in the industry. The production is subject to laws of production. The output may increase 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 a variable proportion 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 on two lines

1.7.6 The Law of Variable Proportions

In the short-period when the output of a good is sought to be increased by way of additional application of the variable factor, the Law of Variable Proportions comes into operation. The short-run is a period of time when the value of only variable factors of production can be changed, while the value of fixed factors of production is held as constant. According to Leftwitch, "The Law of Variable Proportion States that if input of one resource is increased by equal increments per unit of time while the input of offer resources are held constant, total output will increase, but beyond some point the resulting output increases will becomes smaller and smaller".

Assumption : (i) One of the factors is variable, while all other factors are fixed.

(ii)   All units of the variable factors are homogeneous.

(iii)   There is no change in the technique of production.

(iv)   The factors of production can be used in different proportions.

Table No. 1

Units of Land	Units of Labour	Total Product	Marginal Product	Average Product
1	1	2	2	2
1	2	5	3	2.5
1	3	9	4	3
1	4	12	3	3
1	5	14	2	2.8
1	6	15	1	2.5
1	7	15	0	2.1
1	8	14	−1	1.7

Supposing you have a land measuring 1 hectare and you grow tomatoes on it. In column I of the above table units of the fixed factor i.e., land has shown. The column II shows the changes in variable factor i.e., labour. The column III shows total product and column IV marginal product. By using one more unit o labour, whatever addition is made to the total product is called marginal product. The column V shows the average product. It is calculated by dividing the total product of the labour by the number of labourers.
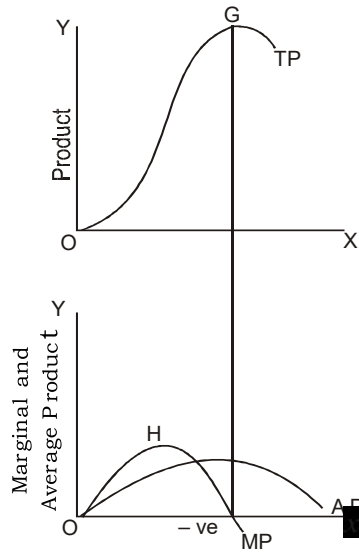
Number of Labourers Fig. 1

In the above figure, quantity of the product is shown on oy-axis and number of labourers on ox-axis. The TP is the total product curve. At point G the total product is maxium when marginal product is zero. Thereafter, it begins to diminish corresponding to negative marginal product. MP is the marginal product curve. Upto point H marginal product increases. At point H it is maximum. Thereafter, the marginal product begins to diminish. Before point I marginal product is more than average product. At point I marginal product and average product are equal. After point I the marginal product diminishes. The marginal product is zero at point c and thereafter it turns negative. AP curve represents average product. Before point I average product is less than marginal product. At point I average product is maximum. Upto point I average product increases, but after that it begins to diminish.

1. Return of Scale : The relationship described above the terms of various laws will hold good even if all the factors of production are varied in the same proportion. It is observed and recognized 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 increases. This could be brought out clearly with the help of the Table No. 3

It is clear from the Table -3 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

Table No.2

Sl. No.	Units of factors used	Total Returns (in Quintals)	Average Returns (in Quintals)	Marginal Return
1.	1 Lab + 1 Acre Land + 1 unit capital + 1 unit organisation	25	25	25
2.	2 Lab + 2 acres Ld +2 2 cpt + 2 Org.	60	30	30
3.	3 Lab + 3 acres Ld + 3cpt + 3 Org.	100	33.3	40
4.	4 Lab + 4 acres Ld + 4cpt + 4Org.	160	40	60
5.	5 units of each factor	220	44	60
6.	6 units of each factor	264	44	44
7.	7 units of each factor	301	43	37

as the laws of production based on change in proportionalist factors. Yet a few of the difference 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 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 reasons 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 organize, supervise and control production. Hence, the returns to various doses of investment may successively start falling.
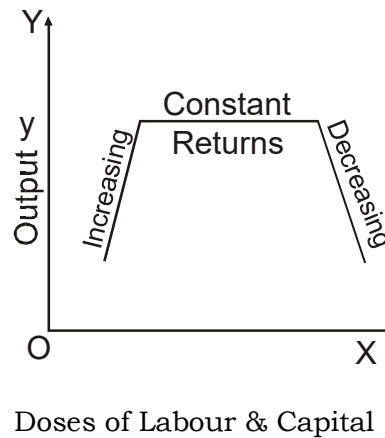
Doses of Labour & Capital

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.

1.7.7 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. Assumptions 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 been reached. This is when the factors are not mixed in exact and right proportions.

(ii)   The technique of cultivation should not undergo changes 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 not be new.

1.7.7.1 Self check exercise

1 Explain the law of variable proportion?

1.7.8 Why does the law applicable to Agriculture more than it does to Industry

According to Marshall, this law operates after 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 in more and 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 to the operation of the law of diminishing returns.

1.7.9 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 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. Industry subject to the law of increasing cost/diminishing cost/constant cost would call forth for a measure of taxation/subsidy no action respectively. In many more fields the laws prove their utility. But out of all the laws, the Law of Diminishing Returns is the most fundamental and universal in application.
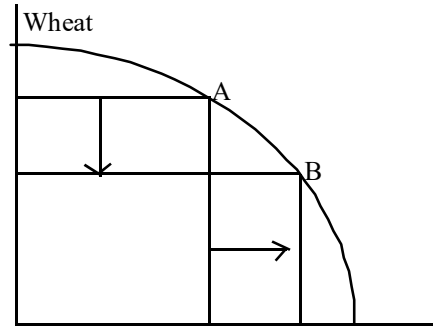
For example :-

(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 Ricardo. Extensive or intensive cultivation results in diminishing returns.

(iii) Law diminishing returns shows the need for new inventions and innovations in the technique of cultivation with a view of increasing the product. In the absence of changes the diminishing returns would set in.

(iv)   The law shows the reality of the economic situation. In the absence of its operation, one acre of land would have raised sufficient produce to feed the entire world.

Thus, the law is of great importance.

1.7.10   Production Possibility Curve

In macroeconomics, the production possibility curve represents the point at which an economy is most efficiently producing its goods and services and allocating its resources in the best possible way. The production possibility curve (PPC) is a hypothetical representation of the amount of two different goods that can be obtained by shifting resources from the production of one, to the production of other. The curve is used to describe a society's choice between two different goods. Figure shows the production two goods wheat and rice. The curve is used to show during a specific period, what could be produced of the combination of the two goods, this curve shows how much of production of wheat must be given up to increase the production of rice (the movement from A to B). Opportunity cost, which is the cost of anything (such as production of rice) in terms of what has to be given up. Opportunity cost is the value of what is foregone in order to have something else. This is important to PPC because a producer will decide how to best allocate resources according to opportunity cost.

1.7.11 Summary

Understanding the production function is crucial for businesses to make informed decisions about resource allocation, optimal input combinations, and production efficiency. Additionally, it is a core concept in the field of economics, helping economists analyze the factors affecting output levels and economic growth.

1.7.12 Glossary

1. **Production Function:** A mathematical representation of the relationship between inputs (such as labor, capital, and raw materials) and the output of goods or services produced by a firm.
2. **Inputs:** The resources used in the production process, including labor (L), capital (K), materials (M), technology, and other factors.
3. **Output:** The quantity of goods or services produced by a firm as a result of using various inputs in the production process.

4. **Total Product (TP):** The total quantity of output produced with a given combination of inputs.

1.7.13   QUESTIONS FOR EXERCISE
1.   Explain the Law of Variable Proportions.
2.   How far is it true to say that various Laws of Production are the phases of the same law i.e. the Variable Proportions.
3.   Explain the law of Diminishing Returns alongwith its assumptions and importance.
4.   Short notes
- Marginal product
- Total product

1.7.14 Suggested Readings

Mandatory Student Feedback Form

https://forms.gle/KS5CLhvpwrpgjwN98

Note: Students, kindly click this google form link, and fill this feedback form once.

Mandatory Student Feedback Form

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